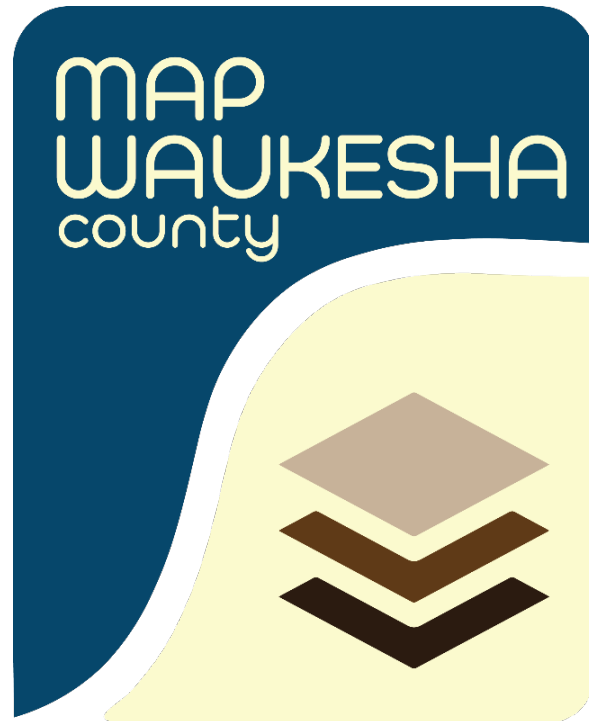


# Waukesha County Land Information Plan 2022-2024



Waukesha County  
Dept. of Parks and Land Use - Land Resources Division  
515 W. Moreland Blvd  
Waukesha, WI 53188  
(608) 548-7946  
<https://www.waukeshacounty.gov/landandparks/land-information-system/>

**Version: 2021-12-02**

Approved/Adopted by Land Information Council on: 2021-12-02

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# EXECUTIVE SUMMARY

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**About this Document.** This document is a land information plan for Waukesha County prepared by the land information officer (LIO) and the Waukesha 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 2021, Waukesha County was awarded \$41,000 in WLIP grants and retained a total of \$793,704 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 Waukesha 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 a wide array of programs and citizen services such as economic development, emergency planning and response, land use planning, resources management, engineering, real estate, and surveying. The Waukesha 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, Waukesha County’s Land Information Office will continue to maintain its core datasets and enable the integration and use of geographic and land record information into the core processes and business functions of the County and its citizens.

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

Waukesha County Land Information Projects: 2022-2024	
Project #1	Acquire 2022 Orthophotography
Project #2	Enable Plats of Survey for Direct GIS Access
Project #3	Continued Support of AWS Cloud Computing
Project #4	PLSS Monument NAD83 Coordinate Densification
Project #5	Continuous Improvement Projects
Project #6	Next Gen 911 Data Compliance Project
Project #7	Drone and UAS Hardware/Software Acquisition
Project #8	Mobile Data Collection Hardware/Software Acquisition
Project #9	LiDAR Acquisition
Project #10	WSRS2022 Data Conversion

The remainder of this document provides more details on Waukesha 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.

## Act 20 and the Statewide Parcel Map Initiative

A major development for the WLIP occurred in 2013 through the state budget bill, known as Act 20. It directed the Department of Administration (DOA) to create a statewide digital parcel map in coordination with counties.

Act 20 also provided more revenue for WLIP grants, specifically for the improvement of local parcel datasets. The WLIP is dedicated to helping counties meet the goals of Act 20 and has made funding available to counties in the form of Strategic Initiative grants to be prioritized for the purposes of parcel/tax roll dataset improvement.

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 (For 2016-2021 Grant Years)

- 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 Waukesha County is meeting these benchmarks appears in the Foundational Elements section of this plan document.

## County Land Information System History and Context

Waukesha County initiated a Public Land Survey System (PLSS) remonumentation program in 1981 under the direction of the Southeastern Wisconsin Regional Planning Commission, which not only reestablished the survey control system, but created new base maps.

In 2000, Waukesha County launched the first public facing land records web mapping site.

In 2004, the first phase II e-911 call was successfully responded to when a call came into the combined dispatch center from a person who did not know her location, but the caller location was able to be geolocated with a dot appearing on the dispatcher's console map.

By 2006, it was determined that Waukesha County had completed all the foundational elements as identified by the WLIP.

More recently, in 2016, Waukesha County, in a contract with SEWRPC, set forth to transform their data from an antiquated datum, (NAD27/NGVD29) to a modern datum, (NAD83/NAVD88) to enable more seamless data transfer with both the surveying community and state and local government and the private sector. Going forward, the County will continue work to maintain and distribute its data free of charge using its open data portal.

The WLIP identified a set of Foundational Elements that were to serve as the basis for a complete County Land Information System. The primary custodian of the WLIP-defined Foundational Elements in Waukesha County is the Department of Parks and Land Use, Land Resources Division (LRD) where the Land Information Office is currently housed. Within the Land Information Office, the LIS Supervisor is assigned the duties of County Land Information Officer (LIO).

## County Land Information Plan Process

County land information plans were initially updated every five years. However, as a result of Act 20, counties must update and submit their plans to DOA for approval every three years. The 2022-2024 plan, completed at the end of 2021, is the third post-Act 20 required update.

### County Land Information Plan Timeline

- DOA release of finalized instructions by March 31, 2021.
- April–September 2021: Counties work on land info plans.
- Draft plans due to DOA by September 30, 2021 (but sooner is advised).
- Final plans with county land info council approval due by December 31st, 2021.

### 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 and the Waukesha County Land Information Council.

<b>Waukesha County Land Information Council and Plan Workgroup</b>				
<b>Name</b>	<b>Title</b>	<b>Affiliation</b>	<b>Email</b>	<b>Phone</b>
+ <b>James Behrend</b>	Register of Deeds	Register of Deeds	jbehrend@waukeshacounty.gov	262-548-7586
+ <b>Pamela Reeves</b>	County Treasurer	County Treasurer	preeves@waukeshacounty.gov	262-548-7033
+ <b>Candace White</b>	Real Property Lister	County Dept. of Administration Tax Listing	clwhite@waukeshacounty.gov	262-548-7597
+ <b>Paul Decker</b>	County Board Member	Waukesha County Board	pdecker@waukeshacounty.gov	262-548-7002
+ <b>James Landwehr</b>	Land Information Office Representative	Land Information Officer	jlandwehr@waukeshacounty.gov	262-548-7946
+ <b>Laura Kruschka</b>	Realtor	Realtor Association Representative	laurakruschkarealtor@gmail.com	414-807-4684
+ <b>Gary Bell</b>	Director of Dept. of Emergency Preparedness	Public Safety/Emergency Representative	gbell@waukeshacounty.gov	262-446-5075
+ <b>Robert Merry</b>	County Surveyor	Appointed County Surveyor (SEWRPC)	rmerry@sewrpc.org	262-547-6721

+ Land Information Council Members designated by the plus symbol

# 2 FOUNDATIONAL ELEMENTS

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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, ¼, meander) <b>set in original government survey</b> that can be remonumented in your county	<ul style="list-style-type: none"> <li>1,947 (2,868 if one would include center of section, closing corners on quarter- section lines, extension corners, witness corners, and meander corners on quarter-section lines which are not part of the original government survey)</li> </ul>
Number of PLSS corners capable of being remonumented in your county that <b>have been remonumented</b>	<ul style="list-style-type: none"> <li>1,947</li> </ul>
Number of remonumented PLSS corners with survey grade coordinates (see below for definition) <ul style="list-style-type: none"> <li><b>SURVEY GRADE</b> – 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</li> <li><b>SUB-METER</b> – point precision of 1 meter or better</li> <li><b>APPROXIMATE</b> – point precision within 5 meters or coordinates derived from public records or other relevant information</li> </ul>	<ul style="list-style-type: none"> <li>1,947</li> <li>2,868, 100% of all monumented corners original or not have established survey grade coordinates.</li> </ul>
Number of survey grade PLSS corner coordinates integrated into county digital parcel layer	<ul style="list-style-type: none"> <li>2,868</li> </ul>
Number of non-survey grade PLSS corner coordinates integrated into county digital parcel layer	<ul style="list-style-type: none"> <li>0</li> </ul>
Tie sheets available online?	<ul style="list-style-type: none"> <li>Yes, see below for link to access both NAD83/2011 and NAD27 coordinates for all USPLSS corners</li> <li><a href="#">USPLSS Tie Sheets</a></li> </ul>
Percentage of remonumented PLSS corners that have <b>tie sheets available online</b> (whether or not they have corresponding coordinate values)	<ul style="list-style-type: none"> <li>100%</li> </ul>
Percentage of remonumented PLSS corners that have tie sheets available online (whether or not they have corresponding coordinate values) <b>and a corresponding URL path/hyperlink value</b> in the PLSS geodatabase	<ul style="list-style-type: none"> <li>100%</li> <li><a href="https://gis.sewrpc.org/portal/apps/webappviewer/index.html?id=9b49d9d04b294b8c8d1b667c9996b8ac">https://gis.sewrpc.org/portal/apps/webappviewer/index.html?id=9b49d9d04b294b8c8d1b667c9996b8ac</a></li> </ul>
PLSS corners believed to be remonumented based on filed tie-sheets or surveys, but do not have coordinate values	<ul style="list-style-type: none"> <li>0</li> </ul>
Approximate number of PLSS corners believed to be lost or obliterated	<ul style="list-style-type: none"> <li>0</li> </ul>
Which system(s) for <b>corner point identification/ numbering</b> 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)?	<ul style="list-style-type: none"> <li>County employs SEWRPC numbering system as follows:           <ul style="list-style-type: none"> <li>Each corner is assigned a corner ID - XXYYZZZ0</li> <li>XX – Township</li> <li>YY – Range</li> <li>ZZZ0 – There are a possible 169 corners within a given township with the Northeast corner of Section 1 being 0010 with the SW of 31 which could again be 0010 (NE of Section 1) or if outside of the Region the number be 1690. The fourth digit "0" would allocate if there are witness/meander corners. If there are witness/meander corners the value of 1 would be for the witness/meander corner that is to the north of the actual corner location, 2 would be to the east, 3 would to the south, and 4 to the west.</li> <li>USPLSS corners from adjacent range lines would number from the east line of the western Township. If common corners from the adjacent</li> </ul> </li> </ul>
Does the county contain any <b>non-PLSS areas</b> (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?	<ul style="list-style-type: none"> <li>No</li> </ul>

