Kittitas County's comprehensive, long-range view of geographic information management

KITTITAS COUNTY GIS

STRATEGIC PLAN | 2018–2023

COMPAS

MAPS PORTAL

OPEN DATA

HYDRO

EPIC

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FROM THE CASCADES...TO THE COLUMBIA
KITTITAS COUNTY

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Acknowledgements

Thanks to our Information Technology team in providing editorial assistance, comments, and constructive criticism in the preparation of this plan. Special thanks to Zane Kinney for producing new graphics and diagrams.

Many thanks to all the departments who took the time to meet and brainstorm all the objectives in this plan. I would also like to thank all the regular participants at the monthly GIS Users Group held here at the county for your ideas and patience as we continue to improve our GIS system.

1.0 Executive Summary

This strategic plan will:

1) Summarize where we currently are as an organization as it relates to geographic information management. Defining our current organizational status sets a baseline for planning.
2) Define a strategic foundation comprised of key pieces that provide a basis for action and create a picture of the end result to be achieved through this plan.
3) Establish strategic initiatives or objectives that elaborate on the high-level goals.

Some of the critical business functions that rely on our Geographic Information Systems (GIS) program include:

- Emergency response navigation using the roads layer (Sherriff's Office and KITTCOM)
- Emergency management analysis – flood, earthquake, disaster assessment & response
- Addressing and access permits
- Permit review analysis, processing, tracking, and data mining for reports and documentation
- Parcel assessment and re-valuation
- Critical areas analysis for land use applications and proposal evaluation
- Growth management act assessment and planning - land use and zoning mapping

Prior to 2007, GIS resided in the Community Development Services Department. GIS had become increasingly useful, but as the demand for GIS analysis and mapping requests increased, the underlying infrastructure was not designed to support the growing need. Mapping requests and GIS services were performed by the GIS Manager in Community Development Services, for all departments, and those tasks dominated their workload.

Since the reorganization of GIS in 2007, Information Technology has succeeded in overhauling the county's GIS infrastructure to the point where it can successfully sustain our current growth as well as support other agencies' GIS database and licensing needs. Updated software and hardware, and converting to an SDE geodatabase dramatically improved how our spatial information is accessed and manipulated. The infrastructure gap has been filled and GIS is operating at a sustainable level; however, there remain opportunities to increase GIS services and improve effectiveness and efficiencies of county staff, including mapping and GIS analysis. Jason Eklund is the county's GIS Coordinator and supports 24

GIS users spread among 5 departments, five users edit and update layers directly in the enterprise geodatabase.

The following strategic goals will be the focus for the GIS program over the next 5 years.

1. Refine GIS management philosophy.
2. Define standards for, and improve quality of, Framework data, and establish tools and procedures for perpetual data maintenance and appropriate access.
3. Improve county program efficiencies through GIS integration.
4. Improve GIS services for internal staff and the public.
5. Expand support that is offered to regional GIS stakeholders.
6. Expand the use of GIS technology and integration in departments and applications in which GIS use is not common but where substantial benefits may be achieved.

2.0 Introduction

A Geographic Information System (GIS) can be defined as "An integrated collection of computer software and data used to view and manage information about geographic places, analyze spatial relationships, and model spatial processes. A GIS provides a framework for gathering and organizing spatial data and related information so that it can be displayed and analyzed.

Enterprise GIS systems are integrated throughout an organization so that a large number of users can manage, share, and use spatial data and related information that is based on a common coordinate system to address a variety of needs, including data creation, modification, visualization, analysis, and dissemination.

Kittitas County currently employs an enterprise GIS system. In order to fully utilize this system and maximize our return on investment, a long-term strategic plan is needed. Here are some examples of critical business functions where GIS plays a major role.

- The roads layer, maintained by Public Works, is the primary source of information for emergency management software (Spillman) used by KITTCOM and first responders (e.g. Sheriff and other law enforcement, fire, and ambulance).
- Addressing and access permits determined by Public Works uses the roads and parcel layers.
- The permit review process, completed by Community Development, uses our web mapping application (COMPAS) and about 15 GIS datasets to determine approval or denial.
- Organizational framework for Land Use documents and records management.
- Platform for the official zoning and land use maps
- Critical areas analysis for land use applications are completed using data in the GIS.
- Noxious Weed Board uses mapping for inspections and uses the parcel layer when determining ownership for notifications regarding weed infestation.
- The Assessor's office maintains the parcel layer, used for assessment, re-valuation, and historical reference. This layer is critical as a base map for most departments using GIS.

- As a result of the Kittitas County Multi-jurisdictional Hazard Mitigation Plan (HMP), models will be generated using our GIS data to determine potential damage from fire, flood, earth quake, etc. to help determine future damage potential and vulnerability.

In this context, strategic planning indicates a comprehensive, long-range view of information management that will provide focus and direction for the more detailed tactical planning that must occur on a routine basis within all departments comprising the GIS community in Kittitas County.

The Strategic Plan has the following key purposes:

- To give long-term direction and foundation for Geographic Information Management (GIM) for Kittitas County.
- To define and support an organizational environment for accomplishing GIM goals.
- To promote GIM programs and initiatives.
- To provide a work agenda and a context for more detailed tactical plans and programs for making progress on specific work elements.
- To provide a vision and overarching strategy within which all geographic information stakeholders can develop strategies and tactics for improved collaboration and coordination.
- To aid financial planning for current and future needs

Strategic planning for management of geographic information should be a continuing process. The strategic planning process should be:

- A dynamic guide for detailed planning of individual elements of the plan.
- A central mechanism for coordinating and integrating elements of geographic information and technology development through the County without loss of planning perspective.
- The major instrument for meeting inevitably changing circumstances without loss of momentum or overall direction.

2.1 Background

In January 2007 Kittitas County reorganized GIS as a central service in the Information Technology Department. Prior to that move, GIS had been primarily functioning from within the Community Development Services Department (CDS). It was evident that while the GIS system had supported County business requirements at a basic level, the system was noticeably falling behind the technology curve. GIS processes and software that had been in use for years were in danger of becoming obsolete within the industry and no longer supported by software vendors. GIS datasets designed for single-use access were being used by multiple departments simultaneously (figure 1), causing frequent data corruption. In addition, most County departments had relied on a single GIS Analyst in CDS to fulfill their requests for maps, analysis and other geographic information. It became obvious that more resources and updated GIS technology were needed in order to sufficiently support the County's various business requirements and workflows.

