Committee Meeting of Council
via ELECTRONIC PARTICIPATION ONLY

Meetings for the Week of
Tuesday, January 26, 2021

Tuesday, January 26, 2021	6:30 p.m.	Committee Meeting of Council

General Government Committee
Tuesday, January 26, 2021

Chair:	Councillor Tanya Vrebosch
Vice-Chair:	Councillor Bill Vrebosch
Members:	Councillor Johanne Brousseau Councillor Chris Mayne Councillor Mark King Councillor Scott Robertson Councillor Mac Bain Councillor Dave Mendicino Councillor Marcus Tignanelli Councillor George Maroosis
Ex Officio:	Mayor Al McDonald

Items to be Addressed:

GG-2021-01	**Report from Lea Janisse dated December 2, 2020 re IS Review.**

Committee Items:

GG-2019-06	Smoking By-Law No. 2019-45 (SIRE/C01/2019/BYLAW/SMOKING).
GG-2020-02	Report from Shannon Saucier dated August 18, 2020 re 2021 Budget Schedule (SIRE/F05/2020-21/OPERBU/GENERAL).
GG-2020-09	Report from Shannon Saucier dated November 13, 2020 re 2021 General Capital Budget and 2021 Water and Wastewater Capital Budget, with the 2022-2030 Capital Forecast Plan (SIRE/F05/2021/CAPBU/GENERAL).
GG-2020-10	Report from Margaret Karpenko dated November 13, 2020 re 2021 General Operating Budget (SIRE/F05/2021/OPEBU/GENERAL).
GG-2021-01	Report from Lea Janisse dated December 2 , 2020 re IS Review.

GG-2021-01

Draft Recommendation:

"That Council receive the Information Services Review report from Blackline Counsulting attached to Report to Council CORP 2020-125 dated December 2, 2020 from Lea Janisse and that the Information Services Review Report be referenced in future consideration regarding Information Services at the City of North Bay."

City of North Bay
Report to Council

Report No: CORP 2020-125 Date: December 2, 2020

Originator: Lea Janisse

Business Unit: Department:

Corporate Services Information Systems Department

Subject: Information Systems Review

Closed Session: yes ☐ no ☒

Recommendation

That the Information Services Review report from Blackline Consulting as attached to Report to Council 2020-125 be received and referred to the General Government Committee meeting on January 12, 2021.

Background

On December 6, 2019 the City issued RFP 2019-122 for a Review of the Information Services Delivery Model for the City of North Bay.

The objective of the review is to review the City's current Information Systems (IS) delivery model with a goal of:

- Assessing the current state of the service delivery model as well as the identification of immediate opportunities for enhancements and the identified future state of the service delivery model;
- Identifying opportunities for cost savings, efficiencies and modernization;
- Setting strategic priorities for IS infrastructure investments and service delivery;
- Safeguarding municipal and partner agency information and assets.

In accordance with Resolution 2020-32 dated January 28, 2020, City Council approved the award of the contract for the IS Review to Blackline Consulting.

Financial/Legal Implications

Corporate Strategic Plan

☐ Natural North and Near
☐ Economic Prosperity
☐ Affordable Balanced Growth
☐ Spirited Safe Community
☒ Responsible and Responsive Government

Specific Objectives

Explore opportunities to reduce the costs of government service delivery, including shared services and new technologies.

Ensure continuous improvement of governance and administration.

Recommended Option

That the Information Services Review report from Blackline Consulting as attached to Report to Council 2020-125 be received and referred to the General Government Committee meeting on January 12, 2021.

Respectfully submitted,

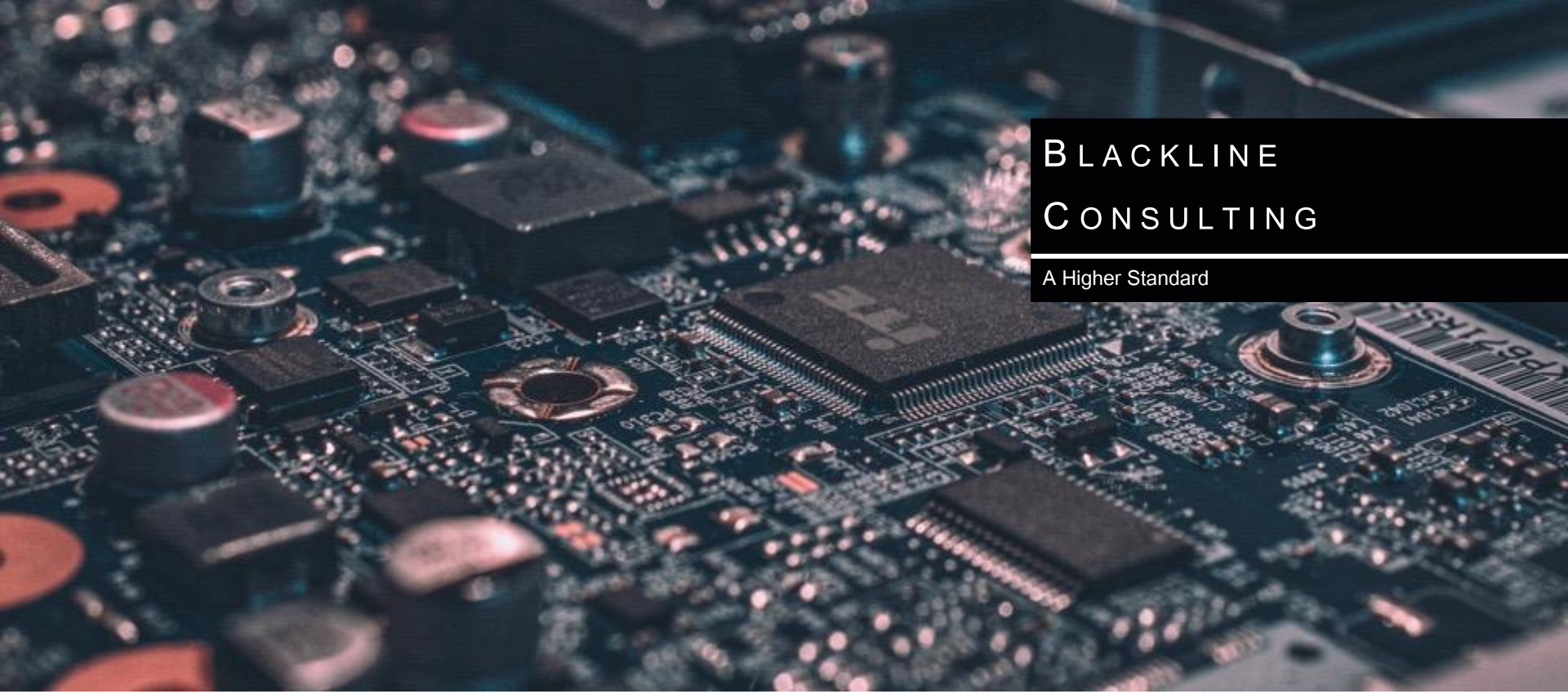
Name: Lea Janisse, MHRM CHRL
Title: Chief Human Resources & Information Officer

I concur with this report and recommendation.

Name: David Euler, P.Eng
Chief Administrative Officer

Personnel designated for continuance:

Name: Lea Janisse



BLACKLINE CONSULTING

A Higher Standard

Review of Information Services Delivery Model

Final Report

The City of North Bay

9th December 2020

Contents

EXECUTIVE SUMMARY

Blackline conducted an assessment of technology at the City

This report presents Blackline Consulting's (Blackline) assessment of the current Information Technology systems and process at the City of North Bay (the City)

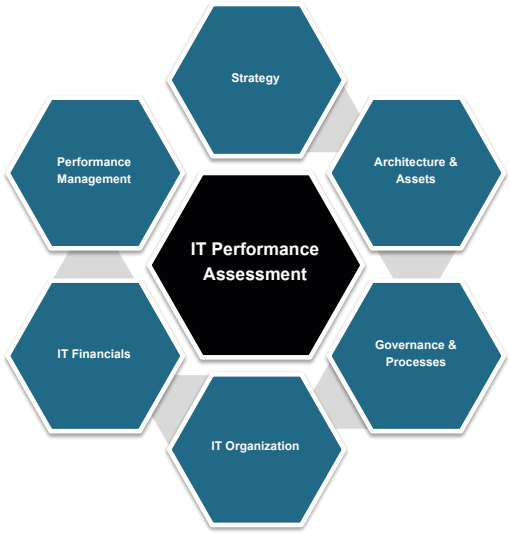
We have structured the assessment into the six areas of IT operations shown in our framework to the right.

- We used data and information from a variety of sources to complete our assessment and analysis:
  - Stakeholder consultation with City staff and Council
  - Technical consultations with IS staff
  - Technical documentation and data review
- For each of the assessment areas, we describe what is in place and provide our assessment of how suitable that is for the City.

Making decisions on IT systems and processes is complex and involves many factors

In undertaking an assessment, it is often difficult to definitively say something is good or bad, more often, it is a question of tolerable investment. The more you invest, the better the IT capabilities you will have.

- With that in mind, this report aims to highlight areas of technology that represent common practice and those that do not. As well as any areas where we feel the systems do not match the needs of the City or carry residual risk.



This identification of residual risks and limitations gives Senior Leadership the opportunity to confirm they are accepting of those risks and the related expenditure.

- Where the risks or limitations are deemed by the City as not acceptable, additional investment in IT will be required.

This summary presents a subset of our observations along with the recommendations they generated

In the summary, the recommendations are not numbered sequentially, as in the main document that are grouped in pillars of activity.

Business systems

Software used by staff to perform their work

The City has a range of commercial applications purchased from software vendors and in-house developed applications by the IS team.

- Most City functions have software to support their work, but not all systems are running the latest versions of the software. Some are outside of vendor support and should be upgraded or replaced to ensure continued access to vendor support.
- The City develops applications in-house as it is less expensive than some commercial products. This is likely due to commercial products having a broader range of features than the City needs. However, when thinking about the cost of the software, the cost to the City to maintain the applications is not factored in, with a proportion of the in-house applications written in code that is no longer supported. Additionally, little documentation exists describing how the applications were developed, leaving a potential gap in continuity.
- With the range of applications the City uses, few are connected to each other to share data and information amongst them. Connecting applications reduces duplicate data entry and provides staff with more information to make evidence-based decisions.

	Recommendation	Observation
9	Integrate applications	▸ Business applications and systems are not integrated to share data and information.
10	Procure an ERP system	▸ There is no HRIS in the application portfolio. ▸ Finance uses an older version of Navaline that is not integrated with any HR components.
15	Offer digital services	▸ There are little City services offered online via the City's website. ▸ Residents can only make online payments for parking tickets.
16	Make records digital	▸ Business practices (including City records) are currently mostly manual, and paper based.
17	Set minimum standards	▸ There are several applications and operating systems no longer supported by vendors.

*Details on the recommendations are in the Recommendations section

Infrastructure

Infrastructure includes the hardware and facilities that make up the IT environment

It also includes the underlying software that makes the hardware run, the operating systems and databases.

- The data centre (DC), where all of the City servers are housed, is of a high standard. Backups are stored on disks, however, they are physically stored at the primary site, therefore prone to damage in the event of a disaster to the primary site. There is no backup location – if a disaster were to befall City Hall, it would take a number of weeks to restore IT services.
- The network that provides communication between staff computers, servers and the Internet is functional but basic. It has little resilience, meaning in some parts, the failure of one component results in a total connectivity loss, meaning staff would be unable to communicate with servers and the Internet.
- Servers are configured in a contemporary way and most are running current operating systems.
- The City does not have a robust method to allow staff to work away from their office location. Measures have been taken during COVID-19 to facilitate this, but that solution should not be in place for the long term.

	Recommendation	Observation
1	Add fire protection to the DC	There is only one small fire extinguisher in the City's data centre.
2	Second internet connection	The network has a single internet connection into the network, risking outages in the event of a disruption.
3	Architect more firewalls	The current network architecture only has one firewall, which limits resiliency.
4	Conduct a security audit	Independent third-party security vulnerability and penetration assessments are not conducted regularly.
5	Secondary DC	The City does not have a secondary, off-site redundant data centre.
6	Store backups off-site	Backups are currently stored at the main City facility rather than a remote off-site location.
7	Establish a BCP	There is no comprehensive Business Continuity Program (BCP) that safeguards against a disruption/outage.
20	Create target architecture	IS does not have a target application architecture that guides decision-making around applications.

*Details on the recommendations are in the Recommendations section

Governance and processes

Governance is the process by which decisions get made regarding IT and technology priorities

Commonly, municipalities form a governance committee with broad representatives from across the organization.

- The City does not have a committee of this nature. IT priorities are set by the management of the IS department.
- Projects are accepted during the year if the IS team has the capacity to take them on. However, there is no reporting or visibility to the leadership team or the rest of the organizations as to what projects IS is working on and what their status is.
- The processes IS follows for standard and routine items are not documented. Documentation is particularly important to safeguard against the loss of institutional knowledge or staff absenteeism.
- There are no service level agreements (SLAs) or specific service levels defined. This particularly important with regard to the third-party organizations that IS supports – organizations such as the libraries and DNSSAB, for example.

	Recommendation	Observation
11	Schedule partner meetings	▸ No regular, set frequent meetings between IS and City departments occur to discuss technology needs.
13	Establish IT governance	▸ The City does not have a governance body for managing IT priorities and technology related matters.
19	Conduct ITIL problem management	▸ IS does not have a formal process for managing reoccurring problems in line with ITIL (industry standard).
8	Document IT processes	▸ IS doesn't document key IT processes and this may lead to the loss in institutional knowledge if staff depart.
14	Use chat or phone for support	▸ There is no first contact resolution for the service desk and this contributes to longer resolution times.
21	Document application code	▸ Code for in-house developed applications is not documented.
22	Create a cloud-first policy	▸ There is no objective criteria to assess cloud use at the City, despite the growing trend of cloud adoption.

*Details on the recommendations are in the Recommendations section

IT financials

In our recent experience, IT budgets at municipalities ranges from $1,400 to $6,750 per user per year

The City budget has averaged around $2,100 in recent years – at the lower end of this range.

- IT operating expenses have gone up recently, which may be related to using more cloud services. As organizations move to cloud services, one-time capital expenses that bought hardware and software in the past now become recurring, monthly operating expenses to pay for the cloud service. The City should expect to see this trend continue and grow.
- The revenue received from third-parties that IS supports is less than the expenses IS incurs to provide the support. The per-user charge to these organizations appears to vary from $63 to $1,073. While some of the expense is explained by the different services each agency receives from IS, this does not completely explain the range.

	Recommendation	Observation
12	Establish SLAs and consistent service pricing	▸ No formal SLAs to set scope, expectations and fees are in place between IS and third-party organizations. ▸ There is no pricing structure/framework that IS currently uses to determine the fees that it charges third-party organizations.
18	Create application strategy	▸ Total Cost of Ownership (TCO) (e.g. cost of maintaining system, cost of updating system, cost of training staff) is not considered when developing in-house applications.

*Details on the recommendations are in the Recommendations section

Staff survey

We conducted an anonymous survey to gather input from City staff on IS service delivery and support

Below we provide some of the key findings.

Users are pleased with IS service and support

The majority of users are very satisfied with the support they receive from the IS department. Users describe the IS team as responsive and helpful.

Refreshing software and hardware versions

A common reoccurring theme was for staff wanting to receive software and hardware in-line with current market trends and versions. Also departments indicated a desire to work with IS to modernize their ways of working by using more technology.

Systems are not integrated

There are many systems in place and they are not integrated, staff feel this impacts their productivity. Multiple systems means that there may be multiple sources of truth as the same information is entered in a different system each time.

User experience is inconsistent

There are some concerns about the consistency of the knowledge, capabilities and response between IS staff. This leads to a change in how users approach IS regarding their service tickets – in some cases, they may circumvent the ticketing system.

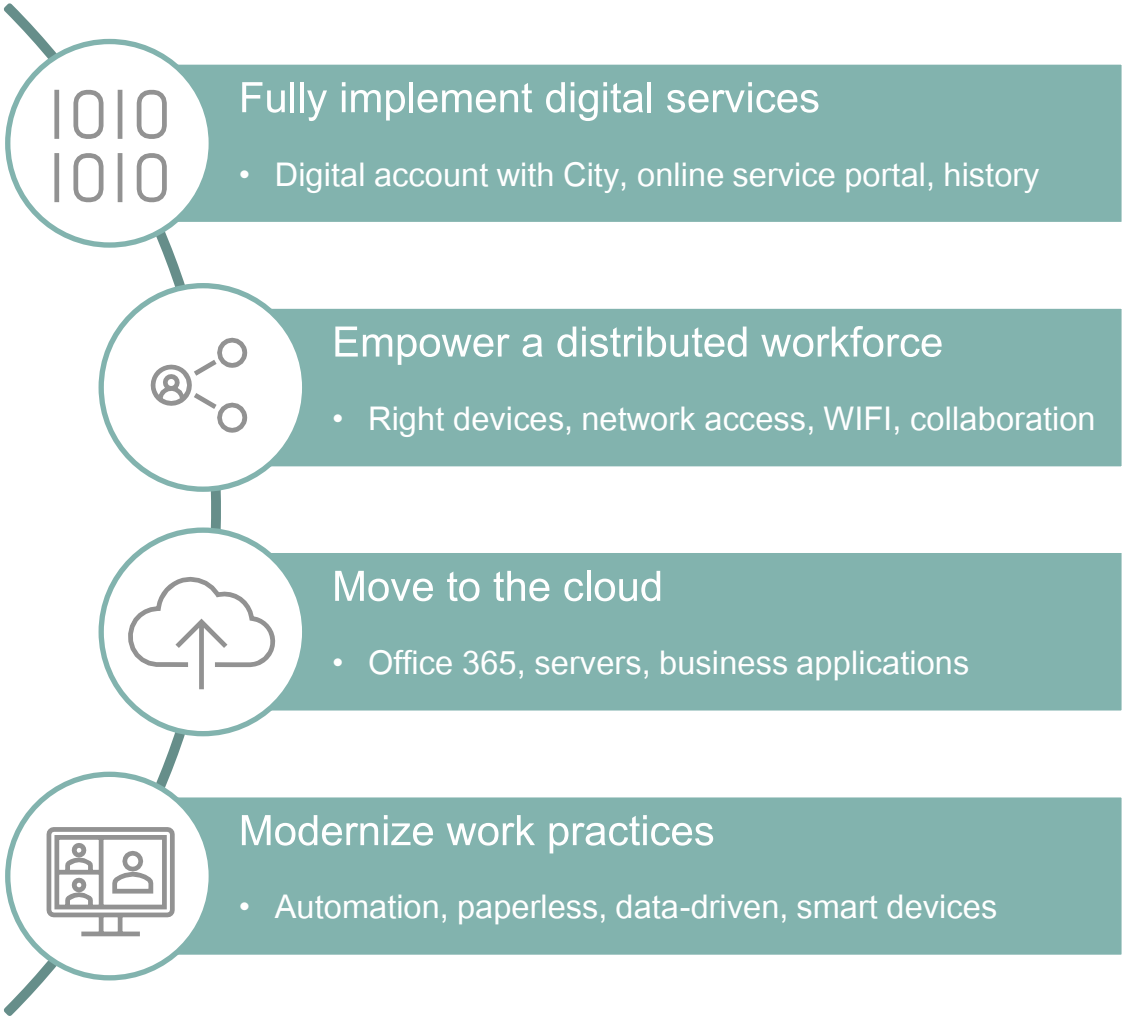
Train users on the tools they currently use