Total number of PLSS corners along each bordering county	<ul style="list-style-type: none"> <li>Milwaukee – 49; Washington – 72; Walworth – 50; and counties outside Region; Dodge – 19; Jefferson – 52; Racine - 46</li> </ul>
Number of PLSS corners remonumented along each county boundary	<ul style="list-style-type: none"> <li>Milwaukee – 49; Washington – 73; Walworth – 50; and counties outside Region; Dodge – 19; Jefferson – 52; Racine - 46</li> </ul>
Number of remonumented PLSS corners along each county boundary with survey grade coordinates	<ul style="list-style-type: none"> <li>Milwaukee – 49; Washington – 73; Walworth – 50; and counties outside Region; Dodge – 19; Jefferson – 52; Racine – 46</li> </ul>
In what ways does your county collaborate with or plan to collaborate with neighboring counties for PLSS updates on shared county borders?	<ul style="list-style-type: none"> <li>All USPLSS corners in the SE Region (Kenosha, Milwaukee, Ozaukee, Walworth, Washington, and Waukesha) are shared and supported from one site. The neighboring counties of Dodge and Jefferson share corner location evidence to assist with the corner perpetuation, however, the corner coordinates are based on differing datums.</li> </ul>

### Custodian

- SEWRPC (in role as County Surveyor)

### Maintenance

- Waukesha County contracts with the SEWRPC to provide yearly maintenance to the geodetic survey control system. This includes identifying monuments that may be disturbed during upcoming construction and ensuring that all survey ties are correct and current. In addition, SEWRPC responds to notification from other surveyors regarding missing or damaged monuments which are then researched and replaced.

### Standards

- Statutory Standards for PLSS Corner Remonumentation
- Statutory Standards for PLSS Corner Remonumentation
  - Waukesha County's practices are consistent with s. 59.74, Wis. Stats. Perpetuation of section corners, landmarks.
  - Waukesha County's practices are consistent with s. 60.84, Wis. Stats. Monuments.
  - Waukesha County's practices are consistent with ch. A-E 7.08, Wis. Admin. Code, U.S. public land survey monument record.
  - Waukesha County's practices are consistent with ch. A-E 7.06, Wis. Admin. Code, Measurements.
  - Waukesha County's practices are consistent with s. 236.15, Wis. Stats. Surveying requirement.
- 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 records or other relevant information
- Esri ArcGIS Professional Parcel Fabric Data Model
- Waukesha County's PLSS corner coordinates were established using the guidelines and specifications from the National Geodetic Survey for Third Order Class I accuracy. The county uses the State Plane Coordinate System (SPCS) Wisconsin South Zone and the datum referenced is the North American Datum of 1983 and vertically, the North American Vertical Datum of 1988 (2012).

# NAD83/2011 and NAD27 - Sample Dossier Sheet

## RECORD OF U.S. PUBLIC LAND SURVEY CONTROL STATION

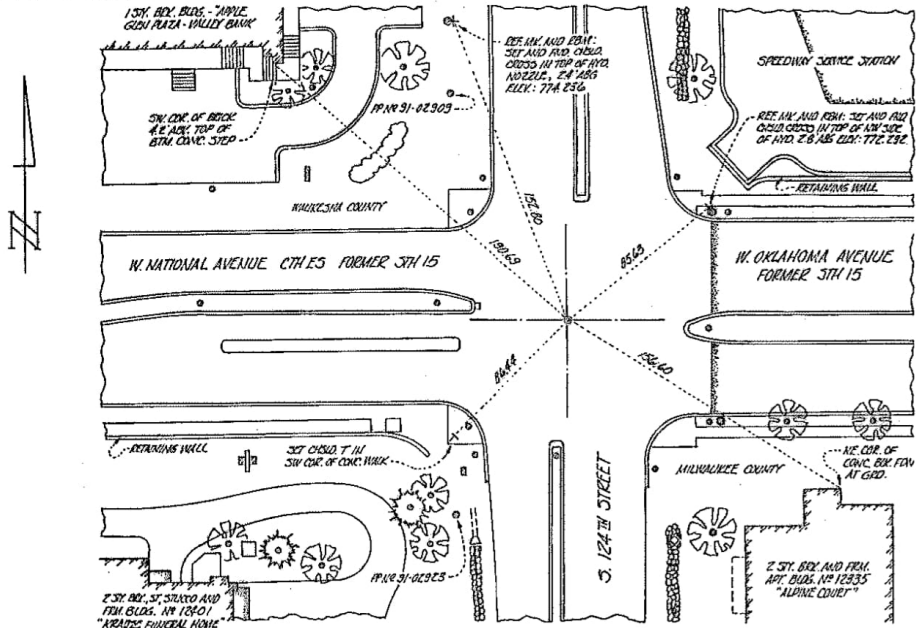
U.S. PUBLIC LAND SURVEY CORNER  $\frac{12}{13}$  T 06 N, R 20 E, Waukesha COUNTY, WISCONSIN

HORIZONTAL: NORTH AMERICAN DATUM OF 1927  
 VERTICAL: NATIONAL GEODETIC VERTICAL DATUM OF 1929  
 HOR. CONTROL: ALSTER & ASSOCIATES, INC. 1966  
 VERT. CONTROL: AERO-METRIC ENGINEERING, INC. 2001  
 NORTHING: 366,157.00 USFT  
 EASTING: 2,516,834.52 USFT  
 ELEVATION: 772.057 FT  
 HOR. ACCURACY: 3rd ORDER, CLASS I  
 VERT. ACCURACY: 2nd ORDER, CLASS II

HORIZONTAL: NORTH AMERICAN DATUM OF 1983/2011  
 VERTICAL: NORTH AMERICAN VERTICAL DATUM OF 1988 (12)  
 HOR. CONTROL: SEWRPC 2017  
 VERT. CONTROL: \_\_\_\_\_  
 NORTHING: 366,167.52 USFT  
 EASTING: 2,485,297.07 USFT  
 ELEVATION: \_\_\_\_\_ FT  
 HOR. ACCURACY: 3rd ORDER, CLASS I (COMPUTED)  
 VERT. ACCURACY: \_\_\_\_\_

RBM ELEV. IN SKETCH BELOW TIED TO NGVD29 DATUM. CONVERSION FROM NGVD29 \_\_\_\_\_ FT DERIVES NAVD88 HEIGHT

LOCATION SKETCH:



SURVEYOR'S AFFIDAVIT:  
 STATE OF WISCONSIN)  
WAUKESHA COUNTY) SS

As County Surveyor for Waukesha and Milwaukee Counties, I hereby certify that I found a concrete monument with SEWRPC brass cap as set to mark this corner in November 1991 by Gregory A. Kunz, S-1346, Consultant to the Waukesha County Department of Transportation, following highway reconstruction; replacing a concrete monument with SEWRPC brass cap set to mark this corner in March 1988 by Claude C. Johnson, Jr. S-765, Waukesha County Surveyor; replacing a broken concrete monument, said concrete monument with City of New Berlin brass cap having been set to mark this corner in the summer of 1965 by Donald R. Polzin, S-624; replacing a cast iron plug with cross set in the then existing concrete pavement to mark this corner in 1957 by Donald J. Dlugopolski, State Highway Commission of Wisconsin Project Engineer, following highway reconstruction; replacing a cast iron plug with cross set in the then existing concrete pavement to mark this corner in 1931 by a Milwaukee County Highway Department project engineer following highway reconstruction; replacing an iron rod set in the then existing concrete pavement to mark this corner in 1913 by a Milwaukee County Highway Department project engineer following highway reconstruction; replacing an old cut limestone monument set to mark this corner in 1876 by Jonathan C. Crouse, Surveyor, in the conduct of the remonumentation of the U.S. Public Land Survey System in the Town of New Berlin; replacing in turn a wood post set to mark this corner in January 1836 by John Mullett, Deputy United States Surveyor, in the conduct of the original United States Public Land Survey; that I referenced the same as shown hereon; and that this record is correct and complete to the best of my knowledge and belief.



