



What We Do

Allegan County GIS
www.allegancounty.org/gis

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Part I

Brand

Chapter 1

Awards

1.1 The GIS Champion Award

1.1.1 GIS Champion Award Code

```
\documentclass[landscape]{article}
\usepackage{wallpaper}
\usepackage{niceframe}
\usepackage{xcolor}
\usepackage{ulem}
\usepackage{graphicx}
\usepackage{geometry}
\geometry{tmargin=.75cm,bmargin=.25cm,lmargin=.8cm,rmargin=.2cm}
\usepackage{multicol}
\setlength{\columnseprule}{0.4pt}
\columnwidth=0.3\textwidth

\begin{document}

%\TileWallPaper{4cm}{2cm}{CoLogo133x200.png}

\centering
\scalebox{3}{\color{green!30!black!60}}
\begin{minipage}{.33\textwidth}
\font\border=umrandb
\generalframe
{\border \char113} % up left
{\border \char109} % up
{\border \char112} % up right
{\border \char108} % left
{\border \char110} % right
```

```

{\border \char114} % lower left
{\border \char111} % bottom
{\border \char115} % lower right
{\centering

\includegraphics[height=1.25cm]{GIS_Logo_better.jpg}
%\end{minipage}
\vspace{-8mm}

\curlyframe[.9\columnwidth]{

\textcolor{red!10!black!90}
{\small Allegan County GIS Services}\\
\textcolor{green!10!black!90}{
\tiny recognizes}

\\
\uline{\textcolor{black}
{Ian Hanes}}
\\
\smallskip
\tiny Chief Equalization Technician
\smallskip

\textcolor{green!10!black!90}
{
\tiny as a
}
\smallskip
\tiny
\\
\textcolor{black}{\large \textsc{GIS Champion}}
\\
\vspace{1mm}
\textcolor{green!10!black!90}
{
\tiny for outstanding dedication and service to the community
\\while using GIS technology on this day
\itshape June 29, 2018
}
\vspace{3mm}

{\color{blue!40!black}
\scalebox{.6}{

\begin{tabular}{ccc}

```

```
\cline{1-1}
%\cline{2-2}
\cline{3-3}
%\cline{4-4}
%\cline{5-5}
\\
Neil Besteman & & Bryan May \\
GIS Manager & & GIS Analyst \\
\end{tabular}
}}}}
\end{minipage}

}
\end{document}
```


Part II

Methods

Chapter 2

Documentation

2.1 About Documentation

2.1.1 How This Book Works

Project General Notes:

- Book folder can be renamed and moved.
- This project is coded with relative paths from processing folder down.

Project file structure:

J:\LIS\GIS_Doc\book\build

pdf docs created by the underlying .tex docs and copied here manually.

J:\LIS\GIS_Doc\Book\source

images that appear in

`\GIS_Documentation.tex`

J:\LIS\GIS_Doc\Book\processing

the Tex workspace.

`\GIS_Documentation.tex`

top level of documentation of type "book" in L^AT_EX. Where book properties and book parts are managed and chapters are imported.

`\archive`

archive copies of entire processing folder.

`\brandPart`

L^AT_EX "book part" about the brand.

`\methodsPart`

L^AT_EX "book part" about the methods.

`\servicePart`

L^AT_EX "book part" about services.

`\build`

folder for temp docs when created by compiling of:

`GIS_Documentation.tex`

*** Note:** each level from here down has a build folder for temp Latex files like this.

Service Book Part Detail

relative path:

```
\processing\servicePart\toolsChapter.tex
```

intermediate level of "book" in L^AT_EX. Where (service part, tool) chapter properties are managed and sections are imported.

toolsChapter

relative path:

```
\processing\servicePart\toolsChapter
```

intermed level of "book" in L^AT_EX. Where book section properties are managed and subsections are imported.

2.2 Document Storage Concepts

2.2.1 GIS File Standard

Folders inside the project folder

Lets talk about map projection

- archive
- build
- delivered
- documentation
- processing
- source

Chapter 3

Team Concept

3.1 Team Structure

3.1.1 Paired Programming

A paragraph about pp from Joy Inc.

Part III

Service

Chapter 4

Applications

4.1 Applications for Treasurer Dept.

4.1.1 Forfeiture Data Collection

Problem and Analysis

Background

Treasurer department has an annual responsibility to properly document the tax forfeiture process. The LIS Department built an application in MS Access and MapInfo that consumed a daily export from BSA and was deployed to the field on a laptop. A digital camera was used for site photos and later imported into the laptop.

