

Buffalo County

Land Information Plan

2025-2027



Buffalo County
Land Information Office
407 S 2nd Ave, PO Box 28
Alma, WI 54610
(608) 685-6285
<https://www.buffalocountywi.gov>

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CONTENTS

EXECUTIVE SUMMARY	3
1 INTRODUCTION	4
2 FOUNDATIONAL ELEMENTS	7
PLSS.....	7
Parcel Mapping.....	9
LiDAR and Other Elevation Data	11
Orthoimagery.....	12
Address Points and Street Centerlines.....	13
Land Use	14
Zoning.....	15
Administrative Boundaries.....	16
Other Layers	18
3 LAND INFORMATION SYSTEM	21
Public Access and Website Information	23
4 CURRENT & FUTURE PROJECTS	24
Project Plan for Parcel Completion (Benchmark 3).....	25
Project Plan for PLSS (Benchmark 4)	25
Project #1: Indexing, Scanning, and Preserving	26
Project #2: Land Information Software	26
Project #3: Land Information Hardware	27
Project #4: Geospatial Data Acquisition	27
Project #5: Web and Cloud Hosting.....	28
Project #6: NG911 and Emergency Management	28
Project #7: Training and Education	29

EXECUTIVE SUMMARY

About this Document. This document is a land information plan for Buffalo County prepared by the land information officer (LIO) and the Buffalo County land information council. Under state statute 59.72(3)(b), a “**countywide plan for land records modernization**” is required for participation in the Wisconsin Land Information Program (WLIP). The purpose of this document is twofold: 1) to meet WLIP funding eligibility requirements necessary for receiving grants and retaining fees for land information, and 2) to plan for county land records modernization in order to improve the efficiency of government and provide improved government services to businesses and county residents.

WLIP Background. The WLIP, administered by the Wisconsin Department of Administration, is funded by document recording fees collected by register of deeds at the county-level. In 2023, Buffalo County was awarded \$142,600 in WLIP grants and retained a total of \$19,776 in local register of deeds document recording fees for land information.

This plan lays out how funds from grants and retained fees will be prioritized. However, as county budgets are determined on an annual basis with county board approval, this plan provides estimated figures that are subject to change and are designed to serve planning purposes only.

Land Information in Buffalo County. Land information is central to county operations, as many essential services rely on accurate and up-to-date geospatial data and land records. A countywide land information system supports economic development, emergency planning and response, and a host of other citizen services. The Buffalo County land information system integrates and enables efficient access to information that describes the physical characteristics of land, as well as the property boundaries and rights attributable to landowners.

Mission of the Land Information Office. In the next three years, Buffalo County’s Land Information Office strives to be recognized for its exceptional webmapping site, gains in governmental efficiencies by broadening the utilization of GIS, improvements in parcel mapping accuracy, and responsiveness to meeting the land records needs of residents and businesses.

Land Information Office Projects. To realize this mission, in the next three years, the county land information office will focus on the following projects:

Buffalo County Land Information Projects: 2025-2027	
Project #1	Indexing, Scanning, and Preserving
Project #2	Land Information Software
Project #3	Land Information Hardware
Project #4	Geospatial Data Acquisition
Project #5	Web and Cloud Hosting
Project #6	NG911 and Emergency Management
Project #7	Training and Education

The remainder of this document provides more details on Buffalo County and the WLIP, summarizes current and future land information projects, and reviews the county’s status in completion and maintenance of the map data layers known as Foundational Elements.

1 INTRODUCTION

In 1989, a public funding mechanism was created whereby a portion of county register of deeds document recording fees collected from real estate transactions would be devoted to land information through a new program called the Wisconsin Land Information Program (WLIP). The purpose of the land information plan is to meet WLIP requirements and aid in county planning for land records modernization.

The WLIP and the Land Information Plan Requirement

In order to participate in the WLIP, counties must meet certain requirements:

- Update the county's land information plan at least every three years
- Meet with the county land information council to review expenditures, policies, and priorities of the land information office at least once per year
- Report on expenditure activities each year
- Submit detailed applications for WLIP grants
- Complete the annual WLIP survey
- Subscribe to DOA's land information listserv
- Coordinate the sharing of parcel/tax roll data with the Department of Administration in a searchable format determined by DOA under s. 59.72(2)(a)

LAND INFORMATION

Any physical, legal, economic or environmental information or characteristics concerning land, water, groundwater, subsurface resources or air in this state.

'Land information' includes information relating to topography, soil, soil erosion, geology, minerals, vegetation, land cover, wildlife, associated natural resources, land ownership, land use, land use controls and restrictions, jurisdictional boundaries, tax assessment, land value, land survey records and references, geodetic control networks, aerial photographs, maps, planimetric data, remote sensing data, historic and prehistoric sites and economic projections.

– Wis. Stats. section 59.72(1)(a)

Any grants received and fees retained for land information through the WLIP must be spent consistent with the county land information plan.

The Statewide Parcel Map Initiative

For Strategic Initiative grant eligibility, counties are required to apply WLIP funding toward achieving certain statewide objectives, specified in the form of "benchmarks." Benchmarks for parcel data—standards or achievement levels on data quality or completeness—were determined through a participatory planning process. Current benchmarks are detailed in the [WLIP grant application](#), as will be future benchmarks.

WLIP Benchmarks

- Benchmark 1 & 2 – Parcel and Zoning Data Submission/Extended Parcel Attribute Set Submission
- Benchmark 3 – Completion of County Parcel Fabric
- Benchmark 4 – Completion and Integration of PLSS

More information on how Buffalo County is meeting these benchmarks appears in the Foundational Elements section of this plan document.

County Land Information System History and Context

Buffalo County first established a Land Information Committee in 1990. The earliest available Land Records Modernization Plans show that their concerns were similar to today, if mostly aspirational. By 1998, the county had a "fully functional GIS," though its description sounds quite limited by today's standards.

They began mapping parcels in the 2000s, about 50% complete by 2011, and almost 70% complete by 2015. The original parcel mapping was done in AutoCAD and later converted into GIS format, adopting an

ArcMap Parcel Fabric in 2015, and switching to an ArcGIS Pro Parcel Fabric in 2019.

For the first several years, Land Information Officer was an additional duty of Treasurer or IT personnel. The first employee whose full-time responsibilities were GIS and land information was hired in 2011. Land information went from a partial duty in other departments to its own department for several years, then reorganized into the Land Management Department in 2022, along with the County Surveyor, Land Conservation, and Zoning. The Land Information Office remains a one-person shop, but Treasurer/Real Property Lister employees maintain parcels, Land Conservation has an uncrewed aerial vehicle (UAV) for lidar and imagery, and Zoning uses GIS for addressing.

County Land Information Plan Process

Counties must submit their plans to DOA for approval every three years. The 2025-2027 plan is to be completed at the end of 2024.

County Land Information Plan Timeline

- DOA release of finalized instructions by March 31, 2024.
- **April-September 2024:** Counties work on land info plans.
- **Complete draft plans due to DOA by September 30, 2024** (but sooner is advised).
- **Final plans with county land info council approval due by December 31st, 2024.**

Plan Participants and Contact Information

Another requirement for participation in the WLIP is the county land information council, established by legislation in 2010. The council is tasked with reviewing the priorities, needs, policies, and expenditures of a land information office and advising the county on matters affecting that office.

According to s. 59.72(3m), Wis. Stats., the county land information council is to include:

- Register of Deeds
- Treasurer
- Real Property Lister or designee
- Member of the county board
- Representative of the land information office
- A realtor or member of the Realtors Association employed within the county
- A public safety or emergency communications representative employed within the county
- County surveyor or a registered professional land surveyor employed within the county
- Other members of the board or public that the board designates

The land information council must have a role in the development of the county land information plan, and DOA requires county land information councils to approve final plans.

This plan was prepared by the county LIO, the Buffalo County Land Information Council, and others as listed below.