DATE OF SURVEY: 17 September 1993 S - 157  
 REVISED: 8 June 2001 REGISTERED LAND SURVEYOR

FORM PREPARED BY SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION (SEWRPC)  
 CERTIFICATION APPLIES ONLY TO THE LOCATION SKETCH AND SURVEYOR AFFIDAVIT

06200530 53 -

## Other Geodetic Control and Control Networks

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

### Layer Status

- Waukesha County does not have or maintain any other Geodetic or Control Networks

# Parcel Mapping

## Parcel Geometries

### Layer Status

- **Progress toward completion/maintenance phase:** In Waukesha County, 100% of the county's parcels are available in a commonly-used digital GIS format, (ESRI Geodatabase). New parcels are added using Coordinate Geometry (COGO) techniques into the ESRI parcel fabric.
- **Projection and coordinate system:** Parcels were created based on the County adopted horizontal geodetic control system which is defined as having survey control accuracy of Third Order, Class I, referencing the North American Datum of 1983/2011, Wisconsin State Plane Coordinate System, South Zone.
- **Integration of tax data with parcel polygons:** The county does not have a parcel polygon model that directly integrates tax/assessment data as parcel attributes. The parcels are combined with tax assessment data as part of a geoprocessing task done quarterly for the map updates.
- **Online Parcel Viewer Software/App and Vendor name:** Vertigis/Geocortex Essentials was used by internal staff to develop Waukesha County's cloud hosted (AWS) application.
- **Unique URL path for each parcel record:**  
<https://prd1.waukcogeo.com/HTML5Viewer/?viewer=parcelviewer&run=TaxParcelSearch&id=WAKC1000982>  
Yes, this URL is stable.  
No, the URL cannot be used to export the parcel record or geometry, however the application allows for selection of groups of parcels for exporting to an Excel .xlsx file.

### Custodian

- Waukesha County Parks and Land Use, Land Resources Division

### Maintenance

- **Update Frequency/Cycle:** Parcel polygons are updated monthly with an ongoing effort to keep parcels current to no more than 30 days from when documents are filed. There are currently three municipalities (Brookfield, New Berlin and Waukesha) that do their own parcel mapping. The parcels from those communities are merged into the county's parcel fabric when they are provided. This has, however, created challenges for meeting the statewide parcel submission standards in the past. The county also has been collecting retired parcels since 2004, namely those parcels that are superseded by newer land divisions or assigned new tax key numbers due to splits/combinations.

### Standards

- **Data Dictionary:** FGDC compliant Metadata has been created for the digital parcel data that identifies all codes used in the file.
- The county migrated its parcels to the ESRI Parcel Fabric data model in 2017 in an attempt to facilitate easier data exchange and maintenance. Further migration into an ArcGIS Pro map service-based editing format took place in 2021 as part of a Strategic Initiative Grant project.

## Assessment/Tax Roll Data

### Layer Status

- **Progress toward completion/maintenance phase:** NA
- **Tax Roll Software/App and Vendor name:** EZ Access from vendor Hamer Enterprises, LLC
- **Municipal Notes:** The Cities of Brookfield, New Berlin and Waukesha do their own tax listing and create their own tax bills. They do not submit the tax roll information to DOR independent of the county.

### Custodian

- The Tax Listing Division is custodian for the data in municipalities for which they provide tax listing services.

## Maintenance

- **Maintenance of the Searchable Format standard:** To better facilitate parcel and tax data to fit the Searchable Format standard, the county has developed an automated tax assessment .XML export process for each of the 37 communities within the county. These files are then ingested into the Statewide Parcel toolset to create a single .xml file. This file is joined to the parcel and then manual processes are used to cleanse, reformat and quality check the data prior to provision to the State Department of Administration.
- **Searchable Format Workflow:** The County maintains parcel/tax roll data in such a way that **requires significant formatting every year**—whether by in-house county staff, or a third-party contractor/vendor. To clarify, despite now having the data exported to a DOA compatible .xml format, there is still significant manual effort to fill missing values and/or meet the extensive needs of the searchable format. Some of this is due to inconsistencies between the four communities that do their own tax listing. However, if the searchable format was not a fluid and evolving standard subject to change from year to year, it would be easier to automate more of the processes to meet the state requirements.
- 

## Standards

- Waukesha County meets and complies with Wisconsin Department of Revenue [Property Assessment Manual](#) and attendant DOR standards
- Waukesha County meets and complies with 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

- POWTS, Private Onsite Wastewater Treatment Systems are linked to parcels by Tax Key number for use with the Transcendent Technologies application in the Waukesha County Parks and Land Use Environmental Division.

### Custodian

- Parks and Land Use – Environmental Health Division

### Maintenance

- The Environmental Health division staff enter new permits as they are received, and the parcels are automatically linked via a join to the parcel polygons.

### Standards

- POWTS data and information is compliant with all county ordinances and state statutes.

## ROD Real Estate Document Indexing and Imaging

### Layer Status

- **Grantor/Grantee Index:** Grantor/Grantee Indexes are available as computer searchable back to 1994. Manual, hardcopy searches are required for documents prior to 1994.
- **Tract Index:** Tract Indexes are available as computer searchable back to 1994. Manual, hardcopy searches are required for documents prior to 1994. Tract index search is based on Public Land Survey System one-quarter section searches for unplatted parcels. All documents identified in State Statute are indexed in Grantor/Grantee and Tract Index systems. Tract index images are linked to GIS layers for Subdivisions, CSM and Condominium areas.
- **Imaging:** All documents identified in State Statute are imaged and accessible for viewing through the computerized indexing system. All Plats of Survey on file with the Register of Deeds have been imaged and indexed in the Tract Index. All map documents including, Subdivision Plats, Condominium Plats and Certified Survey Maps filed with the Register of Deeds office have been imaged and indexed in the Tract Index. All images are now available for viewing (with watermark) by the public or for purchase online using a credit card.

Significant effort is being conducted in the Register of Deeds office toward linking online images to tax keys to help automated searches from and to the GIS.

- **ROD Software/App and Vendor Name:** Aumentum Reporter – from vendor Thomson Reuter

#### Custodian

- County Register of Deeds  
County Register of Deeds also serves as Deputy County Surveyor to enable acceptance of Plats of Survey.

#### Maintenance

- County Register of Deeds

#### Standards

- Waukesha County meets and complies with s. 59.43, Wis. Stats. Register of Deeds; duties, fees, deputies.
- Waukesha County meets and complies with ch. 706, Wis. Stats. Conveyances of real property; Recording; Titles.

## LiDAR and Other Elevation Data

### LiDAR

#### Layer Status

- **Most recent acquisition year:** 2015
- **Accuracy:** The RMSEz was computed to be 0.041 meters (0.135 feet) and AccuracyZ to be 0.080 meters (0.264 feet). RMSEz has been tested to 0.5 feet or better per the task order specifications. AccuracyZ has been tested to meet 18.13 cm Fundamental Vertical Accuracy at 95 Percent confidence level using  $RMSE(z) \times 1.9600$  as defined by the National Standards for Spatial Data Accuracy (NSSDA); assessed and reported using National Digital Elevation Program (NDEP)/ASRPS Guidelines.
- **Post spacing:** USGS QL2 Specifications – 0.71 meter and greater than or equal to 2 points per meter square.
- **Contractor's standard, etc.:** United State Geological Survey (USGS) – LiDAR Base Specifications, Version1.2
- **Next planned acquisition year:** 2026
- **QL1/QL2 acquisition plans:** It is anticipated that the 2025 data will again be acquired meeting at least QL2.

#### Custodian

- Waukesha County Department of Parks and Land Use – Land Resources Division

#### Maintenance

- Waukesha County Department of Parks and Land Use – Land Resources Division – Static data.

#### Standards

- U.S. Geological Survey Quality Level 2 (QL2) specifications.

### 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

- Horizontal Datum: NAD83/2011, Wisconsin State Plane Coordinates, South Zone, US Survey Feet; Vertical Datum: NAVD88, US Survey Feet
- Classified LAS Tiles: 10,000ft x 10,000ft tiles - See USGS LiDAR Base Specifications for technical approach for LAS version, file headers, and classification schema.
- Breaklines: One geodatabase containing all breaklines supporting USGS LiDAR Base Specifications (100ft or wider for river/streams and 2acres or greater for lakes and ponds)

- Digital Terrain Model DTM and hydro-enforced breaklines were used to generate contour lines of vertical interval of one-foot. Every fifth contour is noted as an index contour. DTM and contour vector files were delivered using an ESRI File Geodatabase format.
- Bare-Earth Surface (Raster Digital Elevation Model): 2ft hydro-flattened DEM using the same tiling scheme as above.
- FGDC Compliant metadata files for each of the derivative services.
- County staff also used the DTM data to derive a county-wide Digital Elevation Model with a 5' cell size.

#### Custodian

- Waukesha County Department of Parks and Land Use – Land Resources Division

#### Maintenance

- None required as the LiDAR data set is static. Due to significant costs, the county will look to acquire new LiDAR every ten years or more frequently as budget allows. The next planned acquisition is 2025.

#### Standards

- United State Geological Survey (USGS) – LiDAR Base Specifications, Version 1.2.

## Other Types of Elevation Data

#### Layer Status

- Waukesha County does not have other types of elevation data.

#### Custodian

#### Maintenance

#### Standards

## Orthoimagery

### Orthoimagery

#### Layer Status

- **Most recent acquisition year:** 2020
- **Resolution:** 3-inch pixel resolution
- **Contractor's standard:** Spring acquisition, leaf-off.
- **Next planned acquisition year:** 2022.

#### Custodian

- Waukesha County Department of Parks and Land Use – Land Resources Division

#### Maintenance

- Land Resources Division, however, no maintenance activities are anticipated.

#### Standards

- Orthophotos were compiled to meet National Map Accuracy Standards for 1:1200 scale.

