
City of
PICKERING

# GIS STRATEGIC PLAN

December 7, 2022

CITY OF PICKERING

# GEOGRAPHIC INFORMATION SYSTEMS

City of Pickering's Geographic Information Systems (GIS) program enables all staff and the community with a wealth of highly accurate geographic data. Hundreds of map layers combine with descriptive data to allow GIS users to analyze, map, plan, interpret, protect, enhance, and manage their world. GIS is an integrative technology used by local governments that allows staff and the public to visualize data from disparate data sources in a way that is readily understandable.

The City has a Geographic Information System (GIS) which has seen continued progress since its inception. Most departments throughout the organization depend daily on GIS to provide accurate information combined with analysis resulting in informed decisions, by utilizing simple web-based mapping technologies in combination with a centralized GIS data environment. Using this approach, Pickering has created a GIS environment which has been able to deliver productive, yet limited, services across the corporation.

- ***GIS has become the primary data dissemination platform in local governments nation-wide.***
- ***More than 90 percent of the data maintained by county/regional governments have a geographic component ripe for mapping and analysis.***

# TABLE OF CONTENTS


SEARS

*"GIS has to be part of the culture, or it will not survive. If only 2-3 people use it, it will fail."*

- Chief Administrative Office

"If you don't know where you are going any path will take you there."

- Lewis Carroll

"A failure to plan is a plan to fail."

*- Benjamin Franklin*

SKILLS information DATA

GEO ANALYSIS knowledge REGIONAL support FIELD projects emerging

ENVIRONMENTAL APPLY GIS INDUSTRIES STATISTICAL MAPS

INTRODUCTION

# INTRO

A Geographic Information System (GIS) allows a local government to visualize, question, analyze, and interpret data to understand relationships, patterns, and trends contained within location-based information. GIS has become a primary information management tool for local governments worldwide. The City of Pickering has been using GIS information since the early 2000s. As GIS technology has advanced, the City's utility of GIS has grown exponentially. In November 2021, the City contracted with Geographic Technologies Group (GTG) to create its first GIS Strategy. The plan identified hundreds of needs with a systematic plan for further expansion of the technology.

The City of Pickering has made great strides in the pervasive implementation of GIS. The City has an avid group of GIS users that use GIS for a variety of tasks. Initially, the GTG team met with the Geomatics team in November 2021 to review the state of the City's GIS program. This meeting revealed some new and ongoing opportunities for GIS. Additionally, this meeting enabled the GTG team to understand current usage and to identify the next steps. The needs discovered via the interview process are discussed throughout the strategic planning reports. This executive summary is divided into multiple sections to highlight program successes, show program growth, identify needs, make recommendations, and provide a move forward strategy.

More than 90% of local government services and activities have a geographic location (address or property). Therefore, GIS is the platform that should be used by City staff to visualize their data. The usage of GIS technology is now widespread across the organization, and it has transformed into a core information technology at the City for many departments. This underscores the importance that the GIS program should be well planned and well managed. To that end, the City has developed this GIS Strategy to guide the further implementation of GIS technology and to ensure that the continued investment in GIS service delivery is most effectively managed.

- GIS
- Analysis
- Mapping
- Visualization
- Public Awareness
- Public Input
- Economic Development
- Engineering Asset Management
- City Development Services
- Public Safety and more

# WHAT IS GIS?

A Geographic Information System (GIS) allows a local government to visualize, search, analyze, and interpret data to understand relationships, patterns, and trends contained within location-based information. GIS is an information platform comprised of data, software, and hardware that has become a primary information tool for municipal governments nationwide.

Some people erroneously see GIS as just digital maps – the conversion of paper maps to a digital form, but GIS is much more than that. GIS allows users to analyze their world geographically (spatially). Spatial analysis is how we understand our world —mapping where things are, how they relate, what it all means, and what actions to take. From the computational analysis of geographic patterns to finding optimum routes, identifying areas for economic development, site selection, and advanced predictive modeling, spatial analysis is at the very heart of geographic information system (GIS) technology.

GIS takes massive amounts of data and puts them into a context that is readily understandable and actionable. GIS enables residents to understand property-related issues or infrastructure work in their area, prepare and recover from natural disasters, visualize all of the services in their area, and find information that affects their life quickly and easily.

The City of Pickering Geomatics staff supports and/or maintains core GIS services such as data layer maintenance, application support, and user training, while the Information Technology staff handles GIS application hosting, system administration, database management. Together, these teams provide geospatial support services including customer assistance, mapping, spatial analysis, data integration, application development, and project management to City departments, residents, other municipalities, and external agencies. GIS has become a primary data dissemination and decision-making platform for staff, partner agencies, and the public.

**"GIS enables staff and residents to visualize, interpret, and make decisions about their world."**

**"GIS is the primary data visualization platform for local governments."**

*"GIS in the City of Pickering has evolved from a drafting role to the Policy & Geomatics Division in the City Development Department, with a staff of 3 GIS professionals. Engineering Services Asset Management also has a GIS Technician who is mapping utility and green infrastructure assets. GIS applications now serve as many as 300 city employees and the public."*

*Over 300 layers in the enterprise database for land management, planning, utilities, and public works.*

*"GIS is more than a map, it's location intelligence."*

# GIS AT CITY OF PICKERING

As the acquisition, management, and dissemination of information continue to become increasingly valuable functions within local governments, so too has GIS proven to be increasingly valuable. The City of Pickering is no exception to this observation, as it too has benefited from its implementation of GIS. GIS and location-based technologies have contributed to improving the City of Pickering's business processes, infrastructure, services, information, and decision-making.

Of critical importance to the continued success of GIS at the City is maintaining a vision of the needs and direction of the program for the near future. This GIS Strategy will serve as the beginning of that strategic direction. In January and February 2022, GTG interviewed each department to discuss GIS successes and future needs. At that point, GTG developed a comprehensive GIS Strategy for the City to assist in planning for the future of GIS use at the City. One goal of this document is to identify project priorities for the near future.

GIS has evolved from a drafting role in the City Development Department. GIS was formally introduced within the City Development Policy and Geomatics Division. Concurrently, Engineering Services began mapping utility and green infrastructure assets. Since Geomatics is part of the City Development Department and falls under the Planning & Design umbrella, any requests related to the Planning Act, or from the executive leadership, take priority.

**"A GIS program cannot be run haphazardly.**

**Following best practices and a playbook is key to success."**

# KEY METHODOLOGIES

Multiple data-gathering techniques and assessment methodologies were used to identify the City of Pickering's current successes and future needs. Key methodologies included:

**Six Pillars of Sustainability** – used to evaluate the City in regard to gaps and organize action items. The Pillars of GIS Sustainability are as follows:

1. GIS Governance – how is GIS managed and maintained
2. Data and Databases – key data elements that feed the GIS
3. Procedures, Workflows, and Integration – how is the GIS being integrated with other systems and within the workflows of the organization
4. GIS Software – the appropriate software for various types of users and needs
5. Computing Infrastructure – the appropriate hardware, network, and field tools
6. Training, Education, and Knowledge Transfer – ensuring that GIS is understood, and that the organization has pervasive knowledge of the power of GIS and how to use it

**GIS Benchmarking** – analysis of the City of Pickering's GIS program as compared to comparable organizations nationwide.

**Key Performance Indicators** – enabling the City of Pickering with a set of KPIs to track success now and in the future based on the Six Pillars of Sustainability.

**Interviews of Policy & Geomatics Division Staff –** interviews with key managers, analysts, and stakeholders to determine an optimal move forward strategy and discussion of possible future uses of GIS.

# GIS SUCCESS STORIES

**Don't confuse activity with accomplishment. HAVE A PLAN FOR SUCCESS.**

What constitutes a successful GIS? This question has been a topic of debate for decades. Some people argue that success is a robust database of GIS layers. Others contend success is the implementation of software and hardware that enables users to use GIS. However, the ultimate success of an enterprise GIS program is how the GIS is being successfully used to impact the organization and the lives of residents.

Quantifying and articulating return on investment is very important for an organization. A GIS program might have very successful projects, but without visibility, of these successes, the GIS might be under-appreciated. Therefore, one of the key responsibilities of the GIS leaders in an organization is documenting successes and giving visibility to these organization-wide.

One of the recommendations of this GIS Strategy update is to document successes annually and offer them in a workshop and presentation to the City Council. This visibility will ensure, a) that staff thinks in terms of success (and documenting them) and b) that support remains strong throughout the organization because successes are understood.