Statement of Problem

Current Tax Forfeiture workflow is built on MapInfo software which has been replaced by ESRI software. The Forfeiture data collection application must be recreated in the ESRI framework.

Analysis

Tax Forfeiture Application will facilitate:

- Mobile data collection on handheld device via Collector for ArcGIS configured with Allegan County GIS Portal (**device app**)
 - Device app will:
 - * Synchronize with data in the office (online)
 - * Navigate to forfeiture sites (offline)
 - * Collect data and photos of forfeiture sites (offline)
 - * Synchronize the collected data with data in the office (online)
- Daily form production and printing for each site visited with required data and images.

Design**Forfeiture Data Collection**

Three parts of the daily routine:

1. Pre-processing (in the office):
 - Export current forfeiture list from BSA
 - Update webmap layers with results from BSA export
 - Synchronize from webmap layers to field collection device (**device app**)
2. Field data collection with device app:
 - Support navigation to forfeiture sites
 - Provide a checklist of data points about the site
 - Attach photos to the site
 - Save results for synchronization in post-processing
3. Post-processing (in the office)
 - Synchronize data and images collected in device app to webmap layers

Backend Data Details

ForfeitureParcels Dat is in figurelive data

ForfeitureParcels Feature Class

Details about the data

Collector Setup Details

Install Collector for ArcGIS from Google Play Store

Hard Copy Record

Software

Chapter 5

Tools

5.1 ESRI Tools

5.1.1 COGO Tools in ArcGIS

TEXT

5.2 L^AT_EX Packages used by AC GIS

5.2.1 float Package

usepackage

text

Simple Use

text

Options

text

Add optional arguments to the usepackage line:

Useful options:

- **OPTION NAME**
OPTION NOTE
- **OPTION NAME**
OPTION NOTE

Use with options

text

Commands

5.2.2 graphicx Package

usepackage

text

Simple Use

text

Options

text

Add optional arguments to the usepackage line:

Useful options:

- **OPTION NAME**
OPTION NOTE
- **OPTION NAME**
OPTION NOTE

Use with options

text

Commands

5.2.3 hyperref Package

Introduction

[Official hyperref package documentation](#)

Note: Add the *hyperref package* to the preamble **last**.

```
\usepackage[options]{hyperref}
```

Simple Use

Use `\href{URL}{DESCRIPTION}` to add a link with description

```
\href{https://www.latex-tutorial.com}{Website with tutorials}  
produces:
```

[Website with tutorials](https://www.latex-tutorial.com)

Options

Add optional arguments to the usepackage line:

Useful options:

- **pdftex**
enables other options like breaklines
- **breaklinks**
allow links to be broken across several lines
eg. <https://lists.gnu.org/archive/html/emacs-orgmode/2013-06/msg00776.html>
- **colorlinks**
Colors the text of links and anchors.(default is false)
- **linkcolor**
Color for normal internal links(default is red).
- **anchorcolor**
Color for anchor text.
- **citecolor**
Color for bibliographic citations in text.
- **urlcolor**
Color for linked URLs

Use with options

```
\usepackage[breaklinks,colorlinks,citecolor=blue,
urlcolor=green]{hyperref}
```

Commands

```
\href{URL}{text}  Makes text a link to URL.
```

To put a file path in text:

eg:

[Official hyperref package documentation](#)

(documentation Pt.4 pg.15)

```
\href[options]{URL}{text}
```

Options:

- absolute

```
\href{C:/AC/jalapeno/documentation/packageDocs/hyperref2017.pdf}  
  {Official hyperref doc}
```

- relative **Note: relative path must be from final pdf location**

```
\href{../../../../../documentation/packageDocs/hyperref2017.pdf}  
  {Official hyperref package doc}
```

*This path works from main document

```
\href{../../documentation/packageDocs/hyperref2017.pdf}  
  {Official hyperref package documentation}
```

*This path works from subsection document

```
\hyperref[label]{text}  
  Makes text a link to where \ref{label} would point.
```

```
\hypertarget{name}{text}  
  Sets an anchor on text with the label name.
```

```
\hyperlink{name}{text}  
  Makes text a link that takes you to the anchor labeled name.  
  *Pair with \hypertarget.
```

```
\phantomsection  
  Used in conjunction with
```

```
\addcontentsline  
  to make the correct link in the Table of Contents.
```