## Historic Orthoimagery

#### Layer Status

- 2015; 6" pixel resolution; color; Orthorectified, compiled at 1:1200 scale
- 2010; 6" pixel resolution; color; Orthorectified, compiled at 1:1200 scale
- 2007; 1' pixel resolution; color; Orthorectified, compiled at 1:2400 scale
- 2005; 6" pixel resolution; color; Orthorectified, compiled at 1:1200 scale
- 2000; 1' pixel resolution; black and white; Orthorectified, Part of the county compiled at 1:2400 with 1' pixel resolution and Part of the County compiled at 1:4800 scale with 2' pixel resolution
- 1995; 2' pixel resolution; black and white; Orthorectified, 1:4800 scale
- 1990; 1' pixel resolution; black and white; Not Orthorectified, 1"=1667' scale
- 1980; 1' pixel resolution; black and white; Not Orthorectified, 1"=1667' scale
- 1970; 1' pixel resolution; black and white; Not Orthorectified, 1"=1667' scale
- 1963; 1' pixel resolution; black and white; Not Orthorectified, 1"=1667' scale

- 1950; 1' pixel resolution; black and white; Not Orthorectified, 1"=1667' scale
- 1941; 1' pixel resolution; black and white; Not Orthorectified, 1"=1667' scale

#### **Custodian**

- Waukesha County Department of Parks and Land Use – Land Resources Division

#### **Maintenance**

- Land Resources Division, however, no maintenance activities are anticipated

#### **Standards**

- National Map Accuracy Standards for 1:1200 for flight years of, 2010 and 2005.
- National Map Accuracy Standards for 1:2400 for flight years of, 2007 & portions of year 2000.
- National Map Accuracy Standards for 1:4800 for flight years of, 1995 and portions of 2000.
- Historic imagery for 1990, 1980, 1970, 1963, 1950 and 1941 have standards that are undefined. This imagery was flown at a 1"=1667' negative scale. The negatives were acquired from SEWRPC and the National Archives (1950, 1941), then scanned and georeferenced to an approximate horizontal accuracy of +/- 40'. For more details see related metadata at: <http://prd1.waukcogeo.com/Images/Metadata83/AerialPhotography.htm>

## **Other Types of Imagery**

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

#### **Layer Status**

- 2017 Oblique, non-georeferenced color aerial photos of perimeter of selected lakes
- 1996 Oblique, non-georeferenced color aerial photos of perimeter of selected lakes

#### **Custodian**

- Waukesha County Department of Parks and Land Use – Planning Division

#### **Maintenance**

- None

#### **Standards**

- 2017 – High Resolution JPEG files with accompanying Index map of approximate location.
- 1996 – High Resolution PCD proprietary format files.

## **Address Points and Street Centerlines**

### **Address Point Data**

#### **Layer Status**

- Address points are complete for the county.
- Address Points are maintained for each address in the County.
- Address Points are linked to a related tax parcel and a related street centerline segment
- Address Points are tied to a normalized street name table
- Address Points are linked to the Environmental Health Premise scanned files.
- Address Points are provided to the Waukesha County Emergency Preparedness Department for use in the shared dispatch system.
- Waukesha County participates in the LUCA program in cooperation with the US Census.

#### **Custodian**

- Waukesha County Department of Parks and Land Use – Land Resources Division

#### **Maintenance**

- Site address points and centerlines are maintained by the Waukesha County Land Information System Division staff. New addresses or incorrect address notifications are sent by municipal addressing authorities via the County's online Address Maintenance System (AMS). These notifications are then entered by the Land Resources Division and sent to the Tax Listing department for verification. The GeoComm NG911 GIS Assessment and Recommendations study was completed, and the county will be working toward closing some of the data gaps and populating fields to make it compliant with the Wisconsin NG911 data model.



## Standards

- Wisconsin GIS NG9-1-1 Data Standard (Site/Structure Address Point)
- Addresses are maintained according to USPS standards
- Addresses are formatted to comply with the ESRI Local Government Address Data Model
- Addresses will be formatted to comply with the [WLIA Standard Data Model](#)

## Building Footprints

### Layer Status

- Building footprints were obtained from Microsoft Bing from approximately 2009, to replace outdated buildings captured as part of planimetric mapping from SEWRPC from 1985-2000.

### Custodian

- Waukesha County Department of Parks and Land Use – Land Resources Division

### Maintenance

- Some maintenance is done at the municipal level using building permits, but none are maintained as part of county processes. The footprints are strictly used for reference with all caveats noted regarding their accuracy and currency.

### Standards

- None

## Other Types of Address Information

### e.g., Address Ranges

#### Layer Status

- Addresses are attributed on street centerlines for the entire county and some outlying areas in surrounding counties that have shared assistance agreements with County Dispatch. This layer is complete for the County.
- Centerlines contain attribute for jurisdiction
- Centerlines are linked to a normalized street name table
- Assigned local name and linked to street name alias table for alternate names and other designations
- Contain attributes for address range formatted as Left/Right, Low/High
- Attributes account for Waukesha County's unique coordinate addressing in rural areas.

#### Custodian

- Waukesha County Department of Parks and Land Use – Land Resources Division

#### Maintenance

- Completed by Land Information Office staff concurrent with updating the address point data file.

#### Standards

- None

## Street Centerlines

### Layer Status

- Street centerlines are maintained county wide for use in County Dispatch/E911 operations. This layer is complete for the County.

### Custodian

- Waukesha County Department of Parks and Land Use – Land Resources Division

### Maintenance

- Centerlines are added using preliminary plats georeferenced to existing parcel framework as well as the most current orthophotography available.

### Standards

- Addresses will be formatted to comply with the [WLIA Standard Data Model](#)
- Wisconsin GIS NG9-1-1 Data Standard (Site/Structure Address Point) An ETL process is planned to convert the WLIA Standard to the NG911 Standard.

- The county will begin to work toward meeting the Wisconsin GIS NG9-1-1 Data Standard for road centerlines over the next few years, per the Geocomm NG911 GIS Assessment and Recommendations study. The end-product will also meet the requirements for the WLIA Standard Data Model for Centerlines.

## Rights of Way

### Layer Status

- Rights of Way are complete for the County.
- **How maintained:** Rights of Way are maintained as part of the parcel fabric. They have attributes for Municipality and Type (Dedicated, reserved, etc.) The four municipalities that maintain their own parcel maps are tasked with maintaining their ROWs and providing them to the County.

### Custodian

- Waukesha County Department of Parks and Land Use – Land Resources Division

### Maintenance

- New rights of way are added during the parcel update process. Changes or vacations to existing rights of way are flagged by Tax Listing department and also made during this update process.

### Standards

- None

## Trails

### e.g., Recreational Trails, Snowmobile Trails

### Layer Status

- County-maintained trails are complete. Snowmobile trails are maintained for use by the local snowmobile clubs.

### Custodian

- Waukesha County Department of Parks and Land Use – Parks Division

### Maintenance

- Waukesha County Department of Parks and Land Use – Parks Division

### Standards

- None

## Land Use

### Current Land Use

#### Layer Status

- 2015 Existing Land Use. Currently awaiting a 2020 update, expected in 2022.

#### Custodian

- SEWRPC

#### Maintenance

- SEWRPC. Updates are provided on a 5-year cycle.

#### Standards

- SEWRPC land use mapping standard.

### Future Land Use

#### Layer Status

- 2035 Development Plan is complete for the county. Updates are conducted in collaboration with local municipalities

#### Custodian

- Waukesha County Department of Parks and Land Use – Planning and Zoning Division

## Maintenance

- Planning and Zoning Division of the Parks and Land Use Department perform an annual review and complete an official amendment process.

## Standards

- s. 66.1001, Wis. Stats. Comprehensive planning.
- Completed according to requirements for Comprehensive Planning set forth in State Statutes.

# Zoning

## County General Zoning

### Layer Status

- The County does maintain a GIS representation of county general zoning boundaries for the Towns of Oconomowoc and Ottawa.

### Custodian

- Parks and Land Use Department – Planning and Zoning Division

### Maintenance

- Completed on a monthly basis by Planning and Zoning Division staff. Rezoned information is updated upon occurrence.

### Standards

- Waukesha County Zoning Ordinance

## Shoreland Zoning

### Layer Status

- The County does maintain a GIS representation of Shoreland Zoning/Jurisdiction layers for all unincorporated areas, in addition to floodplain study boundaries above and beyond FEMA's mapped boundaries.
- The layer is 100% complete for the unincorporated areas of the county.

### Custodian

- Parks and Land Use Department – Planning and Zoning Division

### Maintenance

- Monthly or more, as re-zones occur, navigability determinations are made, or floodplain information becomes available.

### Standards

- County Shoreland and Floodplain Protection Ordinance.
- <https://www.waukeshacounty.gov/globalassets/parks--land-use/planning-zoning/2020-zoning-ordinance-amendments-zc-and-sfpo/unofficial-clean-copy-effective-shoreland-ordinance-07-31-2020.pdf>

## Farmland Preservation Zoning

### Layer Status

- The County does maintain a GIS representation of county farmland preservation zoning boundaries, which at present, is applicable in four towns, Oconomowoc, Ottawa, Eagle and Merton.
- This layer is 100% complete for the county.
- **Year of certification:** 2015. Data has been updated to 5/2021 and is updated to reflect re-zones in/out of districts since certification.

### Custodian

- DATCP

### Maintenance

- Completed on a monthly basis by Planning and Zoning Division staff. Rezoned information is updated upon occurrence.

### Standards

- DATCP, Wisconsin Statutes Ch. 91

## Floodplain Zoning

### Layer Status

- The County does maintain a GIS representation of floodplain zoning boundaries
- The county's floodplain zoning GIS data is not identical to the FEMA map. Dam failure floodplains and other approximated floodplains are represented in addition to FEMA boundaries.
- Flood storage boundaries are also provided to the County by the DNR and incorporated into the floodplain zoning area.

### Custodian

- Federal Emergency Management Agency (FEMA)
- Waukesha County Parks and Land Use – Planning and Zoning Division
- Wisconsin Department of Natural Resources

### Maintenance

- Completed on a monthly basis by Planning and Zoning Division staff. Rezone information or new floodplain boundaries are incorporated upon occurrence or adoption of new dam failure floodplain studies.