Buffalo County Land Information Council and Plan Workgroup				
Name	Title	Affiliation	Email	Phone
Mary Malloy +	Register of Deeds	Register of Deeds	mary.malloy@buffalocountywi.gov	608-685-6230
Tina Anibas +	Treasurer	Treasurer's Office	tina.anibas@buffalocountywi.gov	608-685-6214
Andrea Huber +	Real Property Lister / Chief Deputy Treasurer	Treasurer's Office	andrea.huber@buffalocountywi.gov	608-685-6216
Max Weiss +	Board Member	Board of Supervisors	max.weiss@buffalocountywi.gov	
Nathan Machula +	GIS/Land Information Officer	Land Information Office	nathan.machula@buffalocountywi.gov	608-685-6285
Chris Lindstrom +	Board Member	Board of Supervisors	chris.lindstrom@buffalocountywi.gov	

Colin Severson +	Chief Deputy	Sheriff's Office	colin.severson@buffalocountywi.gov	608-685-6271
Ron Jaspersen +	County Surveyor	County Surveyor	ron.jaspersen@buffalocountywi.gov	608-685-6232
Robert Sendelbach +	Board Member	Board of Supervisors	robert.sendelbach@buffalocountywi.gov	
Leslie Sendelbach	Deputy Register of Deeds	Register of Deeds	leslie.sendelbach@buffalocountywi.gov	608-685-6231
Cale Severson	Director/Conservationist/ Zoning Administrator	Land Management	cale.severson@buffalocountywi.gov	608-685-6262
Joe Krumrie	Conservation Technician	Land Conservation	joe.krumrie@buffalocountywi.gov	608-685-6264
Briar Golden	Resource Management and Planning Specialist	Land Conservation	briar.golden@buffalocountywi.gov	608-685-6702
Brock Lederman	Zoning Technician	Zoning	brock.lederman@buffalocountywi.gov	608-685-6701
Steve Wall	Zoning Technician	Zoning	steven.wall@buffalocountywi.gov	608-685-6265

+ Land Information Council Members designated by the plus symbol

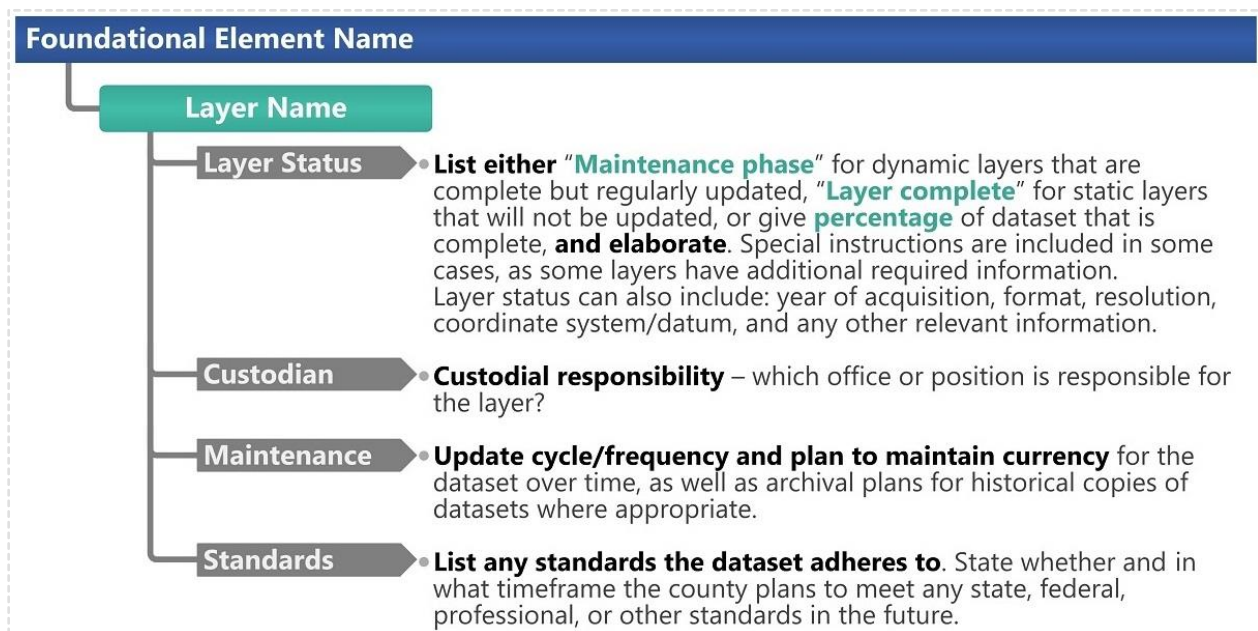
2 FOUNDATIONAL ELEMENTS

Counties must have a land information plan that addresses development of specific datasets or map layer groupings historically referred to as the WLIP Foundational Elements. Foundational Elements incorporate nationally recognized “Framework Data” elements, the major map data themes that serve as the backbone required to conduct most mapping and geospatial analysis.

In the past, Foundational Elements were selected by the former Wisconsin Land Information Board under the guiding idea that program success is dependent upon a focus for program activities. Thus, this plan places priority on certain elements, which must be addressed in order for a county land information plan to be approved. Beyond the county’s use for planning purposes, Foundational Element information is of value to state agencies and the WLIP to understand progress in completion and maintenance of these key map data layers.

FOUNDATIONAL ELEMENTS

PLSS
Parcel Mapping
Lidar and Other Elevation Data
Orthoimagery
Address Points and Street Centerlines
Land Use
Zoning
Administrative Boundaries
Other Layers



PLSS

Public Land Survey System Monuments

Layer Status

PLSS Layer Status

	Status/Comments
Number of PLSS corners (selection, 1/4, meander) set in original government survey that can be remonumented	• 2054 (2455 total. This includes approximately 271 original government meander corners and approximately 130 original government corners currently inundated in back waters.)
Number of PLSS corners capable of being remonumented that have been remonumented	• 1639 (80%)
Number of remonumented PLSS corners with survey grade coordinates (see below for definition) • SURVEY GRADE – coordinates collected under the direction of a Professional Land Surveyor, in a coordinate system allowed by 236.18(2), and obtained by means, methods and equipment capable of	• 1639 (100%)

repeatable 2 centimeter or better precision • SUB-METER – point precision of 1 meter or better • APPROXIMATE – point precision within 5 meters or coordinates derived from public records or other relevant information	
Number of survey grade PLSS corner coordinates integrated into county digital parcel layer (see definition of PLSS integration on page 37)	• 1639 (100%)
Number of non-survey grade PLSS corner coordinates integrated into county digital parcel layer	• 911 (37%; PLSS corners that purport to be remonumented, but will need to be vetted and non-remonumented)
Tie sheets available online?	• Yes, from Tie Sheet Finder on Map Portal
Percentage of remonumented PLSS corners that have tie sheets available online (whether or not they have corresponding coordinate values)	• 86%
Percentage of remonumented PLSS corners that have tie sheets available online (whether or not they have corresponding coordinate values) and a corresponding URL path/hyperlink value in the PLSS geodatabase	• 86%
PLSS corners believed to be remonumented based on filed tie-sheets or surveys, but do not have coordinate values	• 0% (PLSS corners that have not been properly vetted by the County Surveyor are not considered "remonumented")
Approximate number of PLSS corners believed to be lost or obliterated	• 1120
Which system(s) for corner point identification/numbering does the county employ (e.g., the Romportl point numbering system known as Wisconsin Corner Point Identification System, the BLM Point ID Standard, or other corner point ID system)?	• Buffalo County implemented the Romportl point numbering system known as Wisconsin Corner Point Identification System in 2016.
Does the county contain any non-PLSS areas (e.g., river frontage long lots, French land claims, private claims, farm lots, French long lots, etc.) or any special situations regarding PLSS data for tribal lands?	• No
Total number of PLSS corners along each bordering county	• 97
Number of PLSS corners remonumented along each county boundary	• 73 (75%)
Number of remonumented PLSS corners along each county boundary with survey grade coordinates	• 73 (75%)

Custodian

- County Surveyor
- Land Information Officer

Maintenance

- Surveyor maintains the PLSS network, from the initial research, fieldwork, and documentation, to any required updates or corrections. Remonumentation is an ongoing project, with 3 towns remaining, and 2 towns needing further maintenance work. The Land Information Officer incorporates PLSS data into the GIS, imports control points into the Parcel Fabric, and updates township-range, section, and subordinate PLSS boundaries as needed.