Additionally, quantification of the success stories is recommended. The return-on-investment (ROI) section below identifies categories for consideration when documenting ROI. The next few sections document a few of the many successes and outcomes of the City of Pickering GIS program.

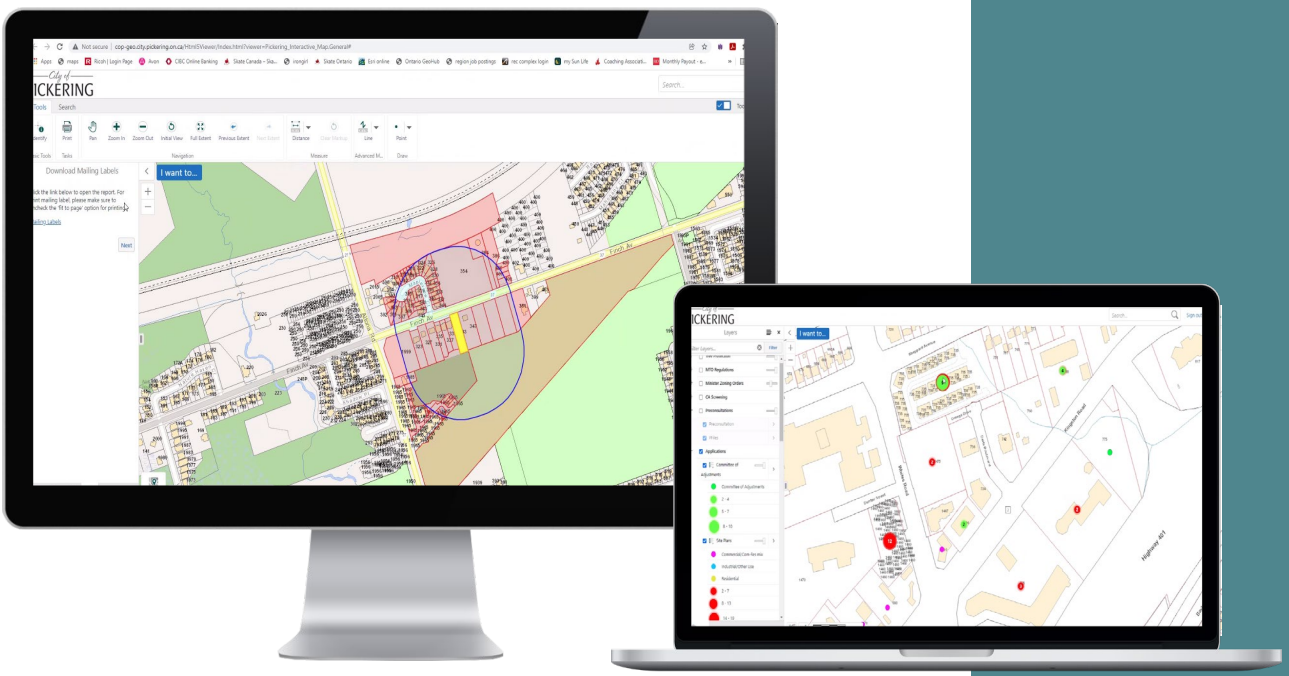
# IMPROVED EFFICIENCY

Geocortex interactive web maps (Planning and General) available to City staff on the City's Intranet allow users to search properties by address and roll number and view them with additional surrounding context (imagery underlay, buildings, roads, wetlands, etc.) to make spatially informed decisions quickly.

# INCREASED PRODUCTIVITY

The "Mailing Labels" tool available in the Geocortex General web map was recently improved to provide mailing addresses for selected properties in an Excel spreadsheet format in addition to the original PDF formatted for printing envelope labels. The Excel format allows the City Clerk's office to print the addresses directly onto the envelopes instead of manually applying label stickers. This has saved time when there are large mail-outs for public notices.

## OPERATIONAL BENEFITS



# IMPROVING COMMUNICATION, COORDINATION, AND COLLABORATION

The City of Pickering has an ArcGIS Online Organization with inter-organizational groups to collaborate and share with other municipalities and consultant organizations working with staff on urban development studies. Interactive web maps are created and shared internally with relevant staff for the purpose of reviewing draft map layers for development studies and other projects.

# EFFECTIVE MANAGEMENT OF ASSESTS AND RESOURCES

The Engineering Department is tracking City assets and infrastructure in GIS datasets, including the stormwater network, sanitary network, water service, parks inventory, roads, sidewalks, streetlighting, and traffic controls.

# SAVED TIME AND TREES!

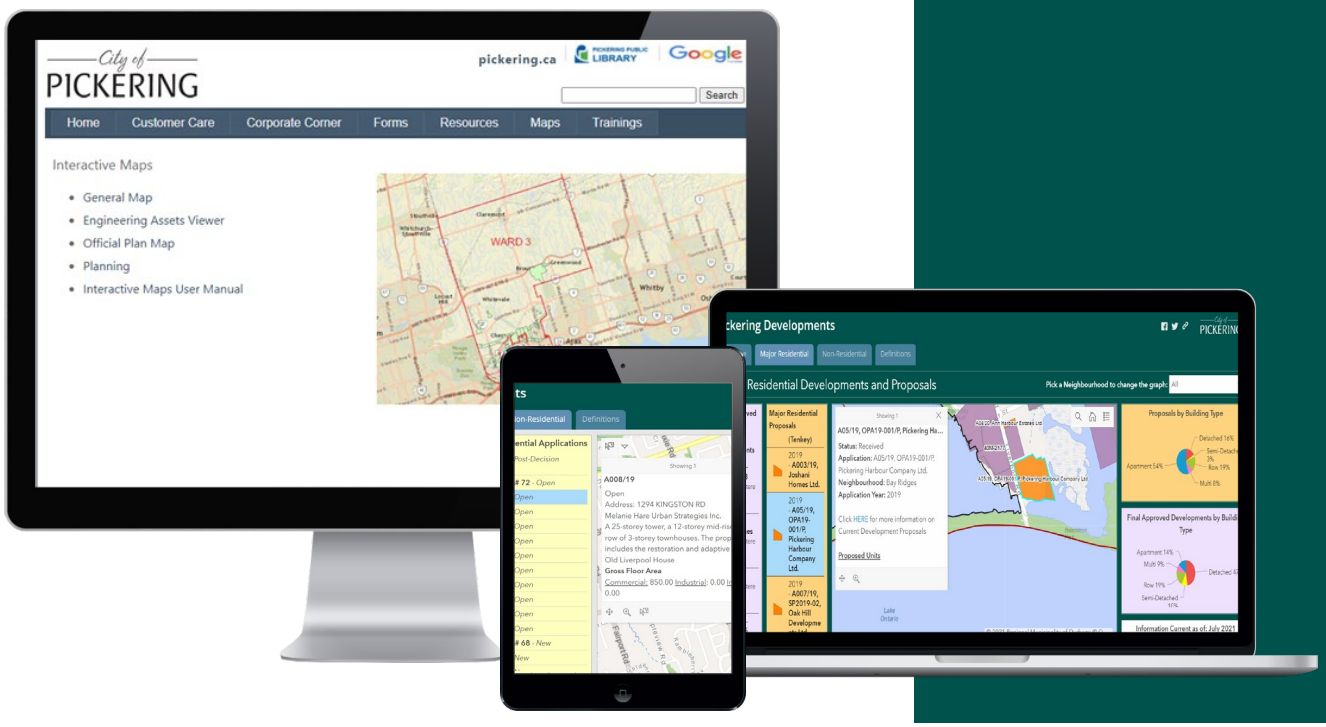
Map of Major Residential and Non-Residential Applications and Building Permits was previously produced quarterly on paper and manually reproduced. By 2018, the residential product was created as the Pickering Developments Story Map on the City's public-facing website, and the non-residential product was added to the story map by the summer of 2019.

# COMPLYING WITH PROVINCIAL AND FEDERAL MANDATES

The City provides a freely and publicly available address points dataset available for download through the City's Open Data portal. These address points are required by Emergency Services and the Region of Durham, who retrieve them from the Open Data portal on a regular basis.

The City maintains a dataset of all areas subject to the Minister's Zoning Orders and Federal expropriation.
The City updates property ownership records in accordance with Provincial regulations.

