**Back Ground**

* 1. **Introduction**

The Piikani Nation Lands department recognizes that a common, enterprise wide approach to managing, implementing and supporting Geographical Information System (GIS) is required to effectively utilize resources for the organization. This synopsis is a shortened version focusing on the recommendations and implementation plan. The full GIS Strategy contains more details on the current situation, survey and interviews and more background on the recommendations.

* 1. **Process Overview**

The strategic planning process was initiated in April 2018 and included the following activities:

* Departmental meetings to identify needs, strengths, weaknesses, opportunities
* Small group and individual interviews
* Interviews with GIS personnel from similarly sized Nations
	1. **Current State**

**1.3.1** **Key Initiatives and Projects**

Beginning in April 2018, the Piikani Nation Lands Department has undertaken several major projects related to building a reliable and dependable GIS, including:

1. Acquiring an enterprise GIS license from ESRI Canada to provide access to most of their tools.
2. Implementing ESRI based tools and migrating existing CAD and other data
3. Development of an enterprise GIS database and workflows containing information on water and waste water assets; this included the migration of CAD and other data.
4. Development of new ESRI based web applications for internal and external (public) viewing of the Piikani Nation Lands Department GIS data sources and information.

Several other significant GIS initiatives have been identified as being important next steps:

1. Migration of all infrastructure information into the GIS.
2. Migration of all Planning and Development Services data into GIS.
3. Replacing the legacy MapGuide application.
4. Implementation of a survey parcel and cadastral GIS.
5. Linking GIS and the Tempest system.
6. **Training, Education and Knowledge Transfer**

Continual training, education and knowledge sharing are key to a successful geospatial strategy.

From a user perspective, different groups and departments have different needs.

* 1. **Strategies for Training, Education and Knowledge Transfer Recommendations for training and education are as follows:**
* Create a regular newsletter / blog informing users about the geospatial projects and changes.
* Provide opportunities for general users to increase their knowledge of geospatial technologies and data through lunch and learn opportunities.
* Provide specific and targeted training for user groups.
* Ensure that the GIS Specialist stay current on GIS technologies and trends.
* Ensure IT support staffs have a general understanding of GIS software and infrastructure requirements.
	1. **GIS Specialist Training and Knowledge**

Training for the GIS Specialist should be based on annual individual training plans developed and reviewed by the GIS Coordinator. It is critical that individual training plans focus on the following:

* Gaps in software or technical knowledge required for the position.
* Specific training in non-technical areas critical to the success of the personnel.
* Professional development to stay current on geospatial technology changes and trends.

It is recommended that the GIS Specialist undertake a minimum of 2 to 3 weeks of professional development annually.

* 1. **Training for Software Knowledge**

GIS Specialist users will have existing ESRI software knowledge and experience in desktop tools, so training should focus on areas that users may not have had exposure to such as:

* Versioning and versioned editing workflows
* Quality control and assessment using ESRI Data Reviewer
* ArcGIS Online for Administrators and Publishers
* Building Geodatabases
* Introduction to Python scripting
* Basic SQL
	1. **Training and Knowledge Specific to GIS Specialist Role**

For the GIS Analyst for Infrastructure, it is recommended that they have training related to:

* Mobile Devices (Tablets and phones) and GNSS Solutions
* Asset management systems
* ESRI geometric and utility network management
* ESRI Roads and Highways event editor, desktop extension, and linear referencing relating to roads and sidewalk infrastructure
* ArcGIS Online for Administrators and Publishers

For the GIS Analyst for Development Services, Corporate Administration and Emergency

Services, it is recommended that they have training in and maintain knowledge related to:

* ArcGIS Online for Administrators and Publishers
* Cartography and map production
* Python scripting for map automation and analysis

• ESRI Web App builder configuration

• Open data portal

* ArcGIS Maps for Office

For the GIS Developer it is recommended that they have training and maintain knowledge related to the following tools:

* Administration and maintenance of enterprise multi-user geodatabases
* ArcGIS Server Configuration and Administration
* Working with ArcGIS
* Web development using JavaScript and the ArcGIS API
* Python related to administration of enterprise geodatabases, portal and general use
* Microsoft SQL Server
* GIS System Architecture and Design
1. **Professional development for geospatial technology changes and trends**

Equally important for GIS Specialists is remaining current on geospatial technology trends and changes. As Piikani Nation Lands Department is mainly an ESRI focused environment, it is recommended that all core GIS specialists regularly (at least bi-annually) attend the ESRI International Users Conference or in the case of the GIS Developer role, attend the annual ESRI Developer Conference.