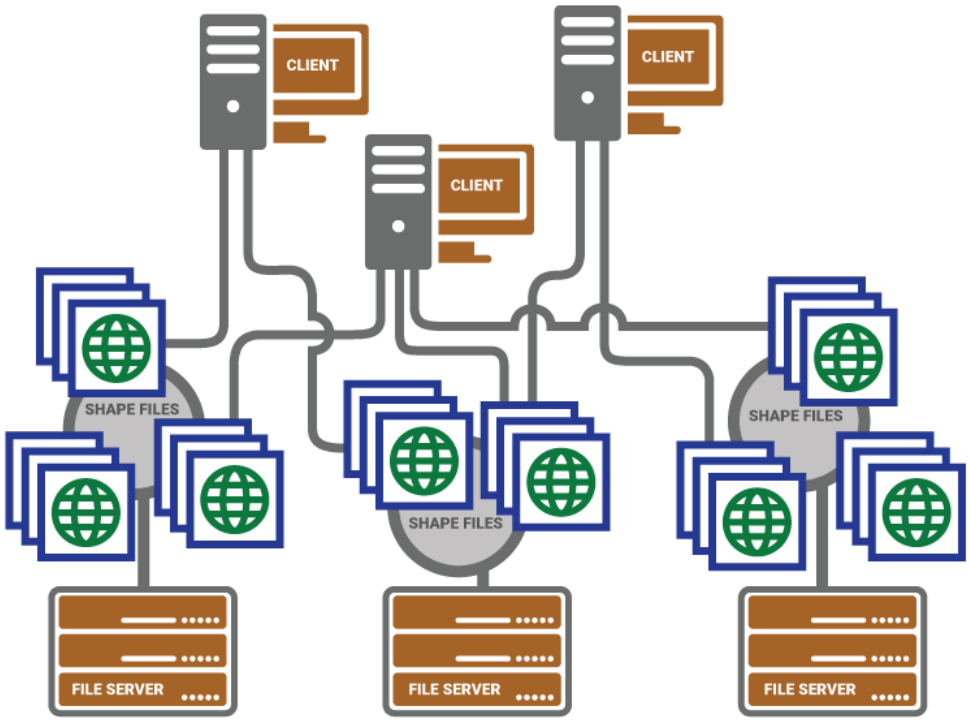


Figure 1: Shapefiles scattered over multiple file servers with multiple users accessing the same files, causing corrupt data with little control over access rights.

Concurrent with the reorganization, the GIS Manager in CDS resigned and a new GIS Analyst was hired to begin work on the County's GIS infrastructure. Areas focused on during this process included software updates, data cataloging and software license consolidation. The GIS Analyst position was re-classified into a GIS Coordinator role which was more commensurate with the job tasks.

3.0 Current Situation and Organizational Context

3.1 GIS Management and Program Status

Information Technology succeeded in building an enterprise SDE database while maintaining a distributed editing user base. Software, hardware and the SDE database dramatically improved how spatial information was accessed and manipulated. This platform is configured for hourly transaction logs, differential backups nightly, and weekly full backups. We have better control over data access through a Windows Authenticated environment.

The GIS page on the public website features 3 main applications for public access and use of our GIS information.

Open Data

Our Open Data site allows downloadable GIS data and metadata available in shapefile, spreadsheet, and KML formats.

COMPAS

Our interactive web mapping application (COMPAS) allows the public to obtain parcel information, locate various districts, buffer parcels and export mailing labels which has decreased office calls to both CDS and the Assessor's office. COMPAS averages close to 12,000 page views per month.

Maps Portal

The Maps Portal provides users static and interactive maps, organized into a gallery, for easy access to information and projects maintained by the county. Content is taken from the ArcGIS Online cloud and can be filtered by the tags placed on it.

Our County does not have a separate GIS department to maintain all the spatial data that we create; that responsibility resides within each department. The GIS Coordinator has been tasked with centralizing the database and writing software extensions to support the departments' maintenance of their data. All the software customizations are on a "per request" basis. A GIS Users Group was formed in 2007 and meets monthly, allowing GIS representatives from each department an opportunity to bring their ideas and concerns to the GIS management.

Prior to the reorganization of GIS in Information Technology, the GIS Manager stationed in Community Development performed mapping services for all departments, as well as the public as a free service. As a result, mapping requests dominated their workload and the core infrastructure began to stagnate. In 2010, the county decided to discontinue accepting public mapping requests due to a lack of resources, restricting GIS mapping services for internal use only.

Today, internal mapping requests are routed to CDS or the GIS Coordinator depending upon the nature of the request. Large format plotting can now be performed in the IT Department, residing in the general fund, eliminating the need for charge back to other departments. This plotter is also used for emergency incident mapping needs.

The primary challenge of a decentralized system is that each department with an identified need for GIS has had to develop competencies within their own staff. Those that have not identified sufficient need for GIS must find staff outside their department to do their GIS work and there have been situations where it is difficult for clients to find someone capable of handling their request. That issue aside, our current program structure has been successful in that it ensures the experts and parties responsible for the information are inputting data that meet critical business functions. A large part of the GIS Coordinator's role is to help define workflows and build tools for such data input and maintenance.

To date, efforts have been focused on maintaining a solid infrastructure and keeping software versions current to take advantage of latest technologies. This has helped to establish a more proactive GIS management approach in order to maintain increasing demands on the GIS system. This plan was also the tipping point in getting our GIS program to its next level of maturity.