## ORGANIZATIONAL BENEFITS



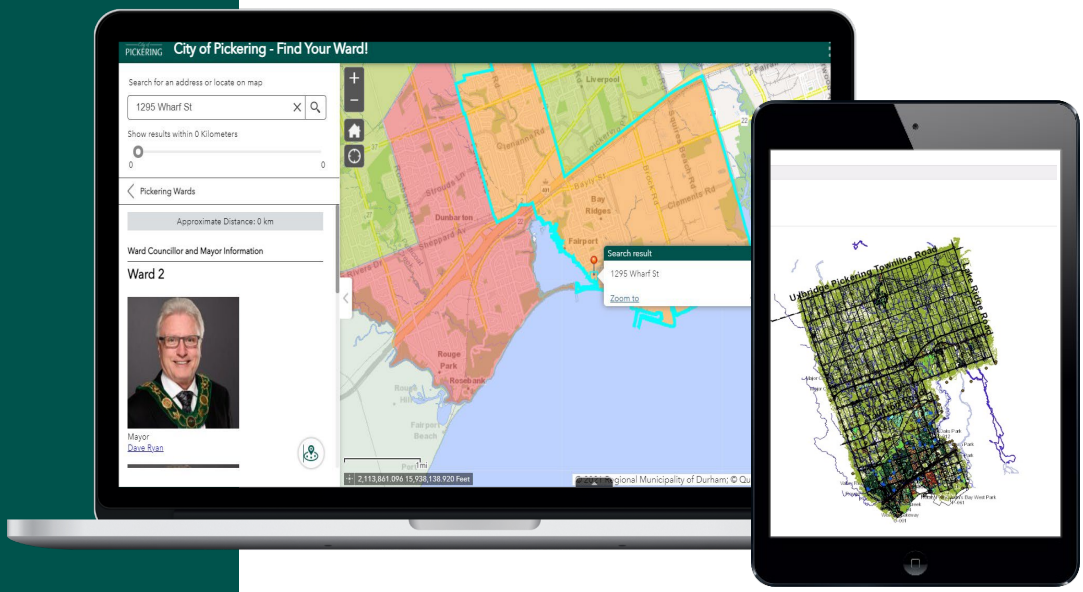
# INFORMING AND EDUCATING STAKEHOLDERS

The City of Pickering's Map Portal is a public-facing ArcGIS Hub-hosted web page that links to several publicly available online web maps that provide information to the public on current development proposals, public art installations, and the Official Plan maps, among other things.

# PROVIDING DATA TO REGULATORS, DEVELOPERS, AND OTHER PARTIES

The City of Pickering makes selected GIS datasets available for developers to download from its Open Data site.

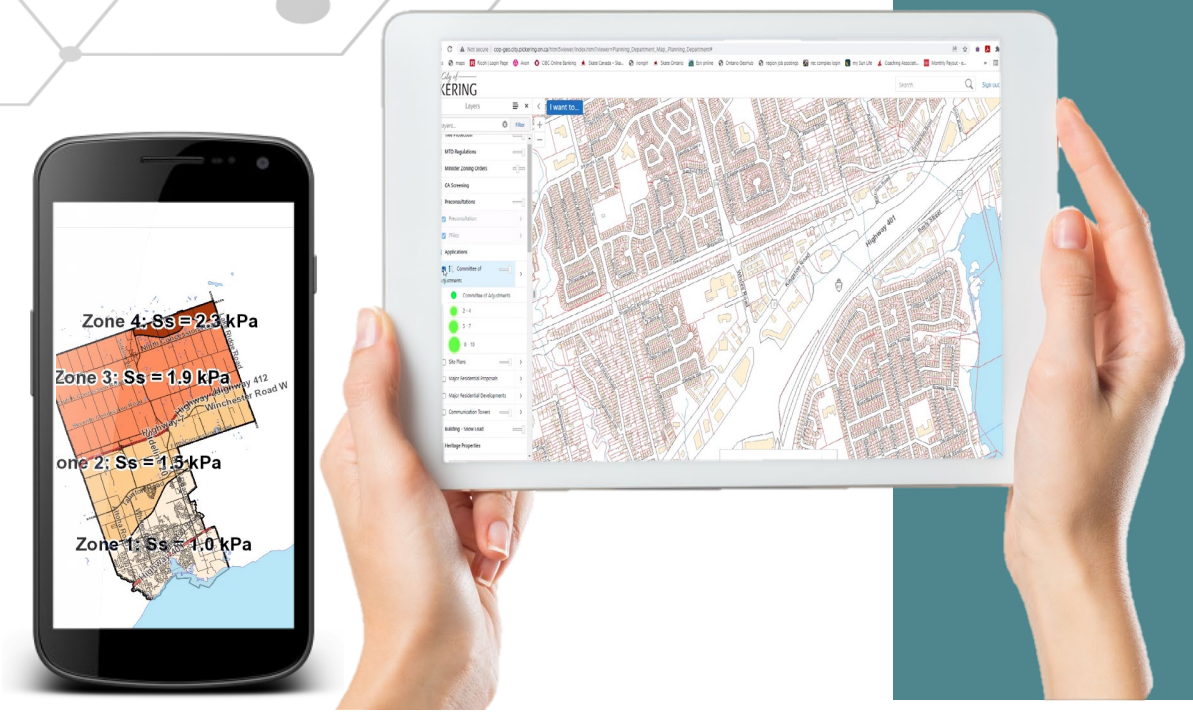
The City also will package an export of other datasets in a specific study area for consultants and other contracted parties when needed. This data is usually provided via the City's ShareFile site (a file-sharing server).



# NEW AND EFFECTIVE WAYS TO PRESENT DATA AND INFORMATION

ArcGIS Online web maps, apps, and dashboards are used to display and share a variety of information with Staff and members of the public (ex. Public Accessory Dwelling Units dashboard, internal HR Dashboard and Survey 123 form for COVID-19 self-reporting, public Ward Boundaries web map with images and contact information of the Councilors).

## ORGANIZATIONAL BENEFITS



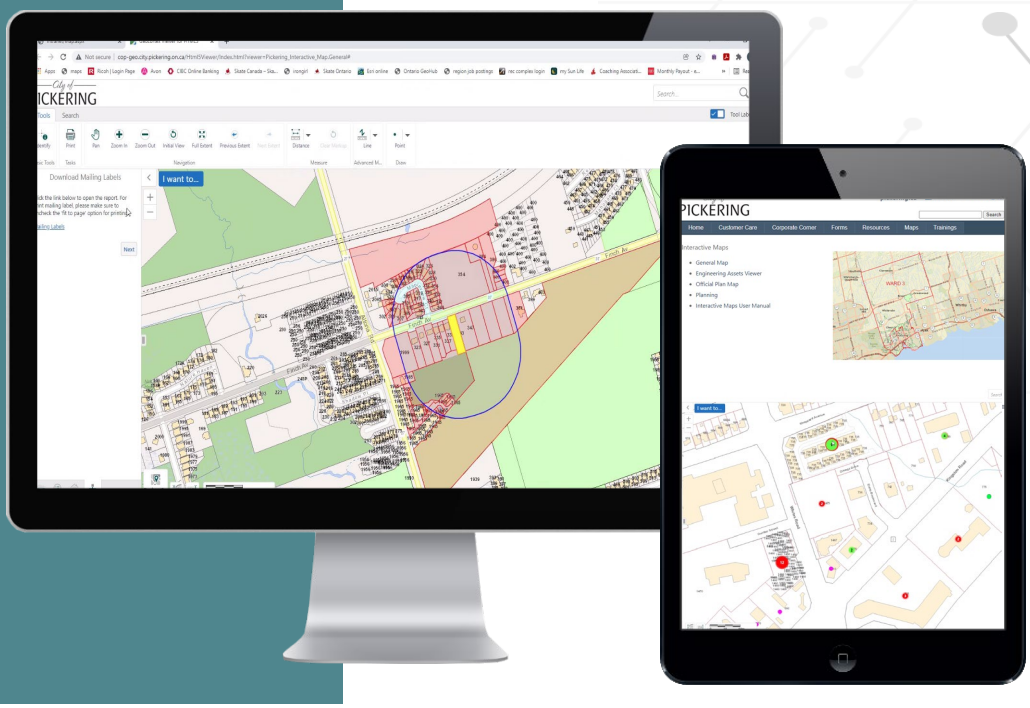
# TECHNICAL AND TACTICAL BENEFITS

## AUTOMATING WORKFLOWS

The Geomatics team currently has and improves upon ArcGIS Model Builder tools for loading data regularly received from other organizations (ex. Single Line Road Network from the Region of Durham is loaded into our Road Centerlines database feature class via a Model Builder tool that will also clip the data the City boundary).