5.2.4 import Package

usepackage

text

Simple Use

text

Options

text

Add optional arguments to the usepackage line:

Useful options:

- **OPTION NAME**
OPTION NOTE
- **OPTION NAME**
OPTION NOTE

Use with options

text

Commands

5.2.5 standalone Package

Introduction

[Link to official standalone documentation](#)

standalone provides a **package** and a **class**

- The *standalone* **package** is used for:
 - Main documents that will input or import sub documents.
 - For example:

```
\usepackage[subpreambles=false]{standalone}
```

 - * Ignores preambles of imported sub documents [2, pg.4]
- the *standalone* **class**:
 - Is a document class
 - Provides standalone / subdocument switches and options
 - For example:

```
\documentclass[class=article]{standalone}
```

 - * behaves as an article when standalone
 - * makes document available for import into a master document

Simple Use

- The *standalone* **package**
 - In the main document:

```
\documentclass[openany]{book}
```

```
\preamble...
```

```
\usepackage{standalone}
```
- the *standalone* **class**:
 - In any subdocument:

```
\documentclass[class=article]{standalone}
```

```
\preamble...
```

Options

- The *standalone* **package**
 - **subpreamble**
 - * default value of subpreambles is *false*
- the *standalone* **class**:
 - **crop**
 - **titlepage**
 - **twoside**
 - * Makes pagination style match book
 - * default value is *false*
 - **multi**
 - * `multi=true|false`
 - * `multi={<environment name>, ...>}`
 - **float**

Use with options

- the *standalone* **package**:
 - `\usepackage[subpreambles=false]{standalone}`
- the *standalone* **class**:
 - `\documentclass[class=article , crop=false, titlepage, twoside, multi={itemize, figure, verbatim}, float=false]{standalone}`

Commands

5.2.6 wrapfig Package

usepackage

text

Simple Use

text

Options

text

Add optional arguments to the usepackage line:

Useful options:

- **OPTION NAME**
OPTION NOTE
- **OPTION NAME**
OPTION NOTE

Use with options

text

Commands

5.3 L^AT_EX Templates

5.3.1 L^AT_EX Section Template

```
%\documentclass[class=report , crop=false, multi={itemize, figure}, float=false]{standalone}
\documentclass[class=book , crop=false]{standalone}

\input{../../../../preamble}

\def\titlename{Section Template}

\title{\input{../../../../commonTitle}} % closing brace for title

\begin{document}% Document Begins

\input{../../../../commonFront} % provides standalone options

\section{SECTION NAME HERE}

\subimport{RELATIVE PATH TO NEW Section/}{NEW SUBSECTION Subsection.tex}

%eg.
%\subimport{latexTemplatesSection/}{subsectionTemplateSubsection.tex}
% etc...

\end{document}
```

5.3.2 L^AT_EX Subsection Template

```
\documentclass[class=book , crop=false]{standalone}

\input{../../../../preamble}

\def\titlename{Subsection Template}

\title{\input{../../../../commonTitle}} % closing brace for title

\begin{document}% Document Begins

\input{../../../../commonFront} % provides standalone options

% NEW INFO GOs HERE.
\subsection{Subsection Template}
```


`\medskip`

5.4 PDF Tools used by AC GIS

5.4.1 Introduction

Purpose and Summary **Workflow Purpose:** Optimization of a large number of pdf docs.

Workflow Summary: Uses Python to create a list of .pdf docs in a folder and creates a batch file to optimize the pdfs in the list to another location. The batch process calls ghost script for the optimization.

requirements Opensource software:

- ghostscript
- python 2.7 and a Python IDE
- A text editor

5.4.2 Python(2.7)

Note: The output of this script is bdoc.txt, Save as a .bat to execute the optimize.