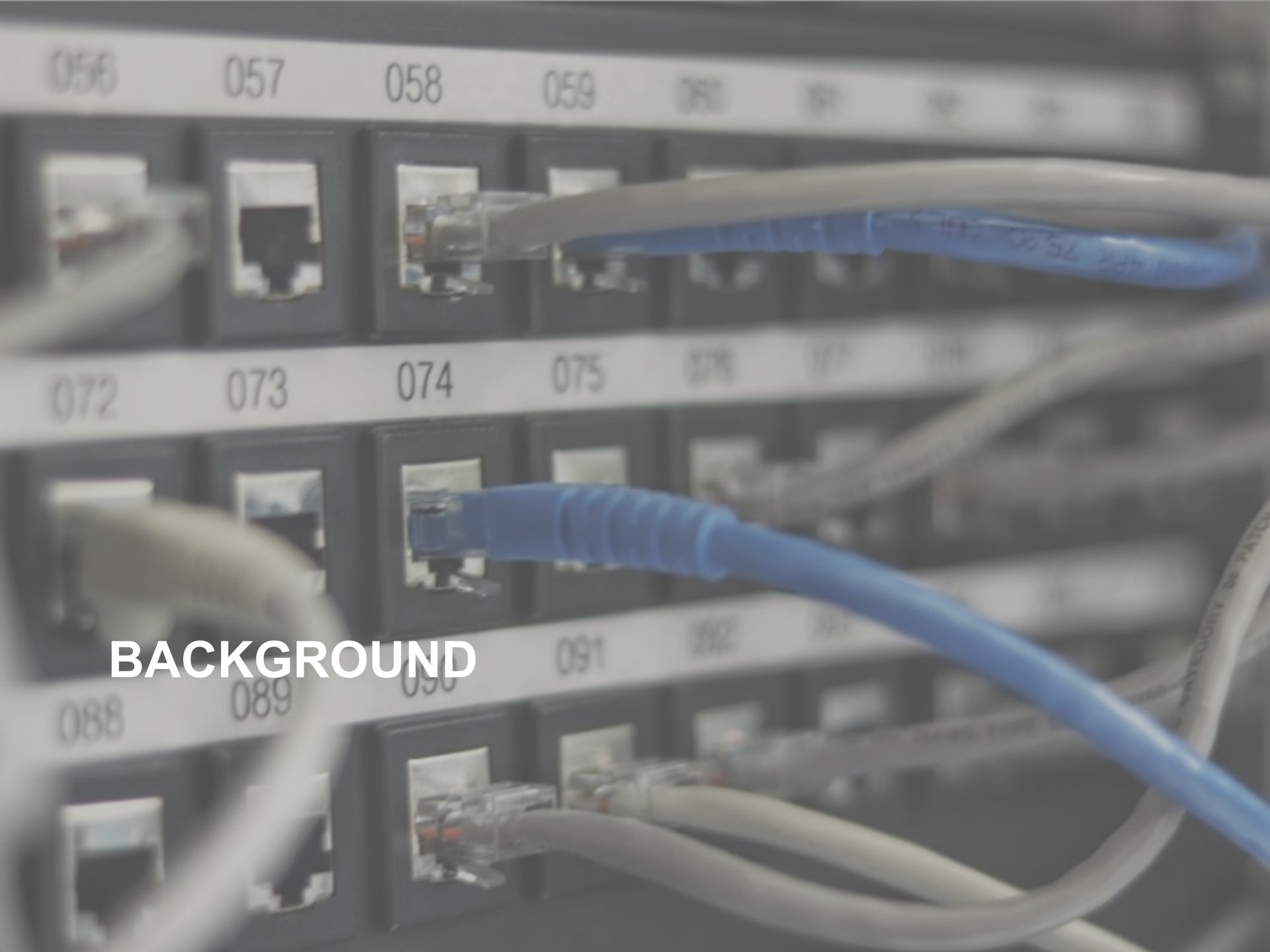
Users desire more training on the tools that they currently use. There also appears to be a limitation in users' understanding of the capabilities and functionalities of the systems they use, suggesting that such training be provided to users.

Planning to change how the City uses technology

As the City looks further ahead, there are many trends in information technology that we believe it should take note of and act upon

- To the right, we highlight four themes we believe should inform the thinking on where the City takes information technology in the future.
- Adopting these concepts would fundamentally change how the City uses technology and the role of IS.




BACKGROUND

This report presents our assessment of technology at the City

Making decisions on IT systems and processes is complex and involves many factors

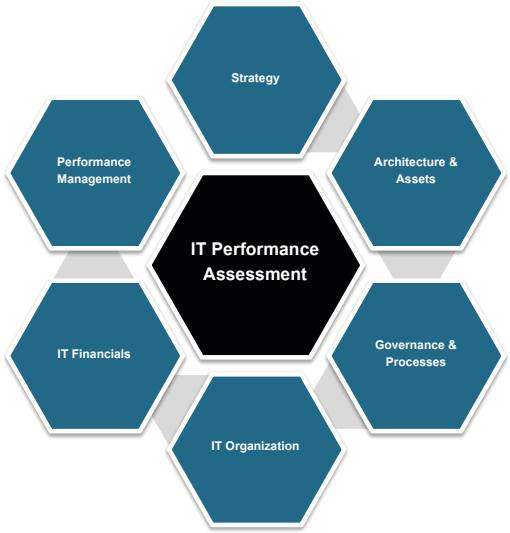
In undertaking an assessment, it is often difficult to definitively say something is good or bad, but whether it is common practice in other similar organizations and whether the decision seems suitable for the client.

- Through this report, we aim to highlight areas of technology that represent common practice and those that do not as well as any areas where we feel the systems do not match the needs of the City.
- Another factor that is considered when making IT decisions is how much you are willing to spend and what residual risk you are willing to accept?
- More functionality and less risk will lead an organization to spend more on IT.

This report presents Blackline Consulting's (Blackline) assessment of the current Information Technology systems and process at the City of North Bay (the City)

We have structured the assessment into the six areas of IT operations shown in our framework to the right.

- Our identification of residual risks gives Senior Leadership the opportunity to confirm they are accepting of those risks and the related expenditure.



We used data and information from a variety of sources to complete our assessment and analysis:

- Stakeholder consultation with City staff and Council
- Technical consultations with IS staff
- Technical documentation and data review

Many departmental priorities require support from IS

Department/Division	Strategic Priority
City Clerk	▸ Electronic agenda and records managements system ▸ Corporate website redesign ▸ Electronic voting
Economic Development	▸ Digital marketing approach to attract investment ▸ Increased use of social media
Financial Services	▸ Dedicating more resources and time to identify the strategic, long-term needs of the Finance department ▸ Financial system that allows more integration between departments
Fire Department	▸ Implementation of new dispatch and records keeping system ▸ Move away from paper-based and manual processes
Human Resources	▸ Implement new employee retention program (North Bay Proud) ▸ Enhanced customer service experience through technological development – working closely with IS
Infrastructure	▸ Systems integration ▸ Enhanced customer experience – more electronic payments
Public Works and Parks	▸ New systems that allow more integration and automation ▸ Hardware more suitable for their operations – offsite tablets
Parks, Recreation and Leisure	▸ Community engagement initiatives – seniors and youth focus ▸ Build a master plan with the aid of trends data and information

City Departments have different needs depending on their current processes, systems in place and technology advances

Not all departments in the City are at the same stage of technology maturity.

- Regardless of the systems in place, most departments still have a high number of manual processes due to the lack of integration between their systems.
- The table on the left shows the strategic priorities for each division interviewed that require support from IS.
- The IS team is only sometimes involved in a Department's decisions about technology, but departmental leaders generally indicated they would like to see a more proactive engagement.

City departments are highly satisfied with the support provided by IS

Departments seek IS support when they require process improvement tools and insights on systems' capabilities

Departmental leaders agree that IS customer service has improved in the last years. The IS team is very diverse and, together, they have the right capabilities to provide support to all departments.

When departments have a specific need and identify system opportunities, they schedule a meeting with IS developers to discuss those needs. The IS team is very open to help and build applications to the extent they can. Some of those meetings result in the development of in-house applications that meet the departments' needs.

The leadership team agrees that IS should focus more on strategic development and innovation. Scheduling periodic meetings with IS would give them the opportunity to understand the needs of each department better – which was happening to some extent prior to COVID-19. Departments would also understand the role of IT and how they can work together to build strategies that lead to better system integration. Working together with IS will result in a reduction of manual and paper-based processes, increase efficiency levels and deliver better services to residents.

The IS team holds a wide range of skills to offer exceptional support and customer service to the City and third-party agencies

Strengths

- IS staff are committed to provide an exceptional customer service experience and to support all users. Users are highly satisfied with the service provided.
- The team is diverse with a broad portfolio of skills regarding different IT areas (e.g. infrastructure, systems, security).
- The IS department provides support to users, allowing them to meet their support service standards. The IS team responds to the majority of tickets in less than 24 hours.
- The IS team develops applications in-house when commercial applications do not meet the needs of departments.
- The infrastructure in place allows departments to run all the systems currently used – in-house developments and commercial products.
- The City's has housed the Data Centre in a dedicated room with several good practice elements.

Opportunities

- Enable organizational resilience and flexible/remote working arrangements.
- Empower the delivery of more automated and digital municipal services and business processes.
- Formalize key IT processes and service offerings tailored to non-City agencies to ensure business continuity, expectations management and resiliency.
- Formalize the relationship between IS and the business to support the strategic growth of the Corporation and City.
- Greater reporting for IT management to focus on preventative actions.
- Improve communication between IS and City departments to offer more strategic support and generate innovative solutions.

*The word cloud on the right highlights the most common positive comments from the staff that Blackline interviewed

Technological changes can be driven by the increased demand for digital services and automation

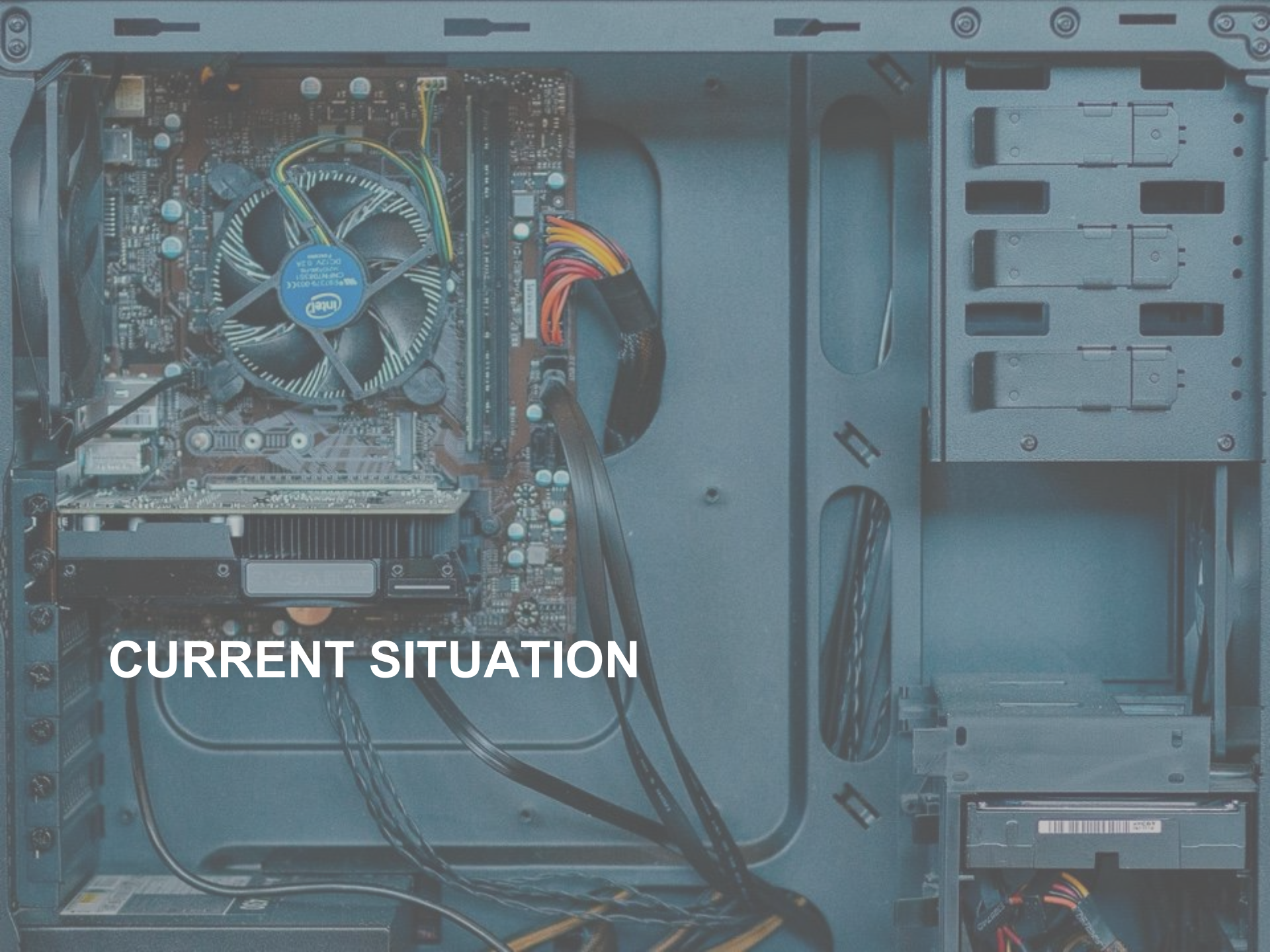
Weaknesses

- The current systems used by the City are not well integrated, leading to inefficiencies. Staff have to manually input data into different applications.
- Communication between IS and City departments is not helping IS staff to make strong strategic decisions about application development and increase integration between systems.
- City staff do not have the option for self-service IT helpdesk ticket submissions. This could result in process duplication where helpdesk staff have to transcribe ticket details into the system.
- Helpdesk staff do not have a formal procedure or script to categorize tickets, potentially leading to inaccurate and inconsistent data.
- The City has outdated technologies in place. Some hardware is running outdated operating systems. In some cases, this is caused by running Provincial systems that require different technology specifications.
- The IS department does not have a clear role in technology initiatives (e.g. software purchase and online services) driven by City Departments.

Threats

- Growing uncertainty around security and the growing complexity of cybersecurity risks and threats.
- Loss of institutional knowledge due to an aging workforce and little documentation on key IT processes.
- Increased demand for digital City services and the low levels of IT investment may create a technology gap.
- The ongoing conditions of the global pandemic, COVID-19, requiring more digital services and flexible working capabilities.

*The word cloud on the right highlights the most common comments on opportunities for improvement from the staff that Blackline interviewed


CURRENT SITUATION

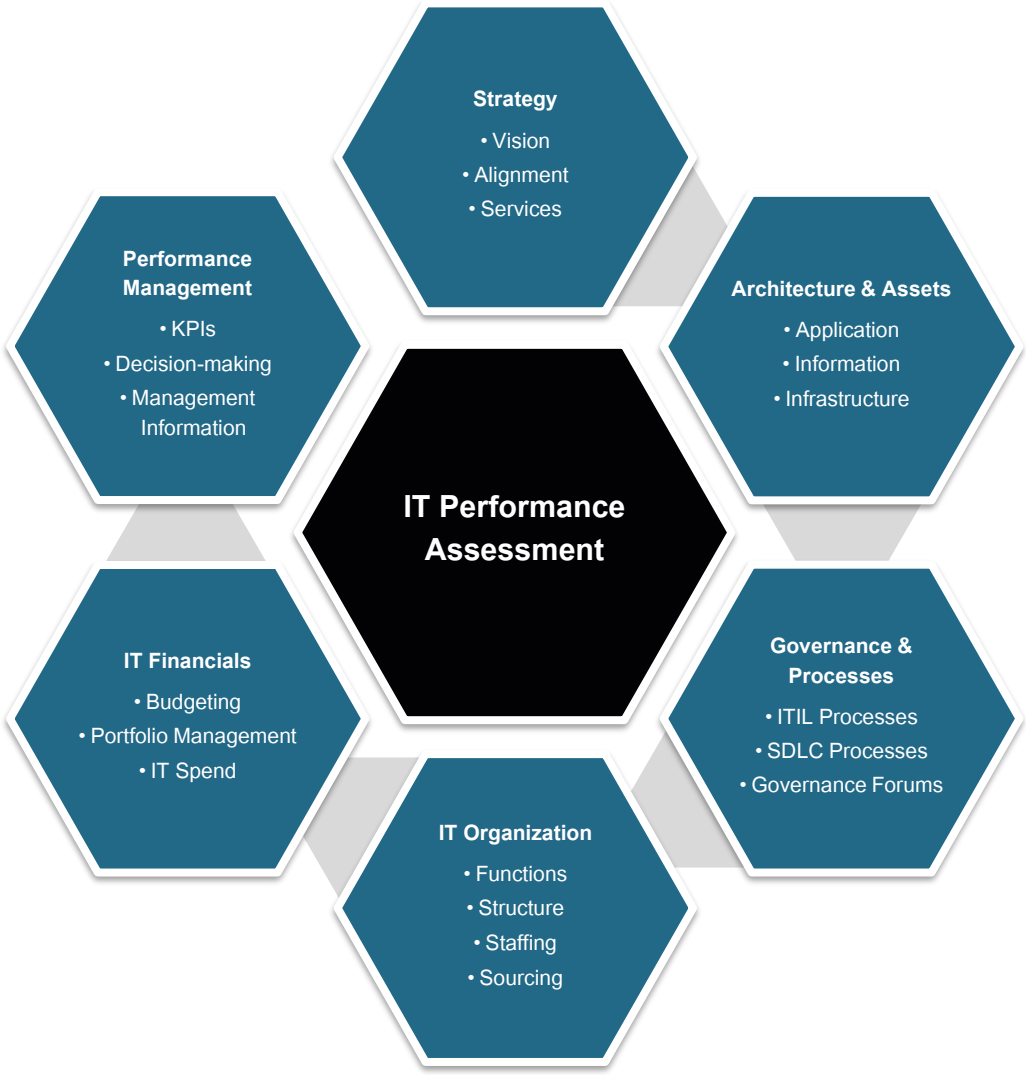
We applied our comprehensive IT assessment framework

Blackline's assessment of the City follows the assessment framework illustrated to the right

The following pages provide our observations and assessment of each of the six domains, with the exception of:

- **Strategy** – there is no official strategic plan that the City's IS Department has previously set.

Over the coming pages, we document the current situation of the City in each domain and our assessment of that position.



Each section is introduced by a risk summary

While there are good and bad practices as it relates to information technology, often decisions on IT choices come down to risk and cost

For example, when a vendor removes support for an application, an organization can continue using that system.

- By doing so, it is accepting the risk that it will not encounter an issue that prevents the application from working, if it did, it would not be able to secure support from the vendor.
- We believe this is an acceptable approach, as long as the organization has made that decision understanding the risk it is taking.

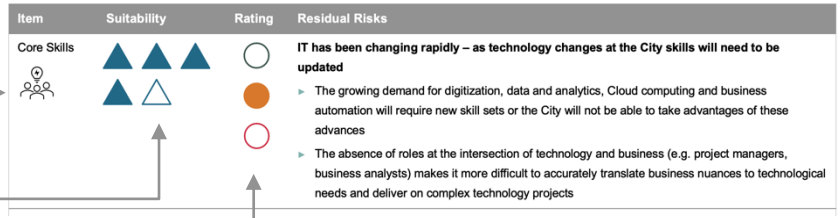
It is not uncommon for residual risks to exist

With any IT decision, there will likely be residual risks. No organization spends unlimited funds on IT. With that in mind, each section of our assessment is preceded by a suitability and residual risk summary.

- This is to help ensure that City leadership are aware and accepting of the residual risks inherent in the current IT systems and architecture.
- On reviewing these risks, if management deems them unacceptable, investment would be required.
- Organizations often develop enterprise risk frameworks to help them identify which risks they should mitigate.

Each of the summaries follows a standard layout:

- Item. This is the category of technology to which the findings align to.
- Suitability. Rated on a scale of 5. The shading of triangles represents how suitable the current set-up is based on the characteristics of the City.
- Rating. This is Blackline's opinion on the severity of the risks that the City is exposed to given the current set-up.
- Residual Risks. The potential and existing risks that are introduced as a result of the current set-up.