The Geomatics team has purchased FME (Feature Manipulation Engine) software and staff have been trained. Several tools are currently being created to improve data flow, better systems integration, and allow for more automation and auto-updating web maps pulling information from a variety of sources.

.



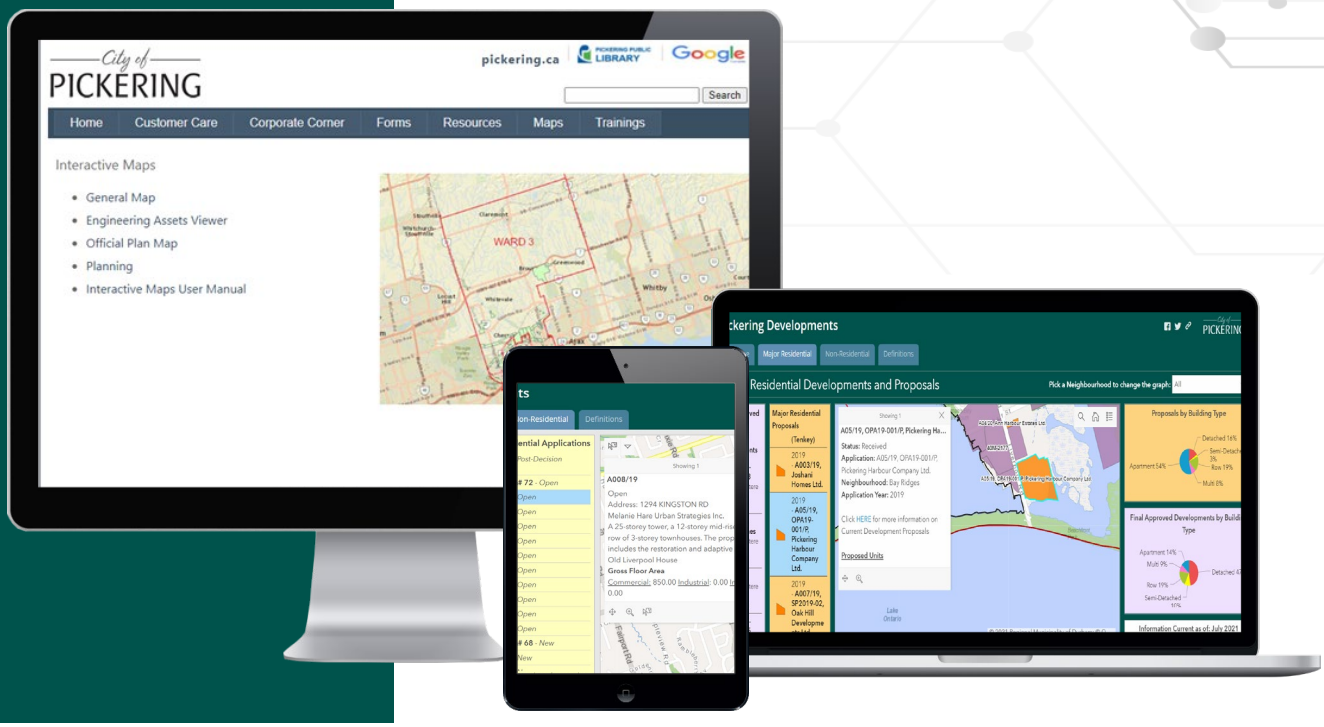
COMMUNITY AND ENVIRONMENTAL

# BENEFITS

## IMPROVING ACCESS TO GOVERNMENT INFORMATION

The City of Pickering makes selected GIS datasets available for public download on its Open Data site.

The City's Map Portal acts as a catalogue of publicly accessible interactive web maps that disseminate information on the municipal ward boundaries, the location of City facilities, and current development proposals.



"A critical key to GIS success is understanding goals and defining success. To that end, having KPIs reflective of industry best practices is an important step."

**KPI's Allow a GIS Program to:**

- Define what success looks like;
- Focus everyone on goals;
- Measure – what gets measured gets done;
- Encourage accountability;
- Provide an opportunity for small and large victories;
- Provide a baseline for detailed annual goals;
- Measure success and progress.

# BENCHMARKING AND KEY PERFORMANCE INDICATORS (KPI'S)


One of the reasons that many GIS initiatives fail to reach their full potential is the absence of metrics and goals. The relationship between metrics and goals is a cyclical one – without metrics, there is no basis for setting goals and gauging progress; without goals, there are no outcomes to measure based on metrics.
The GIS program at the City of Pickering has been very successful, with the Supervisor, Geomatics providing exemplary service to internal and external customers. However, the ongoing success of GIS at the City of Pickering should rely on effective metrics and achievable goals, reviewed annually to evaluate progress and refine objectives. Committing to both will help the City:

- Define success
- Prioritize objectives
- Devise a path forward
- Stay on the desired course

## GIS BENCHMARKING

It is important for the City of Pickering to establish a baseline from which to gauge the success and progress of the enterprise-wide GIS effort. Without metrics, organizational GIS programs often drift over time without focus and clarity. These organizations know that GIS has benefits and they should be using GIS but are not tracking its success. Therefore, it is very important that the City establish metrics and begin to benchmark performance and progress against these metrics. GIS Benchmarking is a structured methodology that identifies the gaps in an organization and uses them to compare actual existing performance with a potential or desired future performance.

This chapter focuses on establishing metrics and Key Performance Indicators (KPIs). This information should be tracked annually to identify progress and areas that need further attention. KPIs allow a GIS program to:

- Define what success looks like;
- Focus everyone on goals;
- Measure – what gets measured gets done;
- Encourage accountability;
- Provide an opportunity for small and large victories;
- Provide a baseline for detailed annual goals;
- Measure success and progress.

# METHODOLOGY

The Benchmarking Analysis (BA) is a subjective evaluation of the existing GIS conditions of the City. It is a checklist of tasks that conventional wisdom and industry knowledge identify as prudent and essential to the success of any enterprise GIS. The six categories of the BA are collectively referred to as the "Six Pillars of GIS Sustainability" and each component can then be used as a KPI gauging mechanism for a successful strategic, enterprise, scalable, resilient, and enduring GIS. Each of the Six Pillars has a sequence of questions graded on a percentage scale – 0% being Poor and needing significant improvement, and 100% being Outstanding and at a 'best business practice' performance level. The goal for a successful GIS program is above 70%.

Each component is weighted equally although the importance of any given component varies with organizations.

An initial assessment is conducted through an interview process whereby a grade is given for each individual item. These results are then refined during the course of the planning process based on staff interviews and supporting documentation. This results in an accurate and objective comprehensive picture of the organization's strengths, weaknesses, gaps, opportunities, and KPIs. These KPIs should be used as a systematic way of monitoring progress over time.


## THE SIX PILLARS

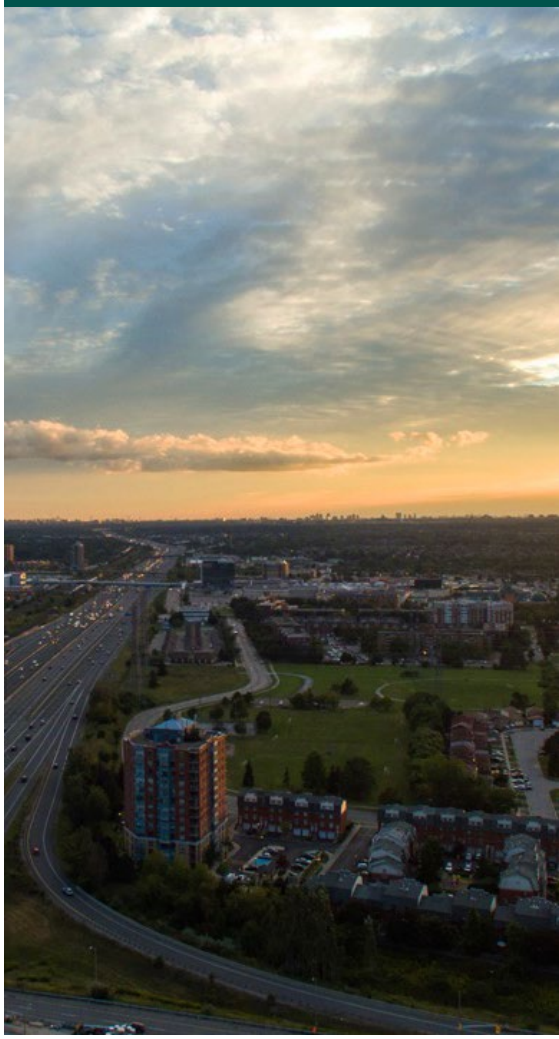
- The following sections discuss the City's existing conditions as it relates to Six Pillars of GIS Sustainability". These pillars are the major areas that must be planned and working well to have an effective GIS program. The pillars are:
- Governance
- Data and Databases
- Procedures, Workflow, and Integration
- GIS Software
- IT Infrastructure
- Training, Education and Knowledge Transfer

These next pages give an overview of key elements of the KPIs. The Benchmarking and KPI Analysis were provided in the Needs Assessment Report.