3.2 Technical Resources and Staff

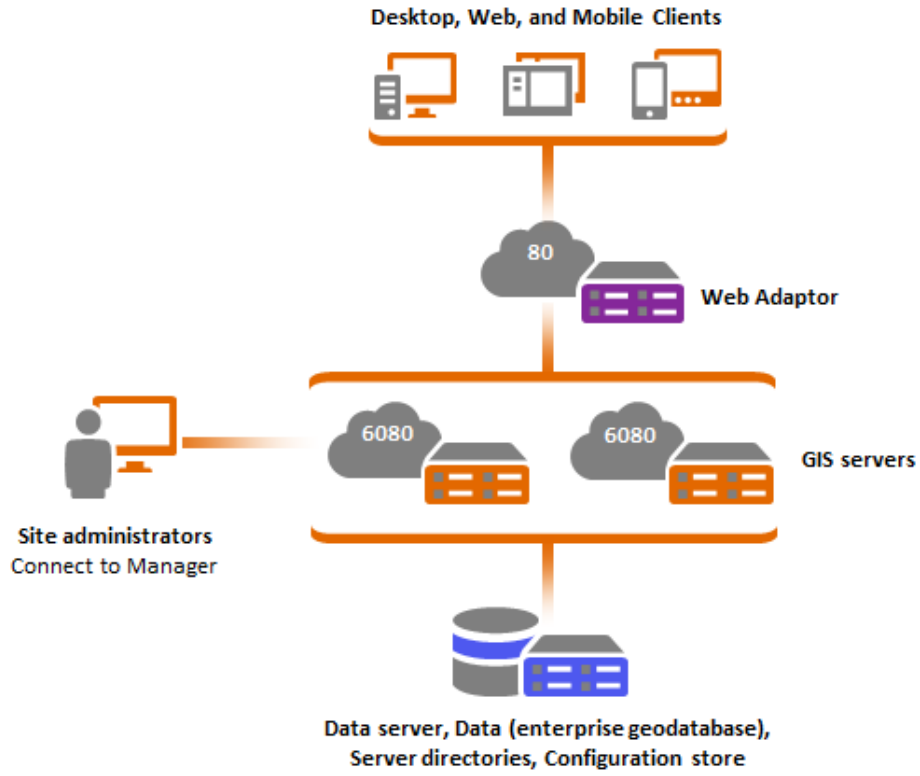
3.2.1 Data

Shapefiles were consolidated into an enterprise SDE database by 2010. The GIS Coordinator designs and builds new spatial layers as the need arises, creates the backup strategy, performs routine maintenance, and controls the security over the SDE database. A list of GIS data layers can be found on our intranet (CAMAS) at http://camas-net/committees/GIS/gis-data-layers.aspx

A number of maintenance routines, in the form of C# console applications, automate nightly maintenance tasks. For more detailed information about the maintenance applications see Appendix A.

3.2.2 Applications and Hardware

Figure 2: Current configuration - ESRI standard multi-machine ArcGIS Server Site



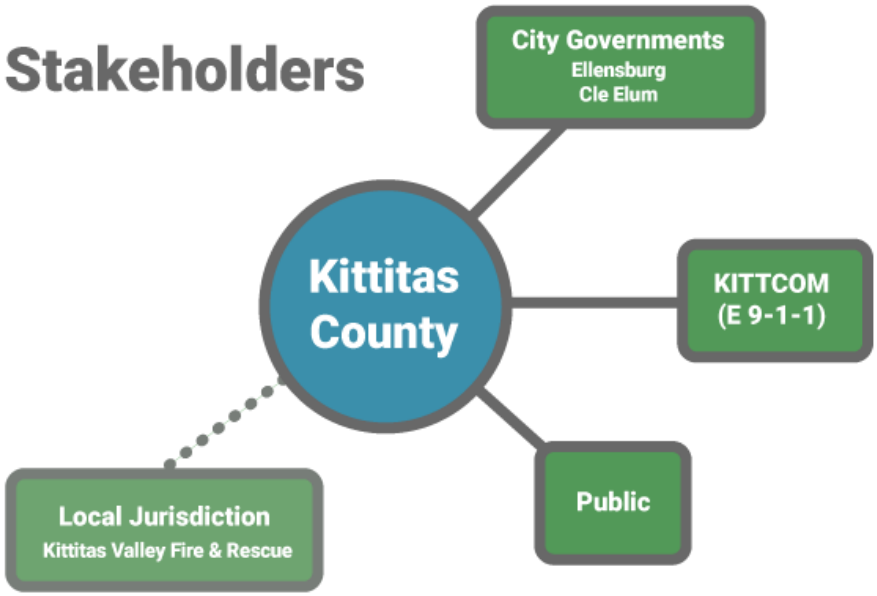
3.2.3 GIS Editor and Management Staff

Jason Eklund is the only GIS management staff member for Kittitas County. There are six staff members among Public Works, Community Development, the Assessor's office, and Noxious Weed who edit and maintain data in the enterprise geodatabase.

3.3 GIS Users

Information Technology supports 24 users spread out among 5 departments. We maintain a central license manager, allowing us an easy way to share licenses across departments. Most of our ArcGIS Desktop Viewer concurrent licenses have been traded in for Single-Use licenses, following ESRI's trend with ArcGIS Online and ArcGIS Pro architecture. See Appendix B for a list of users and license level.

3.4 Stakeholders



4.0 Strategic Foundation

4.1 Mission

The Mission of Information Technology, of which GIS is a part:

To support the business needs of Kittitas County by providing appropriate technology tools, solutions, and assistance

- through an excellent customer service experience;
- by adopting their requests as our own;
- to complete resolution;
- through active teamwork;
- in a fiscally responsible manner;
- securely;
- with creativity, respect, expertise, and professionalism;
- communicating effectively at the appropriate comfort level with our customers;
- while designing, maintaining, and supporting all county information technology infrastructures.

4.2 Vision for Geographic Information Management

- Encourage and support the contributions of everyone in the Kittitas County Geographic Information Community.
- Leverage the human, technical, and information resources of the Geographic Information Community to accomplish measurable countywide and local objectives and to solve real problems.
- Expand the scope and range of GIS analytical and organizational capabilities.
- Provide an organized framework to enable data integration and sharing of both spatial and non-spatial applications and information.
- Be the model for County Government GIS.