Standards

- Statutory Standards for PLSS Corner Remonumentation
 - s. 59.74, Wis. Stats. Perpetuation of section corners, landmarks.
 - s. 60.84, Wis. Stats. Monuments.
 - ch. A-E 7.08, Wis. Admin. Code, U.S. public land survey monument record.
 - ch. A-E 7.06, Wis. Admin. Code, Measurements.
 - s. 236.15, Wis. Stats. Surveying requirement.
- North American Terrestrial Reference Frame of 2022 (NATRF2022)
- Survey grade standard from Wisconsin County Surveyor's Association:
 - **Survey grade** – coordinates collected under the direction of a Professional Land Surveyor, in a coordinate system allowed by 236.18(2), and obtained by means, methods and equipment capable of repeatable 2 centimeter or better precision
 - **Sub-meter** – point precision of 1 meter or better
 - **Approximate** – point precision within 5 meters or coordinates derived from public

Other Geodetic Control and Control Networks

e.g., HARN, Height Mod., etc.

Layer Status

- In 1997 Buffalo County completed geodetic densification from stations within the Wisconsin High Accuracy Reference Network (HARN). The network consists of nearly 90 – 1, 2, or 4 ppm stations established using the “Guidelines to Support Densification of the WI High Accuracy Reference Network (HARN) using Global Positioning System (GPS) Technology” standards specifications, which were current at that time. GPS measurements were completed relative to NAD 1983 (1991). This information is available in hard copy form in the Buffalo County Surveyor’s Office. The Wisconsin Department of Transportation has set numerous other HARN stations throughout Buffalo County as a part of the Wisconsin Height Modernization Programs passive network. DOT has published this data relative to NAD 1983 (2011). The WISDOT Geodetic Survey Unit has developed WISCORS active network.

Custodian

- Wisconsin State Cartographer’s Office (SCO)
- Wisconsin Department of Transportation (DOT)
- County Surveyor

Maintenance

- The Buffalo County Surveyor is responsible for the geodetic data in NAD 1983 (1991). The State is responsible for the maintenance of HARN monuments set in conjunction with the Wisconsin Height Modernization Programs passive network and the WISCORS active network.

Standards

- The 1997 network was developed based on “Guidelines to Support Densification of the WI High Accuracy Reference Network (HARN) using Global Positioning System (GPS) Technology” standards specifications, which were current at that time.

Parcel Mapping

Parcel Geometries

Layer Status

- **Progress toward completion/maintenance phase:** County-wide parcel layer is approximately 95% complete, with remaining parcels either difficult to map because of conflicting plats or legal descriptions, or parcels over water or rights of way. 100% of the mapped parcels are available in a commonly-used digital GIS format.
- **Projection and coordinate system:** Transverse Mercator, NAD 1983 HARN Wisconsin CRS Buffalo (US feet).
- **Integration of tax data with parcel polygons:** The county does have a parcel polygon model that directly integrates tax/assessment data as parcel attributes.
- **Online Parcel Viewer Software/App and Vendor name:** Buffalo County has two parcel viewer apps, both hosted on ArcGIS Online, implemented and maintained in-house. One app is to query and view individual parcels, built on ESRI Instant Apps. The second app is to query and view multiple parcels simultaneously, built on ESRI Experience Builder.
- **Unique URL path for each parcel record:** Yes, the same information formatted for the Statewide Parcel Map Initiative is available on both online parcel viewing apps. The URL is stable, though could be changed in the future. The unique URL values can be easily exported by concatenating the base URL and query string with an unhyphenated parcel ID number, e.g. <https://buffalocounty.maps.arcgis.com/apps/instant/sidebar/index.html?appid=e17ed038515648648ad3355cb4f40a4e&parcelid=<parcel ID>>

Custodian

- Treasurer/Real Property Lister
- Land Information Officer

Maintenance

- **Update Frequency/Cycle:** Parcel polygons are updated as needed by the Treasurer/Real Property Lister in our ArcGIS Pro Parcel Fabric, hosted in an ArcGIS Enterprise Geodatabase, behind a firewall. Geometries are also updated as remonumentation of PLSS corners proceeds.
- The publicly accessible parcel layer is published about twice per year: February-March after new year splits and in preparation for submitting to the Statewide Parcel Map Initiative, and October-November after fall splits.

Standards

- **Data Dictionary:** identical to the Wisconsin Statewide Parcel Map Initiative Searchable Format.

Parcels Without Land Value

Layer Status

- **Number of parcels without a land value recorded to-date:** 0 as of 11/7/2024
- **County geolocates/maps parcels for improvements only and without a land value by:** creating new polygons and parcel stacking.

Assessment/Tax Roll Data

Layer Status

- **Progress toward completion/maintenance phase:** NA
- **Tax Roll Software/App and Vendor name:** Catalis LandNav
- **Municipal Notes:** NA

Custodian

- Treasurer/Real Property Lister

Maintenance

- **Maintenance of the Searchable Format standard:** make inputs consistent with the standard.
- **Searchable Format Workflow:** The county maintains parcel/tax roll data in the Searchable Format or close enough to the Searchable Format that **little to no human labor is required** for the annual submission of parcel/tax roll data to DOA.

Standards

- Wisconsin Department of Revenue [Property Assessment Manual](#) and attendant DOR standards
- DOR XML format standard requested by DOR for assessment/tax roll data

Non-Assessment/Tax Information Tied to Parcels

e.g., Permits, Easements, Non-Metallic Mining, Brownfields, Restrictive Covenants

Layer Status

- Buffalo County does not have permits, easements, brownfields, or restrictive covenants layers. A non-metallic mining layer is in maintenance phase.

Custodian

- Land Conservation
- Land Information Officer

Maintenance

- As needed.

Standards

- Non-metallic mining layer uses a locally developed schema.

ROD Real Estate Document Indexing and Imaging

Layer Status

- **Grantor/Grantee Index:** indexed online back to 1970, with ongoing work to continue indexing further back. Original grantor/grantee index books are fully scanned.
- **Tract Index:** indexed online back to 2014, with ongoing work to continue indexing further back. Original tract index books are fully scanned.
- **Imaging:** All deed books are scanned and available online through either a paid account on Laredo or pay-as-you-go on Tapestry. Other types of records, e.g. Lis Pendens, Federal Tax

Liens, UCCs, and miscellaneous documents, are scanned and available online, but unindexed.

- **ROD Software/App and Vendor Name:** Laredo/Tapestry from contractor/vendor Fidar

Custodian

- Register of Deeds

Maintenance

- Document images are cloud hosted via Fidar Technologies, off site.

Standards

- s. 59.43, Wis. Stats. Register of deeds; duties, fees, deputies.
- ch. 706, Wis. Stats. Conveyances of real property; Recording; Titles.

LiDAR and Other Elevation Data

LiDAR

Layer Status

- **Most recent acquisition year:** 2023
- **Accuracy:** QL1
- **Post spacing:** 0.7 m
- **Contractor's standard, etc.:** Ayres Associates performed the data collection with review by the US Geological Survey (USGS) under their 3D Elevation Program (3DEP).
- **Next planned acquisition year:** 2031-2032
- **QL0/QL1/QL2 acquisition plans:** The 2023 lidar data was acquired with QL1 accuracy.

Custodian

- US Geological Survey (USGS)
- Ayres Associates
- Land Information Officer

Maintenance

- Lidar data acquisition is on a planned 8-year cycle. Therefore, the next project to acquire lidar data should be about 2031-2032.