### Standards

- Federal Emergency Management Agency floodplain standards
- NR 116 Wisconsin Floodplain Management standards

## Airport Protection

### Layer Status

- The County does maintain a GIS representation of airport protection zoning boundaries. The layer is 100% complete.
- **Airport protection zoning map depicts:** Height limitation restrictions, airport aviation easements and runway protection zones.

### Custodian

- Parks and Land Use Department – Planning and Zoning Division

### Maintenance

- Parks and Land Use Department – Planning and Zoning Division. Information is updated upon occurrence.

### Standards

- No formal standards.

## 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

- Six towns, Brookfield, Eagle, Genesee, Lisbon, Merton and Mukwonago, and two villages, Vernon and Waukesha - contract with the County to perform zoning map creation and maintenance to support each Town Zoning Ordinance.

### Custodian

- Parks and Land Use Department – Planning and Zoning Division

### Maintenance

- Monthly or more frequently, as re-zones occur, or as floodplain or navigability information becomes available.

### Standards

- Town or village zoning ordinances for, Brookfield, Eagle, Genesee, Lisbon, Merton, Waukesha, Mukwonago and Vernon.

# Administrative Boundaries

## Civil Division Boundaries

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

### Layer Status

- Civil Division boundaries are complete for 100% of the County.

### Custodian

- Waukesha County Department of Parks and Land Use – Land Resources Division

### Maintenance

- Updated as parcels are annexed as part of ongoing parcel maintenance efforts.

### Standards

- No formal standards.

## School Districts

### Layer Status

- Progress toward completion/maintenance phase: 100% complete for County.
- Relation to parcels: Parcels contain a school district code.
  - Attributes linked to parcels: SCHOOLDISTNO

### Custodian

- Waukesha County Tax Listing

### Maintenance

- Tax Listing maintains school district codes in tax system. LIS maintains map layer, incorporating changes from Tax Listing.
- Periodic checks are done to ensure synchronicity between parcels and the district polygon layer.

### Standards

- No formal standards

## Election Boundaries

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

### Layer Status

- Municipal election wards exist for 100% of the county.

### Custodian

- Department of Parks and Land Use – Land Resources Division
- Waukesha County Clerk's office
- Municipal Clerks within Waukesha County

### Maintenance

- Land Resources Division maintains the election ward layer by monitoring annexations received at the County. Some annexations are filed with the County Clerk, some with the Register of Deeds, and some with both offices. The Land Resources Division works with both Departments to get complete information.
- Wards will be redrawn in late 2021 to account for 2020 US Census data population changes.

### Standards

- Meets standards for submission to LTSB to fulfill Wisconsin State Statute [5.15\(4\)\(br\)1](#)

## Utility Districts

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

### Layer Status

- Waukesha County does not have utility district layers.

### Custodian

- None

**Maintenance**

- None

**Standards**

- None

## Emergency Service Boundary – Law/Fire/EMS

### Layer Status

- **Law Enforcement:** 100% complete for the county
- **Fire:** 100% complete for the county
- **EMS:** EMS Boundaries are determined by the CAD system based on the Fire ESZ boundary plus other event factors based on each call.

### Custodian

- Waukesha County Department of Parks and Land Use – Land Resources Division

### Maintenance

- Updated as per the request of fire and law agencies based on changing operational and response needs.

### Standards

- None, however, the county will begin to work toward meeting the Wisconsin GIS NG911 Data Standard for road centerlines over the next few years, per the Geocomm NG911 GIS Assessment and Recommendations study.

## Public Safety Answering Points (PSAP) Boundary

### Layer Status

- **PSAP Boundary:** 100% complete for the county.

### Custodian

- Waukesha County Department of Parks and Land Use – Land Resources Division

### Maintenance

- Waukesha County Department of Parks and Land Use – Land Resources Division

### Standards

- None, however, the county will begin to work toward meeting the Wisconsin GIS NG911 Data Standard for road centerlines over the next few years, per the Geocomm NG911 GIS Assessment and Recommendations study.

## Provisioning Boundary

### Layer Status

- 100% complete for the county.

### Custodian

- Waukesha County Department of Parks and Land Use – Land Resources Division

### Maintenance

- Waukesha County Department of Parks and Land Use – Land Resources Division

### Standards

- None, however, the county will begin to work toward meeting the Wisconsin GIS NG911 Data Standard for road centerlines over the next few years, per the Geocomm NG911 GIS Assessment and Recommendations study.

## Other Public Safety

### e.g., Healthcare Facilities

### Layer Status

- Hospitals, Daycares and Nursing Homes are 100% complete.

### Custodian

- Waukesha County Department of Parks and Land Use – Land Resources Division

### Maintenance

- Maintenance of day cares and nursing homes relies on extracts of state lists from WI DHS and are checked on a yearly basis as part of an Emergency Management workflow as well as throughout the year as the county is notified about them

### Standards

- None

## Lake Districts

### Layer Status

- The Tax Listing database has Lake District codes for several districts in the County, however those codes are not included in the .xml export used to create ownership parcels. These codes are 100% complete for the districts the County administers.

### Custodian

- Waukesha County Tax Listing department

### Maintenance

- Files are maintained on a monthly cycle. Currently lake districts are being checked and compared using the tax codes to insure they match the geography for the lakes.

### Standards

- None

## Native American Lands

### Layer Status

- Waukesha County does not have a Native American Lands layer.

### Custodian

- N/A

### Maintenance

- N/A

### Standards

- N/A

## Other Administrative Districts

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

### Layer Status

- The County maintains a file containing 100% of the Park and Open Space Lands.

### Custodian

- Waukesha County Department of Parks and Land Use – Parks Division

### Maintenance

- Annually or as plan evolves.

### Standards

- None

## 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

- The hydrography layer is 100% complete for the county. Hydrography lines were captured from planimetric methods as part of the aerial photography collection in 2000. The 2015 LiDAR dataset may be investigated for potential elevation derived hydrography in the future.

### Custodian

- Waukesha County Department of Parks and Land Use – Land Resources Division

### Maintenance

- Static data.

### Standards

- None.



## Cell Phone Towers

### Layer Status

- Waukesha County does not have a cell phone towers layer.

### Custodian

- None

### Maintenance

- None

### Standards

- None

## Bridges and Culverts

### Layer Status

- Bridges and County-owned culverts are 100% complete for the county. Bridges and County-maintained culverts are coded with links to photos and as-built documents.

### Custodian

- Waukesha County Department of Public Works
- Waukesha County Department of Parks and Land Use – Land Resources Division

### Maintenance

- Updated as needed. Culverts inspected on approximately a 3-year cycle.

### Standards

- None

## Other/Miscellaneous

**e.g., Pipelines, Railroads, Non-Metallic Mining, Sinkholes, Manure Storage Facilities, etc.**

### Layer Status

- The following layers are 100% complete for the County.
- Railroads
- Non-Metallic Mining sites
- Agricultural Waste Storage sites

### Custodian

- Waukesha County Department of Parks and Land Use – Land Resources Division

### Maintenance

- Updated as needed.

### Standards

- None

# 3 LAND INFORMATION SYSTEM

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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:

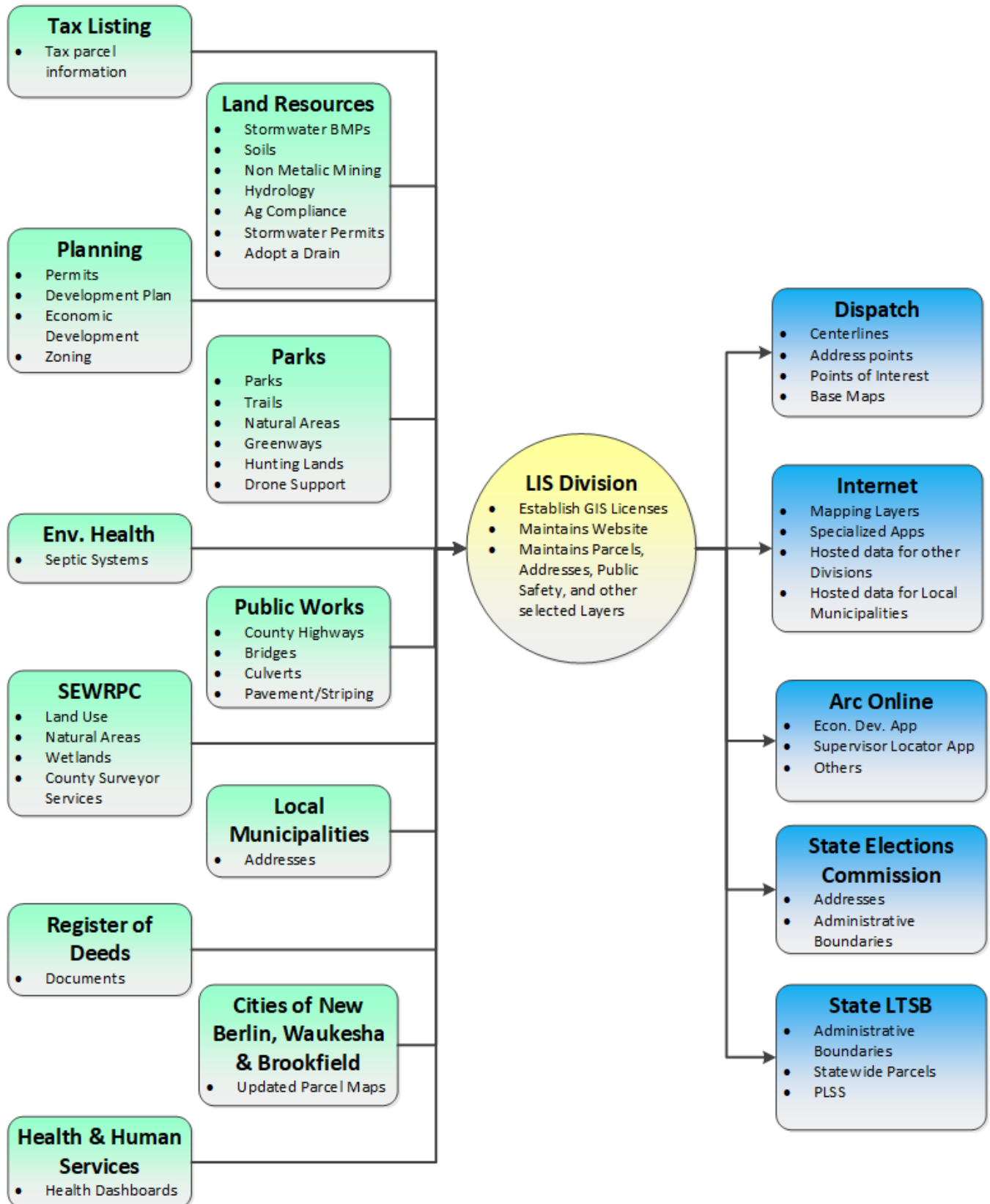
The design, development, and implementation of a land information system that contains and integrates, at a minimum, property and ownership records with boundary information, including a parcel identifier referenced to the U.S. public land survey; tax and assessment information; soil surveys, if available; 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