4.3 Past Strategic Plans

In August of 2006 a strategic plan was proposed by our GIS software vendor, Environmental Systems Research Institute (ESRI) to help improve the infrastructure of the GIS program. The summary of that plan included the following:

- Hire a GIS Coordinator who will reside in the Information Technology department
- In order to fulfill the vision of a more productive and efficient GIS, additional GIS support staff will be needed along with software upgrades and training for support staff and users.
- Meetings were conducted with various departments and agencies expressed the following common needs:
    - Interdepartmental access to data stored in a central location
    - Tighter integration between various systems (e.g., TerraScan, permitting, etc.) and GIS

    - More staffing to support GIS needs
    - More user training
- 1st year
    - Migrate to the ArcGIS platform and move data into an SDE enterprise geodatabase
    - User training
- 2nd year and beyond
    - Allocate funding for ongoing software maintenance.
    - Ongoing training
    - Ongoing Geodatabase development

4.4 Strengths, Weaknesses, Opportunities and Threats (SWOT)

A SWOT analysis helps identify internal and external conditions and forces that may help, support, harm, or present obstacles to an objective or situation. This SWOT relates to the current GIS structure at Kittitas County.

4.4.1 Strengths

- GIS structured within the Information Technology department with strong application, hardware and software support.
- GIS infrastructure that has the capacity to serve as a GIS repository and source of technical support for local agencies. Currently we have inter-local agreements with the City of Ellensburg, City of Cle Elum and KITTCOM (E9-1-1).
- In-house GIS knowledge and development skills.
- Using industry standard GIS technologies.
- Staying current with software version updates and patches.
- Testing additional ESRI software through their BETA testing program.
- Quality hardware, software, and peripherals.
- Highly qualified and capable personnel building and maintaining systems and data.
- High usage/adoption of COMPAS.
- Low resistance to sharing data and skills in all departments as well as other agencies.
- Efficient use of current licensing.

4.4.2 Weaknesses

- Lack of GIS presence in some departments for maintaining their owned GIS layers in SDE (Auditor, Public Health).
- No designated GIS staff person to fulfill internal mapping requests.
- No clearly defined method for routing and updating boundary changes since the Boundary Review Board (BRB) was dissolved.
- GIS Coordinator has not aggressively pursued how GIS can aid non-GIS based operations (Prosecutor, Auditor).
- Standard operating procedures for data collection and maintenance.
- Metadata for core datasets only.

4.4.3 Opportunities

- Unified approach to GIS program development.
- More GIS efficiencies realized from a more structured approach to GIS program management.
- Development of strong GIS leadership.
- Pursue outside funding sources (grants).
- External partner participation on projects that benefit multiple stakeholders.
- Aid GIS program development for City of Kittitas and Kittitas Valley Fire and Rescue.
- Assist continued growth of GIS program for City of Cle Elum.
- Fee based mapping services provided to the public.
- Expanded functionality and education to other departments and the public.

4.4.4 Threats

- GIS is not a central department, creating a perception there is a lack of leadership or utility function only.
- For departments that maintain GIS data, inability to retain employees with sufficient GIS skills.
- Designing data standards that meet the needs of all agencies and departments
- If mapping requests were brought into IT for all departments, other vital GIS program elements could lose priority, similar to our situation before 2007.
- Mapping requests of Community Development Services (from external departments) can take substantial resources away from processing land use applications.
- GIS is a central service in the general budget. As GIS program grows, lack of funding for additional GIS staff.

4.5 Business Drivers

The following business drivers define the types of benefits that can be realized from GIS and document the expected value of the tangible and intangible results of the implementation effort.

4.5.1 Cost Savings

Defines a reduction in current expenses such as contract costs and salaries:

- Coordination with other local agencies for sharing enterprise licensing and hardware costs.
- Aiding land use development.
- Providing a framework to catalogue land use documentation dramatically reducing processing times for public disclosure requests and land use applications
- Field data collection and processing eliminates redundant data entry.
- Reduction in phone calls and counter visits as public can get information from COMPAS and self-serve data downloads.

4.5.2 Cost Avoidance

Reducing or eliminating costs that would be incurred without the use of GIS technology:

- Reduced risk of lawsuits and land use appeals by having more accurate information.
    - Higher quality analysis for land use applications and groundwater permits.

- Reduce project startup costs.
- Emergency management processes and practices reduce the risk to life and property.
- Ability to leverage skills and training across multiple departments and local agencies.
- Decreased downtime for critical workflows
    - Stable GIS database with hourly backups.

4.5.3 Opportunities for Enhancement of County's Image

Benefits not easy to quantify, yet have a positive impact on our operations, social conditions, and quality of service

- Enhanced ability to provide high quality maps and data for public records requests.
- Compliance with government regulations, requirements, and best practices.
- Increase data accuracy confidence levels for internal staff and the public.
- Increased government transparency offering all data maintained by the county available for download.

4.5.4 Operational Efficiency Gains

Expected gains in current personnel efficiency and productivity allowing work to be accomplished in less time and with less expense

- Eliminate duplication of effort by bridging workflows that involve multiple systems and data stores within departments.
- Improve coordination of workflows between departments by centralizing data access.
- Custom application utilities that replace workflows involving multiple steps.

4.6 Strategic Goals

The following high-level goals have been identified by Information Technology to implement Kittitas County's GIS vision and achieve its mission (in order of importance).

1. Refine GIS management philosophy.
2. Define standards for, and improve quality of, Framework data, and establish tools and procedures for perpetual data maintenance and appropriate access.
3. Improve county efficiencies through GIS integration.
4. Improve GIS services for internal staff and the public.
5. Expand support that is offered to regional GIS stakeholders.
6. Expand the use of GIS technology and integration in departments and applications in which GIS use is not common but where substantial benefits may be achieved.

4.7 Critical Success Factors

The following list represents technical, organizational, or financial variables and requirements that have a major influence on the acceptance and accomplishment of the plan.

- Agreement and support of current stakeholder groups, and the ability to attract additional stakeholders.
- One or more “champions” (elected official or department head) aware of and involved in the GIS program.
- Sustainable funding sources to meet GIS program objectives outlined in this plan.
- Policies, procedures, and workflows support effective data stewardship.
- Appropriate and reliable data discovery and access are sustained.
- Clearly defined work plans and practices for monitoring performance.