Standards

- USGS Lidar Base Specification

LiDAR Derivatives

e.g., Bare-Earth Digital Terrain Model (DTM), Bare-Earth Elevation Contours, Bare-Earth Digital Elevation Model (DEM), Digital Surface Model (DSM), Hydro-Enforced DEMs, etc.

Layer Status

- A bare-earth digital elevation model (DEM) and 2-foot contours were part of the deliverables for the 2016 lidar project. In-house 10-foot contours were extracted for use when less precision and smaller data size are appropriate. Post-processing of the 2023 lidar data will also deliver a new DEM, 1-foot contours, and digital surface model (DSM).

Custodian

- Ayres Associates
- Land Information Officer

Maintenance

- Derivative products will be created during the normal lidar data acquisition.

Standards

- USGS Lidar Base Specification

Other Types of Elevation Data

Layer Status

- Maintenance phase. Detailed lidar data is periodically acquired using an in-house UAV for small projects, mostly involving non-metallic mining and erosion-control structures.

Custodian

- Land Conservation

- Land Information Officer

Maintenance

- As needed. Much of this data is for one-time use projects, although non-metallic mining will probably become an annual collection.

Standards

- USGS Lidar Base Specification

Orthoimagery

Orthoimagery

Layer Status

- **Most recent acquisition year:** 2024
- **Resolution:** 6-inch pixel
- **Contractor's standard:** Ayres Associates collected imagery to support 0.5-foot ground sample distance (GSD) orthoimagery to meet ASPRS Class II horizontal accuracy specifications at 1"=100' map scale. The 6-inch pixel orthoimagery was produced to meet or exceed a horizontal accuracy of 1.4 feet RMSE according to ASPRS Positional Accuracy Standards for Digital Geospatial Data.
- **Next planned acquisition year:** 2029

Custodian

- Wisconsin Regional Orthoimagery Consortium (WROC)
- Ayres Associates
- Land Information Officer

Maintenance

- Orthoimagery data acquisition is on a planned 5-year cycle. Therefore, the next project to acquire orthoimagery should be about 2029.

Standards

- ASPRS Positional Accuracy Standards for Digital Geospatial Data, ed. 2, ver. 2 (2024)

Historic Orthoimagery

Layer Status

- Layer complete. Previous WROC orthoimagery from 2019, 2014, and 2010.

Custodian

- Land Information Officer

Maintenance

- Historical orthoimagery is for reference only, though it might be converted to other formats for publishing or hosting online.

Standards

- ASPRS Positional Accuracy Standards for Digital Geospatial Data (older versions)

Other Types of Imagery

e.g., Oblique Imagery, Satellite Imagery, Infra-red, etc.

Layer Status

- Layer complete. Several years of color NAIP imagery from the USDA, other digital color imagery or digitized from color prints, and a few sets of digitized black and white aerial photos from various sources. The latter includes the earliest known aerial photos from 1929-1930, collected by the US Army Corps of Engineers along the Mississippi River during the planning and design of the lock and dam system. Other imagery is periodically acquired using an in-house UAV for small projects, mostly involving non-metallic mining and erosion-control structures.

Custodian

- Land Conservation
- Land Information Officer

Maintenance

- As needed. Historical imagery is for reference only, though it might be converted to other formats for publishing or hosting online. UAV imagery is mostly for one-time projects, although non-metallic mining will probably become an annual collection.

Standards

- Various

Address Points and Street Centerlines

Address Point Data

Layer Status

- Maintenance phase.

Custodian

- Zoning
- City/village boards
- Sheriff's Office 911 Coordinator
- Land Information Officer

Maintenance

- Updated as needed, based on new or changed rural addresses by county zoning, and city or village addresses by those municipalities.

Standards

- Wisconsin GIS NG9-1-1 Data Standard (Site/Structure Address Point)
- Uniform Addressing Ordinance

Building Footprints

Layer Status

- Layer complete, 2018 layer derived from 2016 lidar data.

Custodian

- Land Information Officer

Maintenance

- Not updated since acquired. For reference only.

Standards

- USGS Lidar Base Specification

Other Types of Address Information

e.g., Address Ranges

Layer Status

- Maintenance phase. Rural addresses are assigned from a numbered address grid, based on PLSS sections. Grid numbering starts with W0 and S0 in the northeast corner of the county, extending to about W2700 at the county's west extremity and S3900 at its south extremity. W addresses are assigned along east-west roads and S addresses along north-south roads.

Custodian

- Zoning
- Land Information Officer

Maintenance

- Updated as needed based on remonumentation of PLSS corners.

Standards

- Locally developed address schema

Street Centerlines

Layer Status

- Maintenance phase.

Custodian

- Wisconsin DOT
- County board
- Municipal boards
- Sheriff's Office 911 Coordinator
- Land Information Officer

Maintenance

- Updated as needed. Roads rarely change, but occasionally discontinued by towns, periodically added for new development, and address ranges are frequently updated for errors or addressing needs.

Standards

- Wisconsin GIS NG9-1-1 Data Standard (Road Centerline)
- Uniform Addressing Ordinance

Rights of Way

Layer Status

- Buffalo County does not have a rights of way layer.

Trails

e.g., Recreational Trails, Snowmobile Trails

Layer Status

- Maintenance phase. Overall trail layer plus extracts for various modes of trail usage.

Custodian

- Wisconsin Department of Natural Resources (DNR)
- County Clerk
- Municipal boards
- Buffalo County Snowmobile Association
- Buffalo County Trail Riders
- Land Information Officer

Maintenance

- As needed.

Standards

- Locally developed trail schema

Land Use

Current Land Use

Layer Status

- Layer complete.

Custodian

- Land Conservation
- Land Information Officer

Maintenance

- Updated during the development of the Comprehensive Land Use Plan every 20 years and when updated at 10 years.

Standards

- s. 66.1001, Wis. Stats. Comprehensive planning.

Future Land Use

Layer Status

- Layer complete.

Custodian

- Land Conservation

- Land Information Officer

Maintenance

- Updated during the development of the Comprehensive Land Use Plan every 20 years and when updated at 10 years.

Standards

- s. 66.1001, Wis. Stats. Comprehensive planning.

Zoning

County General Zoning

Layer Status

- Maintenance phase. The County does maintain a GIS representation of county general zoning boundaries.

Custodian

- Zoning
- Land Information Officer

Maintenance

- Updated as rezoning applications are approved by the county board.

Standards

- Zoning ordinance

Shoreland Zoning

Layer Status

- Buffalo County does not have a shoreland zoning layer.

Farmland Preservation Zoning

Layer Status

- Layer complete. The County does maintain a GIS representation of county farmland preservation zoning boundaries.
- **Year of certification:** 2018

Custodian

- Land Conservation
- Land Information Officer

Maintenance

- Coincident with updates to the Farmland Preservation Plan.

Standards

- s. 91, Wis. Stats. Farmland Preservation
- ch. ATCP 49, Wis. Admin. Code, Farmland Preservation

Floodplain Zoning

Layer Status

- Layer complete. Buffalo County does maintain a GIS representation of floodplain zoning boundaries.
- The county's floodplain zoning GIS data is the same as/identical to the FEMA map.

Custodian

- Federal Emergency Management Agency (FEMA)
- Land Information Officer

Maintenance

- Updated after FEMA changes their Flood Hazard Layer.

Standards

- Floodplain ordinance

Airport Protection

Layer Status

- Buffalo County does not have an airport layer. No public airports.

Municipal Zoning Information Maintained by the County

e.g., Town, City and Village, Shoreland, Floodplain, Airport Protection, Extra-Territorial, Temporary Zoning for Annexed Territory, and/or Zoning Pursuant to a Cooperative Plan

Layer Status

- Not administered by county. Typically receive data from the regional planning commission when contracted by municipalities for rezoning. Have sometimes assisted municipalities in digitizing paper zoning maps.

Custodian

- City/village boards
- Mississippi River Regional Planning Commission (MRRPC)
- Land Information Officer

Maintenance

- Municipal zoning information is for reference only.

Standards

- Municipal zoning ordinances

Administrative Boundaries

Civil Division Boundaries

e.g., Towns, City, Villages, etc.