## SUMMARY

On November 15, 2021, GTG interviewed the Supervisor, Geomatics; Senior Geomatics Analyst; Geomatics Analyst; and the GIS Technician in Asset Management to determine benchmark scores. 105 metrics were benchmarked to provide a diagnosis of the health of the existing GIS program. This section offers insight into how GIS is implemented, administered, and operated within the City and provides a current state of existing conditions. The GIS Benchmarking Overall Summary Scores shown below represent the average of all the scores for each of the Six Pillars of GIS Sustainability

**"Good Governance is the most important component of a successful GIS program. Without it, the program will flounder."**



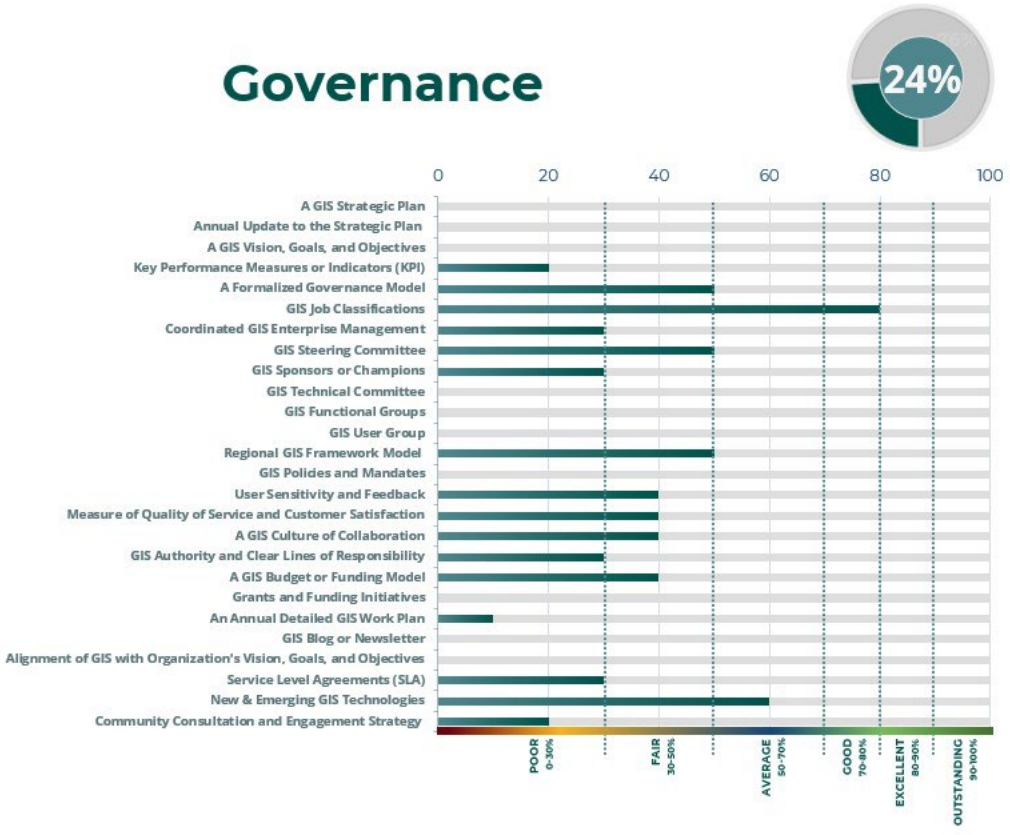
**"We need to amalgamate corporate data into a central database where all have access to analyze and make decisions. I would like to use GIS more than we are now."**

**- Manager, Development Review & Urban Design**

# GOVERNANCE KPI

Arguably, good Governance is the most important factor of a successful GIS program. Without good governance, a GIS program will flounder at best and fail at worst. Overall, GIS governance at the City of Pickering is good. Staff is cognizant of the needs of the users, and they put customer satisfaction as a top priority.

After a full Benchmarking Analysis was completed, the average score for Governance was calculated to be 24%. The GIS program is doing well or following best practices in several ways relating to governance; however, there are still areas that need significant improvement. The Benchmarking Bar Chart below shows the score for each individual GIS Governance item.



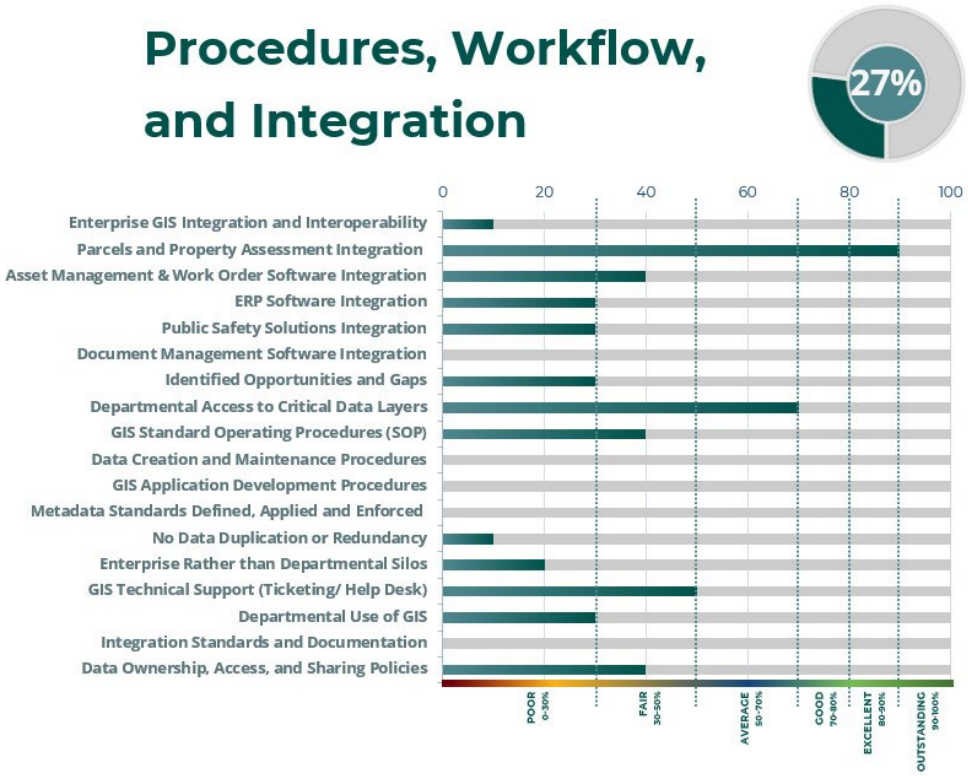
# PROCEDURES, WORKFLOW, AND INTEGRATION KPI

A prevalent misconception about GIS is that it is just a compilation of computerized hard-copy maps. In reality, it is a digital map that is integrated with data that enables users to analyze, query, understand, and compare datasets. One of the mistakes that many GIS programs make is keeping GIS separate from other IT systems. GIS should be the viewing portal to those IT systems and work symbiotically with each of them.

One of the key components to any successful GIS is how well it integrates with other systems and how it improves the overall workflow of the organization. GIS implementations often fail because the GIS is seen as a stand-alone mapping technology. However, in reality, it is a primary integrative tool that should serve as an organization's portal into all of its data.

After a full benchmarking analysis was completed, the average score for Procedures, Workflow, and Integration was 27%. While some integration is in place, there is opportunity for more seamless integration between departments and system. See the Benchmarking Bar Chart to review individual Procedures, Workflow, and Integration items.