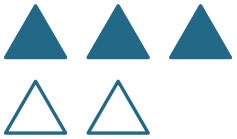
BUSINESS SYSTEMS

Summary of findings

indicates the item presents few risks

indicates the item has some risks

indicates the item has significant risks

Item	Suitability	Rating	Residual Risks
Business Systems 			**Some gaps in coverage and a couple of older systems needing replacement** ► Manual, paper-based processes with little automation and digitization in business systems causes business continuity risks (e.g. natural disaster leading to a loss in physical files) ► Little system integrations and the absence of a Business Intelligence (BI) tool may lead to missed business insights potentially impacting evidence-based decision-making ► Departmental needs may be missed and systems may be added to the estate without consideration of the broader application portfolio in the absence of a target application architecture ► The City's dated systems and technologies potentially compromise technology standards ► IS' high degree of in-house application development with little documentation impacts business continuity and loss of institutional knowledge

Most departments have systems in place to support their operations

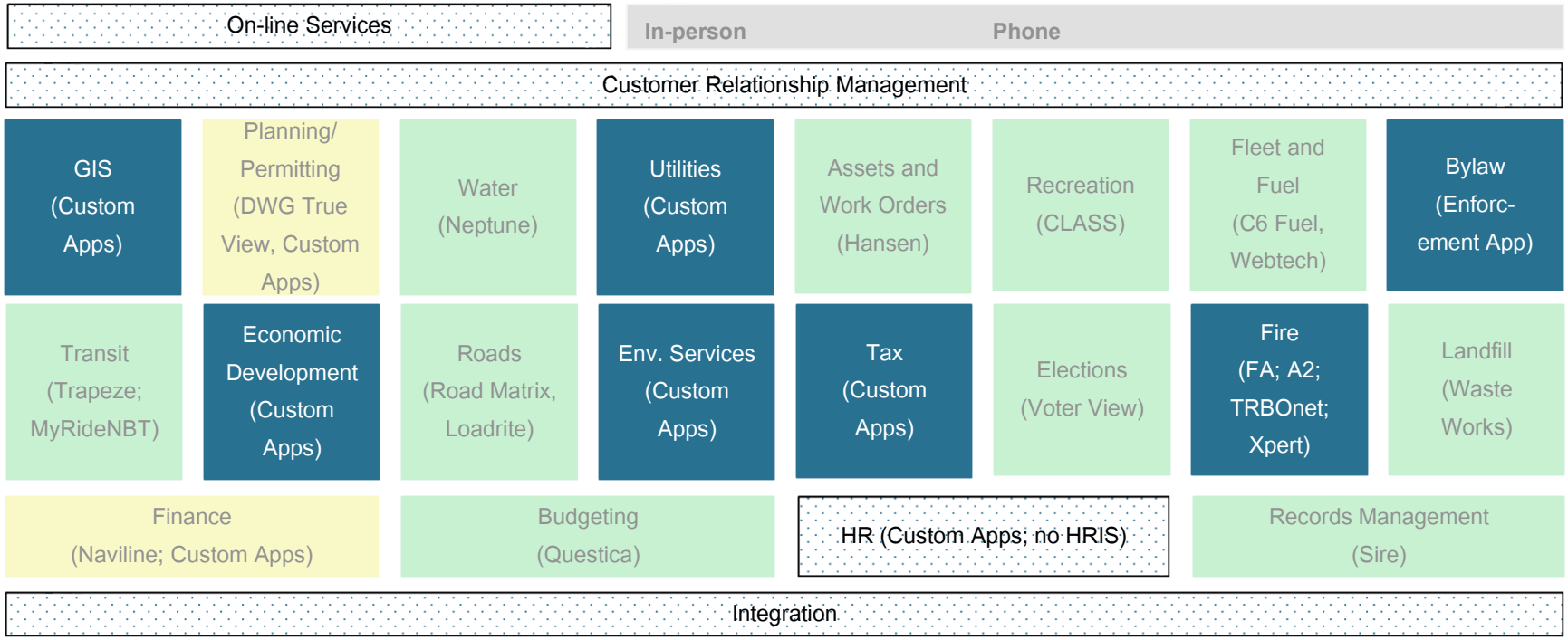
The diagram below is a logical architecture of a municipality. It shows the common systems municipalities run.

- Commercial off the shelf applications
- One or several in-house developed custom applications
- Mix of custom and commercial applications
- No system support

North Bay has a blend of custom and commercial applications

For the most part, departments have some sort of system to support their needs. In cases where they don't have a system, IS has developed custom apps to meet some of the Department's needs.

- Some gaps in key systems exist. For example, HR does not have an HRIS system, which is uncommon in organizations the size of the City.



IS staff support over 400 applications at the City and other agencies

This is a very high number of applications for the IS team to manage given its staff numbers

Of the 403 applications, 62% are commercial off the shelf (COTS) products developed by software vendors. While the remaining 38% are developed in-house by IS staff.

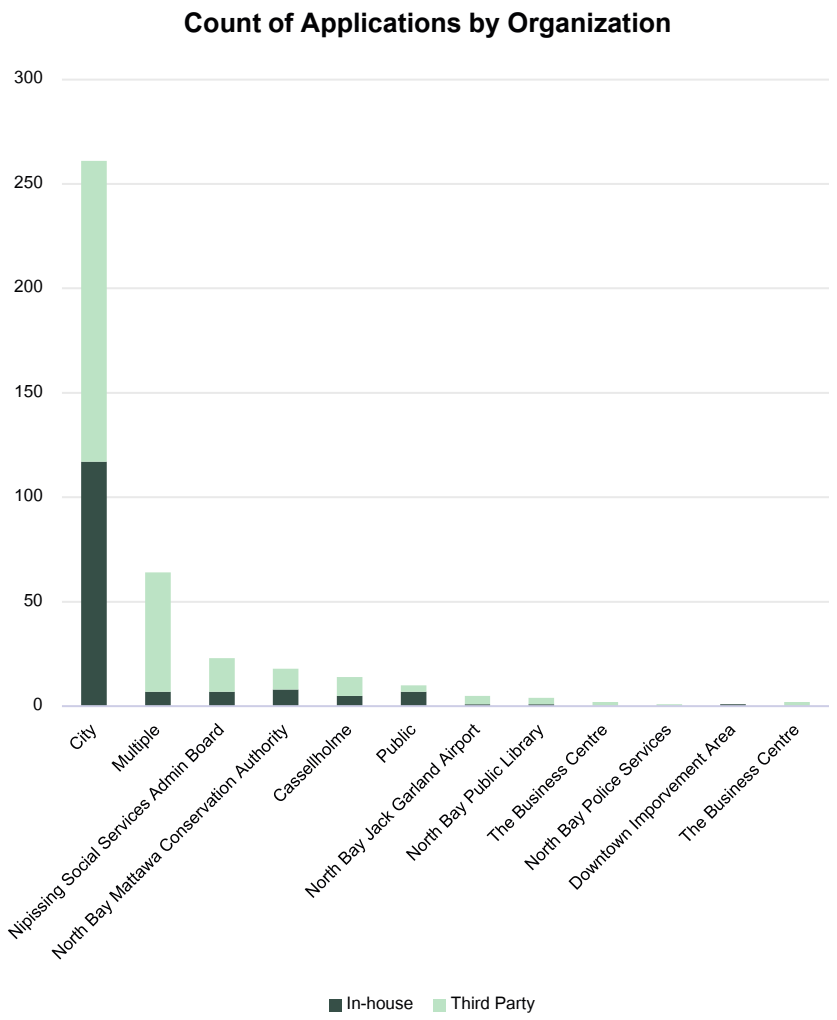
- The chart to the right shows the number of applications IS supports for each organization it works with, along with the split between COTS and in-house.
- Many of the COTS products are various office productivity tools such as Adobe Acrobat, Microsoft Office and Internet browsers. While support for these applications is generally lower than for an enterprise system, IS is still required to periodically update them and to address "how to" questions.
- Reducing the number of applications would likely reduce the workload to support them and it would reduce the breadth of knowledge staff require.

The number of in-house developed applications is much higher that is common in other municipalities

Many decades ago, organizations generally recognized the total cost to develop, maintain and enhance software applications was less when done by a software vendor who could distribute these costs across many customers.

- The City has made the strategic decision to develop applications that closely meet its needs rather than buying products with additional features it does not need. It has found this approach more cost-effective.
- As well as developing, the City also maintains these applications. Upgrading them as underlying software such as OS and databases change.

There are several applications that the City supports for departments and third-party agencies that are mandatory as instructed by the Province.



Note that on the graph 'Multiple' denotes the case where one, or more organization uses an application

Some of the core business applications have reached the end-of-life

Finance uses Naviline to support its operations

The underlying technology Naviline runs on is the IBM Power9 product, which is IBMs high-performance server series.

- Naviline is a finance system used by multiple user groups/departments. The City implemented Naviline in the early 2000s and is currently running version 9.01.19.02. The last update was conducted in October 2019. However, the most recent version is 9.1, and some updates and functionality require the latest version for compatibility.
- After 15+ years of use, the system is now re-branded into a package called ONESolution and offers a new user interface and Cloud hosting.
- Anecdotally, users of Naviline have reported difficulty using it, including performance issues, dated user interface and outdated process flows.

Support for the CLASS recreation system has ended

ACTIVE Network purchased the CLASS system and notified customers in 2014 that support for CLASS will end in 2017 for clients running CLASS version 8.0 (City's current version). Since then, ACTIVE Network is encouraging existing users to move to the product ACTIVE Net.

- The City can continue to use CLASS as it has a perpetual license, but it will not receive any updates, fixes or security patches. It will also not receive any support on how to use CLASS from ACTIVE Network.

Some departments do not have core applications as highlighted in the logical architecture on the previous page

For instance, the HR department does not have an HRIS system. They have several in-house custom-developed applications to support their processes instead.

- Without an integrated platform, HR staff have to request IS to produce some manual reports for them (e.g. employee sick/vacation time reporting). Staff indicated this hampers making data-driven decisions related to HR.

Some applications are old and this poses difficulties over time

- Newer applications often offer new capabilities and functionalities relevant today. These could include functionalities like remote and mobile access. For example, ACTIVE Net is a SaaS solution and therefore supports mobile and remote access.
- Integrations between applications become more difficult as older applications struggle to communicate with newer ones. This is a relevant challenge given the current application estate of the City.
- Additionally, older applications may not work on new operating systems or new hardware.

This becomes more important as the technology landscape of the City grows and the business demands more technology. While not widely adopted, some IT organizations implement policies that set restrictions on maintaining currency for application versions.

Little documentation exists today for custom-developed applications

As software is developed, it is good practices to document what the code does and how the application is configured

No formal documentation has been created for the City developed applications. Some comments have been added directly in the code to explain its functions, but this is not comprehensive.

- The IS Development Team is aware of this and has taken some steps to mitigate the missing documentation. One step is having a second person from the developer conduct the code testing, thereby becoming more familiar with the software.
- Secondly, they rotate responsibility for supporting the applications when they are live, again building on their understanding of the software and its respective code.
- The current situation leaves a residual risk that if members of the development team leave, some knowledge of custom applications may be lost from the City.
- A loss of this sort of knowledge could make support and problem solving more time consuming, as well as making future changes to an application's code more difficult.

Some of the in-house developed applications were developed in software languages that are coming to the end of support

IS have used ASP, ASP .Net and C# development frameworks for the in-house applications. The two ASP frameworks from Microsoft are in the latter stages of the support lifecycle.

- IS has migrated some of the custom packages to more current frameworks, but the approach is to only do that when a material enhancement is needed.
- The risks associated with older frameworks are broadly similar to those we outlined for COTS products.

The current best-of-breed architecture evolved over time

The City did not make a specific decision that a best of breed architecture was the right architecture

With no formal target application architecture, each time a departmental need was identified, a fresh search for a solution was conducted.

- The illustration to the right contrasts the two most common application architectures.
- Organizations often choose an ERP, or core platform, approach when they are seeking high levels of standardization and efficiency. It is also common when data is shared by many parts of an organization.
- Whereas BoB tends to suit organizations that have unique processes that give them a competitive advantage and where data sharing is limited.
- Municipalities straddle both of these camps – municipalities provide similar services and have an interest in implementing efficient processes. However, there is limited interest in standardization across the sector and the breadth of services far exceeds the breadth of functionality commonly contained in an ERP.

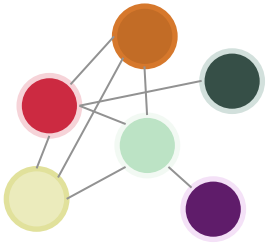
Some municipal ERPs exist, but the most common architecture in Ontario municipalities can be considered Target Platforms.

- An organization selects a few major platforms (e.g. asset management, CRM, GIS) for the majority of the functionality and then supplements gaps with narrow functionality applications.
- There does not appear to be a specific reason the City should move away from its current model – although it would be advisable to formalize the policy.

Best of Breed (BoB)

Best of breed requires forethought when selecting new systems to:

1) identify what opportunities are available for sharing information and
2) how best to integrate the system(s).



Often organizations use middleware products to create a standard communication layer for applications to “speak” with each other. Or in some cases point to point (P2P) connections are used. However, P2P can often create more complexity over time.

Core Platform

A core platform architecture was once very common - e.g. use of ERP systems for the majority of business functionality. Such an architecture requires depth of knowledge in the system modules, customization and configuration more specifically. The common challenge with this is that business requirements may not always be met and manual work arounds are used. Data integration typically occurs via import tools.

Cloud is increasingly the only option for business systems

The City uses a small number of Cloud-based applications, but the majority are installed in City Hall

The City does not have a policy on Cloud, but will increasingly find it doesn't have a choice for an application to be hosted on-premise.

- While most vendors still offer their applications and systems in both Cloud and on-premise solutions, the trend is for vendors to offer only Cloud options.

Cloud changes costs from capital to operating

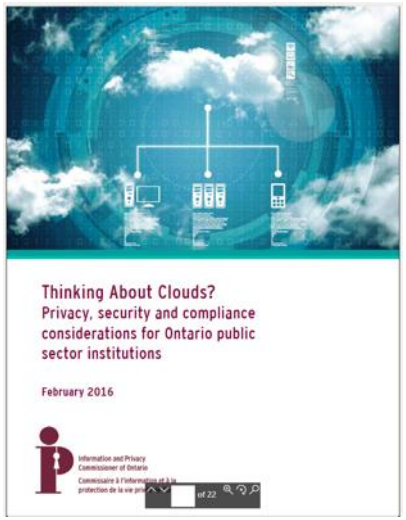
Today, when the City implements a new system, it will likely capitalize the hardware and software purchases.

- Cloud solutions are subscription-based, meaning you pay a monthly/yearly amount to gain access to the software and the associated hardware it is running on.

Many municipalities have developed Cloud policies to assist with the transition

The policies set the corporate vision and direction for Cloud, the pace at which the municipality will adopt Cloud solutions.

- This pace can range from 'only if we have to' through 'when we have to replace a system', to 'moving everything as quickly as we can'.
- Along with the vision, the policies tend to include an assessment tool that will determine how attractive it is to move a specific application to the Cloud.



While a migration of this sort does require planning, municipalities do not face any specific barriers

In 2016, the Ontario Privacy Commissioner published a study to help public sector entities navigate their concerns about taking advantage of the Cloud.

- The report concludes that there are privacy risks, but highlights that privacy legislation does not prohibit the use Cloud services.
- The report proposes a number of mitigation approaches that public sector organizations can adopt to address a different set of privacy and security risk than those they face with on-premise deployments.

Integration is fundamental to the success of BoB architectures

As the diagram to the right suggests, some applications in the IT application portfolio exchange data

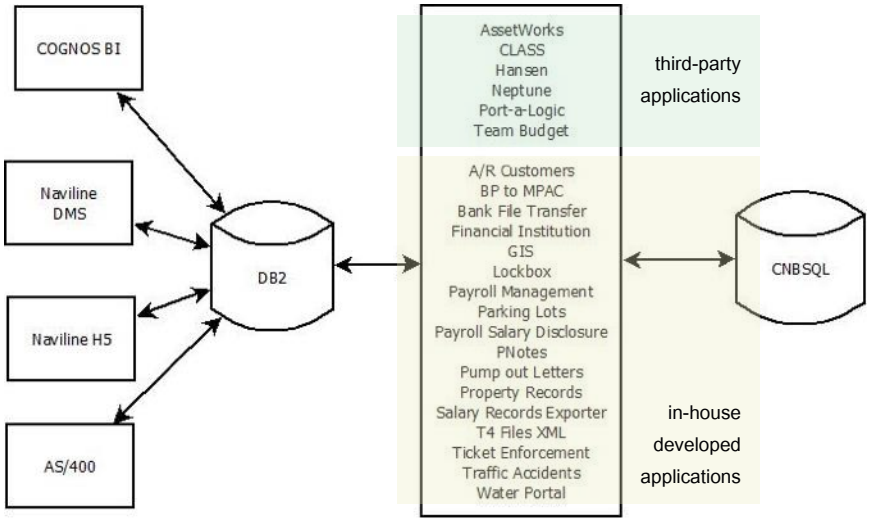
Predominately this integration is to move data from Naviline, the finance system, to other applications.

- For example, Team Budget. This integration is achieved by copying data directly from one database to the other.
- A few API integrations exist, such as between AssetWorks and Neptune, to allow residents to view water usage within the City's portal.

The implication of a BoB is the need to integrate systems to allow data to flow, avoid a siloed architecture and avoid data duplications or double-entry as they are inefficient and prone to human errors and omissions.

- Data integration will become increasingly important if the City looks to offer more digital services, allow for self-service reporting tools, or automate processes.
- It is also important to consider the architecture when adding new applications – e.g. does it fit into the architecture? Are there APIs or other integrations offered? Otherwise, silos in the architecture will prevail.

Given that the City's application portfolio follows a BoB architecture, it is beneficial to formalize the architecture and establish required integrations.



Several municipal services are available digitally on the City's website

The City's website primarily provide information to browsers, but some online services are available

The services fall into three groups: portal, forms and GIS.

- The portal allows residents to log in and view their water account (usage and billing). The website states that over 12,000 individuals have created accounts to access services online. This is a fairly good adoption representing 50% of the private households.
- Online applications/forms are available for three services: accommodation tax, burning permits and complaints.
- Residents can also use an interactive map – powered by Geographic Information Systems (GIS) Application – to access map services. On the map, one has the option to explore properties and general zoning within City boundaries.
- As municipalities extend their online services, payment processing is a critical element. Currently, residents only have the option to pay for parking tickets online, which is a third-party platform called paytickets.ca. The second area is systems integration – to be able to provide a range of services online will often require integration between front-end and back-end applications to make the required data available for the online service.

Municipalities across Canada are increasingly offering more digital services. The table below illustrates common online service offerings.

- In comparison to the City, some larger municipalities across Ontario offer a greater degree of online and digital services.

Recreation Registrations, bookings, reporting damage	**Building** License and permits, code infraction complaints	**Roads** Report damage, potholes, snow issues etc.
Animal Services Reporting dead animals	**Parking** Complaints, permits, pay municipal tickets / fines	**Transit** Interactive transit routes and maps
Taxes Property tax look up (e.g. account information)	**Customer Service** General complaints, community engagement	
Search - Detailed search with filtering capabilities		
Live Chat - Ability to chat with agents in real time		
General Services - Applications for permits / licenses		

The current COVID-19 global health pandemic has demonstrated that organizations are not equally prepared to offer digital/online services when physical services are inaccessible. Digital/online services may become part of business continuity plans for greater resiliency in the future.

INFRASTRUCTURE

Summary of findings

indicates the item presents few risks

indicates the item has some risks

indicates the item has significant risks

Item	Suitability	Rating	Residual Risks
Data Centre	▲ ▲ ▲ ▲ △	○ ● ○	**No backup data centre** ► The purpose built-data centre meets industry standards and the needs of the municipality ► There is no secondary disaster recovery site to use in the event of an outage/disruption, which means the City would be down for a long time if the data centre was affected
Infrastructure	▲ ▲ ▲ △ △	○ ○ ●	► Back-ups are conducted daily but the absence of a Disaster Recovery Plan (DRP) and spare hardware risks extending outages/disruptions and increasing potential data loss by a number of weeks ► End-of-life server operating systems (OS) potentially expose the servers to security vulnerabilities as patches and support are no longer released. Similarly, end-of-life end-user equipment (e.g. laptops/desktops) expose the devices to security vulnerabilities and lack vendor support
Network	▲ ▲ ▲ △ △	○ ● ○	► The network functions well, but is relatively basic ► Some single points of failure exist that increase the risk and impact of outages or disruptions ► WIFI is not available for staff, meaning mobile working is more difficult.