Layer Status

- Maintenance phase.

Custodian

- County Clerk
- Land Information Officer

Maintenance

- Updated after annexations or boundary changes, and any changes based on remonumentation of PLSS corners.

Standards

- s. 66, Wis. Stats. General Municipality Law

School Districts

Layer Status

- Layer complete.
- **Progress toward completion/maintenance phase:** 100%
- **Relation to parcels:** school districts are tied to parcels as indicated in the tax rolls.
 - **Attributes linked to parcels:** Parcel ID, School District, School District Number

Custodian

- Wisconsin Department of Public Instruction (DPI)
- Land Information Officer

Maintenance

- As needed.

Standards

- s. 117, Wis. Stats. School District Reorganization

Election Boundaries

e.g., Voting Districts, Precincts, Wards, Polling Places, etc.

Layer Status

- Maintenance phase. County is divided into 14 supervisory districts. Three municipalities are

divided into separate wards: the cities of Alma, Buffalo City, and Mondovi.

Custodian

- County Clerk
- County and municipal boards
- Land Information Officer

Maintenance

- Updated after boundary changes.

Standards

- s. 62.08, Wis. Stats. Alteration of aldermanic districts

Utility Districts

e.g., Water, Sanitary, Electric, etc.

Layer Status

- Buffalo County does not have a utility district layer. Two municipalities have utility districts they maintain, tracked by parcel in the tax database.

Emergency Service Boundary – Law/Fire/EMS

Layer Status

- **Law Enforcement:** Layer complete.
- **Fire:** Layer complete.
- **EMS:** Layer complete.
- **First Responder:** Layer complete.
- **MABAS:** Layer complete.

Custodian

- Sheriff's Office 911 Coordinator
- Adjacent counties (response areas overlap county boundaries, both internal and external)
- Land Information Officer

Maintenance

- As needed.

Standards

- Wisconsin GIS NG9-1-1 Data Standard (Emergency Service Boundary)

Public Safety Answering Points (PSAP) Boundary

Layer Status

- Layer complete.
- **PSAP Boundary:** coincident with the county boundary.

Custodian

- Sheriff's Office 911 Coordinator
- Land Information Officer

Maintenance

- As needed.

Standards

- Wisconsin GIS NG9-1-1 Data Standard (PSAP Boundary)

Provisioning Boundary

Layer Status

- Layer complete. Coincident with the county boundary.

Custodian

- Sheriff's Office 911 Coordinator
- Land Information Officer

Maintenance

- As needed.

Standards

- Wisconsin GIS NG9-1-1 Data Standard (Provisioning Boundary)

Other Public Safety

e.g., Healthcare Facilities

Layer Status

- Buffalo County does not have a health facility layer, but does maintain various public safety layers, e.g. hazardous materials storage, which are in maintenance phase.

Custodian

- Emergency Management
- Land Information Officer

Maintenance

- As needed.

Standards

- Emergency management layers use a locally developed schema.

Lake Districts

Layer Status

- Buffalo County does not have a lake district layer.

Native American/Tribal Lands

Layer Status

- Buffalo County does not have a Native American nor tribal land layer.

Other Administrative Districts

e.g., County Forest Land, Parks/Open Space, etc.

Layer Status

- Layer complete. Boundaries of National Wildlife Refuges from the US Fish and Wildlife Service; State Natural Areas, State Parks, State Trails, and State Wildlife Areas from the Wisconsin DNR; conservancy land from non-profit organizations; and municipal parks from parcel data.

Custodian

- US Fish and Wildlife Service
- Wisconsin DNR
- The Nature Conservancy
- Mississippi Valley Conservancy
- Municipal boards
- Land Information Officer

Maintenance

- As needed.

Standards

- Various

Other Layers

Hydrography Maintained by County or Value-Added

e.g., Hydrography maintained separately from DNR or value-added, such as adjusted to orthos; Elevation-Derived Hydrography

Layer Status

- Layer complete. Vector-based bathymetry and lidar-derived topobathy layers compiled from US Army Corps of Engineers data for the Mississippi River.

Custodian

- US Army Corps of Engineers
- Land Information Officer

Maintenance

- As needed.

Standards

- USGS Elevation-Derived Hydrography Specifications

Cell Phone Towers

Layer Status

- Maintenance phase. Location of cell towers and sectors of cell service antennas to assign emergency calls received from those sectors to the appropriate PSAP. Based on Buffalo County's terrain and location, cell phone calls from other counties and even across the state boundary in Minnesota are often routed through towers here.

Custodian

- Cellular service providers: AT&T, Bug Tussel, Cellcom T-Mobile, US Cellular, and Verizon
- Sheriff's Office 911 Coordinator
- Land Information Officer

Maintenance

- Updated as new or changed information is received from cellular service providers.

Standards

- s. 196, Wis. Stats. Regulation of Public Utilities
- ch. PSC 173, Wis. Admin. Code, 911 Emergency Telecommunications Service

Bridges and Culverts

Layer Status

- Layer complete. Bridge layer based on Wisconsin DOT data. Culvert layers based on Wisconsin DOT data and 2018-2020 field verification.

Custodian

- Wisconsin DOT
- Highway Department
- Land Information Officer

Maintenance

- As needed.

Standards

- s. 30.123, Wis. Stats. Bridges and culverts
- s. 85.64, Wis. Stats. Assessment of local bridges and culverts

Other/Miscellaneous

Pipelines**Layer Status**

- Layer complete. Data from the National Pipeline Mapping System (NPMS), restricted from public view at scales larger than 1:24,000.

Custodian

- US DOT
- Land Information Officer

Maintenance

- Will update if gas pipelines are extended in the future.

Standards

- 44 USC 3545(f)
- 49 USC 60132
- 49 CFR § 191.29
- FIPS PUB 200, Sec. 3

Railroads

Layer Status

- Layer complete. Data from BNSF and CN railways, including tracks, crossings, bridges, and mileposts, plus heritage railway owned by the Wisconsin DNR and operated by the Chippewa Valley Motor Car Association (CVMCA).

Custodian

- BNSF Railway
- CN Railway
- Land Information Officer

Maintenance

- As needed.

Standards

- s. 191, Wis. Stats. Railroads; Construction
- s. 192, Wis. Stats. Railroads; Regulations and Liabilities
- ch. Trans 31, Wis. Admin. Code, Rail Passenger Excursions on State-Owned Rail Lines

Non-Metallic Mining**Layer Status**

- Maintenance phase.

Custodian

- Land Conservation
- Land Information Officer

Maintenance

- As needed.

Standards

- s. 295, Wis. Stats. Nonmetallic Mining Reclamation; Oil and Gas; Ferrous Metallic Mining
- ch. NR 135, Wis. Admin. Code, Nonmetallic Mining Reclamation
- Non-Metallic Mining Reclamation Ordinance

3 LAND INFORMATION SYSTEM

The WLIP seeks to enable land information systems that are both modernized and integrated. Integration entails the coordination of land records to ensure that land information can be shared, distributed, and used within and between government at all levels, the private sector, and citizens.