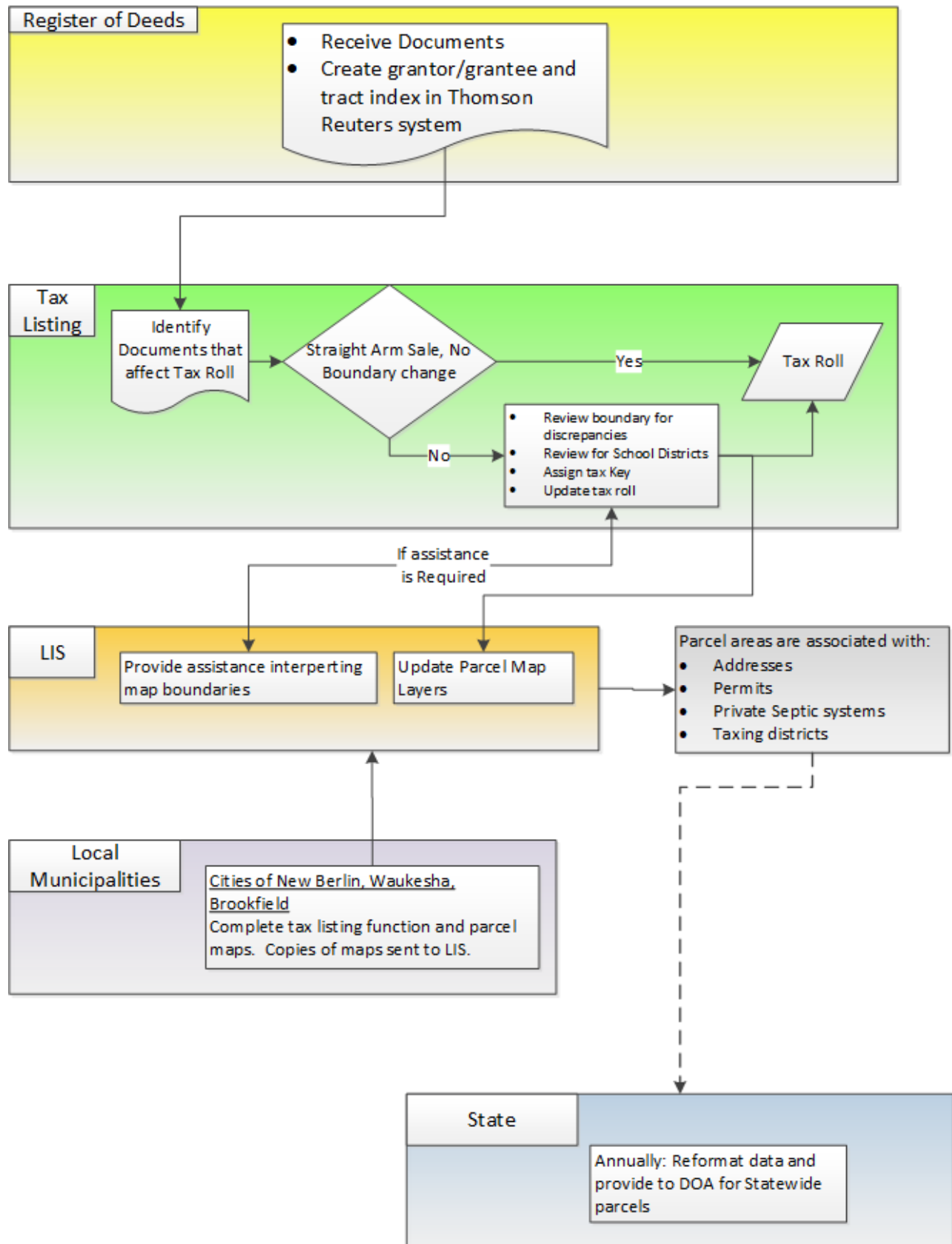
## Diagram of County Land Information System

### Waukesha County Land Information System Components and Relationships



# County Parcel Data Workflow Diagram

## Waukesha County Parcel Data Workflow Diagram



## 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

- In 2015, Waukesha County moved all software and data related to the Land Information System to computer servers hosted by Amazon Web Services. The County is currently running 5 instances (servers) as part of the GIS technology stack as well as 3 development instances.

### Software

- Waukesha County is currently licensed for the software products below.

Company	Product	Purpose
ESRI	ArcGIS Enterprise	Hosting Web services and supporting data
ESRI	ArcGIS for Desktop	Data editing and analysis
ESRI	ArcGIS Pro	Data editing and analysis
ESRI	3d Analyst, Spatial Analyst, Data Interoperability, Image Server	Special purpose analytics
ESRI	ArcOnline account	Online data application site
ESRI	ArcCatalog	FGDC compliant metadata on all foundational element datasets
ESRI	ArcGIS HUB Enterprise	Centralized location for all internal and external apps.
ESRI	Drone to Map	Drone data collection, flight planning, etc.
Vertigis	Geocortex Essentials	Web map application creation and maintenance
Safe Software	FME	Data format conversion and ETLs
Microsoft	SQL Server	Database storage and retrieval
Thomson Reuters	Aumentum Reporter	Register of Deeds Document Imaging and Indexing system
Hamer Enterprises	EZ Tax	Tax Listing and Billing
Lizard Tech	GeoExpress 10	Orthophoto conversion
Blue Marble	Global Mapper	Data reprojection and transformation
WebHarvy	WebHarvy	Screen scraping application used for Temporary Chapter 980 residence location.

- **County currently uses ArcGIS Pro:** Yes

### Website Development/Hosting

- Public access to land information is provided via 1 general public facing website. The URL for the site is: [https://prd1.waukcogeo.com/HTML5Viewer/?viewer=html\\_viewer\\_ext](https://prd1.waukcogeo.com/HTML5Viewer/?viewer=html_viewer_ext)  
Access to parcels, tax, addresses, school districts, supervisory districts, floodplains, zoning (where administered by the County), land use, public lands, soils, PLSS, elevation, hydrography, and historic aerial photography is provided via this single site. In addition to this public site the county also hosts twelve other websites for internal use. These sites allow viewing, querying and editing functions for planning and Land Resources staff as well as collaborative work with field staff and municipal partners. Waukesha County will continue to provide additional public access to data through the development of specialized web mapping applications that will be hosted in the ArcOnline and ArcGIS Portal.

## Metadata and Data Dictionary Practices

### Metadata Creation

- **Metadata creation and maintenance process:** Waukesha County maintains FGDC metadata for all of its core foundational elements. This metadata is then provided as a clickable link on the GIS website. For all new data acquired from vendors, FGDC standard metadata is a required deliverable. Link: <https://metadata-waukesha-county.hub.arcgis.com/>

### Metadata Software

- **Metadata software:** ESRI ArcGIS Catalog
  - 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:** None

### Metadata Policy

- **Metadata Policy:** No formal policy.

## Municipal Data Integration Process

- Waukesha County has had a longstanding relationship with four municipalities that conduct their own parcel maintenance activities, namely the cities of Brookfield, Waukesha and New Berlin. With the County's move to the parcel fabric, the County has provided Amazon workspaces (virtual desktops) to the municipalities to better facilitate updates to the fabric and export back to the County. As the County moves to the ArcGIS Pro Parcel Fabric editing model, each municipal partner will be allowed to edit parcels within their spatial extents using county published ArcGIS map services. The County tax listing department also receives tax roll information from Brookfield, New Berlin and Waukesha for incorporation into the County Tax File. There is now a DOR compliant .xml export routine that can be run to create a series of xmls for each municipality. Those are merged to make a single .xml for the County for joining and embedding into the countywide parcel set. The joined data is extracted quarterly, symbolized and shared as county map services to support internal and external applications.