The City's Data Centre is more sophisticated than many similar sized municipalities

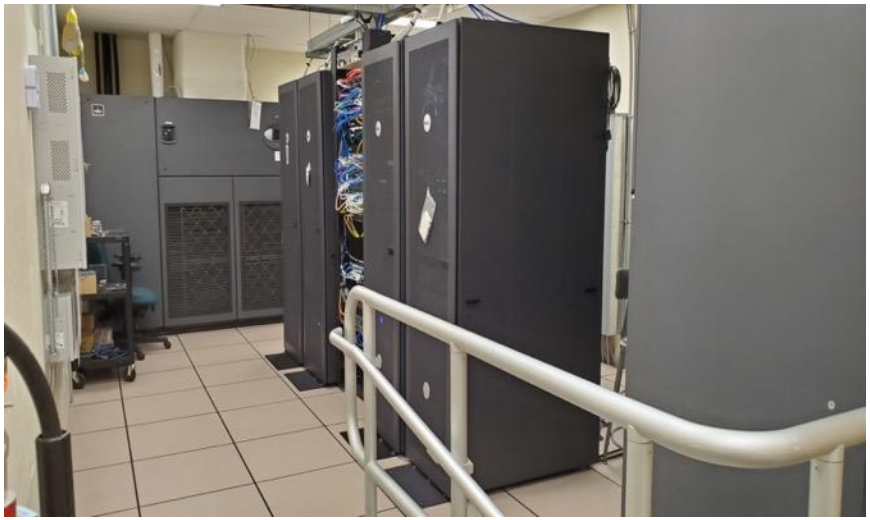
The Data Centre (DC) is a dedicated room that has been designed for this special purpose, as the image on the right illustrates

The City's DC is located on the 7th floor of City Hall. The Uptime Institute (UTI), a global authority on DC design and management, has created a DC classification system.

- Based on the characteristics of a DC, the classification indicates the amount of downtime to expect. The classification is a scale from 1 to 4, the higher the tier, the less downtime.
- We would classify the City's DC as a Tier 2, which UTI indicates would have just 22 hours of downtime in a year.
- The characteristics that help it to achieve this tier include:
  - Dedicated server room with physical security (limited entry to IS and maintenance staff)
  - Two different dedicated HVAC (cooling) systems
  - Raised floors for the cabinets and cabling
  - UPS and backup generators
- Missing characteristics that prevent it from gaining a higher tier include:
  - Redundant network
  - Redundant power
  - Redundant utility provider

One material residual risk that the DC faces is damage from fire.

- A single small fire extinguisher is within the DC. In the event of a fire, this would be inadequate.



Equipment within the DC is replaced on a 5-year refresh cycle

IS has a 5-year service agreement with Dell to replace hardware. If needed, IS extends the service agreement. That said, IS does not store spare equipment on-site in the event of DC hardware failure.

The City currently does not have a secondary site that is redundant

Typically, organizations of similar size to the City have secondary DC sites that are physically further away from the primary site, are redundant and back data and information up. This helps ensure continuity and minimizes the impact of a loss of service at the primary site.

Majority of the servers in the IT environment are virtualized

The City has a large number of virtualized servers – 39 of 54 (or 73%) of all servers are virtual

Virtual servers offer a number of advantages to IT departments, including:

- The ability to quickly scale at a relatively low cost. It allows them to partition one physical server into several virtual ones. These can then be deployed, operated and managed using multiple operating system instances at once on one physical server. Virtual servers can also be shifted between hardware and thus reducing the downtime.
- The ability to maximize server utilization by running several virtual instances. This also reduces the number of physical servers located on-site and is, therefore, more cost-effective.
- The ability to create independent environments to separate certain environments. This is particularly useful in the City's case as application development occurs in-house. This way, testing can be kept in a separate environment mitigating against the risk of disruption.
- The ability to host applications that require newer OS versions on existing servers as virtual instances without adding physical servers.
- The ability to continue supporting legacy software as old OS can remain running on virtual servers, reducing the cost of migration.

The images below illustrate the differences between physical server architectures in comparison to virtual server architectures

Physical server architecture (left) compared to a virtual server architecture (right)

Almost half of all physical servers have passed end-of-Extended-life

The City's physical servers are not maintained regularly, thus putting the virtual servers at risk

Almost half of the Operating Systems (OS) on the physical servers have reached end-of-extended-life, with the remainder currently in extended life support. IS management has indicated that many of these servers are operating legacy applications that are planned to be decommissioned.

- Just less than half (47%) of the physical servers are operating on MS Windows Server 2008 R2 OS. This OS reached end-of-extended-life support in January 2020; Mainstream end of life occurred in January 2015.
- The remainder half (53%) of the physical servers are operating MS Windows Server 2012 R2. End of Mainstream life was reached in January 2018; Extended life is set to expire in January 2023.

This potentially exposes the servers to security vulnerabilities as security patches and support are no longer released for the OS version when it passes end-of-extended-life.

Maintaining the currency of physical servers is a pre-requisite to running virtual servers on them, otherwise, several risks prevail.

- Physical servers must be upgraded regularly. The hardware to avoid hardware failure; the OS to receive security updates and vendor support. Ultimately, the failure of one physical server may bring down several virtual environments exacerbating the incident.

The image to the right illustrates the City's servers and cabling in the various racks at the data centre.

The City's virtual servers are running VMware on various MS Windows Server OS versions

- 44% are running MS Windows Server 2008 R2 Standard
- 46% are running MS Windows Server 2012 R2 Standard
- The remainder 10% are running MS Windows Server 2016 Standard

MS Windows Server 2016 Standard is under support until 2022 and extended life until 2027. The other OSs face the same concerns highlighted for the physical servers.

A basic hub and spoke network architecture connects all City sites to the data centre and Internet

The data centre at City Hall is the hub, with each remote location connected to it with a spoke

The diagram to the right shows the layout of the City's network.

- All network traffic that has to reach another City site, reach a City server or reach the Internet goes through the hub at City Hall.
- While this is the most common network architecture adopted by organizations to connect their internal locations, it does have some inherent weaknesses that should be mitigated. Primarily a failure at the hub, which would lead to loss of connectivity for all users.
- The City provides public WIFI at City Hall. This is a separate connection, not on the City's main network and is architected through a separate firewall.

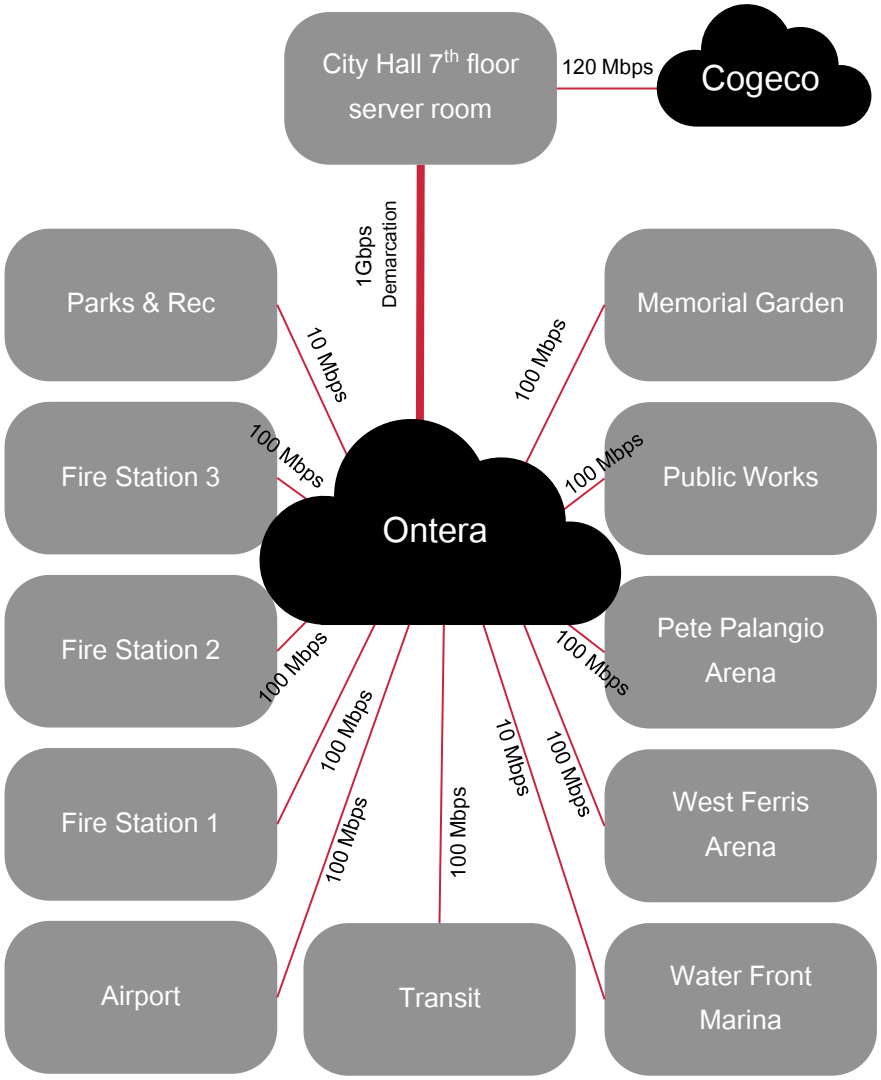
The City does not have mitigations in place in the event of a failure of network components

Commonly referred to as single points of failure (SPOFs), if these components fail, some or all users would lose connectivity. Specific SPOFs include:

- **Internet connection:** there is just one internet connection, which, if it failed, all users would lose internet connectivity.
- **Connections to City Hall:** There is a single line between City Hall and Ontera, if this failed, all sites would lose Internet and server access. Similarly, each site has a single connection to Ontera and a failure would disconnect that location.

The network functions and the City could choose to accept these risks and not expand the architecture.

- Common mitigations are implementing redundant connections – so a second Internet connection, possibly terminating somewhere else than City Hall or connections between sites so that alternate routes exist.

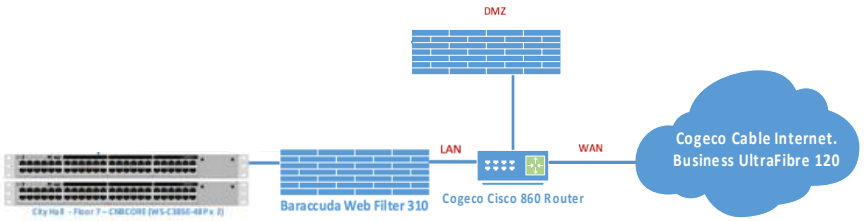


Some characteristics of the network are less common today

The local area network, the connections at City Hall, have characteristics that were more common in the past

- **Single firewalls:** Firewalls filter network traffic and try to prevent suspicious traffic from moving to the next section of the network. It is common for firewalls to come in pairs so that if one fails, the other can take over. The City does not have paired firewalls.
  - IS has created a DMZ, a section of the network less secure than the internal network but more secure than the Internet. This is between the Cisco ASA and the Barracuda web filter, as demonstrated to the right.
  - The Cisco device was first brought to market in 2005 and was last sold in 2017.
- **Wired connection:** The vast majority of network connections are wired. There are spots of WIFI in certain locations, but this tends to be to provide guest WIFI. Most organizations offer pervasive WIFI and few end-user devices support wired connections.
- **Static addresses:** Each device is manually given a fixed network address. This is very uncommon and will make it difficult for mobile devices to operate as when they move to a different segment of the network, their address will be incorrect and they will not be able to connect. More common is Dynamic Host Configuration Protocol (DHCP), where a device is given a new address by a server each time it powers on.

While the network functions today, increased use of cloud services and mobile devices would suggest these configurations would need to be changed.



Establishing and enforcing security practices are foundational to information security culture and protection against attacks

The City should ensure that both City staff and IS staff follow good practices regarding information and password security. Common considerations include:

- Administrative rights only when/where required
- Regularly changing passwords
- Creating complex passwords that are hard to guess but easy to remember
- Protecting passwords
- Avoiding writing down passwords
- Different passwords for different account

Telephony across the City is based on VoIP connectivity

All sites and locations across the City are primarily VoIP telephony. Some sites have traditional landlines for emergency purposes, which is in line with common practice.

- The master controller is located at City Hall in the basement. There are four remote VoIP (Mitel) controllers at the larger locations across the City. Those are maintained by Bell.
- Staff have VoIP handsets on their desks, which look similar to traditional handsets.

One advantage of VoIP is enhancing mobility.

- VoIP calls can be redirected to many devices, whether VoIP handsets, laptops or mobile phones. The same contact number is retained, but calls can be made/received on any device.
- Softphones even eliminate the need for additional devices by using software to make and receive calls. Commonly this goes hand-in-hand with mobile and remote working.

Without a business continuity and IT disaster recovery plan, the City could be without IT for many days in the event of a disaster

The City retains fulsome sets of backups that can be used to restore failed systems

However, there is not a secondary location or alternate hardware to restore the backups to.

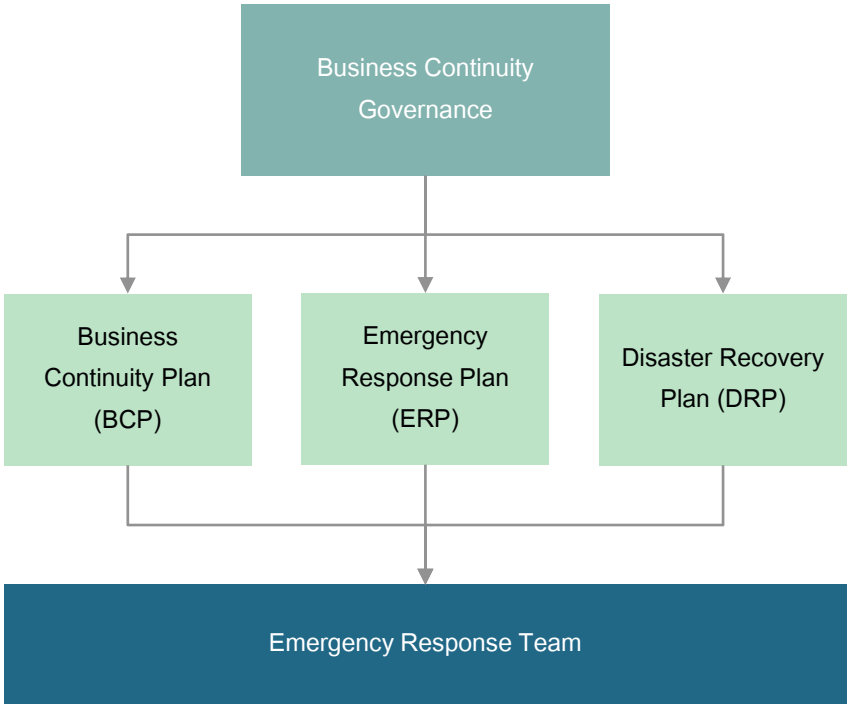
- In the event of a material disaster, such as a loss of the data centre through a fire or flood, the City would have to procure hardware, find a location to house it, begin the process of restoring systems and reconfigure the network for the new server locations.
- This process could take anywhere from 5 to 20 days. Since the City has not practiced this type of recovery, it is likely to take it longer and you cannot be certain your backups will allow you to restore all the systems.
- An additional concern in this scenario is that the backups are stored in the data centre and would be lost along with the other infrastructure.

The City does not have a Business Continuity Plan (BCP)

BCPs ensure that an organization can continue to operate when an outage or disruption occurs (e.g. COVID-19).

- One element of a BCP is the IT Disaster Recovery Plan (DRP). A procedural document that outlines how IT services will be restored.
- A Business Impact Assessment (BIA) informs the DRP. The BIA outlines the effect on the organization of being without a specific system and concludes on the speed with which each system should be restored.

An overview of a typical business continuity program at an organization



The backup schedule is common and effective

Each day, the IT systems are backed up to a dedicated backup system – referred to as a disk-to-disk backup

To manage storage, IS has defined what data will be backed up, what data will be retained and what data will be deleted from the backups.

- Each day just the data that has changed since the previous day is backed up, an incremental backup. A week's worth of daily increments are available at any one time.
- Once a week, a full backup is completed of all data. Four full weekly backups are on hand at any one time. IS retains one yearly backup of the previous year's data and information on systems.

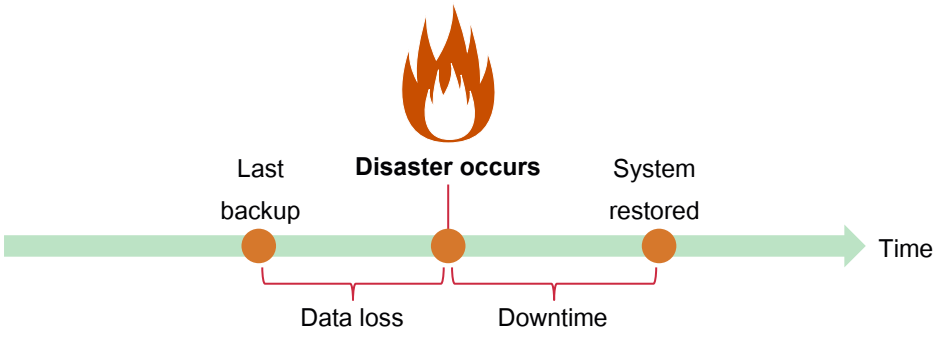
The lack of a DRP or recovery hardware means the current backup solution is more of a file recovery mechanism

When users delete or lose files, IS can use the backups to restore the files. In the event of a software corruption, IS could also restore a system to the existing hardware.

- IS has certainly proven the file recovery capability works and occasionally has restored individual systems.

While the backup protocol reflects common practice, knowing if it is correct for the City requires an understanding of downtime and data loss - the graphic to the right shows these concepts.

- Each senior leader should provide their needs for both these characteristics to allow IS to develop a suitable DRP and backup schedule.



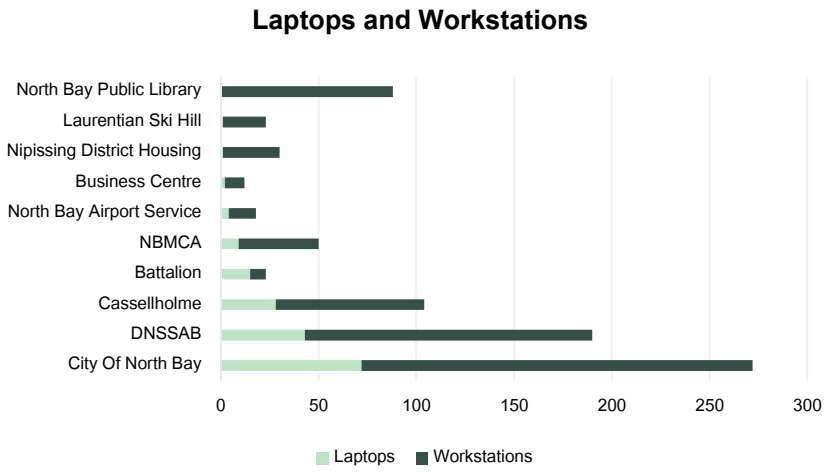
Majority of devices are running the most up to date operating system

Staff from the City and third-party agencies have different computer brands

The IS department provides support to a total of 175 laptops and 635 workstations for users at the City and other third-party agencies.

- The graph on the right provides a breakdown. 75% of the equipment is concentrated in the three largest organizations that IS supports: The City, DNSSAB and Casselholme.
- Almost all of the workstations are Dell. For laptops, there is less consistency, where 33% are Microsoft, 45% Dell and 22% are a mix of other brands. This is common as organizations deploy hardware depending on their needs. Commonly, senior staff have some flexibility in choosing the different brands of equipment.