Script that creates a batch file

```
import os, sys

project = os.path.dirname(os.path.dirname(__file__))
processing = os.path.join(project, 'processing')
#source = os.path.join(project, 'source')
build = os.path.join(project, 'build')
sourcepdf = os.path.join(build, '20180716')

inString1 = "gswin32 -sDEVICE=pdfwrite -dCompatibilityLevel=1.4
-dPDFSETTINGS=/ebook -dNOPAUSE -dQUIET -dBATCH
-sOutputFile=J:\\Projects\\2018ParcelAtlas\\build\\optimized\\"

inString2 = " J:\\Projects\\2018ParcelAtlas\\build\\20180716\\"

batchdoc = os.path.join(processing, "bDoc.txt")

# Main
#####

if __name__ == "__main__":

    list1 = os.listdir(sourcepdf)
    l = open(batchdoc, 'w')
    for i in list1:
```

```

newi = i[1:]
print newi
t = inString1 + newi + inString2 + i + "\n"
print t
l.write(t)

l.close()

```

5.4.3 ghostscript

About ghostscript is used for the optimization. ghostscript is an interpreter for the PostScript language and for PDF [1].

Licensing ghostscript is available opensource under AGPL conditions. more information can be found [here](#).

Download ghostscript can be downloladed [here](#).

5.4.4 Windows batch files

A line from the batch file looks like:

```

gswin32 -sDEVICE=pdfwrite -dCompatibilityLevel=1.4
-dPDFSETTINGS=/ebook -dNOPAUSE -dQUIET -dBATCH
-sOutputFile=J:\Project\2018ParcelAtlas\build\optimized\
02-001-001-00.pdf J:\Projects\2018ParcelAtlas\build\20180716
\_02-001-001-00.pdf

```

5.5 QGIS Tools

5.5.1 Using COGO Tools in QGIS

Set up the Azimuth and Distance Plugin (Azd Plugin).

In the Plugins drop down(1), under the topography group select the **Azd Plugin**(2)(see fig.).

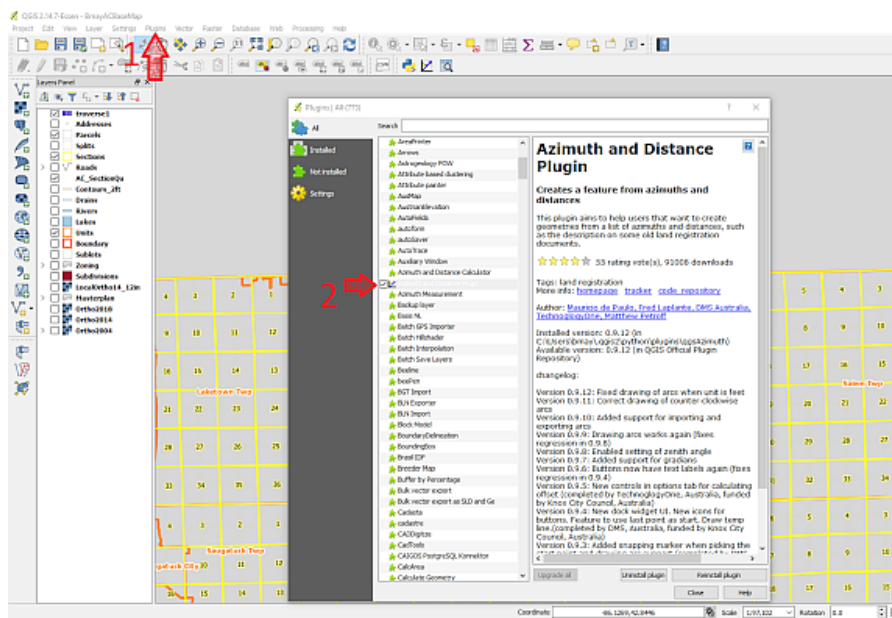


Figure 5.1: launch plugin

Note here which layer is active (see fig.).