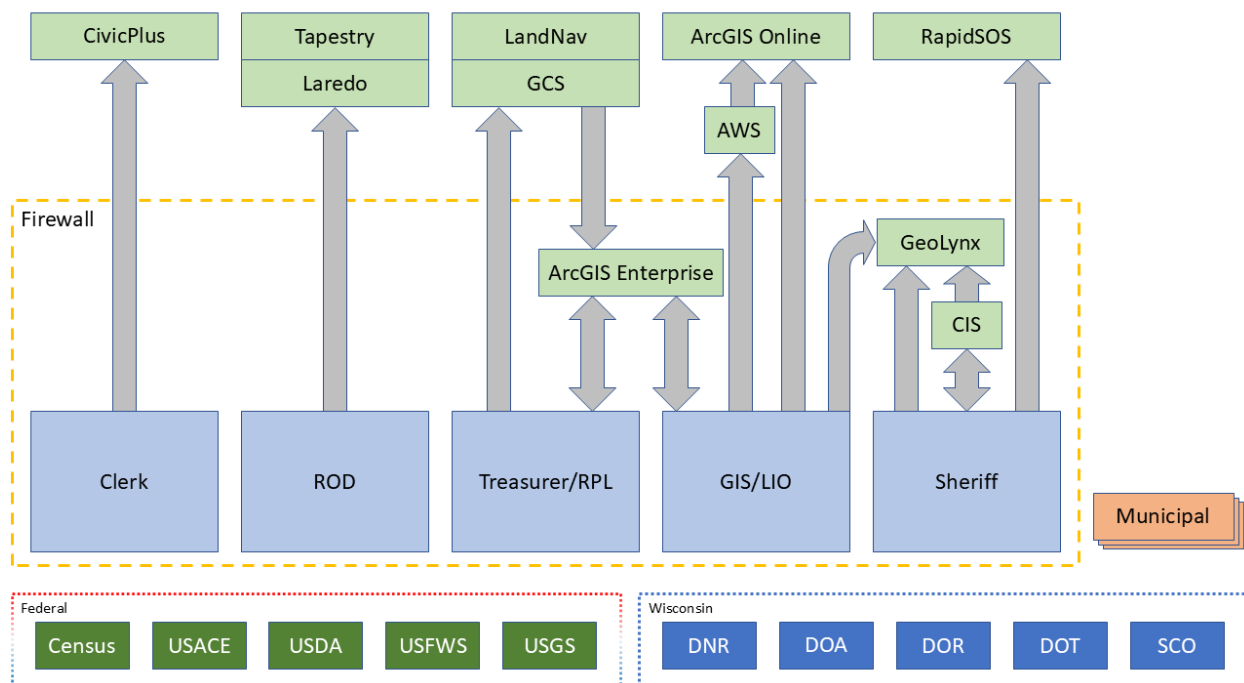
One integration requirement is listed under s. 16.967(7)(a)(1), Wis. Stats., which states that counties may apply for grants for:

The design, development, and implementation of a land information system that contains and integrates, at a minimum, property and ownership records with boundary information, including a parcel identifier referenced to the U.S. public land survey; tax and assessment information; soil surveys, if available; wetlands identified by the department of natural resources; a modern geodetic reference system; current zoning restrictions; and restrictive covenants.

This chapter describes the design of the county land information system, with focus on how data related to land features and data describing land rights are integrated and made publicly available.

Current Land Information System

Diagram of County Land Information System



Technology Architecture and Database Design

This section refers to the hardware, software, and systems that the county uses to develop and operate computer systems and communication networks for the transmission of land information data.

Hardware

- Multiple servers running on VMWare virtual machines in rack-mounted Dell servers.
- Dell desktop and laptop computers, spread across multiple departments.
- DJI Matrice 350 RTK UAV with Zenmuse L1 lidar sensor/RGB camera
- Epson SureColor T7270 plotter

Software

- **County currently uses ArcGIS Pro:** Yes
- ESRI ArcGIS Enterprise, ArcGIS Pro, ArcGIS Online, and ArcMap
- Catalis LandNav (previous system, GCS, also still in use)
- Fidar Laredo and Tapestry

Website Development/Hosting

- ESRI ArcGIS Enterprise on internal network behind a firewall. This hosts our Parcel Fabric, editable by our Treasurer/Real Property Lister and Land Information Officer; and WROC orthoimagery and lidar data, which is accessible to county employees.
- ESRI ArcGIS Online hosts multiple single-purpose mapping apps to disseminate land information to the general public, and our map portal that lists available apps.
- Amazon Web Services (AWS) hosts downloadable files in an S3 Bucket, including PDFs of tie sheets, survey data sheets, and survey maps, plus zipped archive files of tiled geospatial data, i.e. orthoimagery and lidar.
- CivicPlus hosts our county website, administered by the County Clerk, with several pages linking to land information resources.

Metadata and Data Dictionary Practices

Metadata Creation

- **Metadata creation and maintenance process:** Metadata is created or updated as GIS layers are created and updated.

Metadata Software

- **Metadata software:** ArcGIS Pro
 - The software does generate metadata consistent with the FGDC Content Standard for Digital Geospatial Metadata, and ISO geographic metadata standard 19115.
- **Metadata fields manually populated:** As needed.

Metadata Policy

- **Metadata Policy:** No formal policy, but populate default metadata fields.

Municipal Data Integration Process

- Nearly all municipal data is received in non-GIS formats, usually as single data points, and at best as spreadsheets of tabular data. No municipalities within Buffalo County have their own GIS, though we occasionally receive GIS data on their behalf from the Mississippi River Regional Planning Commission (MRRPC), from projects they were contracted by municipalities.

Public Access and Website Information

Public Access and Website Information (URLs)

Public Access and Website Information

GIS Webmapping Application(s)

Link - URL	GIS Download Link – URL	Real Property Lister Link - URL	Register of Deeds Link - URL
https://buffalocounty.maps.arcgis.com	https://buffalocounty.maps.arcgis.com	https://landnav-publicportal.buffalocounty.com	https://www.buffalocountywi.gov/190/Register-of-Deeds

Single Landing Page/Portal for All Land Records Data

URL

<https://www.buffalocountywi.gov/394/TaxAssessment-Info>

County Webpage with Link to Statewide Parcel Map (www.sco.wisc.edu/parcels/data)

URL

<https://www.buffalocountywi.gov/394/TaxAssessment-Info>

Data Sharing

Data Availability to Public

Data Sharing Policy

- All data is available upon request, unless otherwise restricted, and much of the information is already available to search and access through apps on our map portal:

<https://buffalocounty.maps.arcgis.com/>

Open Records Compliance

- A Public Records Notice is posted in the courthouse, with office hours and procedures for records access and fees for copies of records.

Data Sharing Restrictions and Government-to-Government Data Sharing

Data Sharing Restrictions

- No restrictions beyond federal pipeline data, and information shielded by the judicial privacy law once it is in effect and requested.

Government-to-Government Data Sharing

- No additional restrictions.

Training and Education

- The annual Training & Education grant funds attendance at WLIA conferences and workshops. ESRI's annual Enterprise License Agreement allows use of their training and videos, plus complementary attendance at the ESRI User Conference (virtual, or in-person if funds are available for travel and lodging).

4 CURRENT & FUTURE PROJECTS

This chapter lists the current and future land information projects the county is currently undertaking or intends to pursue over its planning horizon. A project is defined as a temporary effort that is carefully planned to achieve a particular aim. Projects can be thought of as the means to achieving the county's mission for its land information system.