Even though the process is not formal, the IS department is involved in the procurement process of hardware for all City departments and third-party agencies.

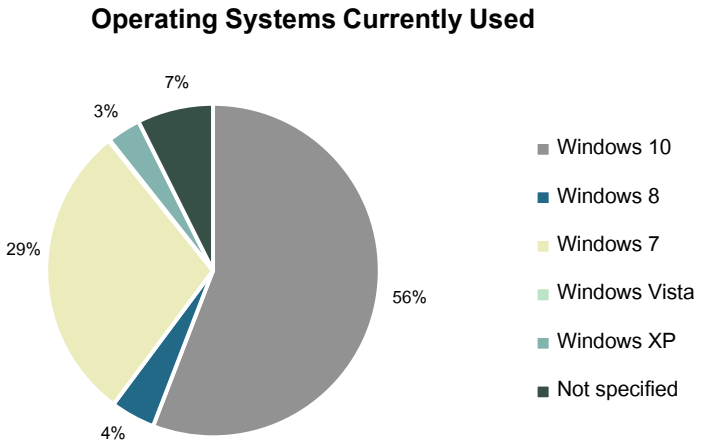


Almost one-third of devices are running unsupported, dated OS

29% of computers are running on Windows 7 OS, 3% on Windows XP and one computer still running on Windows Vista. These operating systems are unsupported and passed end-of-extended-life, meaning that they will not receive any security updates or any extended vendor support.

- That said, many of these devices are not on the corporate network and are associated with systems that cannot be upgraded, such as the door security.

All other computers purchased since 2017, are running on Windows 10 – the most recent OS.



IS supports the printers of the City and third-party agencies

In total, IS supports 87 printers at the various locations

This is a high number, approximately 1 per 8 users. The general trend is creating printer pools where two to three printers might support an entire floor of users.

- 76% of printers belong to the City and DNSSAB. The remaining 24% is made up of nine organizations. When there are issues that require in-person support or changing toner, the IS team is required to visit the facilities in-person.
- There are different brands of printers across the City and third-party agencies. 72% are HP, 13% are Dell and the rest are from a variety of other brands. This is not unusual because of the different needs that each department has. Some printers are designed to meet those specific needs (e.g. multi-purpose printers, desk printer, all in one printer).
  - That said, some applications that City departments use are compatible with specific printer models only. This poses some limitation to IS.

Along with the printer pool trend, many organizations have outsourced printer services to external providers, often the printer vendors (e.g. Xerox), which we understand the City has done.

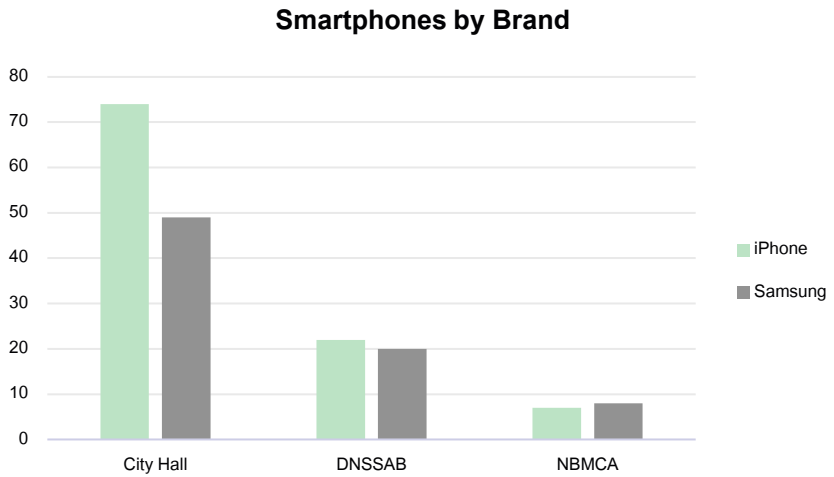
- Typically, the outsourcer is also responsible for the maintenance and support of printers – including changing toners and the printer will have the phone number of the service provider on it for users to call.

The current trend for some organizations is towards digital records and thus reducing the number of printers/copiers. However, this is typically part of longer-term digitization strategies.

IS is responsible for 284 cellphones in total

And should expect to see that number continue to rise.

- It is common to see cellphones of different brands and generations across organizations. Of the total devices supported, 63% are iPhones and Samsung, the remaining 37% are made up of a variety of other brands.
- Some organizations have a Bring Your Own Device (BYOD) policy. City staff and users from third-party agencies have the option to bring their own devices. The IS team supports those BYOD devices and, if required, provides them with a SIM card.



Remote work is not inherent to the IT environment

Prior to the COVID-19 restrictions, City staff had limited remote work capabilities

Some staff had access to a Citrix remote desktop, however, only limited software products were licensed within Citrix as this required purchasing additional product licenses.

- Few City staff have laptops; the majority of staff have desktop workstations. For those compelled to work from home, it was only feasible by using their personal devices, if they did not have a city laptop.
- IS staff have identified a short-term solution for those staff to access City IT resources.

However, more recently, IS has been working with the various business departments to identify opportunities that meet their needs in enabling remote work, such as digital signature solutions.

If the City wished to enable remote working for some of its staff, then IS may consider changing several factors in the IT environment:

Hardware

providing staff with mobile tools such as tablets and laptops over desktops

Software

preferring Cloud based/SaaS applications that are accessible remotely

Virtual Connection

with mobile devices, virtual private connections (VPN) allow user to securely connect to the corporate network from a remote location

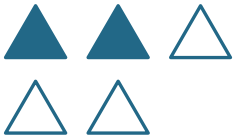
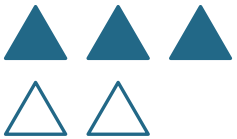
GOVERNANCE & PROCESSES

Summary of findings

indicates the item presents few risks

indicates the item has some risks

indicates the item has significant risks

Item	Suitability	Rating	Residual Risks
Governance 			**Limited executive input into priorities** ► The absence of a dedicated technology committee potentially can lead to business needs being missed and not prioritized correctly. ► Little transparency and visibility into IS workload to the organization may create a misconception of the priority of departments' projects ► Project prioritization without input from the business and an objective project prioritization criteria makes it difficult to fairly and impartially rank and prioritize technology projects
Process 			**No formal service levels between all stakeholders** ► Without formal documentation of core IT processes employee absence or departure can leave a gap in institutional knowledge, emphasized recently when the IS director and manager left. ► Limited service level agreements between IS and the third-party agencies IS supports creates inconsistencies regarding expectations, budget, accountability and scope of service ► The absence of a formal technology project in-take process creates misalignment between IS and departments. IS currently does not formally require project details and this may undermine IS' effort and involvement in a project, thus impacting IS resource planning

IS is represented at the Executive Leadership Team

Key decisions about IT are not formally part of the agenda of the Executive Leadership Team

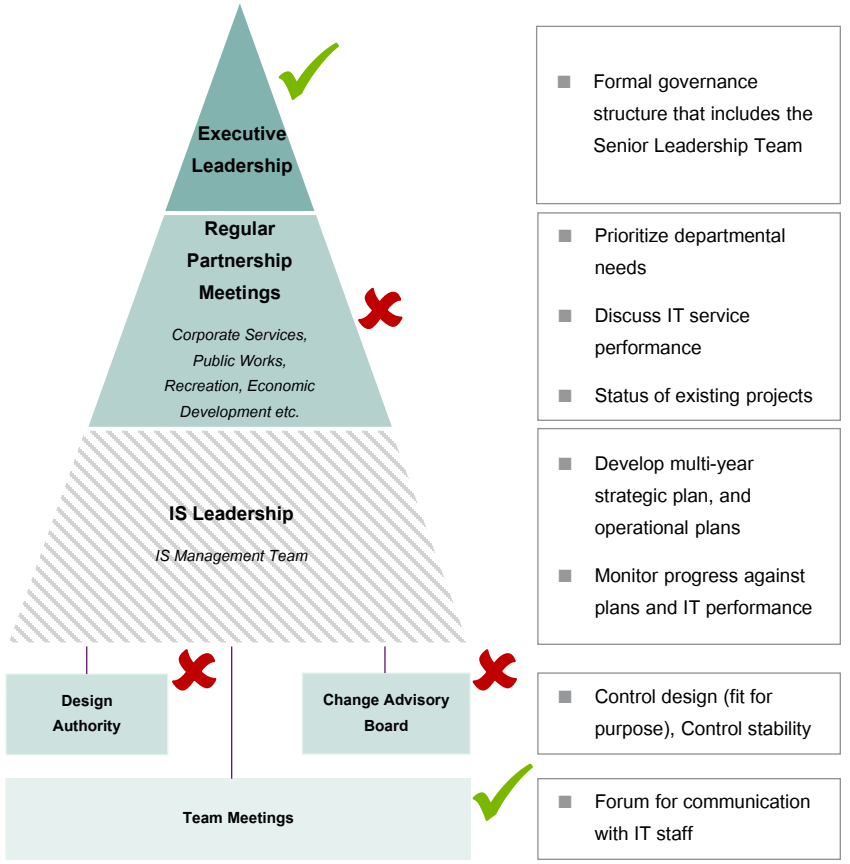
Historically, the Director of IS was making key decisions about projects and the technology roadmap. There are no formal structures for discussion about priorities between the IS leadership and departmental leaders.

The diagram to the right is an illustration of our IT governance framework. The boxes to the right of the diagram are a brief description of what the forum should do.

- ✓ indicates the City has this component
- ✗ indicates the City does not have this component
- Grey shaded boxes represent **not applicable** to the City
  - The Director of IS position is currently vacant and therefore IS Leadership Meetings are not applicable

The effect of the governance structures is that decisions on IT priorities are made by IS based on their available resources, not necessarily on the importance to the City.

Core IT Governance Forums



IS relies on individuals for core IT operational processes and procedures

Core IT processes are neither standardized nor documented

IS relies on individuals for knowledge on processes and other key IT documentation. This potentially creates a knowledge gap in the case of employee absence or departure. This institutional knowledge is at risk when individuals leave the City.

- As we highlighted in the Business Systems section of the report, little documentation exists about the custom-developed software, but this is also true of other aspects of IS operations. For example:
  - Infrastructure diagrams and documentation are fairly limited. IS relies on the infrastructure staffs' inherent knowledge of the network and infrastructure to carry out processes and execute change.
  - Departments request projects by emailing or calling IS. There are no forms or documents that departments submit to provide initial detail (e.g. budget, scope, strategic alignment, timeline, etc.) with the appropriate managerial approvals as required.
- IS supports a great number of non-City agencies without current service level agreements. This may cause inconsistencies regarding expectations, budget, accountability and scope.
  - In select cases, high-level service levels exist. However, they are not documented formally, are out-of-date and do not accurately represent the services provided by IS currently.

Since the former IS Director and Manager departed the City, the effect of not having formal documentation has been highlighted

IS produced the documentation available for our request to help us to understand the situation at the City.

- However, some information was just not available or not known.
- Little documentation and standardization are not uncommon in many organizations. It consumes resources to create and maintain documentation. While it is not required for the City to follow rigorous industry process standards, it is beneficial to ensure some degree of documentation suitable for the City.

IS uses the City's Corporate Strategy to guide decision making

The IS Department does not have a formalized IT strategy or technology roadmap that sets the direction for the next defined-number of years

Instead, IS uses the City's corporate strategy (called North Bay Strategic Plan 2017–2027) to identify any technological implications to use as an overview of potential and upcoming projects.

- Historically, the Director of IS would meet annually with each of the department heads to understand if they had any IT needs for the coming year that IS should budget for.
- While this has identified some projects, many projects are communicated to IS staff during the year, which were not identified during budgeting.

There is no process or forum for prioritizing technology projects

IS maintains a collated list of projects that it has been asked to deliver.

- Without a formal process, prioritization is left for the IS department to conduct. This may or may not align with the priorities of the City as a whole.

It is good practice to inform technology direction and strategy from corporate and departmental strategies

That said, technology is not a key pillar of the City's strategy. There is little mention of technology beyond as an overarching background service (e.g. broadband connectivity).

- For IS to be closely connected to City needs will require greater consultation.

It is common practice for a committee of department leaders to discuss the specific priorities for technology projects, following a defined prioritization framework.

- Since technology is a key enabler to the work of the City, not having a forum of this nature can impede the City from achieving its objectives. Projects that support those objectives can be delayed in favour of projects that do not support the objectives.

IT projects are prioritized by IS with limited input from the business

Business departments are required to email or call the IS department for any technology projects

The requestee will provide basic details on the required project. The IS Manager will then work closely with the requestee to identify scope, budget, timelines and other project-related details. At this point, the IS Manager will assign IS staff to the project who will liaise and collaborate with the respective department to complete the project.

- There are no formal project forms that departments may submit to request projects.
- Not having visibility into the projects that IS is currently working on makes it difficult for the team to get a sense for workloads when projects emerge. The business having no visibility also makes it difficult for them to get a perspective on IS's current workload or project list.

Little documentation and formality may lead to unmanaged expectations and may potentially cause increases in scope that will negatively hinder IS' ability to conduct their daily work and work on other projects.

IS does not use objective criteria to prioritize technology projects

The absence of objective criteria and no involvement from the executive team may lead to a skewed project prioritization list. It is beneficial to have input from the business for IS to provide context on the achievability of projects as well as get input on what's a priority to the City – similar to the capital budget process.

It also gives stakeholders visibility into decision making regarding technology projects.

- Objective criteria may include questions such as is this project driven by legislation/regulation? Does this project have productivity gains exceeding $X? Does this project advance the corporate strategy?

This is uncommon in organizations similar in size to the City. Commonly, organizations have set-frequent meetings (quarterly or every six months) with the IT/technology governing committee.

- Typically, the IT team engages the business to collate a list of projects, then uses a project prioritization framework to rank them, then presents the list, at a high-level, to the governing committee. At the committee meeting, representatives have an opportunity to challenge and discuss the rank of projects.

Delivering IT projects without project management resources is contrary to common practice

The IS team completed 84 technology and IT-related projects for the City and third-party agencies in 2019

For 2020, there are 57 projects on the project list.

There is a list of projects for 2021+ that include 94 projects for the City and various third-party agencies. This project list has not been finalized and is subject to changes.

- The number of IS projects is common for an organization of the City's size.
- However, it is uncommon to have little involvement from the business regarding technology projects and prioritization.

For the most part, organizations will also have project management resources to support the delivery of projects and allow technical staff to work on the technical scope of projects.

IS does not have a project dashboard that it shares with stakeholders

Commonly, IT departments have a complete project list that lists all projects and supporting details. Details vary but typically include risks, benefits, budget, resource allocation, milestones, etc.

- A condensed version of the project list is typically shared with key stakeholders (e.g. executive team) to provide visibility into projects outlining high-level project information.

From January to August 2020, the IS Development team worked on 20 projects

The IS development team has 3 FTEs who work on day-to-day, operational matters, as well as projects. Projects are for a mix of different clients, including City departments as well as third-party agencies such as DNSAAB.

Such a model is common in IT departments. However, without the appropriate project governance tools and controls, it can be difficult to deliver. Ultimately, it can have unintended consequences, such as:

- More difficult to perform resource management
- Project delays due to unforeseen operational needs (e.g. priority incident)
- Requires technical staff to become their own project managers

The development team uses BaseCamp as a project management tool

Projects are entered into the software. Project stakeholders (such as third-party agencies or external consultants) have access to the tool and can follow-up on details such as project status.

- However, the tool is not consistently adopted throughout the City or IS. Using a project management tool is common practice in organizations, especially for larger, multi-stakeholder projects.

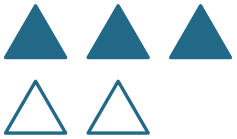
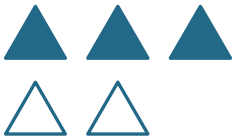
IT FINANCIALS

Summary of findings

indicates the item presents few risks

indicates the item has some risks

indicates the item has significant risks

Item	Suitability	Rating	Residual Risks
Third-party Agency Support			**Current agreements are less formal and do not in most cases reflect the services provided** ► IS may not be recovering the full cost of service to agencies as the recovery rate averages 83%, while the Agencies represent 49% of the users supported by IS ► Where agreements on services and service levels exist, they have not been maintained as the services provided changed. ► There is a perception that agencies get better services that internal staff, that can only be resolved with service levels and reporting ► Revenue and demand for service per third-party agency user varies greatly between the different agencies despite IS offering similar services and services levels. In the absence of a formal service level agreement, this may lead to discrepancies in the costs charged to the third-party agencies
Financials			**Budget is lower than is common for other municipalities** ► Low IT spend leads to difficulties maintain the currency of the technology estate. It also may have led to lower cost solutions – such as the network – than others have chosen ► Total revenue has been trending downward for the last three years, meaning the City may not be recovering its costs from the third-parties it supports.

IS expenses are increasing annually at a reasonable rate

Since IS also supports other third-parties, it is not straightforward to analyze the expenses

IS has all of the labour costs, but the agencies pay directly for hardware and software. For this analysis, we have prorated the City's labour cost based on the number of users so that the analysis focuses on the City's direct costs.

- The chart to the right shows IS expenses with the personnel costs prorated to 51% of the annual total – reflecting that the City is 51% of supported users.
- OpEx grew in the period by 31%, while Goods and Services grew more rapidly (62%), personnel cost, being larger contributed most in absolute terms.
- IS personnel expenses grew by 8% between 2017 to 2020. This seems reasonable as it is roughly 2.3% yearly, broadly in line with inflation.

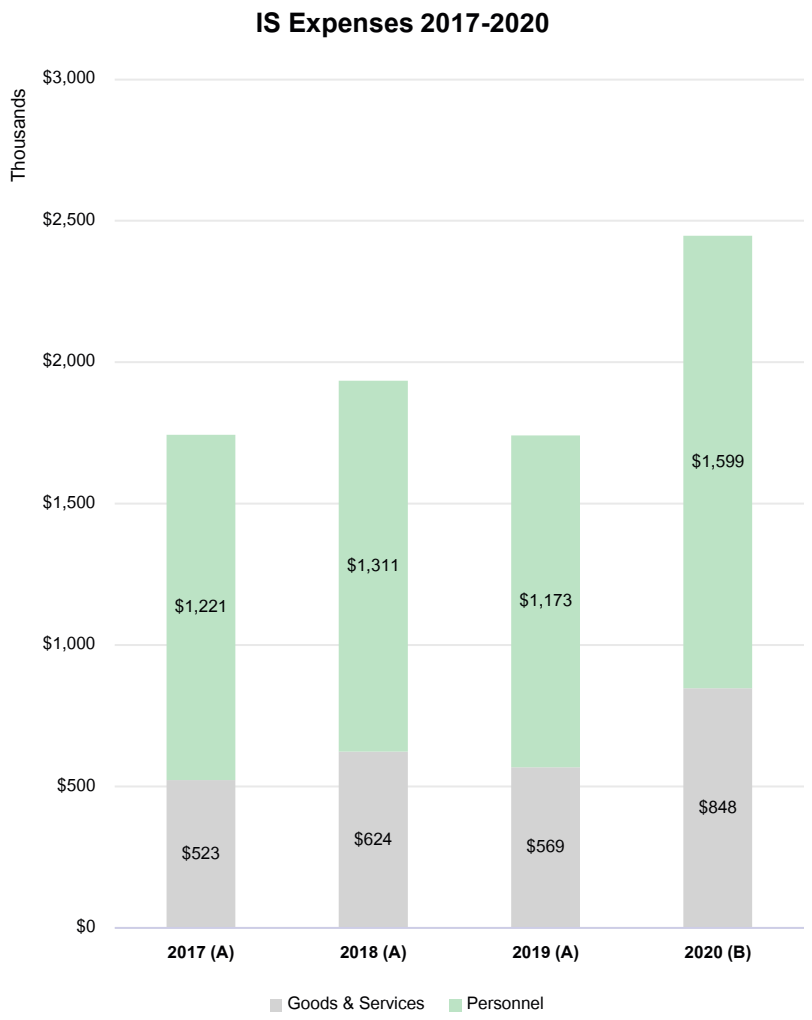
The ratio of Personnel related costs has been declining and now makes up 65% of OpEx

Gartner puts its benchmark at 41% of operating expenses, much lower than the City. However, on average, organizations in this benchmark spend 21% on outsourced services, whereas the City spend 0% of its budget.