# 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
<a href="https://prd1.waukcogeo.com/HTML5Viewer/?viewer=html_viewer_ext">https://prd1.waukcogeo.com/HTML5Viewer/?viewer=html_viewer_ext</a>	<a href="https://data-waukeshacounty.opendata.arcgis.com/">https://data-waukeshacounty.opendata.arcgis.com/</a>	<a href="http://tax.waukeshacounty.gov/Default.aspx">http://tax.waukeshacounty.gov/Default.aspx</a>	<a href="https://landrecordspublicaccess.waukeshacounty.gov/">https://landrecordspublicaccess.waukeshacounty.gov/</a>

### Web Services/REST End Points

#### URL

<https://gis2.waukcogeo.com/server/rest/services>

### Municipal Website Information

Municipal Website	Municipal Website URL
City of Waukesha GIS Web Map	<a href="https://gis.waukesha-wi.gov/HTML5Viewer/?viewer=property">https://gis.waukesha-wi.gov/HTML5Viewer/?viewer=property</a>
City of Brookfield GIS Web Map	<a href="https://citybrookfieldwi.maps.arcgis.com/apps/webappviewer/index.html?id=67a4c07670714cd59c30195cfec802b2">https://citybrookfieldwi.maps.arcgis.com/apps/webappviewer/index.html?id=67a4c07670714cd59c30195cfec802b2</a>
City of Muskego GIS Web Map	<a href="https://muskego.maps.arcgis.com/apps/webappviewer/index.html?id=0599bccb61b94e00b4eebd3a0d581c11">https://muskego.maps.arcgis.com/apps/webappviewer/index.html?id=0599bccb61b94e00b4eebd3a0d581c11</a>
Village of Hartland GIS Web Map	<a href="https://maps.ags.ruekert-mielke.com/HTML5Viewer/Index.html?viewer=hartland">https://maps.ags.ruekert-mielke.com/HTML5Viewer/Index.html?viewer=hartland</a>
City of Mukwonago GIS Web Map	<a href="https://maps.ags.ruekert-mielke.com/HTML5Viewer/Index.html?viewer=Mukwonago">https://maps.ags.ruekert-mielke.com/HTML5Viewer/Index.html?viewer=Mukwonago</a>
City of Oconomowoc GIS Web Map	<a href="https://oconomowoc.ags.ruekert-mielke.com/">https://oconomowoc.ags.ruekert-mielke.com/</a>
City of Pewaukee GIS Web Map	<a href="https://prd1.waukcogeo.com/HTML5Viewer/?viewer=pewaukee_html_viewer">https://prd1.waukcogeo.com/HTML5Viewer/?viewer=pewaukee_html_viewer</a>
Village of Sussex GIS Web Map	<a href="https://maps.ags.ruekert-mielke.com/HTML5Viewer/Index.html?viewer=sussex">https://maps.ags.ruekert-mielke.com/HTML5Viewer/Index.html?viewer=sussex</a>

## Data Sharing

### Data Availability to Public

#### Data Sharing Policy

- Many of Waukesha County's core data sets and foundational layers are available on the County's open data portal for download free of charge. Documents that are part of the Register of Deeds Tract Index are available for a cost through the ROD's online document purchasing application.

#### Open Records Compliance

- Any data sets that are not available on the County open data portal are typically provided free of charge via upload to a cloud storage site.

### Data Sharing Restrictions and Government-to-Government Data Sharing

#### Data Sharing Restrictions

- None

#### Government-to-Government Data Sharing

- The Waukesha County Municipal GIS Users meets biannually for project updates, collaboration and networking. Data sharing is encouraged and promoted within the group.

### Training and Education

- Waukesha County Land Information staff members are always encouraged to attend conferences and seminars to stay current on technology and trends.
- Conferences typically attended include the ESRI Users Conference, WLIA Annual Conference and Regional Meetings, and GIS Day.
- The LIS Supervisor coordinates a Southeastern Wisconsin ESRI Technical Users Group SEWETUG meeting quarterly.
- LIS Technician staff has taken online training for Amazon Web Services administration, as well as attending AWS Summits.
- In-house efforts include a Waukesha GIS Technical Users group to focus on training and collaboration with county departments and divisions.



# 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.

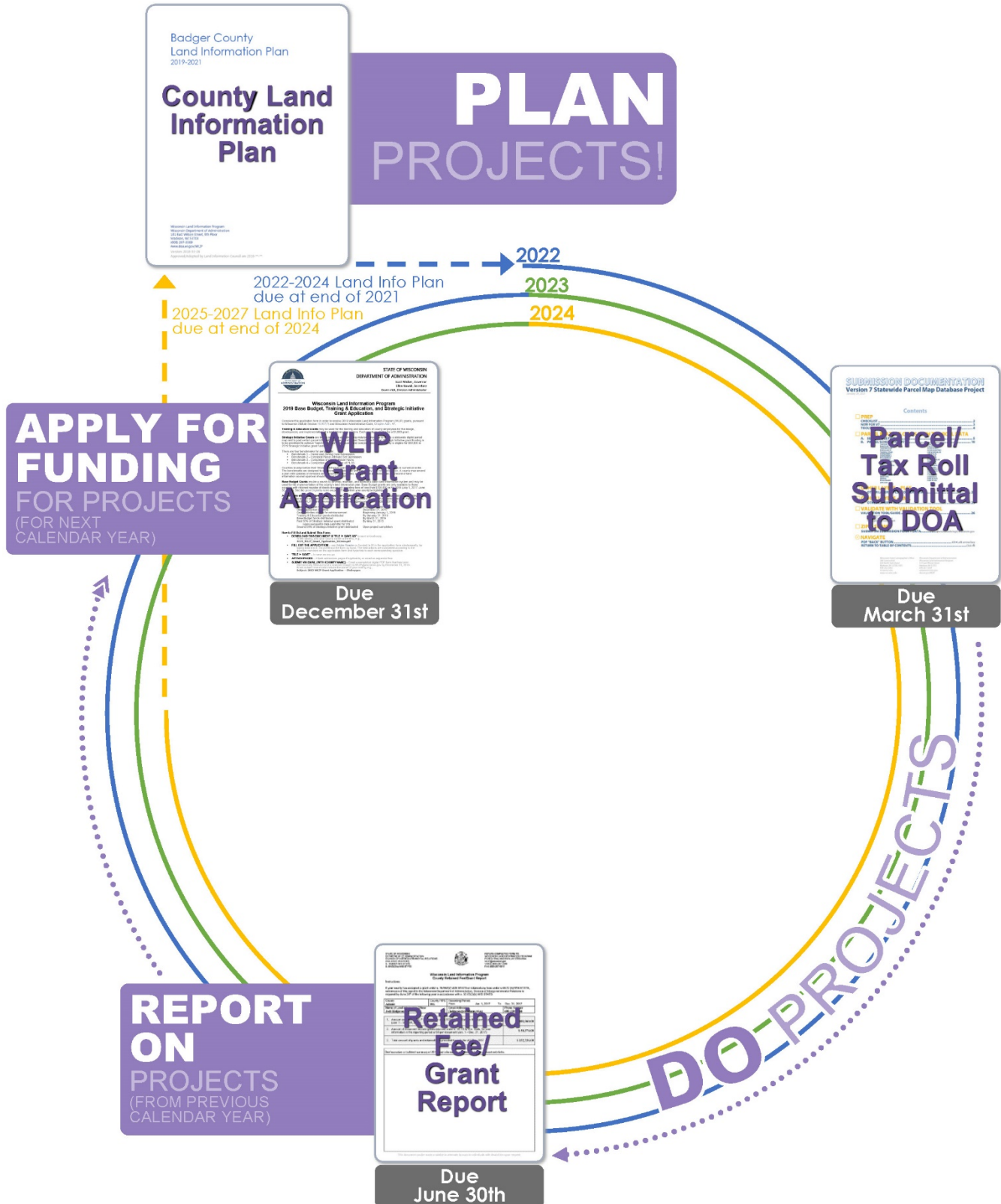


Figure 1. The WLIP Land Information Plan/Grant Project Cycle

## Project #1: Acquire High Resolution Orthophotography

### Project Description/Goal

- Acquire 3" pixel resolution or greater color leaf-off aerial photography for Waukesha County. Planned imagery collection years are 2022 and 2024, and every two years thereafter.
- Land Info Spending Category: Orthoimagery

### Business Drivers

- Orthophotography is a critical and highly used GIS layer within the County's land information system.
- Orthophotos are used for zoning enforcement, hardcopy map displays for development, planning activities, address/structure verification, stormwater management, watershed assessments, natural resource inventories, etc.
- County Planning and Land Resources Divisions have determined that 5 years between aerial photo acquisition is insufficient. SEWRPC has agreed to try and facilitate orthophoto data collection at 2-year intervals beginning in 2022.
- Improved resolution to 3" pixels will allow for improved feature identification, especially decks, impervious surfaces and county and municipal infrastructure assets.

### Objectives/Measure of Success

- Delivery and acceptance of orthophoto product within time frame outlined in contract.

### Project Timeframes

Timeline – Project #1 Acquire High Resolution Orthophotography		
Milestone	Duration	Date
Planning & vendor selection	90 days	Summer/Fall 2021
Aerial Photography Missions	30 days	April 2022
Project complete	–	Dec, 2022
Planning & vendor selection	90 days	Summer/Fall 2023
Aerial Photography Missions	30 days	April 2024
Project complete		Dec. 2024

### Responsible Parties

- SEWRPC – Contract draft and oversight, QC, liaison/coordinator for regional partners.
- Aerial Photography Vendor – Flight, data collection, ground control, data processing.
- Waukesha County Land Information Systems Division – Leverage data and make available.

### Estimated Budget Information

- \$54,000-\$65,000/flight year

## Project #2: Enable Plats of Survey for Direct GIS Access

### Project Description/Goal

- Index remaining 36,000+ plats of survey not indexed as part of a previous strategic initiative grant project. Plats are recorded in the Register of Deeds office and indexing will spatially enable them and make them accessible to the public using GIS via a link to tax key or document number
- Land Info Spending Category: Digital Parcel Mapping

### Business Drivers

- Ongoing phone requests for existing plats of survey
- Reduce Register of Deeds office traffic/inquiries
- Complete remaining indexing/mapping for all plats of survey

### Objectives/Measure of Success

- 100% of all plats are searchable within the GIS application using tax key, retired tax key or document number

### Project Timeframes

- 2023-2024

### Responsible Parties

- Waukesha County Register of Deeds
- Waukesha County Parks and Land Use – Land Resources Division

### Estimated Budget Information

- \$50,000 Consultant or in-house staff retrieving plats of survey, appending tax key or retired tax key to existing index.