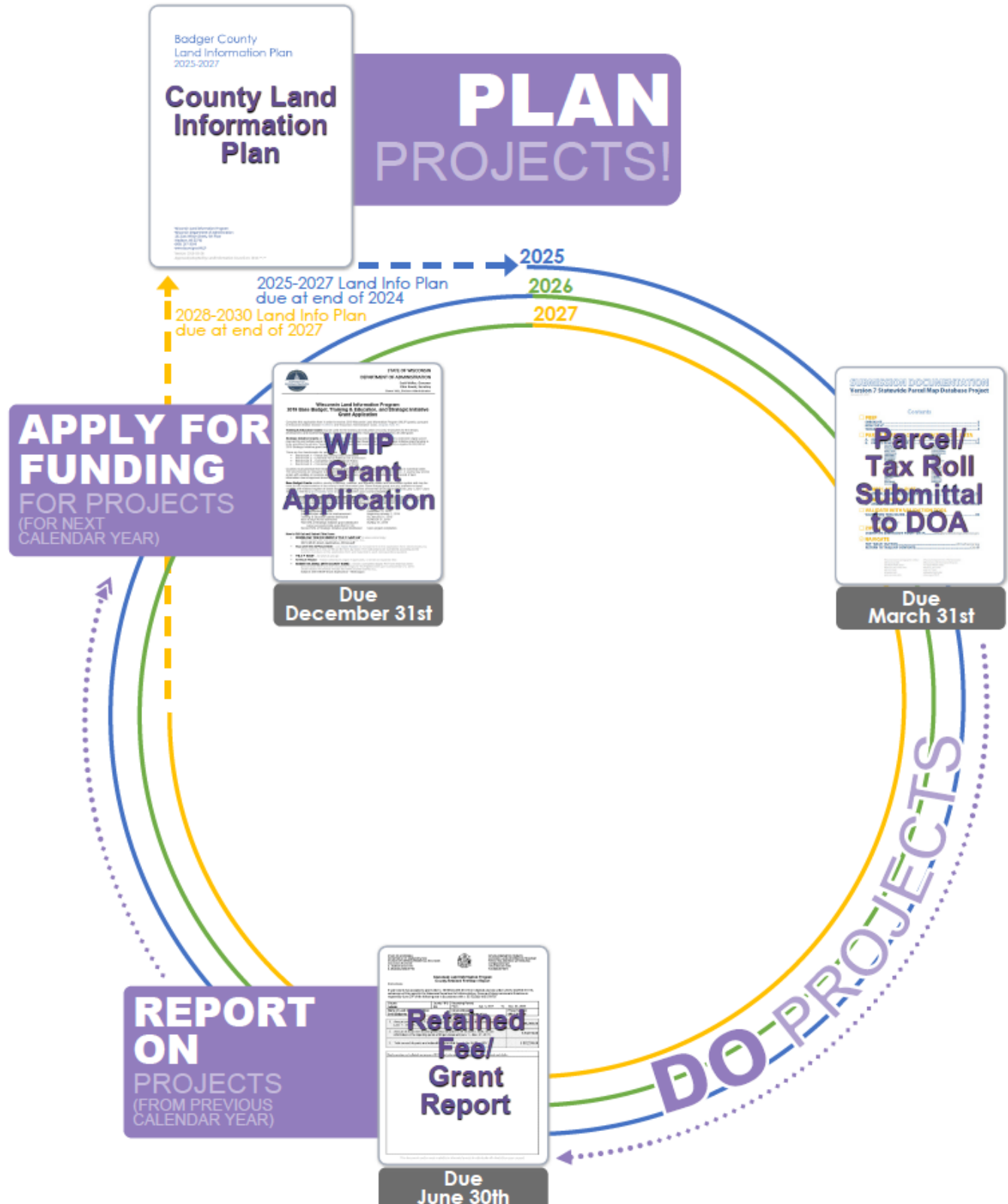


Figure 1. The WLIP Land Information Plan/Grant Project Cycle

Project Plan for Parcel Completion (Benchmark 3)

Project Title: Project Plan for Parcel Completion (Benchmark 3)

Project Description

Current status of parcel data

- **Current status of parcel data in the county:** See [Parcel Layer Status](#) in Chapter 2.
- **Tally of the total number of parcels in digital format:** 24,207
- **Estimated number of parcels yet to be digitized:** 1500
- Land Info Spending Category: Digital Parcel Mapping, Other Parcel Work

Planned approach

- WLIP grant funding partially supports Treasurer/Real Property Lister personnel to map and maintain parcels.
- The Treasurer/Real Property Lister office is primarily responsible for parcel mapping, with assistance from the Land Information Officer, and periodically from other Land Management Department personnel.

Business Drivers

- Citizens, local and state government, realtors, title companies, planners, architects, engineers, surveyors, and other firms require accurate parcel data.

Objectives/Measure of Success

- **The objective is to meet Benchmark 3 (Completion of County Parcel Fabric) by:** 12/31/2027
- **Number of parcels to be added for the planning period (2025-2027):** 1500
- Success will be achieved when all unmapped tax parcels are added to the Parcel Fabric and no gaps exist in parcel coverage for rights of way, water, or any other reason.

Project Timeframes

- Ongoing parcel mapping will continue, with an estimated completion date of 12/31/2027.

Responsible Parties

- Treasurer/Real Property Lister
- Land Information Officer

Estimated Budget Information

- See table at the end of this chapter.

Project Plan for PLSS (Benchmark 4)

Project Title: Project Plan for PLSS (Benchmark 4)

Project Description

Current status

- See [PLSS Layer Status table](#) in Chapter 2.
- Land Info Spending Category: PLSS

Planned approach

- Projects through contract county surveyor to remonument each town in-turn, with partial funding by those towns. Currently working on the penultimate two towns, Canton and Maxville. Final town is the largest by area, Nelson. After those are completed, two towns, Alma and Buffalo, require maintenance work. Remonumentation in those towns was started in the late 1990s, before statewide efforts at remonumentation. The research and field work were completed, but corner coordinates were not surveyed with GPS nor were adequate tie sheets completed.

Missing Corner Notes

- Information may be available through the Buffalo County Surveyor for corners that were remonumented in early phases of the project (1990s through 2009), and for which tie sheets are not available on the app.

County Boundary Collaboration

- Approximately 23 corners remain un-remonumented along coincident boundaries between Buffalo County and Pepin County. The Buffalo County Surveyor will work with Pepin County's surveyor to ensure corners are set in a way that is consistent with best practices for survey grade PLSS corner remonumentation.

Business Drivers

- Completion and integration of PLSS will improve the geospatial accuracy of the parcel layer and other county

land information system layers.

Objectives/Measure of Success

- **The objective is to meet Benchmark 4 (Completion and Integration of PLSS) by:** Dec 31, 2026
- **Number of corners to be remonumented and/or rediscovered by 2027:** 415
- **Number to have new coordinates established by 2027:** 415
- **Accuracy class for these new coordinates by 2027:** Survey grade
- **Number of new corner coordinates to be integrated into the parcel fabric by 2027:** 415
- **Number of new tie sheets to be posted online by 2027:** 415

Project Timeframes

Timeline – Project Plan for PLSS		
Milestone	Duration	Date
Project start	–	Jan 1, 2025
Contractor remonumentation	3 years	Jan 1, 2025–Dec 31, 2026
Project complete	–	Dec 31, 2026

Responsible Parties

- County Board
- County Surveyor
- Land Information Officer

Estimated Budget Information

- See table at the end of this chapter (for budget information for the planning period 2025-2027).
- **Estimated remaining cost for completion and integration of PLSS (to reach maintenance mode)**
 - **Estimated approximate average cost of remonumentation per corner:** \$2175
 - **Total cost of remaining remonumentation:** \$902,625 (\$595,000 already allocated)
 - **Total cost of remaining integration of PLSS points into parcel layer:** \$0
 - **Cost of anything else remaining:** \$0
 - **Total remaining cost:** \$902,625

Project #1: Indexing, Scanning, and Preserving

Project Description

- Indexing, scanning, and preserving recorded documents and other land information, including personnel, supplies, and vendor support.
- Land Info Spending Category: Administrative Activities and Management

Business Drivers

- Recorded documents will be digitized and available for search and access online, while the original records are preserved.

Objectives/Measure of Success

- When all recorded documents are scanned and indexed, and physical documents are archived.

Project Timeframes

- Ongoing

Responsible Parties

- Register of Deeds

Estimated Budget Information

- See table at the end of this chapter.

Project #2: Land Information Software

Project Description

- Purchase or subscribe to software or systems that support land information, including ESRI Enterprise License Agreement, Catalis LandNav, Fidlar Technologies, permitting software, UAV data processing, or any needed additional software.

- Land Info Spending Category: Software

Business Drivers

- Specialized software is necessary to create, maintain, and disseminate land information, in multiple county offices.

Objectives/Measure of Success

- Necessary software and systems are funded via grant or other sources.

Project Timeframes

- Software license renewals, most annually, but on different dates for different systems.

Responsible Parties

- Register of Deeds
- Treasurer/Real Property Lister
- County Surveyor
- Zoning
- Land Conservation
- Land Information Officer

Estimated Budget Information

- See table at the end of this chapter.