5.0 Strategic Initiatives

5.1 Road Map to Critical Upgrades

The following upgrades will need to be addressed over the next couple of years.

5.1.1 Runtime SDK from v10.2.7 to v100

The Runtime SDK enables you to build native mapping apps for various platforms. We currently have 2 applications that are built on top of the ArcGIS Runtime SDK for .NET.

1. EPIC – Exotic Plant Information Collector used by Noxious Weed
2. Apollo – Mobile field data collection app for post emergency assessments

There were significant changes to the SDK with the release of version 100 which will allow for the following:

- Support for exporting and downloading vector tile packages
- More flexible control over synchronization between local data and feature service
- New pre-planned workflows when taking maps offline

With this version release, licensing has changed and both applications will need to be licensed at the “Basic” level due to editing of local datasets that sync with the feature service. Esri sells deployment packs of 50 for $5,000 which is more than enough to license both applications. Migration requirements include:

1. $499 - Visual Studio 2017 standalone license
2. No additional cost - Windows 10
3. $5,000 - license pack of 20 deployments for “Basic” level

5.1.2 Javascript API from v3.2 to v4.6

This upgrade will affect COMPAS (our public facing web mapping application), and Hydro, Public Health’s group B water system database. Esri is suggesting the migration path for moving from 3.x to 4.x should

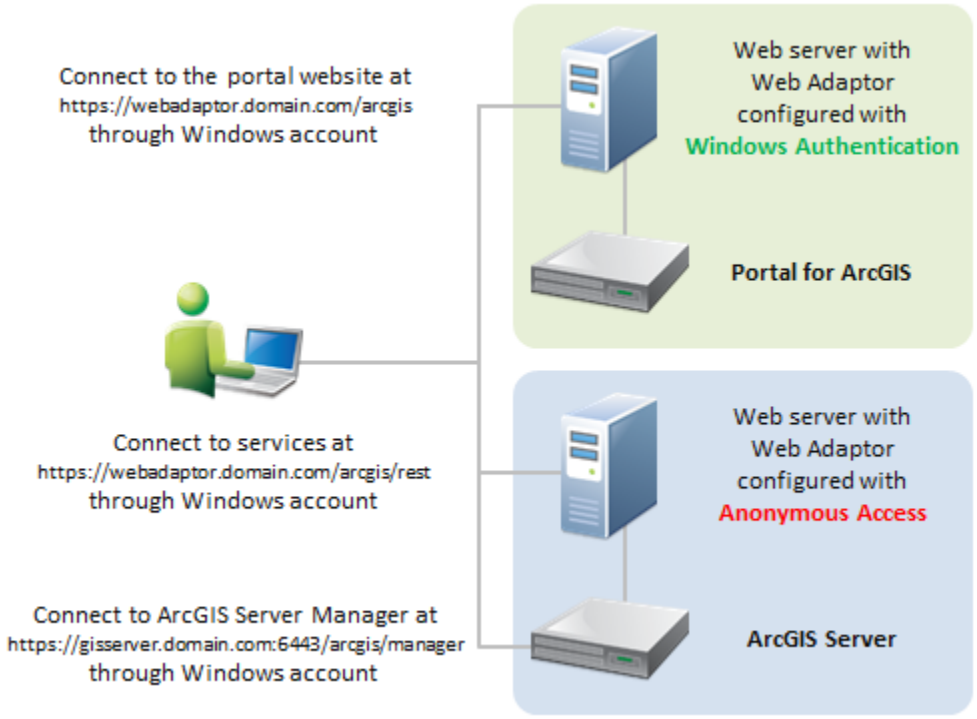
be focused on an entire re-write vs. simply trying to upgrade the application. Migration cost requirements include:

1. Staff time involving input from all Applications Division staff.
2. No additional cost.

5.1.3 ArcGIS Portal Configuration

Portal for ArcGIS is a component of ArcGIS Enterprise that will allow Kittitas County to share maps, scenes, apps, and other geographic information with other staff in our organization. The front-end ArcGIS Enterprise portal is powered by the back-end infrastructure of Portal for ArcGIS. The GIS Coordinator can customize the ArcGIS Enterprise portal to fit the county's look and feel.

A more simplistic view of ArcGIS Portal would be an internal version of ArcGIS Online, giving Kittitas County the ability to become a true "web GIS". A more detailed description of this can be found on Esri's website. Most likely we would federate our server site with portal using the following configuration.



Configuration requirements would include:

1. New dedicated virtual server for Portal installation (no additional cost but use of datacenter resources)
    a. Windows Server 2012

b. 16 Gb Ram
c. 4 cores

2. Configure current ArcGIS Server site as HTTPS only (no additional cost, will use the already purchased wildcard security certificate)

5.1.4 Desktop/Server Licensing

Refer to current desktop licensing in Appendix B. Esri's licensing model is moving toward named user accounts, managed through ArcGIS Online (or Portal). Concurrent use licensing will be phased out by Kittitas County by 2023. Currently we are licensed for up to 4 cores for ArcGIS Server. As web service usage rises, the need to license more cores for our ArcGIS Server site is anticipated, carrying a new maintenance price tag.

- Current - $5,000/year maintenance fee for up to 4 cores (ongoing cost is current budget)
- Projected - $5,000 for each additional core and $1,250/year maintenance fee. Additional cores are not anticipated until 2022.

5.1.5 Open Data Template Update

The Open Data application template is part of our ArcGIS Online subscription and will need to be updated to the latest version ArcGIS Hub 2.1. We are currently running the version of 1.10 and cannot modify the template until we upgrade. Esri strongly recommends we upgrade. This will entail some custom HTML and CSS in order to brand the web page with the Kittitas County header and footer but will point to the same feature services on our ArcGIS Server.

5.2 Objectives

To accomplish its goals, Kittitas County has established objectives that:

- Are clear, concise and attainable
- Are measureable
- Are targeted for completion during strategic plan cycle
- Include responsibility for taking action

The following objectives support the strategic goals defined in section 4.6 and position GIS to be effective over the next 5 year period. Lead departments for each objective are indicated with the department abbreviation in parentheses.