It is also recommended all the members of the Core GIS group attend at least one ESRI Canada regional conference held frequently in the Province or annually one in Canada.

In addition to ESRI conferences, it is recommended that Piikani Nation Lands Department GIS staff participate in local and provincial municipal government special interest groups. In the surrounding areas there is a loosely organized municipal GIS user group that GIS staff should attend to network with peers and learn from other municipalities.

1. **Emergency operations and emergency operations center**

Currently there is limited information in GIS for emergency operations such as evacuation routes and wildfire hazard. The data is mainly contained in management plans, other documents and paper maps. It is recommended that all emergency related mapping information be incorporated into the enterprise GIS and that it be published for use during emergencies. This includes:

* Trails and access beyond Piikani Nation roads and pathways
* Floodplains
* Topography
* Prevailing wind information
* Wildfire fuel density and fuel type
* Wildland-urban interface areas and fire hazard risk
* High hazard location
* Evacuation routes and traffic management plans
* Staging locations and reception centers
* Guaranteed water supplies
* Schools
* Traffic management plans
* Mass pubic event management data
* Identification of critical infrastructure

It is also recommended that Piikani Nation Lands Department develop a clear vision of what information is required for emergency operations and develop a plan to support the integration of that information in the GIS.

1. **GIS Software and applications**

Piikani Nation Lands Department is in a state of transition, moving away from an AutoCAD/MapGuide solution for mapping and GIS, into a full stack ESRI enterprise GIS solution. Piikani Nation Lands Department is currently using ESRI ArcGIS desktop (ArcMap) solutions for data editing and analysis, ArcGIS Server for publishing of web services, ESRI Portal for consuming services and building web maps and ESRI Web App Builder for developing web applications. It is recommended that when implementing GIS solutions, Piikani Nation Lands Department should lean to the future, towards web service and web apps over traditional client-server desktop solutions. Current GIS software related efforts at Piikani Nation Lands Department are well aligned with these trends.

1. **Software licensing**

Piikani Nation Lands Department is currently accessing ESRI licenses and software under a small agreement enterprise license agreement (ELA). Given the expected cost difference between purchasing and paying annual maintenance versus the small amount enterprise license agreement, it is recommended that Piikani Nation Lands Department continue participating in the ESRI enterprise license agreement program as it offers a cost savings as well as flexibility in managing application and software deployment. It is also recommended that Piikani Nation Lands Department continue to leverage ESRI products available to them under this agreement as much as possible to maximize benefits.

1. **Upgrades**

It is recommended that Piikani Nation Lands Department upgrade to the latest version of ArcGIS at least every two years. When upgrading it is important to verify that all the applications, particularly ArcFM, can interoperate with the enterprise geodatabase and ArcGIS Server. It is generally recommended that all the desktop and server applications remain at the same version to avoid problems with publishing and other incompatibilities.

1. **Public mapping applications**

There were various opportunities identified by Piikani Nation for providing information to the public in focused mapping applications on very specific topics of public value, including:

* Accessing cemetery records and being able to locate burial sites of loved ones and to know what plots are available.
* Tourist and citizen recreation opportunities including beaches, parks, walkways, paths, and trail sand other recreation facilities.

Once the core GIS and data are in-place, it is recommended that Piikani Nation Lands department explore these opportunities to expose information to the public through the establishment of simple focused web mapping applications.

1. **Mobile devices and GPS for the field**

For GIS data to be deployed to the field, it is recommended that the City purchase and deploy a standard mobile device to field staff.

Additionally, it is recommended that Piikani Nation Lands Department have better GPS equipment to support field staff using mobile devices to locate buried or other assets. Mobile device GPS, while always improving, still do not perform well in certain field conditions. Piikani Nation would not require a device for each field worker but having a few devices available would suffice for basic navigation. Training would be required for users of higher accuracy devices.