## Project #3: Continued Support of AWS Cloud Computing

### Project Description/Goal

- Continued support of AWS cloud computing
- Land Info Spending Category: Hardware

### Business Drivers

- Flexibility and scalability for providing infrastructure and tools offered by Amazon Web Services.
- Ongoing cost savings from previous IT cross charges for in-house hardware/network.

### Objectives/Measure of Success

- System uptime, scalability and performance optimization.

### Project Timeframes

- 2022-2024

### Responsible Parties

- Waukesha County Parks and Land Use – Land Information System Division
- Contract with Amazon Web Services

### Estimated Budget Information

- \$180,000 (\$60,000/annually X 3)

## Project #4: PLSS Monument NAD83 Coordinate Densification

### Project Description/Goal

- This initiative would continue to fund SEWRPC serving as county surveyor, to occupy monuments in urban areas and update/correct horizontal coordinates previously calculated by least squares adjustment for incorporation into dossier sheets.
- Land Info Spending Category: PLSS

### Business Drivers

- Because the Waukesha County PLSS system was converted to NAD83 using a selective sampling of points and a least squares adjustment algorithm, many of the monuments do not have field-occupied coordinate values.

### Objectives/Measure of Success

- Increased NAD83/2011 accuracy for the PLSS network.
- Additional monuments occupied and location/condition verified to augment annual monument maintenance.

### Project Timeframes

- 2022-2024

## Responsible Parties

- SEWRPC or contracted services vendor
- Waukesha County Parks and Land Use – Land Information System Division

## Estimated Budget Information

- \$100,000 (\$50,000/annually X 2)

## Project #5: Continuous Improvement Projects

### Project Description/Goal

- Continue to provide a high level of service for data access and public record information to public as well as county staff, via web applications, open data portal, and imaging system access.
- Land Info Spending Category: Hardware, Software, Website Development/Hosting Services.

### Business Drivers

- Increased demand for data access and acquisition by public and internal departments.
- The Parks and Land Use LIS System Plan developed in 2018 includes working toward a more distributed, enterprise approach which may require additional software, licenses and applications.

### Objectives/Measure of Success

- Faster, easier and more reliable access to GIS data through desktop applications and portals as well as mobile-friendly applications and data collection.

### Project Timeframes

- 2022-2024

### Responsible Parties

- Waukesha County Parks and Land Use – Land Information System Division

### Estimated Budget Information

- \$15,000 GIS Server Software
- \$5,000 Web Hosting Software
- \$5,000-\$10,000 ESRI Level II, ArcOnline or On-Premises Portal licenses

## Project #6: Next Gen 911 Data Compliance

### Project Description/Goal

- Ensure that County E911 point, centerline and zone information is compliant with Next Gen 911 (NG911) specifications
- Land Info Spending Category: Address Points, Street Centerlines

### Business Drivers

- Next Gen 911 data requirements
- Increasing reliance on GIS data for police, fire and emergency management activities.

### Objectives/Measure of Success

- 100% compliance with data standards set forth and guided by Statewide NG911 Plan.
- Full GIS integration with County Dispatch and Emergency Management

### Project Timeframes

- 2022-2024

### Responsible Parties

- Waukesha County Communications Center
- Waukesha County Parks and Land Use – Land Resources Division

### Estimated Budget Information

- \$50,000 Data capture including; turn lanes, one-way streets, dual carriageways, speed limits, impedances, road closures, point/centerline association, field mapping etc.

## Project #7: Drone and UAS Hardware/Software Acquisition

### Project Description/Goal

- Acquire a new UAS drone copter and related hardware/software to collect aerial imagery and ground condition information on roadway construction, wetland assessment and restoration, drainage issues, building projects, bridge inspection and other land resource related projects.
- Land Info Spending Category: Orthoimagery

### Business Drivers

- Increasing demand for drone flights to obtain updated photography for a number of land conservation, land use and planning projects.

### Objectives/Measure of Success

- Drone, hardware and software acquired for use on county projects.

### Project Timeframes

- 2024

### Responsible Parties

- Waukesha County Parks and Land Use – Land Resources Division

### Estimated Budget Information

- \$5,000 UAS vendor.

## Project #8: Mobile Data Collection Hardware/Software Acquisition

### Project Description/Goal

- Acquire new mobile device hardware and related GIS/GPS related field data collection software. This can include iPads, Android tablets, Handheld GPS units, mobile phones, GPS Pucks, GPS survey equipment and associated software and peripherals.
- Land Info Spending Category: Hardware/Software

### Business Drivers

- Field data collection has been steadily increasing in the County over the past few years. Having devices with field-grade accuracy would enable additional data collection and field verification activities.

### Objectives/Measure of Success

- GPS-enabled data collection devices acquired for use on county projects.

### Project Timeframes

- 2023-2024

### Responsible Parties

- Waukesha County Parks and Land Use – Land Resources Division

### Estimated Budget Information

- \$3,000 - \$5,000

## Project #9: LiDAR Acquisition

### Project Description/Goal

- Acquire updated LiDAR coverage for entire county.
- Acquire LiDAR derivatives, including contours, breaklines, building rooftops, DEM, etc.
- Land Info Spending Category: LiDAR

### Business Drivers

- Elevation data is important as Waukesha County continues to foster residential and commercial

development in the Southeastern Wisconsin region.

- Current 2015 data is out of date

### Objectives/Measure of Success

- Delivered data meets industry and federal accuracy standards.
- Potential grant reimbursements from future USGS QL2 3DEP programs.

### Project Timeframes

- 2023-2024

### Responsible Parties

- Waukesha County Parks and Land Use – Land Resources Division

### Estimated Budget Information

- \$150,000

## Project #10: WRSR2022 Data Conversion

### Project Description/Goal

- Convert all County GIS vector and raster data sets to North American Terrestrial Reference Frame of 2022 (NATRF2022) and the North American-Pacific Geopotential Datum of 2022 (NAPGD2022) system/projection.
- Land Info Spending Category: PLSS

### Business Drivers

- As the North American Terrestrial Reference Frame of 2022 datum/projection becomes more widely used, Waukesha County needs to remain on the most current and widely used system.
- Move to NAD83/2011 in 2019 has positioned the County for the future move to WRSR2022

### Objectives/Measure of Success

- Data delivered in North American Terrestrial Reference Frame of 2022 datum.

### Project Timeframes

- 2023-2024

### Responsible Parties

- Waukesha County Parks and Land Use – Land Resources Division
- Vendor TBD

### Estimated Budget Information

- Unknown



## Appendix A

# Waukesha County Land Information Council Meeting

*Wednesday, December 2nd, 2021*

*10:00 AM*

*Virtual via Microsoft Teams*

## Meeting Minutes

**Attendance:** Rob Merry, County Surveyor/SEWRPC; Pamela Reeves, Treasurer; Gary Bell, Emergency Management; Candy White, Tax Listing/DOA; Chairman Paul Decker, County Board; Jim Landwehr, LIO/Council Chair. Absent; Jim Behrend, ROD and Laura Kruschka, Realtor

## Update on 2021 County Land Information Program Activity

### **NAD83 Survey monument occupation report – Merry**

County Surveyor Merry provided information regarding the visitation of NAD83 survey monuments for coordinate verification across the eastern ¼ of the county. SEWRPC's ongoing work is part of their regular maintenance contract

### **2020 Plat of Survey Project - Landwehr**

Landwehr provided an update of the Plat of Survey indexing project. Project was completed by US Imaging in May of 2021. 98,000 tax key numbers were assigned plats of survey with approximately 30,000 plats still remaining to be indexed.

### **Local Redistricting Project - Landwehr**

Landwehr provided an overview of the redistricting process and explained how it was delayed this year, with a start date of August instead of April, as is usual. These delays were caused by the US Census not delivering the data caused in part by COVID-19 issues. Chairman Decker extended his thanks to the LIS team for their efforts.

### **Ongoing COVID-19 Support – Landwehr**

Landwehr outlined the ongoing support for COVID-19 mapping services. Support commitments have dropped significantly in 2021, with GIS only providing school district case reports and mapping back to HHS for use by the school districts in the county.

## **2022 Orthophoto project update - Merry**

Landwehr outlined that the county will be eligible to get orthophotos every two years under SEWRPC's new update cycle. Mr. Merry described the contract amounts and stakeholders and said that a finished contract is expected by the end of the month. Chairman Decker noted his approval of the 2-year cycle citing increasing need for current data by public, private and utility sectors.

## **2022-2024 Land Information Plan Review and Approval - Landwehr**

Landwehr outlined the parameters of the 3 year plan. He then gave detail to the 10 Current and Future Projects section. Questions by Chairman Decker regarding the timing and critical nature of the NextGen 911 project were addressed by Gary Bell.

The plan was then offered up for a motion. Motion offered by Paul Decker. Seconded by Gary Bell. Approval was unanimous.

## **Report on 2022 Strategic Initiative Grant Proposal -Landwehr**

Mr. Landwehr described the two potential projects for the 2022 Strategic Initiative Grant. These include Orthophoto acquisition and NAD83 PLSS monument occupation. Both projects will be administered by SEWRPC. No objections or questions were raised.

**Questions?** None.

Meeting Adjourned at 11:10 AM.

jgl/12/2/2021