Goal 1: Refine GIS Management Philosophy

1.1 Continued Proactive GIS management (IT)

Take a more planned oriented, pro-active approach to managing the county-wide GIS program. This includes annual revision of this document and active involvement with each department to improve existing workflows using our GIS system.

COMPLETED - GIS Analyst position title changed to GIS Coordinator (IT, 2012)
Change the GIS Analyst position title in Information Technology to GIS Coordinator as this better defines the job tasks currently performed and reflects the top-down structured approach to our GIS program.

Goal 2: Define standards for, and improve quality of, Framework data, and establish tools and procedures for perpetual data maintenance and appropriate access

2.1 Data Accuracy Standards and Metadata (IT)
Establish data accuracy/collection standards for data created by Kittitas County. Existing GIS datasets need to have metadata on how it was created, who created it and at what accuracy. Future datasets will be built based upon established data accuracy and collection standards and will not be published without minimal metadata. Metadata on datasets will be done in two phases:

> ***Phase 1: COMPLETED (2013) -*** *Establish metadata for all datasets that Kittitas County maintains.*
>
> **Phase 2:** Establish field data collection standards that encompass hardware, software and acceptable accuracy.
>
> **Phase 3:** Establish metadata for 3rd party data.

2.2 Point of Entry/Access Addressing Database (IT)
Build a new point-of-entry addressing database to be used as the standard for Kittitas County, KITTCOM, the City of Ellensburg, first responders, and all other local jurisdictions. This is a requirement of KITTCOM by the National Emergency Numbering Association (NENA) for their new next generation E9-1-1 system.

> ***Update***: This dataset is complete but upper county building locations need verification.

2.3 Correct Road Addressing to Match Mobility Database (PW)
Inconsistencies exist between how road segments are addressed and the matching records in the Mobility database. These inconsistencies need to be systematically corrected.

2.4 Strategy for Road Atlas Updates (PW)
The road atlas has not been updated for a couple years due to staffing changes. New staff will either need to familiarize themselves with the MapLogic ArcMap extension that was being used, or purchase a new solution for building/maintaining map books.

2.5 Survey Control Network (PW, On Going)
Build a county-wide survey control network that can be used to accurately register other datasets for improving spatial accuracy. Public Works staff are collecting monuments at job sites and interns will help fill the gaps in rural areas where control points are needed, with the end product consisting of control points that cover the entire county.

2.6 Tie Together the Bridges Layer with the Roads Layer (PW)
Establish a geometric network between the roads layer and the bridges layer.

COMPLETED - Consolidate and Organize LIDAR Data (PW, 2015)
Combine all the LIDAR data we have into a single raster mosaic dataset. This will help to discover any needed gaps in our coverage.

COMPLETED - Accessible Food Layer (PH, 2013)
Create a new GIS feature class layer that represents restaurants, health food stores, community gardens, convenience stores, etc. This layer can be used as another Social Determinate of Health.

COMPLETED - Complete Wells Database (PH, 2013)
Supplement gaps in the current wells dataset by collecting all missing wells in the county via GPS and build a database which links each well to the parcels they serve.

COMPLETED - Old Solid Waste Facilities Feature Class (PH, 2013)
Create a new GIS feature class layer that represents old solid waste facilities. This information is valuable when studying social determinates of health

COMPLETED - School Board Director Districts Feature Class (AU, 2013)
Create a new GIS feature class layer which represents school board director district boundaries.

COMPLETED - Parcel Fabric data model (AS, 2013)
In ArcGIS 10.0 there are new tools available for the maintenance of parcel data that can only be used if the parcels are contained in a parcel fabric. We will migrate the current parcel data model to take advantage of these tools and ensure we are staying current with the latest industry standards.

COMPLETED - Commissioner District and Voter Precinct Changes (AU, 2012)
Specific boundary changes have been proposed and approved by the Board of County Commissioners as a result of the 2010 census population numbers. The layers in our SDE database cannot be modified until the resolution has been signed. Once completed, database changes will be published.

Goal 3: Improve county efficiencies through GIS integration

3.1 Improve Floodplain Management Response (PW)
Create more efficient tools for information gathering and reporting to FEMA when a flood event occurs. Create floodplain management visualization tools for CDS when working directly with clients who want to build near a floodplain.

- Integrate Operations and Planning feature datasets within our SDE database. These are specific feature classes designed by ESRI, to help gather information about dynamic emergency incidents.
- ***COMPLETED - Establish a standard mobile field collection solution (2015)***. *A Windows WPF application has been built to run on a Windows tablet for mobile field collection of emergency*

events, both fire and flood. Collector for ArcGIS on the Windows platform is now in beta and will be tested.

- ***COMPLETED - Collector for ArcGIS and Operations Dashboard (2013):*** *A proof of concept project has been built for field collection of flood data with real-time monitoring of the event by administrative staff.*

3.2 Link GIS to CAD (PW)
Establish a link between CAD and GIS systems to allow Public Works staff to bring in GIS base maps for fast creation of road engineering projects. There are many GIS resources and data that can be utilized by the Public Works CAD programs to increase efficiencies (e.g., the SDE database).

3.3 Proximity Search Tools (PR)
Develop tools that will allow the Prosecutor's office to leverage GIS capabilities in the form of proximity searches. Often times the Prosecutor's need the ability to run a proximity search for traffic accidents in relation to specific mile posts, drug deals in relation to schools, or determine distance to a building point of access.

3.4 Land Use Application Workflow Integration with SmartGov (CDS)
As planners enter application information into SmartGov, give them the ability to easily copy the parcels involved to a feature class in the SDE database for current and future mapping and analysis purposes.

3.5 Build Framework for Update of Public Health Assessment Maps (PH)
Establish a working map template and set of tools that will allow Public Health to update assessment maps from census data on a semi-regular basis as new data is made available.

The Following task has been superseded by a tablet application developed for Windows 10

Smartphone Mobile Editing of Restaurant Inspections (PH, 2013)

Create a new points layer of food establishments and build an ArcGIS Online application that will allow inspectors to enter food inspections on their smartphone or tablet in the field.

COMPLETED - Land Use Application SDE Feature Class (CDS, 2015)
Streamline the land use application mapping process and increase transparency with the public by building a new feature class for the SDE database that will contain all land use applications that can be tracked through COMPAS.