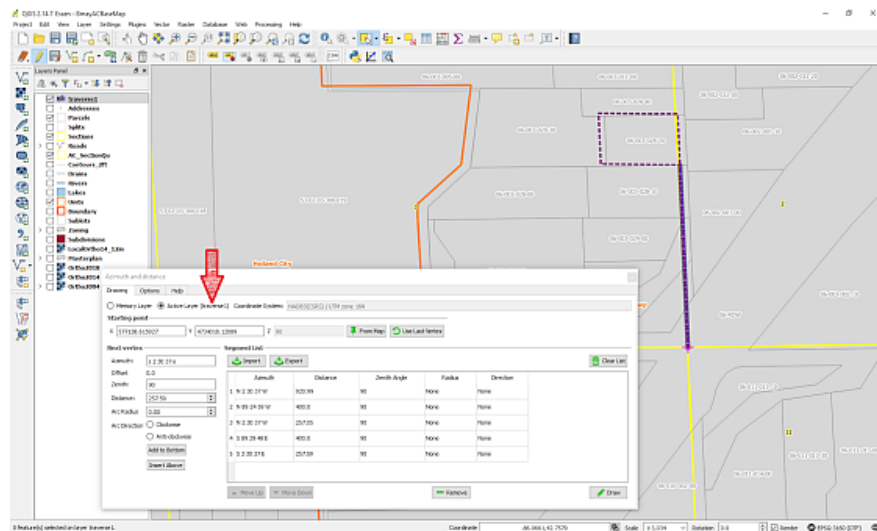


Figure 5.2: check active layer

If necessary, left click the layer *traverse 1* in Layer Panel to activate it(see fig.).

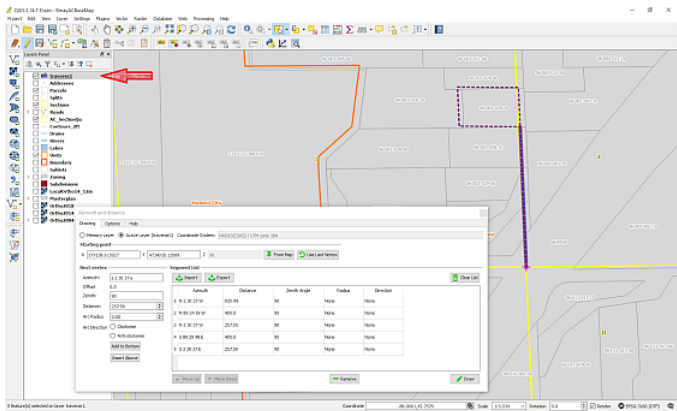


Figure 5.3: activate layer

Configure Options On Options Tab: Select Boundary, Bearing, Feet, and Degree radio buttons.

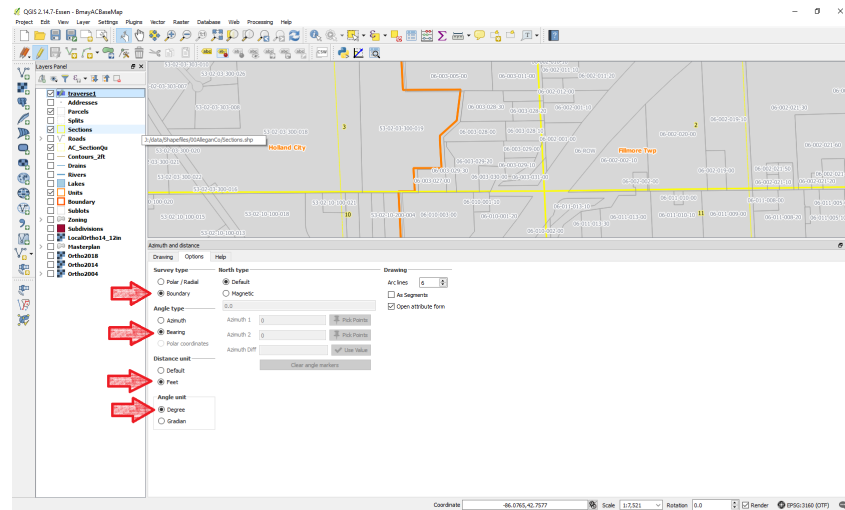


Figure 5.4: Plugin Options

Using the tool Boundary descriptions are entered into the Drawing Tab. Azimuth (bearing) and Distance are the important boxes (Set Offset = 0 and Zenith = 90 and ignore)(see below).

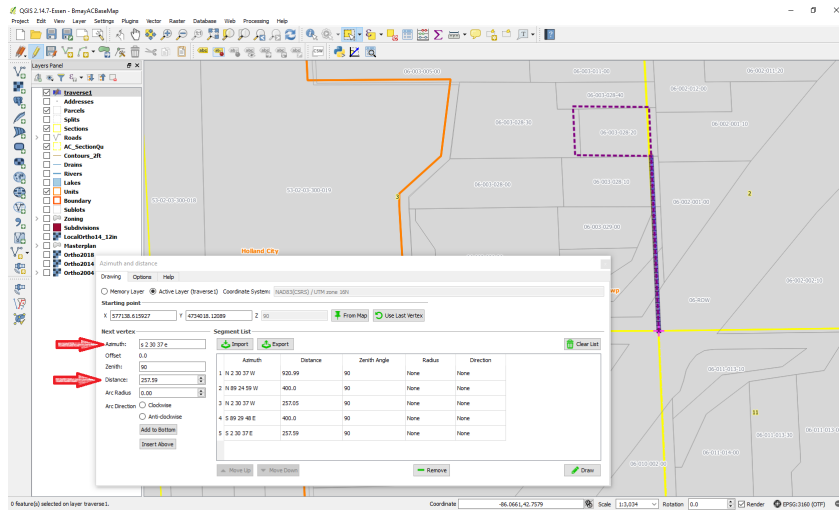
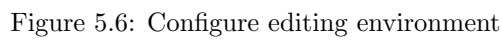