- Combine the benchmark would be 62% against the City's 65% - meaning the City is in line with the average ratio.

Goods and Services grew by 62% between the period 2017 to 2020.

- Software Maintenance makes up almost half of the Goods and Services expenses or 25% of total expenses. It grew by over 40% between 2017 and 2020. This is unexpected given the degree of in-house development. However, this may be the Anti-Virus renewal fee, as IS typically renew their Anti-Virus once every several years, thus causing a one-time soar in Software Maintenance expenses.
- Internet Fees within Goods and Services experienced an increase of over 500% between 2019 and 2020. The increase is due to enhancements to network speed and WIFI installations in 3 recreation arenas. The City should expect demand for Internet to continue and for this cost to increase further.



Note that 2020 financial are budgeted figures and actuals may vary

IS spends less per staff than common practice when including all users the team supports

Again prorating the data, it costs the City between $1,871 and $2,551 per user per year to operate its IT systems

This is at the lower end when compared to other municipalities in Ontario* who range between $1,395–$6,750 per user.

- This lower number would suggest less investment in technology and the technology environment we have described in this report shows those lower levels. Underinvestment is known to limit an IT organization's ability to provide services.
- The internal development of software may contribute to some of this lower number, however, as we discussed in the infrastructure, many elements of the environment are basic – and lower cost.

This lower investment in IT and technology is evident in a number of key IT areas:

- IS spend has not increased much historically – especially when excluding 2020 budgeted year
- Most City departments have applications to support their operations, but limitations exist: some applications are dated, some departments don't have core applications, and no application/system integrations exist
- The IS team has developed a number of in-house applications for City departments. This typically keeps software licensing costs low
- The City does not have a secondary data centre in the event there is an outage or incident and traffic is required to be routed
- The network architecture is basic and vulnerable to a component outage. There are limited redundancies, operating systems of servers are dated, and the architecture does not inherently support remote work capabilities

IT budgets are a choice. The City can continue at this level of expenditure and accept more basic IT systems.

*London, Sudbury, Hamilton, Brantford, Oakville, Cambridge, Chatham-Kent

IS does not appear to be recovering all of the costs of supporting third-parties

IS receives fees from the agencies that it supports

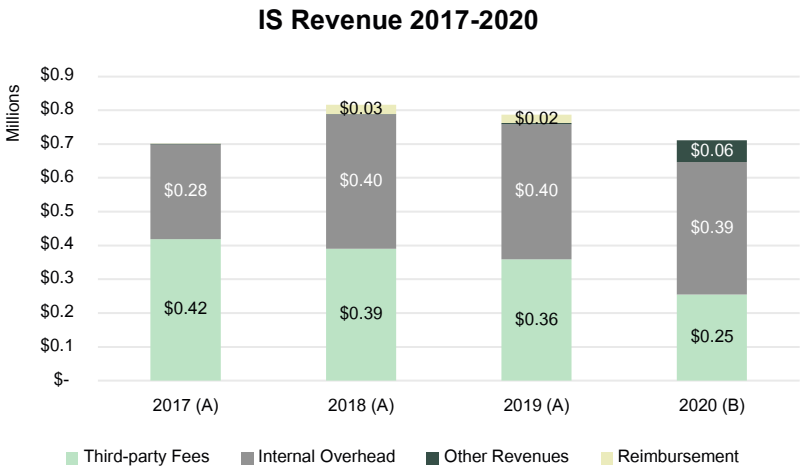
While total revenue is slightly higher than in 2017, it has been declining for the last three years.

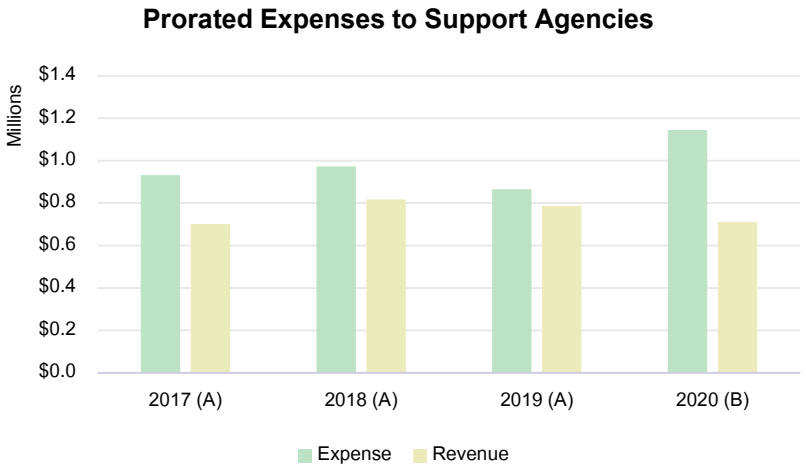
- Third-party fees make up on average 47% of revenue and have fallen all four years. This may be because IS no longer supports as many agencies as it did in 2017. IS also no longer receives revenue (since 2017) from Northern Ontario Heritage Fund Corporation.
- Internal Overheads is revenue from other City departments for IT services. This has increased over the years, with a slight drop in 2020.

IS may not be recovering the full cost of service to agencies

Agencies represent 49% of the users supported by IS. If we prorate IS expenses to 49% and compare it to the revenues IS receives, we get the chart shown in the lower right.

- Cost recovery is the percentage of expenditures recovered through fees. The cost recovery rate has been averaged 83% in recent years.
- The City does not have a target for how much it recovers from agencies and, where formal agreements exist, they do not reflect the services that are delivered.





Note that 2020 financial are budgeted figures and actuals may vary

The majority of incident tickets are submitted by City users

Incident tickets are the only item tracked by IS

As the table to the right shows, City staff account for around 65% of tickets but represent 51% of supported users.

- From the data recorded in the ticketing system, 67% of the labour went tickets from City users. This suggests that the labour per ticket is probably the same on average, whether a City user or an agency user.

Having the agencies at this level of recovery pays for about three staff

One of the benefits of arrangements such as the City's, is that it builds scale.

- If the City withdrew from the agreements, it would have to consider whether it continued to fund the three positions that the arrangement effectively covers.
- One of the benefits of scale is the ability to specialize. Right now IS is just large enough to have some specialization such as GIS and database developers, losing three positions would remove much of that specialization.

Agency	Incident Tickets (2019)	%
City Of North Bay	6,224	66.2%
DNSSAB	1,816	19.3%
Cassellholme	505	5.4%
North Bay Mattawa Conservation Authority	221	2.3%
Outside	165	1.8%
North Bay Airport Services	164	1.7%
Battalion	108	1.1%
The Business Centre Nipissing	95	1.0%
North Bay Public Library	69	0.7%
North Bay Police Force	19	0.2%
Nipissing District Housing	12	0.1%
Laurentian Ski Hill	10	0.1%
Total	**9,408**	

Cost recovery rate and demand from third-party agencies seems to vary

The table to the right uses incident tickets to compare the labour for each agency to the revenue

This is a way of viewing the data – we are not suggesting this is how fees should be calculated.

- The first observation is the cost per user varies wildly, from as low as $63 for the airport to as high as $1,073 for the library.
- The services received do differ. Cassellholme has their own servers and network that IS operates, whereas DNSSAB uses all City-owned servers. The libraries have an IS coordinator who fields basic IT requests. While adjusting for these differences might bring the costs per user more inline, they are unlikely to fully align given the range.
- The second measure is the amount of demand for service an agency generates – labour per user. Here again, there is a big variation in labour with libraries demanding less than an hour per user and DNSSAB over 6 hours.

These discrepancies, along with the low recovery, suggest that the City would benefit from formalizing service agreements

Agency	Total Hours Worked	Users	Revenue	Price per User	Labour per User (Hrs)
Battalion	82.4	31	$17,000*	$548	2.66
Cassellholme	337.8	235	$21,118	$90	1.44
DNSSAB	1,278.9	195	$204,847	$1,050	6.56
NB Airport Services	100.4	44	$2,759	$63	2.28
NB Mattawa Conservation Authority	289.1	53	$4,088	$77	5.45
NB Police Force	8.4		$11,635		
NB Public Library	39.8	49	$52,575	$1,073	0.81
Total	**2,361.1**	**607**	**$314,022**		

* Revenue from Battalion includes expenses related to IS staffing.

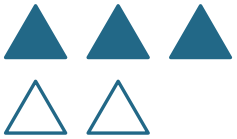
PERFORMANCE MANAGEMENT

Summary of findings

indicates the item presents few risks

indicates the item has some risks

indicates the item has significant risks

Item	Suitability	Rating	Residual Risks
Third-party Agency Support			**Current agreements are less formal and do not in most cases reflect the services provided** ▸ IS may not be recovering the full cost of service to agencies as the recovery rate averages 83%, while the Agencies represent 49% of the users supported by IS ▸ Where agreements on services and service levels exist, they have not been maintained as the services provided changed. ▸ There is a perception that agencies get better services that internal staff, that can only be resolved with service levels and reporting ▸ Revenue and demand for service per third-party agency user varies greatly between the different agencies despite IS offering similar services and services levels. In the absence of a formal service level agreement, this may lead to discrepancies in the costs charged to the third-party agencies
Service Desk			**Visibility of staff issues causes them frustration** ▸ Not having first contact resolution in place may slow down the resolution process and involve more resources than potentially required ▸ IS staff spend more time on helpdesk tickets than is common, diverting resourcing from other areas of IS towards end-user support ▸ Inconsistent categorization and subcategorization of tickets makes it difficult for IS to conduct performance tracking and problems analysis ▸ Customer service is compromised when there is no transparency on user ticket progress (e.g. status updates or self-service progress check-in on timelines)

Users are generally satisfied with the support provided by the help desk

We have interviewed a number of staff, who have all commended the support they receive from IS

Staff generally understood that at times other user's matters were a higher priority, which might delay IS getting to their matter.

- Equally, most understood the need to have the incident record in the ticketing system, ServicePro. However, most felt that better communication could be given on how their issue was being addressed rather than the current rote email.

Looking at the incident data shows that the majority of incidents are addressed within one day

The help desk has a service standard to respond to tickets in less than 48 hours. Based on 2019 data, 71% of tickets are resolved within that time window.

- However, few tickets are resolved during the first contact. This is somewhat due to the current process.
- Staff are asked to email their requests to a service desk email account, which IS monitors. Each request is input into ServicePro and assigned to an IS staff member or queue. Having this process means that resolution at first contact can't happen.

IS staff spend more time on helpdesk tickets than is common

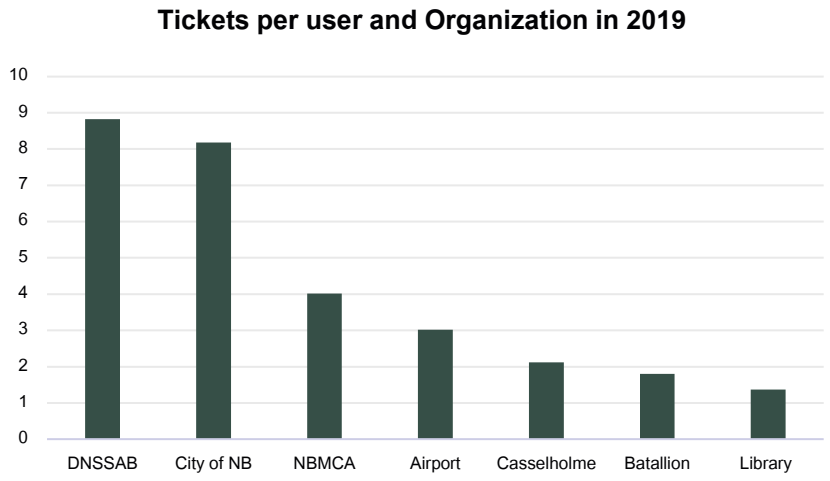
The number of tickets received falls into a common range

In 2019 staff recorded a total of 7,978 tickets in ServicePro, the helpdesk software. Typically, a user will raise between five and eight tickets per year. At the City, the figure is 6.5.

- When we compare the tickets per user across the various organizations that IS supports, there is a clear distinction between the tickets submitted by larger organizations and those by the smaller ones.

The City expends 3.8 FTEs on incident tickets, whereas a benchmark indicates it should be 2.2 FTEs

- Based on the data provided, the total time worked on incident tickets in 2019 was 6,214 hours or just over 3.8 FTEs of the pool of 10 IS staff. There are two dedicated helpdesk staff plus another team member who spends approximately 40% of their time on helpdesk activities, which is likely not captured in the 6,214 hours.
- Gartner suggests that the average organization spends 10% of its staffing on helpdesk plus 12% on end-user computing - which for the City would equate to just over 2 FTE.



*One FTE is equivalent to 1,645 hours of work in a given year

Issues related to hardware, security and connectivity appear higher than we would expect

In considering reducing the time spent on tickets, organizations predominately focus on reducing the number of tickets

When we categorize the tickets, we can start the process of determining what is driving the volume of tickets. The chart to the right shows this distribution.

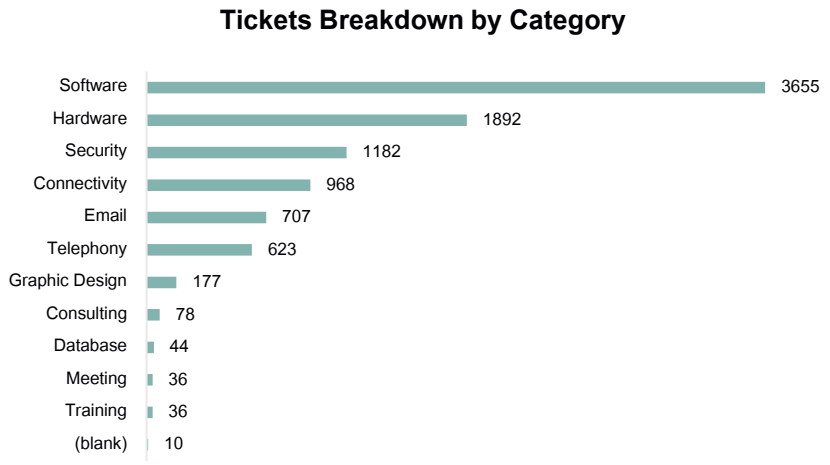
- Incidents related to software make up almost 40% of the total. Given users interact mostly with software, this is to be expected. The large number of systems that IS support, 403, may also drive this number higher.
- The next three categories are less expected. Hardware issues should be infrequent for users, connectivity issues should be low as the network should be designed to be resilient and many organizations have adopted self-service to manage security configurations.

The table to the right shows the most common types of incident

Certain types of incident are candidates for elimination.

- Error: something isn't working, root cause analysis will reduce repeated errors
- Reminders: automating regular system activities will reduce manual interventions
- Access: self-service will reduce the number of requests for access to network resources and password resets
- Modification: self-service will reduce the number of requests for information on Internet, intranet and social media
- Assistance: user education will reduce the requests for help using IT systems

- Reducing these five categories by 25% will lead to a fall in tickets by 1408, approximately 15%.



Incident	# of Tickets	Incident	# of Tickets
Error	1519	Assistance	515
Reminder	1430	New User	263
Access	1288	Update	168
Configuration	590	MAC	151
Modification	577	File Assistance	120
Install	530		

Using our subclassification supports investigating hardware, security and software

The chart to the right shows the subcategory breakdown for the four most common categories of incidents

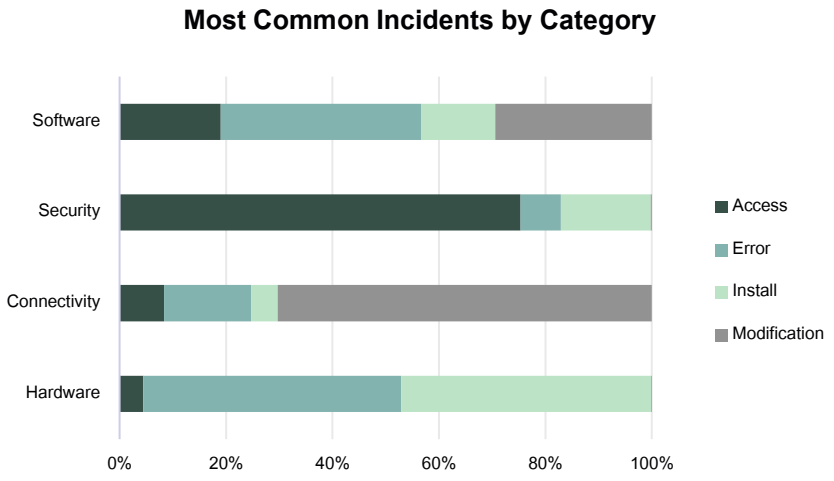
Access and error are subcategories that are good candidates for problem analysis.

- Software errors, hardware errors and security access are all material proportions of their categories and would suggest investigation.
- From the 6,921 total hours worked in a year, 37% (2,579) are related to errors, access and installations of systems and hardware, and modifications on the website. These hours could be reduced by programming regular training sessions and providing clear written procedures to follow in the case of software or hardware failures.

Another way of deciding which categories to investigate is to focus on where the most labour is expended

On average, help desk staff work 44 minutes on each ticket. While there is some variation in the average effort across the categories, the times are broadly similar.

- This means that software, hardware and security are also occupying the most time of staff, confirming them as candidates for investigation.



Average time worked per ticket

Software 51 min	**Hardware** 51 min	**Security** 29 min	**Connectivity** 47 min
Email 18 min	**Telephony** 38 min	**Graphic Design** 5 min	**Consulting** 1 hr
Database 1 hr 15 min	**Training** 1 hr 18 min	**Meeting** 1 hr 33 min	**Avg. per ticket** **44 min**

Identifying recurring problems that can be eliminated will be difficult with the current data in ServicePro

ITIL is an accepted standard that defines a full set of processes an IT department may follow

One process ITIL defines is called Problem Management. It is the process of looking at incidents to determine if there is a root cause that, if resolved, would mean the incident would not occur again.

- A simple example is a user getting a password wrong and being locked out. Resolving the issue is resetting the password, however, to prevent a user from having to contact a helpdesk, it is common to implement a password reset self-service functionality – which is problem management.

Problem management involves the analysis of the incident data

We reviewed the ticket data to complete this section of our report and noticed issues with the data that would make it difficult to do the analysis.

- Categorization: It is easiest to find recurring issues when they have meaningful categories. The service desk staff allocates tickets into 32 categories and around 130 subcategories, however, this categorization is not applied consistently. The top table on the right shows some examples of tickets of the same nature categorized differently.
- Reminders: IS also uses ServicePro to set reminders for their daily/monthly activities (e.g. change server tapes, airport cheque runs, change backup drives and prepare monthly reports). Those reminders added up to approximately 15% of the tickets in 2019, but there is not a category for reminders. It would therefore be difficult to exclude these reminders from the analysis.

Category	Ticket Title
Hardware	Backup Computer for Chequing PC
Backup	Backing up full laptop
Hardware	Set up camera for Council meeting
MSOffice	Video not playing at Council meeting
Hardware	Sophos install
Security	Create New User - install Sophos

Reminders

Change backup drive
Change Server Tapes
October 10th landfill
City Cheque Run
Final Water Bills
Hourly Payroll Transfers

Users would like greater transparency on their tickets

Once users have emailed their request, they get a standard email response when the ticket is created, telling them someone will be in contact with them

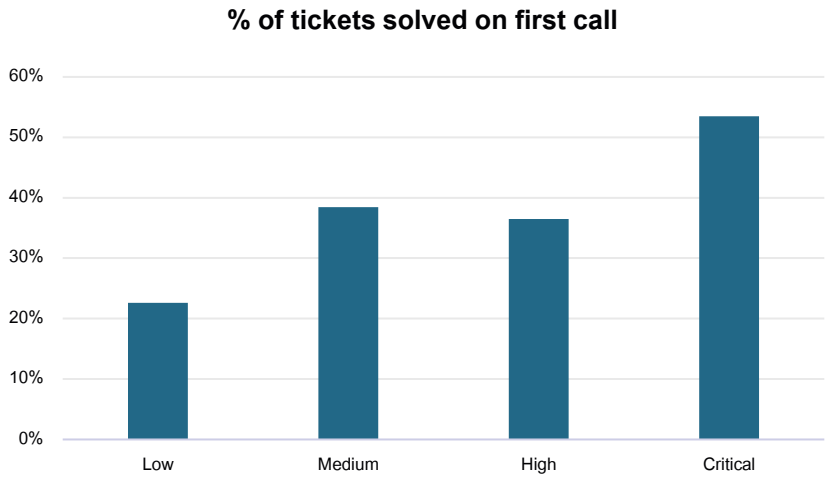
Users accepted that they always felt their issue was important but recognized there might be higher priority work happening. They also commented that being able to understand where their ticket stood in the priorities might also help.