COMPLETED - Integrate Noxious Weed database into the GIS system (NW, 2016)
The master Weed database which tracks all current and historical information is updated annually and not accessible through the GIS. By integrating this information with our GIS database, inspectors will have access to historical information through the mapping interface and have the ability to update the system throughout the year.

Phase 1: COMPLETED (2012) - *Import the Excel data into a standalone SDE table in SQL Server and tie the information to the tax parcels.*

***Phase 2*: COMPLETED (2012) -** *Build an ArcMap utility that will allow the inspectors to add new records to this table and lookup historical information for a given parcel.*

Phase 3: COMPLETED (2017) Have NW staff using EPIC exclusively for inspection update and research throughout the year, eliminating the need for separate Excel spreadsheets.

Phase 4: COMPLETED (2017) Enable the mobile editing capabilities of EPIC by purchasing the Esri standard license for the Runtime SDK for .NET.

NOTE: EPIC won first place in the Apps Fair at the 2017 ESRI International User Conference in San Diego, CA. Voted as best app with over 18,000 in attendance.

COMPLETED - Wells Database Editing Application (PH, 2014)
Build a web application (Hydro) that will allow Public Health staff to edit the wells point layer and related B Systems and connected parcel records table. The application will use the ArcGIS JavaScript API to push edits through a REST endpoint to the SDE database.

COMPLETED - Automate Cache Update Process for COMPAS (IT, 2014)
Build an automated way to update the COMPAS base map cache by analyzing which parcels have changed since the last cache and only caching those areas. Use the new tools included with ArcGIS 10.2.

Goal 4: Improve GIS services both internally and to the public

4.1 Enhance Public User Experience of Existing Applications (IT)
We have numerous applications the public has access to for getting information. Some of these applications include:

- Road Atlas Index map for downloading road atlas pages using an interactive map interface.
- Voter Precinct Index map for downloading individual static PDF voter precinct maps.
- Open Data site for downloading GIS data
- Maps portal where we put all our interactive and static map content
- COMAPS – our online web mapping application for property information
- The Water Mitigation Suitability Map for looking up groundwater permit determinations

Improve the visibility and discoverability of this data to the public.

4.2 Update COMPAS Web Application (IT)
COMPAS is running the ArcGIS Javascript API version 3.2 which is still being supported but cannot take advantage of new framework elements like web scenes for 3D capabilities. COMPAS will be completely overhauled for the new 4.x version and run from within HTML 5 for better features and an enhanced user experience.

4.3 Install/Configure ArcGIS Portal (IT)
Portal for ArcGIS allows an organization to have their own internal "ArcGIS Online" environment to securely serve up applications and map services for internal use only. As our use of map services increases with other departments, Portal will allow us to be a true "web GIS".

4.4 Migrate from ArcGIS Desktop to ArcGIS Pro (IT)
ArcGIS Pro will eventually have all the capabilities of ArcMap and replace it. Some GIS staff has started to familiarize themselves with it. In order to stay ahead of the eventual phase out of ArcMap, all staff will be using ArcGIS Pro by 2021. This process will include taking an Esri online course as a group before an official transition takes place.

4.5 Building Permits Accessible through COMPAS (CDS)
Paladin is building a connector in SmartGov that will allow staff to add documents directly to LaserFiche from the SmartGov interface. Once this functionality is in place and documents exist in LaserFiche, make them accessible from COMPAS through a LaserFiche WebLink page.

4.6 Groundwater Checklist Available through COMPAS (PH)
Add the groundwater checklists to LaserFiche and make them accessible from COMPAS through a LaserFiche WebLink page.

4.7 Add Sales Information to COMPAS (AS)
Add the ability to display sales information in COMPAS as a separate layer that can then be printed, or exported out as a report for public consumption. This will either be a custom query interface for desired sales characteristics, or a buffer proximity search for all sales surrounding a subject property.

4.8 Enterprise SDE Database with Redundant Failover for KITTCOM (IT)
Build a new enterprise SDE database that our e-9-1-1 call center (KITTCOM) will use for their GIS database, housed at the County. We would then create a failover SQL Server by setting up a database mirror to a server at their office.

COMPLETED - Precinct Maps for Public Download (AU, 2014)
Make voter precinct information and maps more accessible on our website. Precinct lines change infrequently, so create static PDF downloadable maps for the public to access. These maps will be hosted on the public maps portal site.

COMPLETED - Migrate GIS Infrastructure to new Virtual Server Environment (IT, 2013)
During the conversion of all our servers to the new virtual environment, establish a new ArcGIS Server 10.2 "site", consisting of multiple servers to distribute requests issued to the GIS web services. During the conversion, migrate and upgrade the SDE database to SQL Server 2008 R2 (x64).

COMPLETED - Public Maps Portal (IT, 2013)
Create a destination portal webpage for published map outputs. This page will be a modified version of the public maps portal template made available by ESRI. This portal would allow each department to publish projects and maps for interactive use by the public.

COMPLETED - Upgrade COMPAS to JavaScript API (IT, 2013)
Transition the COMPAS web mapping application to ESRI's JavaScript API framework. ESRI is ceasing future development of the Web ADF and advises that web mapping applications built on this platform be moved to one of their Application Programming Interfaces (API's) as soon as possible. We are choosing JavaScript over Silverlight or Flex.

COMPLETED - ArcGIS 10.0 Upgrade (IT, 2012)
Currently we have mixed desktop versions of 9.3.1 sp1 and 10.0. Not having all client desktops running version 10.0 prevents us from upgrading our central SDE database to version 10.0. Upgrading ArcSDE to version will allow us to leverage new capabilities that can streamline workflows across County departments.

Goal 5: Expand support that is offered to regional GIS stakeholders

5.1 City of Cle Elum GIS Integration (IT)
The City of Cle Elum now has its own Esri Desktop license and is creating their own layers in coordination with the county.

5.2 City of Kittitas GIS Integration (IT)
Explore the City of Kittitas' GIS situation for integration and support opportunities.