**"Software is often the culmination of GIS success."**



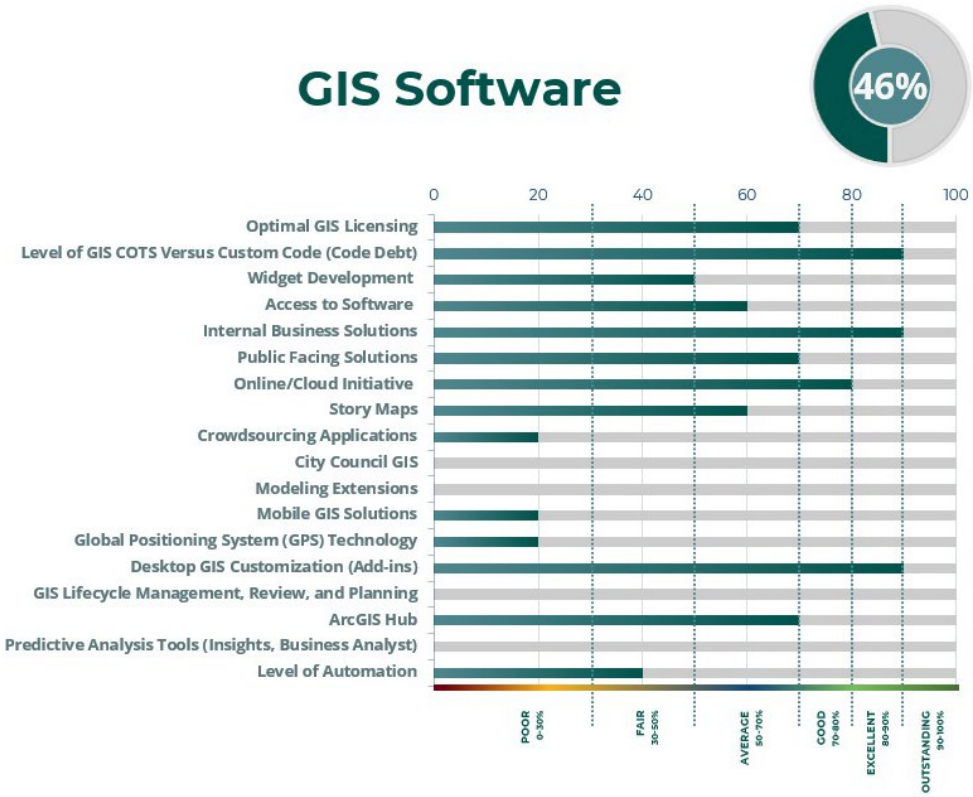

# SOFTWARE KPI

**"GIS has to be part of the culture, or it will not survive. If only 2-3 people use it, it will fail."**

- Chief Administrative Officer

Software is the manifestation of investment in GIS. This is a great time to be using GIS. A decade ago, users were provisioned software applications that required extensive knowledge of GIS. The applications were not user-friendly nor aesthetically pleasing. However, the focus over the last few years has been the user experience. End-user tools are now being designed with ease-of-use in mind. Most users are not GIS professionals and therefore need tools that are intuitive and meet a specific need or set of needs. Likewise, tools for the public have become much more intuitive and graphically pleasing. Esri has created and released hundreds of software options that work on various platforms.

Pickering GIS staff have done a good job of implementing end-user tools. There is opportunity to leverage the Esri environment further and provide the appropriate tools for the appropriate users. After a full benchmarking analysis was completed, the average score for GIS Software was 46%. See the Benchmarking Bar Chart to review individual GIS Software items.

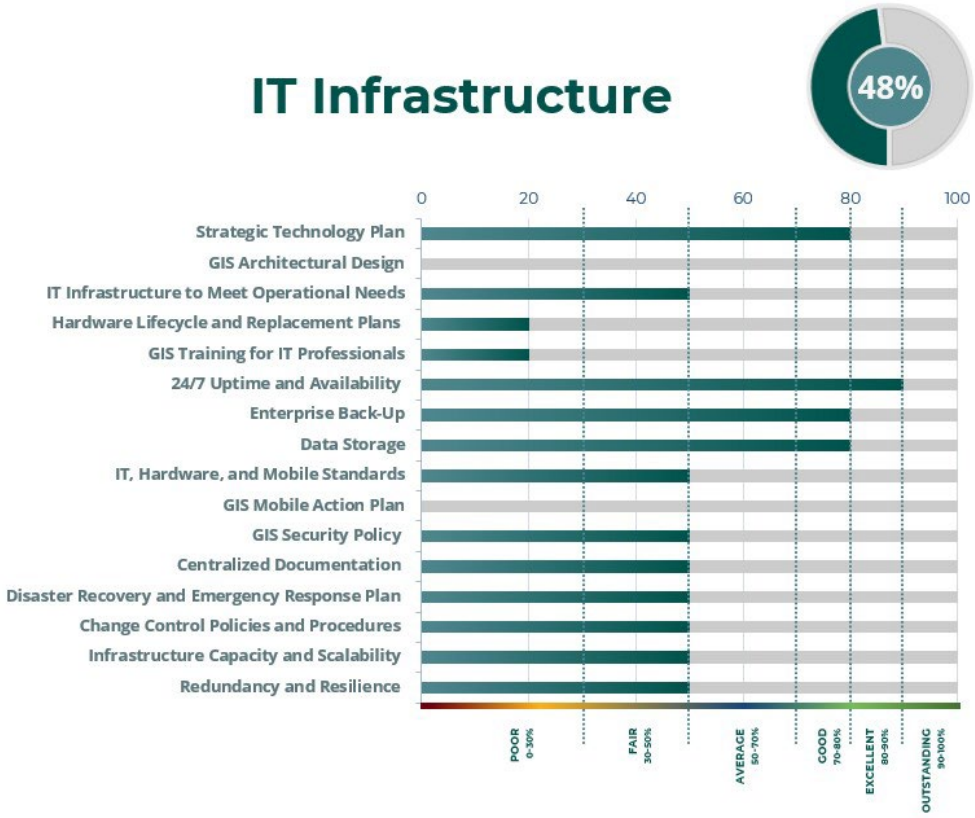


# INFRASTRUCTURE KPI

Arguably the least glamorous component of an enterprise GIS is the infrastructure necessary to keep it running. Nonetheless, a good infrastructure is critical to GIS success. A slow and/or unreliable GIS experience is one of the quickest ways to frustrate users. Once users make up their minds that technology is not user-friendly and/or unusable it takes a huge effort to convince them otherwise. Therefore, maintaining an effective hardware and networking platform is mission critical. City of Pickering's GIS program is supported by the IT team, giving staff access to IT professionals.

After a full benchmarking analysis was completed, the average score for Infrastructure was 48%. The last two letters of GIS represent Information Systems, indicating the technology's overall reliance on traditional information technology components (databases, networks, servers, data storage, etc.). Overall, Pickering's Information Technology (IT) Division has done a good job of ensuring that the GIS infrastructure needs are met. See the Benchmarking Bar Chart to review individual Infrastructure items.