- Submitting tickets by email creates a delay and reduces communication. Promoting users to call the helpdesk would allow for first contact resolution and provide personalized information on what was going to happen with their ticket if it could not be resolved immediately.
- We recognize the helpdesk phone is not staffed all day, which, unless planned for, could leave users going to voicemail, creating a different type of frustration.

Entering tickets sent by email is a duplication of work

The user has already keyed in the information, which is then rekeyed into ServicePro. Moving to predominately phone will not mean more effort for IS.

- The chart to the right suggests that over half the tickets require additional information from users to resolve them.
- Another area that could be investigated is user self-serve. Currently, staff cannot input their own service desk tickets directly into the system. Many services desk tools provide user portal access to submit tickets and view status. Another alternative is the automatic generation of tickets from emails.



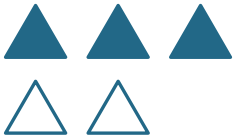
IT ORGANIZATION

Summary of findings

indicates the item presents few risks

indicates the item has some risks

indicates the item has significant risks

Item	Suitability	Rating	Residual Risks
Core Skills 			**IT has been changing rapidly – as technology changes at the City skills will need to be updated** ► The growing demand for digitization, data and analytics, Cloud computing and business automation will require new skill sets or the City will not be able to take advantages of these advances ► The absence of roles at the intersection of technology and business (e.g. project managers, business analysts) makes it more difficult to accurately translate business nuances to technological needs and deliver on complex technology projects
Staffing 			**Low compared to other municipalities** ► IS staff levels are fairly low compared to the number of users IS supports making the team less agile and flexible as greater planning and foresight is required to avoid staff feeling overworked ► Services are delivered using in-house resources; little is outsourced to third-party organizations, thus compromising innovation and modernization when the majority of staff's time is spent on daily, routine tasks focused on keeping the lights on ► Coverage and mitigation against absenteeism and staff exit may potentially become more difficult, exacerbated with little documentation and standardization across IT operations

The IS team composition resembles a traditional IT department

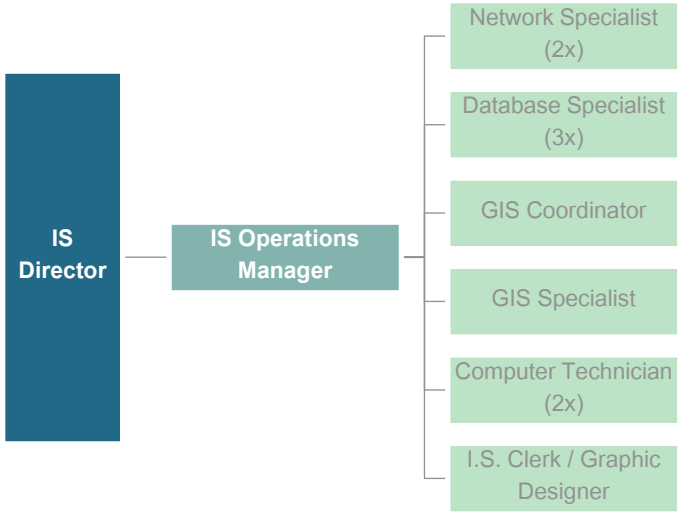
The organizational structure of the IS Department is a flat hierarchy

The Span of Control (SPOC), the number of staff that report to one supervisory position, is inconsistent. The Director of IS has one direct report while the Manager of Operations has ten direct reports.

- For an IT function, a SPOC of ten to a manager is within the range we would expect.
- While the number of staff does not suggest the need for a Director, however, the strategic nature of IT to the City requires a senior role to interact at the most senior levels.

There are several roles that are expected an IT department supporting an organization the size of the City:

- Project Management roles – they are predominantly responsible for managing technology projects and liaise between the business and IT. Technology change is continual and accelerating, as such the need for managing change will continue to grow.
- Architect roles – they are predominantly responsible for architecting the IT environment based on the needs of the organization. Note that this role can take multiple forms, including data architect, systems architect and network solutions architect.
- Business Analyst roles – they are predominantly responsible for supporting strategic and innovative initiatives by identifying business improvement opportunities using technology.



As IS, and the City, look to the future, the demand for new roles and skills emerges

Potentially increased demands for digitization and data-driven decision making will require IS to introduce new skills to the team. There are growing trends for organizations to use their data to draw insights and drive decision-making, improving business processes and digitizing where possible to benefit from efficiencies, the move towards Cloud will require in-house cloud infrastructure capabilities, and lastly, moving to the Cloud will require a greater degree of vendor and supplier management.

The ratio of IS staff to the users they support is low

The City's IS staff as a ratio of total City staff is 1.9%

When considering the staff in the third-party agencies that IS supports, the ratio drops to 1%.

- We have conducted a comparison of IT staff ratio to total municipal staff for several Ontario municipalities*. The range of IT staff to total municipal staff ratio is between 1.2% and 4.9%, with an average of 2.4%.

When factoring in the third-party agencies, IS ranks well below the average. In fact, IS ranks lower than the lowest comparator. Excluding the third-party agencies, the City continuous to rank slightly below the average.

Low numbers of IS staff relative to the number of staff that the Department supports may introduce a number of risks

- Innovation and modernization are compromised when the majority of staff's time is spent on daily, routine tasks focused on keeping the lights on. This is exacerbated by in-house service delivery and no outsourcing.
- Agility and flexibility become a trade-off as greater planning and foresight is required to ensure that staff are not overworked.
- Coverage and mitigation against absenteeism and staff exit may potentially become more difficult. This is exacerbated with little documentation and standardization across IT operations.

The table below summarizes the IS staff relative to the City and third-party agencies

IS FTE to City staff	
City's IS department staff	12
City's total full-time staff	627
City's total staff and other agencies IS supports	1,234
IS staff as a ratio of total City staff	**1.9%**
IS staff as a ratio of City and other agency staff	**1.0%**

We conducted a correlation calculation on the number of IT staff for 22 municipalities and concluded the following

- Strong correlation between the number of IT staff and the total IT operating budget
- Relatively weaker correlation between the number of IT staff and the number of municipal staff
- Relatively weakest correlation between the number of IT staff and the municipal operating budget

This suggests that they move in line. For example, as the number of municipal staff increases, the number of IT staff increases – however, the increase is not 1-to-1.

* London, Sudbury, Hamilton, Brantford, Oakville, Cambridge, Chatham-Kent

STAFF SURVEY

A representative portion of staff responded to a survey regarding technology in the City

Between 13th July and 14th August, we published a 12 question online survey

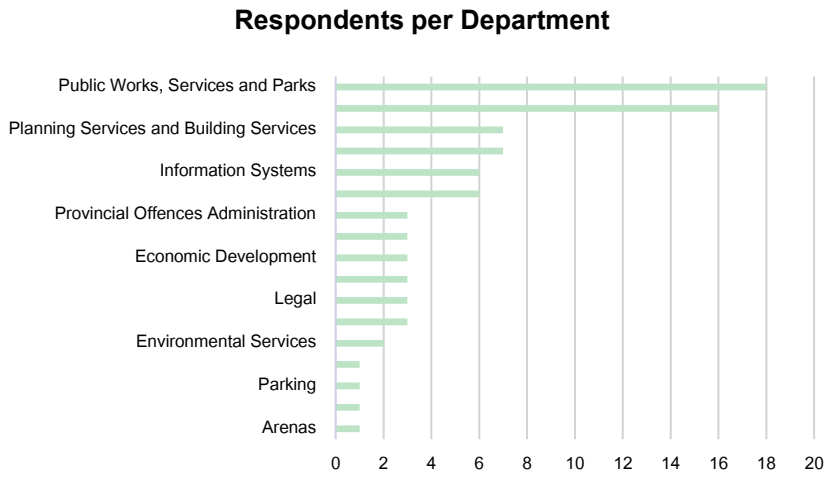
The questions ask staff to comment on the IS department, the service they receive and the systems that are available to them.

- Appendix A contains a copy of the survey questions.

During the period, we received 85 responses, representing approximately 20% of City staff

The chart to the right shows the number of staff from each department.

- Staff from all departments responded to the survey, indicating the responses should represent the views across the City.
- That said, finance and public works were a greater proportion of responses of the total – meaning their views will be slightly over-represented.
- Conversely, recreations proportion of responses was much less than their proportion of staff – leading their views to be underrepresented.
- As this was an online survey, it will favour those who have access to computers and the Internet as part of their job.



Staff would generally promote the services provided by IS

Using a net promoter approach to measure satisfaction, IS received an average satisfaction score of 7.9

The Net Promoter Score (NPS) is used to gauge the satisfaction of a customer base. It uses a single question: How likely is it that you would recommend "the service" to a colleague? With respondents asked to score between 0 and 10.

- Those who respond with a score of 9 to 10 are called Promoters and considered highly satisfied. Those who respond with a score of 0 to 6 are labelled Detractors and considered dissatisfied. Responses of 7 and 8 are labelled Passives.
- The NPS is the difference between the percentage of Promotors and the percentage of detractors and can range between -100 and +100.

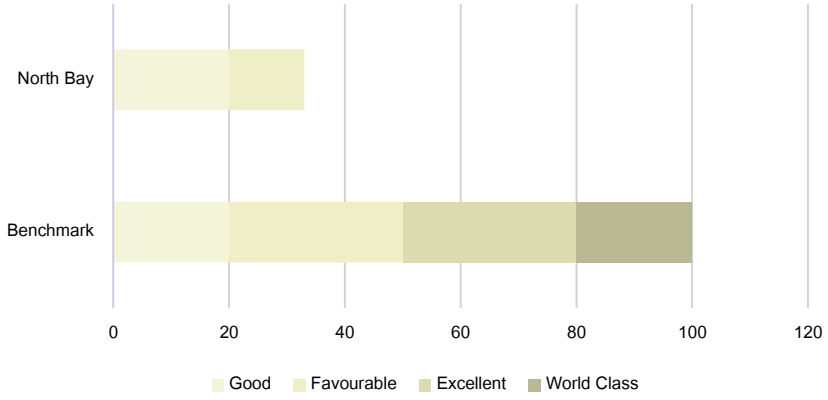
More subtly, the question tries to gauge how likely customer would be to go somewhere else if they had a choice

IS received an NPS of 33, which is considered favourable.

- This indicates that even with a choice, most staff are happy enough with the services provided by IS.

Satisfaction rating with IS

IS Net Promoter Score



The vast majority of respondents felt the systems in place met their needs

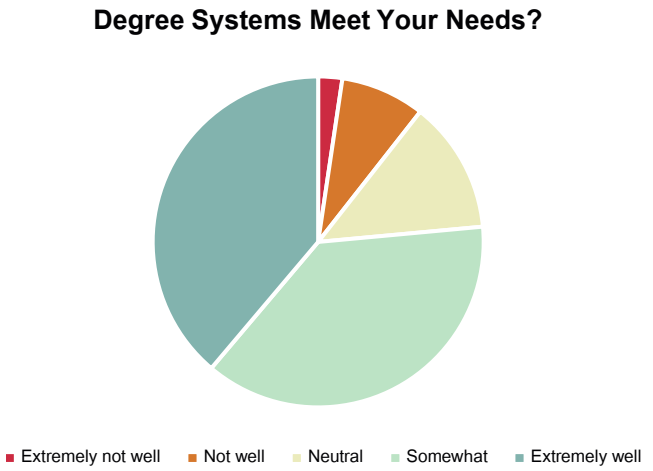
Those that were less satisfied with IS support identified system issues as the primary reason

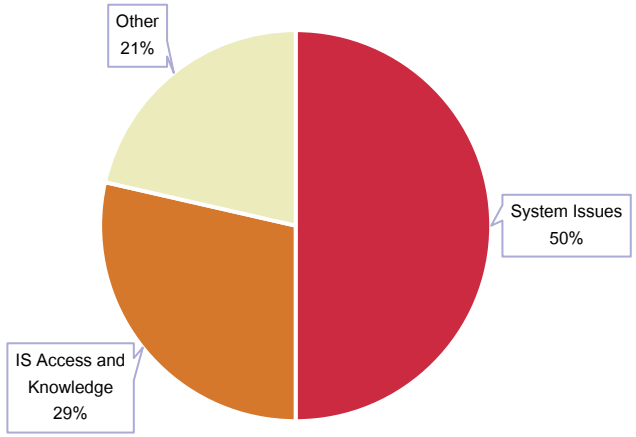
Although asked to comment on the technology, 30% of those who were less satisfied felt it was the ability to access IS support and the inconsistency of staff knowledge that made them less satisfied.

- The IS support team has very diverse capabilities. For example, some staff are trained to support only GIS issues, while others are more specialized in Cognos support. When staff request support, many times, they find it frustrating to wait until a specific IS staff member is available.
- At times, the user contacts the staff member that supports a particular system directly.

One system in particular was commented upon.

- Where staff identified systems issues, the unsuitability of Naviline was the most common issue cited. Navaline is not well integrated with other systems used in the City.





This was echoed in responses when asked what changes would improve their productivity – the most popular response being ‘none’

Where changes were suggested, they were related more to the systems than the quality of the IS support

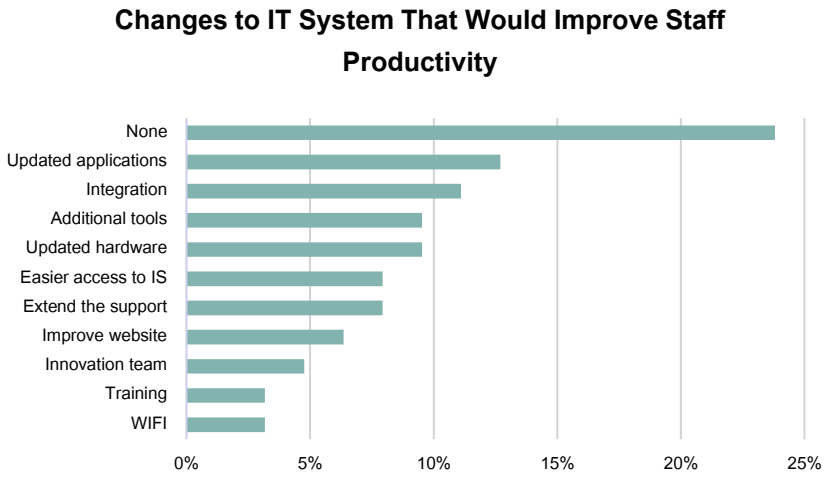
46% of the suggestions were related to changes to the systems, while just 21% were related to the service provided by IS.

- When it came to updating the systems, Naviline again featured in half of the suggestions.
- The third most popular answer was related to integration. The City uses many systems and some of them are not well integrated. This situation does not allow processes to be more automated and may lead to duplication of work or data entry.

An interesting suggestion was the formation of a team dedicated to driving innovation and modern working practices

The suggestions applied to the work of both IS and other City departments.

- The suggestions included implementing more structured processes, working in partnership to identify new solutions and helping departments to move forward.



Interactions with IS were more frequent than we expect

If everything is running smoothly, we typically expect users to interact with the IS group every one to two months

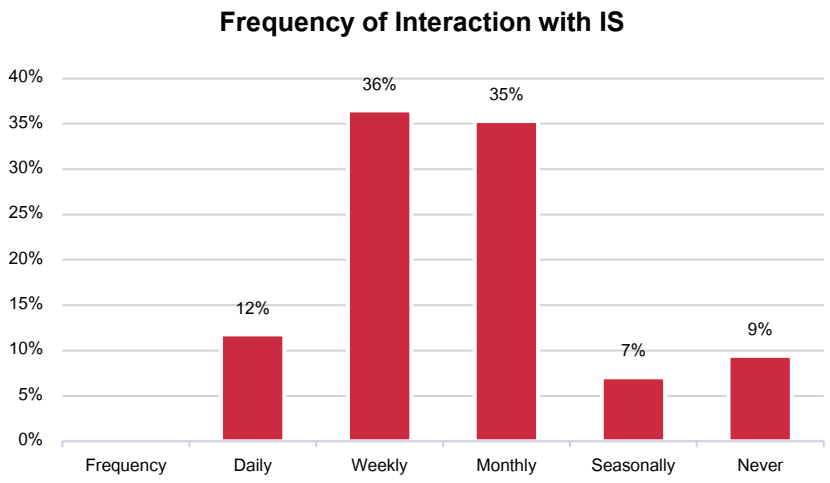
49% of users are interacting weekly or daily, much higher than the average we expect.

- The frequency of interaction with IS did not affect the level of satisfaction with the interaction, with all frequencies showing over 50% of staff being satisfied or very satisfied with the interaction.

Looking at why people were more or less satisfied, the promptness and helpfulness of IS was the most commonly identified reason

As previously mentioned, dissatisfaction came from wait times and inconsistency of experience.

- This concept of consistency also featured when staff were asked for additional feedback to offer to IS. Consistency was discussed in relation to the level of customer service of IS staff, which was felt to vary depending on who you spoke to.
- Consistency was also discussed in terms of response times, with some staff being very responsive, while others considered less responsive.
- While the overall sentiment of the survey was very positive towards the service provided by IS – the themes in the table to the right are the ones that stand out.



Themes	Responses
IS is helpful	21
Prompt	18
Inconsistent service	9
Good culture	5
Long wait times	4
Difficult to access	2
Limited support	2

Users want to see the modernization of hardware and software

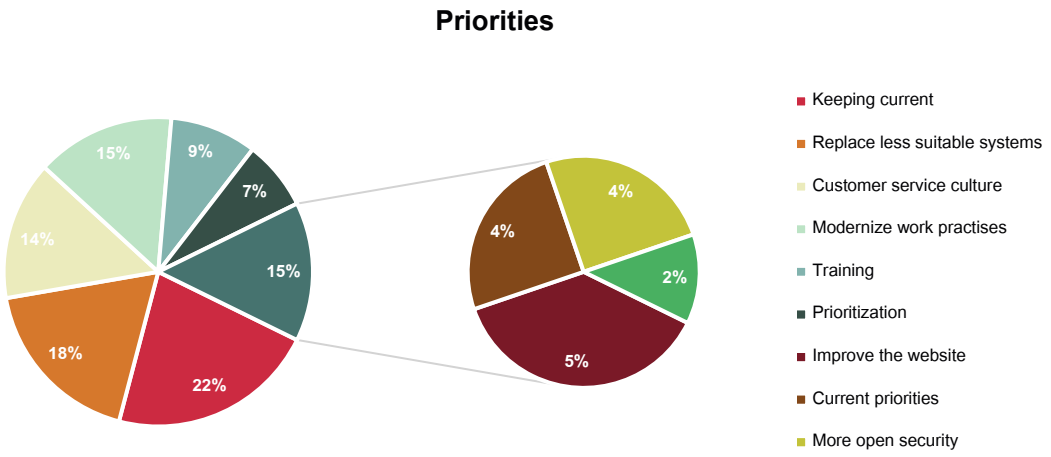
The top five suggestions relate to the usage of technology in a more efficient way

Top of the list was keeping current with both hardware and software. This included current versions of software, newer versions of existing hardware and newer forms of hardware such as tablets.

- Replacing systems with ones that better fit the needs of the City was mentioned. Naviline issues were less prevalent than in previous questions.
- The theme we noted earlier of creating an 'Innovation Team' appears again as modernizing work practices. Along with training, which features somewhat more strongly than in previous questions.