Project #3: Land Information Hardware

Project Description

- Purchase of computers, plotters, printers, peripherals, global navigation satellite system (GNSS) equipment, UAVs, or other accessories that support land information.
- Land Info Spending Category: Hardware

Business Drivers

- Computers and other hardware require periodic replacement.

Objectives/Measure of Success

- Computers and other hardware are sufficient for operations.

Project Timeframes

- Computers and other hardware are replaced as needed on a rolling basis, along with new purchases as additional requirements are identified.

Responsible Parties

- Register of Deeds
- Treasurer/Real Property Lister
- County Surveyor
- Zoning
- Land Conservation
- Land Information Officer

Estimated Budget Information

- See table at the end of this chapter.

Project #4: Geospatial Data Acquisition

Project Description

- Set aside funding for future imagery and lidar projects, or other data acquisition. Buffalo County has Local Government Investment Program (LGIP) accounts set up to deposit funds and accrue interest, spreading the cost for these large projects over several years. Orthoimagery is on a 5-year acquisition cycle and 8 years for lidar. UAV data is acquired in-house for smaller projects.
- Land Info Spending Category: Orthoimagery, Lidar

Business Drivers

- Updated geospatial data at the same or better resolution as existing data improves the ability to accurately map and visualize land information in its current state of development.

Objectives/Measure of Success

- Sufficient funding is available to acquire new orthoimagery every 5 years and lidar every 8 years.

Project Timeframes

- Part of each annual WLIP Strategic Initiative Grant and/or Base Budget Grant can be allocated for geospatial data acquisition, with the next anticipated orthoimagery project in 2029 and lidar project in 2031-2032.

Responsible Parties

- Land Information Officer

Estimated Budget Information

- See table at the end of this chapter.

Project #5: Web and Cloud Hosting

Project Description

- Land information is hosted online via the county website, ArcGIS Online, AWS, or other servers or cloud-based solutions. Develop apps and services to search and access land information, e.g. find a solution to host orthoimagery that is viewable from within apps.
- Land Info Spending Category: Website Development/Hosting Services, Administrative Activities and Management

Business Drivers

- Land information must be made accessible to the general public online, while the ArcGIS Enterprise system is behind a firewall.

Objectives/Measure of Success

- Land information becomes increasingly accessible.

Project Timeframes

- Ongoing

Responsible Parties

- County Clerk
- Land Information Officer

Estimated Budget Information

- See table at the end of this chapter.

Project #6: NG911 and Emergency Management

Project Description

- Maintain 911 GIS database, convert to NENA standard for NG911 implementation, develop procedures to streamline data updates, interoperability between systems and overlapping jurisdictions, and further develop GIS layers and apps for emergency management.
- Land Info Spending Category: Address Points, Street Centerlines, Software, Administrative Activities and Management

Business Drivers

- Land information is a critical input for the 911 system, ensuring emergency responders are routed quickly and efficiently.

Objectives/Measure of Success

- A smooth transition from the existing E911 system to NG911. Quicker emergency response times from improved 911 system. Pre-planned GIS support in case of emergencies.

Project Timeframes

- Buffalo County is currently scheduled to go live on the AT&T ESInet in the 4th quarter of 2024.

Responsible Parties

- Sheriff's Office 911 Coordinator
- Emergency Management
- Land Information Officer

Estimated Budget Information

- See table at the end of this chapter.

Project #7: Training and Education

Project Description

- Registration, travel, lodging, and other costs for attending WLIA, ESRI, or other conferences or training. Materials and other costs to host GIS training for county employees, citizens, or others.
- Land Info Spending Category: Training and Education

Business Drivers

- Land information requires specialized knowledge and experience. Much of the technology is constantly changing. Training others to use or at least consume GIS products will help disseminate land information as widely as possible.

Objectives/Measure of Success

- The Land Information Officer should attend at least one conference or other event annually for professional development. Other county employees should be trained to enable them to use GIS in their duties. Public training should be made available so land information can be more broadly accessed and understood.

Project Timeframes

- Attend at least once conference or training event per year. Continue outreach to county employees and citizens.

Responsible Parties

- Land Information Officer

Estimated Budget Information

- See table at the end of this chapter.

Completed Projects

- Submitted V8, V9, and V10 parcel data to the Statewide Parcel Map Initiative.
- Submitted municipal and ward boundaries to LTSB semi-annually.
- Submitted outdoor recreation data to the Wisconsin Office of Outdoor Recreation in 2023 and 2024 for their Outdoor Recreation Inventory.
- Acquired QL1 lidar data through the USGS 3DEP program in 2023.
- Acquired 6-inch WROC orthoimagery in 2024.
- Assumed responsibility for 911 database maintenance in October 2023, which the Sheriff's Office had outsourced since 2021.
- Published documents and geospatial data to AWS and revived domain name to fix broken links from SCO and county web apps.
- Created, converted, or updated web apps on ArcGIS Online for public GIS access.
 - Parcel viewer apps; both a single and multiple parcel viewer using different ESRI technologies
 - Recreation apps for ATV/UTV use, fishing, hunting, parks, public land, trails, and winter trails
 - River status dashboard for real-time water levels, initially for record 2023 spring floods; FEMA flood hazard areas; and watersheds
 - County, municipal, and special zoning districts, assigned addresses, and areas with greater than 12% slope
 - Survey data sheet finder, survey map index, and PLSS grid
 - Apps for road closures, schools and school districts, supervisory districts, cemeteries, and historical USGS topographic maps
 - Replaced existing aerial imagery and lidar data download apps from obsolete to current technology
- Submitted data for commercial applications: parcel data for published plat books and snowmobile and ATV trails for recreation apps.
- Contributed address and road data to commercial and open source map data to correct errors in publicly available mapping apps and improve GPS driving directions:
 - Google Maps Content Partners

- ESRI Community Maps Program
- TomTom Mapshare
- HERE Data Onboarding
- Open Street Map
- Programmed Python scripts to convert and compile data for multiple formats:
 - Statewide Parcel Map Initiative searchable format from the tax database, Parcel Fabric, and 911 addresses
 - NENA standard NG911 data from E911 data
 - Google Maps Content Partners format from NG911 data
 - ESRI Community Maps Program format from NG911 data
 - Human readable address and road layers from NG911 data
- Contributed more than 20 maps for the county's 10-year update to the Comprehensive Land Use Plan.
- Completed more than 50 projects for other county offices, municipalities, firms, and citizens.
- Writing a continuity document to explain GIS/Land Information Officer duties and responsibilities, local file and data organization, points of contact, and other information.
- Resolved state boundary dispute with Winona County, Minnesota.

Estimated Budget Information (All Projects) for Planning Period 2025-2027

Estimated Budget Information

Project Title	Item	Unit Cost/Cost	Land Info Plan	Project Total
			Citations Page # or section ref.	
Plan for Parcel Completion (Benchmark 3)	Treasurer/Real Property Lister support	\$22,508/year	p. 25	\$67,524
Plan for PLSS (Benchmark 4)	Remonumentation support	\$65,000/year	p. 25	\$195,000
1) Indexing, Scanning, and Preserving	ROD support	~\$1500/year	p. 26	\$4500
2) Land Information Software	ESRI Enterprise License Agreement	\$11,300/year	p.26	\$33,900
	Catalis LandNav	\$25,000/year		\$75,000
	Fidlar Technologies	\$25,400/year		\$76,200
				\$185,100
3) Land Information Hardware	Computer replacement	\$5000/each	p.27	\$50,000
	Plotter supplies	\$1500/year		\$4500
				\$54,500
4) Geospatial Data Acquisition	Orthoimagery	~\$11,000/year	p. 27	\$33,000
	Lidar	~\$13,125/year		\$39,375
				\$72,375
5) Web and Cloud Hosting	AWS hosting	~\$10/month	p.28	\$360
6) NG911 and Emergency Management	Validation software	\$7500/year	p.28	\$7500
7) Training and Education	Conferences	\$1000/year	p.29	\$3000
GRAND TOTAL				\$589,859

Note. These estimates are provided for planning purposes only. Budget is subject to change.