**"GIS software has become untethered. No longer do we have to sit at our desk using a PC. GIS can be used anywhere."**



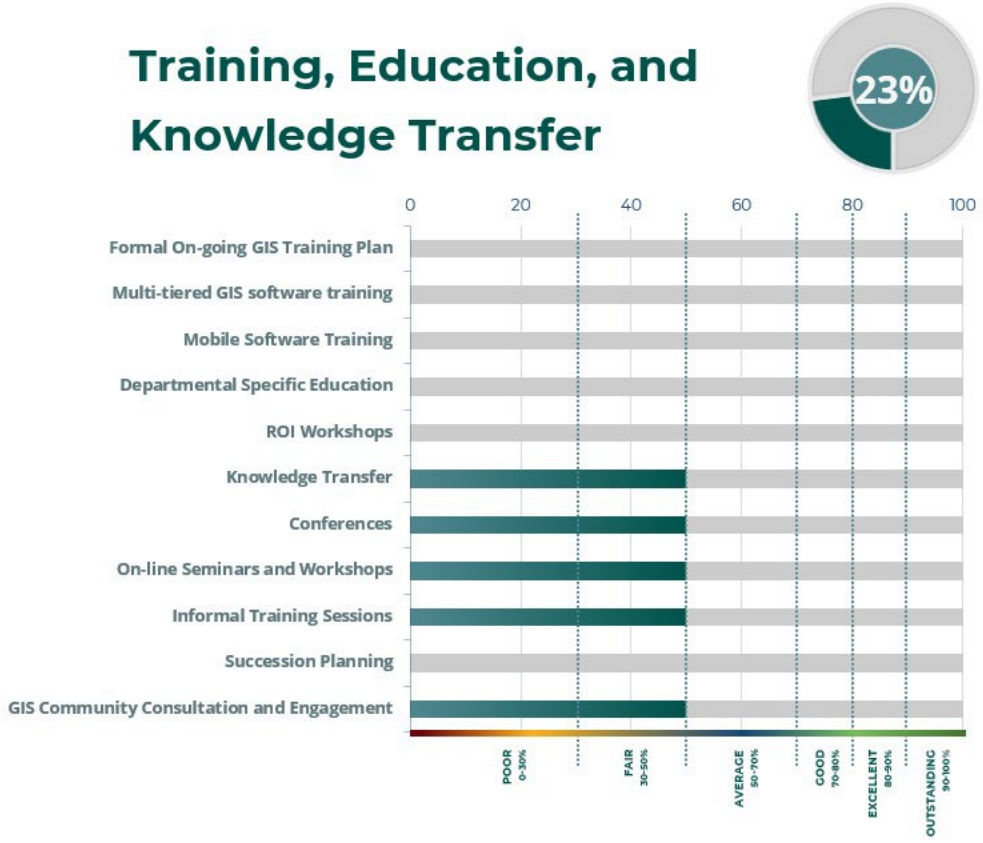

**"A slow user experience results in losing a user. Regaining that person as a user takes a ten-fold effort."**

# TRAINING, EDUCATION, AND KNOWLEDGE TRANSFER KPI

Training, Education, and Knowledge Transfer is universally the most underserved pillar of GIS sustainability. However, it is one of the most important. Many excellent GIS implementations languish because the power of GIS is not understood. Some organizations mistakenly believe that software training is enough. However, education and understanding of what GIS can do for the end-user are equally (if not more) important.

After a full benchmarking analysis was completed, the average score for Training, Education, and Knowledge Transfer is 23%. Some staff members attend conferences, and the GIS Division does a fair job of training departmental staff on specific application functions that relate to their operations. However, a more concerted effort should be made to provide regularly scheduled, formal GIS training, education, and knowledge transfer. Users need to be notified of the training available to them through a variety of educational techniques. See the Benchmarking Bar Chart to review individual Training, Education, and Knowledge Transfer KPIs.

**"An organization that understands what GIS can do for them is on the verge of becoming a world-class organization."**




***"Many excellent GIS implementations languish because the power of GIS is not understood."***

# DATA KPI

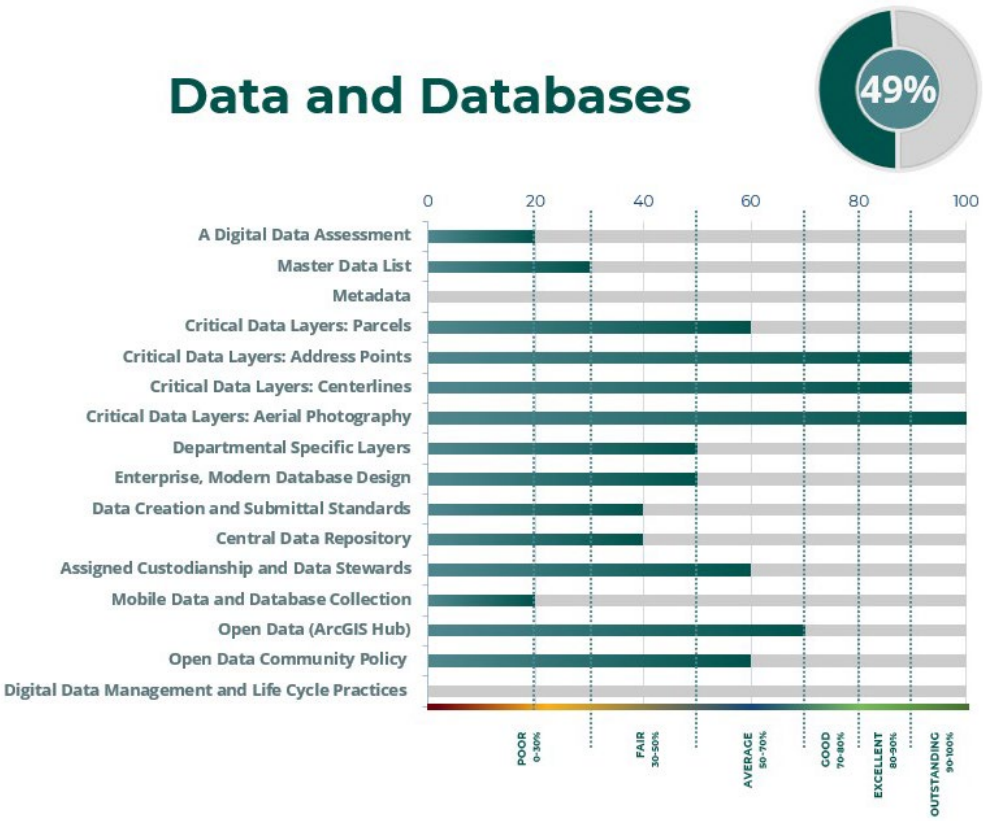
Data is a critical and expensive component of a GIS program. Organizations spend millions of dollars creating and maintaining data (spatial and non-spatial). One of the most powerful aspects of GIS is that it has the potential to become the primary tool for viewing data within an organization. Most data maintained by a local government has a geographic component (e.g., address, property id). Visualizing the data spatially empowers staff to analyze and manage data in new ways. GIS should be used to 'geo-enable' the wealth of data that resides in the various IT systems maintained by the organization.

After a full benchmarking analysis was completed, the average score for Data and Databases was 49%. One of the strengths of the City GIS program is the central GIS data repository. Opportunities exist to leverage the GIS data further, and one part of this overall study is to make detailed data recommendations. The Benchmarking Bar Chart below shows the score for each individual Digital Data and Database item.

**"Knowing where things are, and why, is essential to rational decision making"**

**~ Jack Dangermond**





*"We need to see where the value can be added to our daily work."*

- Manager, Policy & Geomatics

# VISION, GOALS, AND OBJECTIVES

## VISION STATEMENT

## ENTERPRISE-WIDE GOALS AND OBJECTIVES

Having a Vision, Goals, and Objectives is critical to the success of any GIS program. The Vision Statement clarifies the overall purpose of the City of Pickering GIS initiative and gives clarity to GIS staff and users. The following is a recommended vision statement for the City of Pickering GIS Initiative:

***"The vision of the City of Pickering's GIS is to maintain an enterprise, scalable, sustainable, and highly secure GIS that promotes the effective and innovative use of geospatial technology and location intelligence through best practices, community engagement, and innovation, supported by good GIS governance, coordination, accurate and reliable data, standards, and on-going training and education."***

The goals and objectives of the City are derived from the questionnaire, department interviews, discussions with GIS staff, and follow-up research and documentation review. The goals and objectives have been categorized to align with the Six Pillars of GIS Sustainability (See KPI section). The City of Pickering should strive to achieve the following goals and objectives by completing the associated tasks. An annual work plan should be established to accomplish these goals and objectives. These goals and objectives should be reviewed annually and updated as appropriate.

# GOAL 1: EFFECTIVE GOVERNANCE MODEL

**OBJECTIVE:** Develop a GIS governance strategy that includes clear lines of responsibility, accountability, decision making, and good overall management.

**TASK 1:** Create a Hybrid GIS Governance Model – Institute a clear and understandable strategy for effective management of GIS and the best use of enterprise GIS resources.

- Add GIS management and oversight to the IT department.
- Implement GIS expertise in key departments.

**TASK 2 :** Develop Clear Lines of GIS Authority and Accountability.

**TASK 3 :** Establish Key Performance Measures and KPIs and measure them annually.

**TASK 4 :** Improve Enterprise GIS Management to ensure a more coordinated and collaborative GIS experience for all stakeholders.

**TASK 5 :** Enforce the GIS Steering Committee Meetings for a smooth implementation process to allow direct interfacing between executive decision-makers and GIS experts.