5.3 Kittitas Valley Fire and Rescue GIS Integration (IT)
Extend GIS support to Kittitas Valley Fire and Rescue.

5.4 CWU Internship Program (IT)
Develop an ongoing CWU internship or other cooperative arrangements with CWU staff and students.

Update: CDS has been using interns to complete a lot of GIS data entry since 2015.

Goal 6: Expand the use of GIS technology and integration in departments and applications in which GIS use is not common but where substantial benefits may be achieved

6.1 GIS Users Group (IT, On-going)
Staff involved in the use and maintenance of GIS data attend a monthly meeting, chaired by the GIS Coordinator, to cover GIS topics and issues that affect each department.

6.2 Department Visits (IT, On-going)
Schedule visits with departments to learn critical business workflows on an annual basis.

6.3 Job Shadow (IT, On-going)
In order to discover where efficiencies through GIS processes can be realized, the GIS Coordinator will job shadow employees to better understand their work processes.

6.4 Annual Update of GIS Strategic Plan
Visit departments at the first of the year to discuss upcoming GIS goals and projects. We also go over all the GIS information and applications that the public has access to.

COMPLETED - Map Social Determinants of Health (PH, 2012)
Be more proactive with the Public Health Department in using GIS to explore social determinants of health by geocoding and integrating electronic health record systems. Our Public Health Department has received a grant, awarded by the CDC, to study social determinates to health. Information Technology will be creating the maps and performing the GIS analysis for this project which will be published by the National Association of City and County Health Officials and represents a huge impact on public health for the next few years.

Glossary of Terms

GIS Terminology

- **ESRI** – Environmental Systems Research Institute. This is the primary GIS software vendor for Kittitas County and the company that supplies us with the ArcGIS platform (Desktop and Server).
- **ArcReader** - a free desktop mapping application that allows users to view, explore, and print maps and globes. Anyone with ArcReader can view high-quality interactive maps authored by a high-level ArcGIS for Desktop product and published with the ArcGIS Publisher extension.
- **ArcSDE** – Also known as SDE or Spatial Database Engine. Technology for managing geographic information in a relational database management system (RDBMS). ArcSDE is part of the ArcGIS platform, and is the data server between ArcGIS and relational databases. It is used to enable geographic information to be shared by many users across a network and to scale in size from personal, to workgroup, to enterprise use.
- **Collector for ArcGIS –** Works directly with our ArcGIS Online subscription to Capture, update, and report spatial and tabular information directly from your Android or Apple device.
- **Operations Dashboard -** Operations Dashboard app for ArcGIS is a Windows-based app that provides a common operating picture for monitoring, tracking, and reporting an event (or system of events) across a group of people within your organization. This works in-conjunction with the Collector for ArcGIS and displays the data collected.
- **LIDAR** – Light Detection and Ranging is an optical remote sensing technology that can measure the distance to, or other properties of, a target by illuminating the target with light, often using pulses from a laser. In a GIS application, elevation data and 3D surfaces can be constructed from LIDAR images.
- **Shapefile** - A vector data storage format for storing the location, shape, and attributes of geographic features. A shapefile is stored in a set of related files and contains one feature class. This is the most universal form of GIS file formats, compatible with many platforms.
- **Geodatabase** - A database or file structure used primarily to store, query, and manipulate spatial data. Geodatabases store geometry, a spatial reference system, attributes, and behavioral rules for data. Various types of geographic datasets can be collected within a geodatabase, including feature classes, attribute tables, raster datasets, network datasets, topologies, and many others. Geodatabases can be stored in relational database management systems, or in a system of files, such as a file geodatabase.
- **Parcel Fabric** - A parcel fabric stores a continuous surface of connected parcels or parcel network. Parcels in a fabric are defined by polygon features, line features, and point features. Polygons are defined by a series of boundary lines that store dimensions as attributes in the lines table. Dimensions on parcel lines should ideally match recorded dimensions on the record or survey or plan.
- **Topology** - In geodatabases, the arrangement that constrains how point, line, and polygon features share geometry. Topology defines and enforces data integrity rules.

Appendix A

Maintenance Applications

Log files are generated for each maintenance routine and are checked frequently to ensure proper maintenance of the system.

Nightly

- COMPAS maintenance
    - Builds a new COMPAS reporting feature class which includes all the information found from the “results” popup containing “Ownership”, “Districts” and “Critical Areas” information. With this feature class, no spatial queries need to be run in “on the fly” geoprocessing services on the web, making COMPAS queries much faster.
- Parcel Publishing
    - Parcels are exported from the parcel fabric in SDE and merged with the ownership data from TerraScan to create a published feature class that can be downloaded by the public and used internally by County staff for analysis.
    - An analysis is also performed during this task that will compare the most recent updated parcel date to the last COMPAS base map cached date. If parcels have been updated since the last time the COMPAS base map was cached, these parcels are copied to a separate layer to be used for updating the TaxMap base map cache tiles for COMPAS.
- SDE maintenance
    - Pulls the TerraScan ownership tables into SDE for direct use in the GIS system.
- TerraScan ownership tables exported to CSV (T2Query Export) files and then zipped, to make available for public download through the maps portal.

Periodic

- If the parcel publishing routine sends an email that the COMPAS TaxMap base map needs to be updated, run the CacheUpdate console application (C#) which will update the cache tiles in COMPAS.

Appendix B

ArcGIS License Allotment for each Department

Department	*License Level*	*License Type*	*Position*
Public Works	Advanced	Concurrent	Flood Plain Manager
Public Works	Advanced	Single-Use	Engineer Tech
Public Works	Basic	Single-Use	Engineer Tech
Public Works	Basic	Single-Use	Front Counter
Public Works	Basic	Single-Use	Vacant
Public Works	Basic	Concurrent	Shared
Assessors	Advanced	Concurrent	Cadastral Tech
Assessors	Standard	Concurrent	Administration
Assessors	Basic	Concurrent	Shared
CDS	Advanced	Concurrent	Planner
CDS	Basic	Single-Use	Permit Tech
CDS	Basic	Single-Use	Permit Tech
CDS	Basic	Single-Use	Intern
Public/Environmental Health	Basic	Single-Use	Env Health Specialist
Noxious Weed	Basic	Single-Use	Assistant Director