IS having a customer service culture echoes the inconsistency noted earlier

Many comments lauded the service, responsiveness and helpfulness of the team, but having all IS staff behave this way seems to be a concern to be addressed.



Key takeaways

We have grouped the most common themes from the survey into six takeaways below.

1	**Keep delivering responsive, helpful service**	► Users are very satisfied with the support they receive from IS. They mentioned that the IS team is very responsive and helpful.
2	**Get to latest versions of technology**	► Having current versions of hardware and software feature in the responses to a number of different questions. As a theme it was more prevalent than requests new platforms or capabilities.
3	**Connect systems or simplify the architecture**	► The City, and other organizations supported by the IS team, have a variety of systems in place. Responses highlight a number of systems where better integration would improve productivity.
4	**Create a consistent user experience – make IS more accessible**	► Users are satisfied with the IS support they receive, but there are some concerns about the consistency of the knowledge, capabilities and response between IS staff. Comments highlighted that if the user expected to be directed to less responsive team members, it might change how they approach IS – for example, bypassing the ticketing system.
5	**Work with department to modernize their work practices with the right tools**	► Some staff suggested IS have a leading role in modernizing work practices across the City with the application of technology. Potentially forming a 'innovation team' to uncover opportunities for applying existing technologies or acquiring new capabilities to enhance productivity.
6	**Help staff use the tools they have**	► Desire for training appeared in responses, but more telling was the general satisfaction with the current systems. Exceptions existed to that viewpoint, but we typically see users who don't understand a system well, being less satisfied. ► Along with the limited suggestions for enhanced capabilities, suggests to us that work should be done to enhance users understanding of the current system capabilities before changing or replacing.


RECOMMENDATIONS

Our recommendations span across five different pillars

We identified 22 recommendations for the City to implement over the next 36 months

The diagram below illustrates how we developed our recommendations and how we grouped them into the pillars.

IT Performance Assessment

Stakeholder Consultations

City Staff Survey

Emerging Technologies and Future Trends

Vetting – we assessed applicability, impact, collapsed similar recommendations and removed duplicates

	# of recommendations
Build a more secure and resilient infrastructure	8
Be a technology partner to the Corporation	6
Increase the City's digital presence	2
Modernize the technology environment	5
Prepare for the future	1

Build a more secure and resilient infrastructure

These recommendations aim to achieve greater resiliency and security for the City's technology assets and underlying infrastructure

There are eight recommendations in this category.

#	Recommendation	Timing
1	Introduce more suitable elements of fire protection in the City's Data Centre (e.g. adequate amounts of regular-sized, fire extinguishers) as there currently is only one small fire extinguisher.	Short-term
2	Establish a secondary internet connection to the City's current network. Set it up for resiliency by using both internet connections simultaneously or program it as an automatic failover in the event of a disruption. Consider having it terminate at an alternate location to City Hall.	Short-term
3	Implement a second firewall in parallel with the current firewall. Should one fail, the second will ensure network security. Going further, establishing a hardware-based DMZ with two firewalls in series.	Short-term
4	Contract an external third-party organization to conduct a security and penetration testing exercise that will assess the security posture and identify any security vulnerabilities. Common practice for scope of service is to include: - Network Cloud and Data Centre - Internal and DMZ Security Testing - Social Engineering Testing - Host and Endpoint Protection - Governance and Compliance - Security Risk Management and Data Protection - Incident Response and Identity and Access Management	Short-term
5	Setup a secondary, redundant Data Centre that is located offsite from City Hall. Common practice is to ensure a physical separation of at least 10km between the primary and secondary site. Consideration can be given to the following: - housing the secondary site at a third-party organizations' facility that IS supports - leasing area in a commercial Data Centre facility - considering a cloud based solution	Short-term

Build a more secure and resilient infrastructure

#	Recommendation	Timing
6	Store the City's disk-to-disk backups at a site remote from the City's main Data Centre location. Common practice is to store backups in an organization's off-site secondary Data Centre to mitigate against physical damage caused by any natural disasters. A rapid solution could be to place the backup solution at a partners facilities.	Short-term
7	Create a Business Continuity Program (BCP) in collaboration with the City departments that addresses the technology needs of the Corporation. Common practice includes the following elements in a program: - Business Impact Assessment that assess the needs of the business departments (RTO/RPO) - IT Disaster Recovery Plan that specifies how IS responds to an outage/disruption - regular (e.g. annual) testing of the BCP program and continuous improvement - BCP governance made up of an emergency response team and committee	Medium-term
8	Establish and implement common IT operational policies and procedures that are aimed at retaining institutional knowledge where little formal documentation exists currently (e.g. application code).	Medium-term

Be a technology partner to the Corporation

Change the role of IS so that it establishes an on-going, collaborative and strategic technology partnership with City departments

There are six recommendations in this category.

#	Recommendation	Timing
9	Integrate business applications through a middleware solution to allow for data and information sharing between applications.	Medium-term
10	Work with the business departments (e.g. HR and Finance) to procure an ERP application that satisfies the functionality required by HR, Finance, and other applicable corporate services. This ERP will not support operational departments, but should integrate.	Medium-term
11	Schedule regular, frequent meetings for IS and business departments. Common practice is to discuss the current and future technological needs and priorities of the different City departments, as an input to the technology annual and strategic plans.	Short-term
12	Establish Service Level Agreements (SLAs) with third-party organizations that IS supports. The objective is to achieve cost recovery of services, as well as aligning expectations and providing consistent services. Commonly, SLA governance includes the following: - formally documented service provision and corresponding service levels - pricing the SLA based on a pricing framework (taking into account labour, time, material, # of users, # of sites, etc.) - tracking of all workorders conducted for the third-party organizations	Short-term
13	Form an IT governance committee with diverse representation from the Corporation at the decision-making level, such as the leadership team. Commonly, IT governance committees have the following responsibilities: - discussion of IT priorities and vetting of the technology roadmap (for both, planned and unplanned projects) - assessment and re-assessment of IT projects using an objective prioritization framework - presentation of a project dashboard demonstrating progress and status of project pipeline - confirming readiness for implementing IT changes	Medium-term
14	Encourage City users to use chat or phone channels (i.e. instant two-way communication channel) to report incidents and have IS that are dedicated to these channels, working towards first call resolution.	Short-term

Increase the City’s digital presence

These recommendations establish a digital foundation and put the City on a longer term path towards digital government

There are two recommendation in this category.

#	Recommendation	Timing
15	Expand the City's website to offer more digital services to the public in-line with common practice and business needs (e.g. online forms, online payment options, online complaints and service requests). This is particularly relevant during the ongoing COVID-19 pandemic where services at a distance are encouraged, and is likely to continue to be importance post COVID-19.	Medium-term
16	In addition to the current records management project underway at the City, establish a Corporate-wide project to digitize all historic, and new records and move to a digital records management (technology and policy).	Medium-term

Modernize the technology environment

The objective of these recommendations is to achieve greater operational resiliency and adopt elements of common practice

There are five recommendations in this category.

#	Recommendation	Timing
17	Establish minimum standards for maintaining application currency and technology standards. Common practice is for such standards to address applications as well as Operating Systems (OS). Once established, ensure versions are in-line with the standards outlined – examples include updating Navaline to the latest version, replacing the CLASS system, and updating server and end-user equipment OS.	Short-term
18	Establish a plan to address the current and future legacy applications. The plan should take into account the vision for the City's application portfolio. - A key input is consideration for the Total Cost of Ownership (TCO) of an application. Meaning consideration should be given to an application's lifecycle (development to retirement). This requires IS to factor in the costs of maintaining, upgrading and supporting in-house developed applications when costing an application and to ensure they have the capacity to do that.	Short-term
19	Conduct monthly problem management reviews of incident ticket data. This includes conducting analysis on common tickets to identify problems and conduct root cause analysis. As an input to this, ensure that there is alignment on the following: - standardization across the practice of ticket logging, prioritization, classification, time and effort, and resolution - user friendly process with an emphasis on transparency (e.g. notify users on status of ticket with target resolution time, and progress updates)	Short-term
20	Create a target application architecture taking into account current and future needs of the City. The target application architecture will guide decision-making around the details (e.g. type) of business applications the City adds to its portfolio.	Short-term
21	Mandate documentation of in-house, custom developed application code and application configuration. The objective to create an audit trail (e.g. for troubleshooting) as well as retain institutional knowledge in the event of staff absenteeism.	Short-term

Prepare for the future

The recommendation in this category seeks to establish guidelines on the use of Cloud, as the City looks to the future and adopts trends in technology

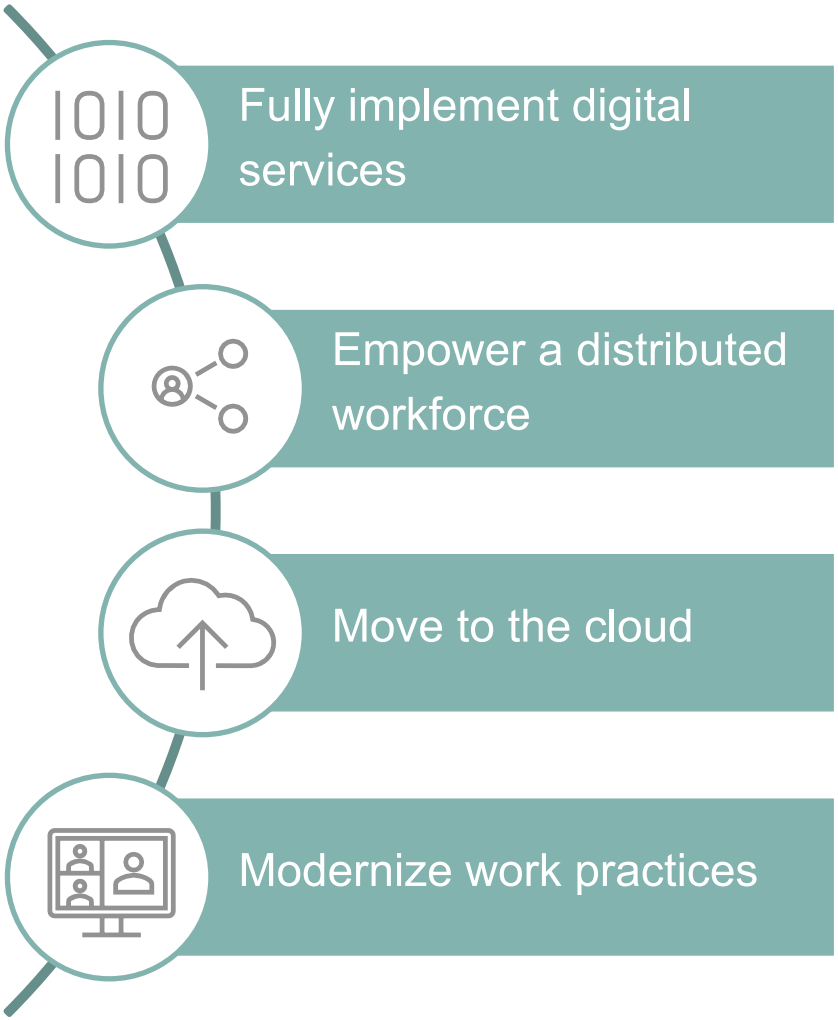
#	Recommendation	Timing
22	Create a cloud-first policy that is supported by a cloud-use framework. The framework uses objective criteria to assess whether cloud based software should used in a specific situation. Commonly, organizations use such a framework to guide the decision making around whether an application is a cloud based solution or on-premise. Common practice for such a tool is to give consideration to the following: - compliance on data security and privacy - latency and bandwidth requirements - technology stack (e.g. mainframe) - operating versus capital expenditure preference	Short-term

Planning to change how the City uses technology

Much of the recommendations in the previous pages of this section relate directly to observations generated from our current state assessment

As the City looks further out, there are many trends in information technology that we believe it should take note of and act upon.

- To the right, we highlight four themes we believe should inform the thinking on where the City takes information technology in the future.
  - **Digital services:** COVID-19 has elevated the need to provide services to residents digitally at any time from anywhere. An innovation that is more widely available in the private sector, leading to residents expecting a similar service from their government and municipal organizations. This is a trend that is likely to continue post-COVID-19.
  - **Distributed workforce:** not only limited to field and mobile staff. Providing all staff with the capabilities to work remotely from anywhere. COVID-19 has demonstrated that staff require flexibility and agility to quickly be able to work from anywhere when required.
  - **Cloud:** a growing trend amongst public sector organizations is to move to the cloud to benefit from the advantages it offers to technology management and business resiliency.
  - **Modernization:** augmenting work practices to offer accessibility and business resiliency, such as digital processes and digital records. Again, COVID-19 has demonstrated the need to digitize and modernize work practices to allow access from anywhere and reduce process frictions when working in a decentralized fashion (e.g. remotely).



Fully implement digital services

Residents should be able to complete the vast majority of their interactions with the City online – at any time of the day

While we recognize that not everyone is able to use online services – this should not be the reason to withhold them from the rest of the population.

- Foundational to true digital services is residents having a unique digital identity with the City – their City account. Ideally, this account would give them access to their service portal, which contains information about them, history of their interactions with the City and access to the online services.
- Seamless integration with operational systems follows. What is created, changed or deleted in the portal should be reflected in the operational systems staff use in near real-time. If I apply for a parking permit – the application should be available in the permitting system. If I report a pothole – a work order should be created in the public works system – and so on.

Aspiring towards a fulsome set of online services may necessitate implementing a customer relationship management system (CRM).

- It is likely not acceptable to have a customer portal that tracks a history of customer interactions and not have an equivalent system for other channels such as phone and in-person.

Empower a distributed workforce

COVID-19 has demonstrated the ability of municipalities to deliver services using a workforce that is located outside of the primary office they worked from historically

This presents an opportunity to redesign how staff are accommodated at North Bay and how services are delivered. Having staff work outside the office requires the right systems and access, which should be put in place ahead of another crisis.

- Reengineer the network for secure mobile working. This should include ubiquitous WIFI, additional routes and more robust gateway security. Potentially upgrades to bandwidth will be required to support the additional traffic that will be traversing the network, particularly to accommodate for video meetings.
- Provision end-user devices that support work practices. This might include laptops or tablets for staff that need to work in multiple locations. This may include rearchitecting the phone systems as well, to support moving the physical locations of extensions – even in some cases moving to soft-phones.
- Provide secure access to necessary business systems. As user interfaces become increasingly web-based, this becomes easier, but there may still remain a need to access systems located in City data centres that do not have a web-based interface.
- Provide the tools to support working in a distributed manner – commonly, these will include chat, video and audio conference facilities, online sharing of information, etc.

Move to the cloud

The benefits of cloud services has been thoroughly demonstrated both economically and operationally

Linked with a distributed workforce, having cloud-based systems makes flexible working easier for an organization to enable. Additionally, moving responsibility for day-to-day maintenance of IT systems away from City staff will free their time to focus on how the City uses technology and on driving innovation.

- The place to start is the infrastructure. Easy wins include Exchange online for email, Office 365 for collaboration, document management and standard office automation. Servers can be moved to cloud providers such as the Microsoft Azure service. Ultimately, the aim would be to largely move all of the computing out of the City data centre. Potentially, this could work with the BCP recommendation of transitioning the City data centre into the backup facility. This will also allow technology staff to focus on new skills such as data analytics and vendor management.
- In tandem, taking a cloud-first approach for new and upgraded business applications will start to reduce the City's business servers. Although with the number of in-house developed applications, you will not eliminate those servers. That said, you should give consideration today to changes that may need to be made to those in-house applications for them to run on a cloud infrastructure.

Modernize work practices

Technology changes how people are able to work and the things they can do, but only if thought is put into making those changes

Moving systems to the Cloud gives the City the opportunity to refocus IT staff on modernizing work practices.

- Set responsibilities and reporting lines so that modern work practices are a priority for the City. Training may be required to give the team the skills to review how work is conducted, identify improvements and redesign workflows.
- Eliminating manual activities and replacing them with technology solutions – automation – is fundamental. This is the area that smart devices can be applied in the municipal context, for instance, providing information on the condition and performance of various municipal assets.
- Managing the data and information that is collected is critical. Having the capabilities, both the technology and the skills, to gather, store – but most importantly, to use – the data that is available for the City's decision-making.

APPENDICES

Appendix A

Staff survey questions

No.	Question
1	How long have you worked at the City?
2	Which department do you work in?
3	How likely would you be to recommend a colleague contact Information Systems for assistance?
4	Which IT systems do you use on a regular basis? Please list the main ones in order of importance to you.
5	How well do the City's IT systems meet your needs?
6	Please explain the reason for your rating.
7	What changes to IT systems or services would materially improve your ability to do your job or the quality of services your department provides?
8	How often do you interact with the Information Systems department?
9	How would you rate your interactions with the Information Services department?
10	Please describe your reasons for this rating.
11	What priorities should the Information Systems department focus upon?
12	Please provide any additional feedback you have relating to IT systems and services at the City.

Community Services Committee
Tuesday, January 26, 2021

Chair: Councillor Johanne Brousseau
Vice-Chair: Councillor Scott Robertson
Members: Councillor Tanya Vrevosch
Councillor Chris Mayne
Councillor Bill Vrebosch
Councillor Mark King
Councillor Mac Bain
Councillor Dave Mendicino
Councillor Marcus Tignanelli
Councillor George Maroosis
Ex Officio: Mayor Al McDonald

Committee Items:

CS-2001-35	Rezoning applications by Consolidated Homes Ltd. – Golf Club Road (D14/2001/CHLTD/GOLFCLUB).
CS-2017-13	Report from Beverley Hillier dated April 6, 2017 re North Bay Official Plan Review (SIRE/D08/2017/OP/NBOPR).
CS-2018-13	Report from Erin Vaughan dated November 14, 2018 re 2018 Summer in the Park Summary (SIRE/M02/2018/SPECI/SUMPARK).
CS-2019-16	Report from John Severino and Ian Kilgour dated December 3, 2019 re Community and Recreation Centre Update (SIRE/R05/2017/ARENA/WESTFERRIS).
CS-2020-04	Rezoning application by Shortt Acquisitions Inc. on behalf of 2453454 Ontario Limited - 111 Cartier Street (SIRE/D13/2020/2453454/111CARTIER).
CS-2020-11	Zoning By-Law Amendment and Draft Plan of Subdivision application by Antech Design & Engineering on behalf of Millford Development Limited and New Era Homes Limited - Ski Club Road (unaddressed lot) and an adjacent parcel (SIRE/D12/D13/2020/MILLFORDNEHL/SKICLUBRD).

Infrastructure and Operations Committee
Tuesday, January 26, 2021

Chair:	Councillor Chris Mayne
Vice-Chair:	Councillor Mark King
Members:	Councillor Tanya Vrevosch Councillor Johanne Brousseau Councillor Bill Vrebosch Councillor Scott Robertson Councillor Mac Bain Councillor Dave Mendicino Councillor Marcus Tignanelli Councillor George Maroosis
Ex Officio:	Mayor Al McDonald

Committee Items:

EW-2010-03	Report from A. Korell and J. Houston dated March 26, 2010 re Kate Pace Way west end bike route connection between Memorial Drive and Gormanville Road (R05/2010/KPWTR/WESTENDR).
EW-2018-01	Report from Megan Rochefort dated June 5, 2018 re Algonquin Avenue Traffic Study (SIRE/T08/2018/ALGONQUIN/TRAFFICSTUDY).

Items Referred by Council for a Report

Date	Item
August 26, 2013	Exotic Animals
July 2, 2014	Annual Update for Residential Rental Housing By-Law (annually in the Fall).
August 24, 2015	Waterfront Accessibility (report no later than April 2016)
January 15, 2019	Motion re: Casino Proceeds
March 26, 2019	Motion re: Nuisance Party By-law
June 4, 2019	Motion re: Climate Change
November 19, 2019	Growth Community Improvement Plan Update - Dec 2021
March 10, 2020	Motion re:Municipal Naming and Sponsorship Naming Rights Policy