**TASK 6 :** Establish a GIS Technical Committee to oversee the technical challenges of deploying an enterprise GIS.

**TASK 7 :** Establish a GIS User Group of stakeholders who share information and compare experiences with GIS technology for the benefit of all members.

**TASK 8 :** Create GIS Policies.

**TASK 9:** Establish Regional GIS Policy.

**TASK 10 :** Measure the Quality of GIS Service and gather feedback throughout the organization at least once a year.

**TASK 11 :** Promote a Culture of Collaboration through positive messaging and user group meetings.

**TASK 12 :** Explore GIS Grants and Funding Initiatives.

**TASK 13 :** Develop an Annual GIS Work Plan aligned with the Corporation's Vision, Goals, and Objectives.

**TASK 14 :** Create a GIS Blog or Newsletter to share accomplishments and opportunities with the user community.

**TASK 15 :** Develop Departmental GIS Service Level Agreements, SLA to define services provided by the Geomatics team and document how the central GIS group will support each department and the enterprise within the organization.

**TASK 16 :** Promote and Encourage Community Consultation and Engagement using a map-centric platform to build relationships with external partners, enable communities to better understand government processes, and allow the City to get diverse perspectives on improving services.

# GOAL 2: MAINTAIN ACCURATE AND RELIABLE GIS DATA AND DATABASES

**OBJECTIVE:** Develop Data Procedures, Protocols, and Standards, and Enforce Best Business Data Maintenance and Governance Practices

**TASK 1:** Conduct a Digital Data Assessment of all GIS Data layers to analyze the data and identify any inaccurate data, non-standard spatial projections, and incomplete data or attributes.

**TASK 2 :** Develop a Master Data List, MDL to document key data sets.

**TASK 3 :** Create Metadata for all GIS Data Layers detailing how, when, and where data was created and the scale, accuracy, resolution, and other properties.

**TASK 4 :** Develop and Enforce Metadata Standards.

**TASK 5 :** Create an Enterprise Modern Databases Design – e.g., Esri Utility Network Model and other Asset Management solutions.

**TASK 6 :** Develop Data Creation and Data Submittal Standards to ensure data quality and process sustainability.

**TASK 7 :** Assign, Enable, and Document GIS Data layer Custodians and Stewards.

**TASK 8 :** Develop a Mobile Data Collection Program.

**TASK 9:** Improve and Enhance the Arc GIS Hub Open Data Portal.

**TASK 10 :** Improve Digital Data Management and Life Cycle Practices.

**TASK 11 :** Create New Digital GIS Data Layers as identified in the Needs Assessment.

# GOAL 3: DEVELOP AND ENHANCE GIS PROCEDURES, WORKFLOW, INTEGRATION, AND INTEROPERABILITY

**OBJECTIVE:** Integrate GIS functionality with existing enterprise software business systems and workflows

**TASK 1:** Integrate GIS with Existing Enterprise Business Systems.

**TASK 2 :** Improve the Integration of GIS with Asset Management and Work Order Software.

**TASK 3 :** Improve the Integration of GIS with Enterprise Resource Planning (ERP) Software.

**TASK 4 :** Improve the Integration of GIS with Public Safety Software Solutions.

**TASK 5 :** Integrate GIS with Document Management Software.

**TASK 6 :** Improve Departmental Access and Use of GIS Software for editing, analysis, and visualization.

**TASK 7 :** Develop GIS Data Creation and Maintenance Procedures.

**TASK 8 :** Improve the GIS Ticketing and Support Procedures.

**TASK 9:** Develop Data Ownership, Access, and Data Sharing Policies to document what controls exist for the organization's geodata.

# GOAL 4: PROMOTE EFFECTIVE, EFFICIENT, AND INNOVATIVE USE OF GIS SOFTWARE

**OBJECTIVE:** Utilize Esri's GIS software ecosystem across the enterprise, including Desktop, Web, and Mobile solutions.

**TASK 1:** Optimize GIS Software Licensing
- Cost-Benefit - Migrate Geocortex to Esri solutions.
- Leverage Esri Enterprise Agreement Offerings.

**TASK 2 :** Promote Widget Development to make configurable software products more useful.

**TASK 3 :** Create Story Maps.

**TASK 4 :** Create Crowdsourcing Solutions.

**TASK 5 :** Utilize Real-Time GIS in Council Meetings to better visualize information about the various issues related to the organization.

**TASK 6 :** Evaluate GIS Modeling Extensions

**TASK 7 :** Implement Mobile GIS and GPS Solutions for office-to-field, field-to-office workflows to increase the use and participation of GIS by departments.

**TASK 8 :** Improve and Enhance the existing ArcGIS Hub Map Portal solution.

**TASK 9:** Evaluate GIS Predictive Analysis Tools to determine use cases for the City.

**TASK 10 :** Improve the Level of Automation.

# GOAL 5: MAINTAIN ENTERPRISE IT INFRASTRUCTURE TO SUPPORT GIS

**OBJECTIVE:** Integrate GIS functionality with existing enterprise software business systems and workflows

**TASK 1:** Develop a GIS Architectural Design plan to understand and visualize the complex interrelationship between the GIS technology components.

**TASK 2 :** Develop GIS Training for IT Professionals – Geodatabase Administration, GIS Security Platform

**TASK 3 :** Develop a GIS Mobile Action Plan of the City's tactics to increase GIS accessibility on tablets, smartphones, and other mobile devices.

**TASK 4 :** Evaluate Existing GIS Data Security Plans.

**TASK 5 :** Develop Data Storage and distribution strategies to support the growth of the GIS initiative.

**TASK 6 :** Manage Staffing Structure and Governance changes.

# GOAL 6: IMPLEMENT GIS TRAINING, EDUCATION, AND KNOWLEDGE TRANSFER

**OBJECTIVE:.** Improve the opportunities for GIS Training, Education, and Knowledge Transfer across the enterprise.

**TASK 1:** Develop a Formal GIS Training Plan to provide all new and current staff with GIS training and education opportunities.

**TASK 2 :** Develop Multi-tiered GIS Training for all levels of user.

**TASK 3 :** Conduct Mobile GIS Training on topics like GPS, AVL, and field data collection solutions.

**TASK 4 :** Conduct Departmental Specific GIS Training to increase organizational GIS skillsets and knowledge base.

**TASK 5 :** Conduct GIS ROI Workshops to showcase the value and Return on investment GIS offers the City.

**TASK 6 :** Promote Education and Knowledge Transfer through conference attendance, online seminar participation, and informal training sessions.

**TASK 7 :** Conduct GIS Succession and Continuity of Operations Planning.

**TASK 8 :** Promote Community Consultation and Engagement – Implement methods for sharing ideas, discussions, and information about GIS and emerging technologies.

# CONCLUSION

The City of Pickering's GIS is a success by any standard. As evidenced by the key performance indicators, the City has achieved implementation of the technology. However, the technology continues to evolve and advance. Many opportunities exist to expand the use of GIS within departments and with the public. It is clear that staff throughout the City need to and desire to continue to utilize GIS technology to conduct daily tasks. GIS use in local government is going to become more prevalent. GIS will become the de facto portal for managing and analyzing data at the City of Pickering (spatial and non-spatial). The spread of GIS tools has been significant over the past few years. Also, residents are equipped with an ever-increasing array of GIS-based tools. They have location-aware phones and an assortment of mobile devices. Over the next decade, this will become more prevalent. Users will expect local governments to automatically provide location-based service (LBS) information on road closures or work in their area, the location of the nearest recreation facility with desired amenities, the location of special events, utility services, and the location of capital projects. This can only be accomplished through the use of GIS. The City has invested in GIS and will continue to do so. The importance of GIS at the City will continue to increase. Therefore, it is critical to the success of the organization as a whole that the recommendations made in this GIS Strategy are adopted, ensuring that the City's GIS investment will be viable and able to meet the ever-increasing demand.

**"This GIS Strategy will serve as a road map for the future and should be updated incrementally to reflect accomplishments and changing priorities."**

**"The application of GIS is limited only by the imagination of those who use it."**

**- Jack Dangermond**

***"We need to amalgamate corporate data into a central database where all have access to analyze and make decisions. I would like to use GIS more than we are now."***

- Manager, Development Review & Urban Design


*A product of:*

GEOGRAPHIC TECHNOLOGIESGROUP®

*Beyond Location Intelligence*