Figure 5.5: Entering Bounds

Use Settings Dropdown and Snapping Options to enable snapping to Sections, Quarter Sections, and or Parcels if desired (see fig.).



Locate Point of Commencement

To get to the Point of Commencement,

Use **any combination** of the following methods:

- Using Reference Layer
- Using Measuring Tool
- Search by Parcel Number (Search Layers Plugin)
- Draw COGO lines (Azd Plugin)(as described earlier)

Using Reference Layer Use reference layers; Units, AC_SectionsQu, Sections, and Parcels. Toggle layers on and off in Layers Panel and zoom in and out with mouse wheel.

Using Measuring Tool Use the measuring tool, make sure to set units to feet. To exit current measurement right click (see fig.).

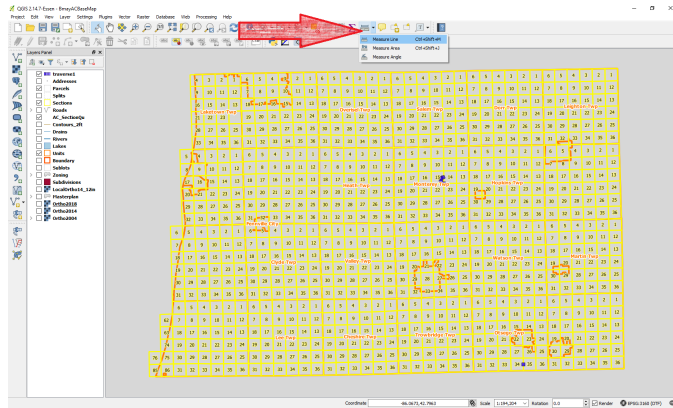


Figure 5.7: Measuring Tool

Search by Parcel Number (Search Layers Plugin.)

To Launch Search Layers Plugin:
In Plugins dropdown:
Enable the **Search Layers** Plugin. (see fig.)

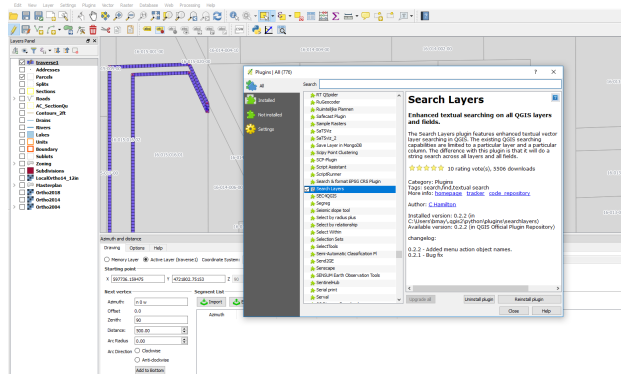


Figure 5.8: Search Layers Plugin

Enter parcel number (with dashes), Set layers, and set search field.(see fig.)

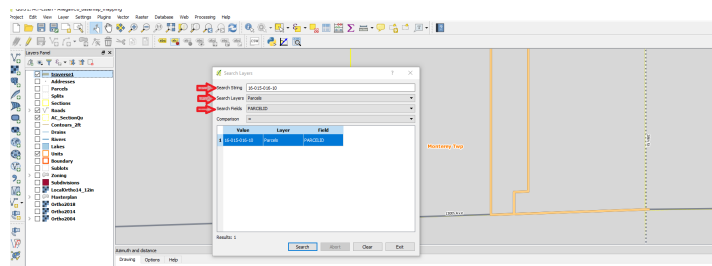


Figure 5.9: Search Layers Setup

Part IV

Resources

Appendices

A.1 Geography 101

Foundations of geography

A.1.1 A Primer on Coordinate Systems Commonly Used in Michigan

A Primer on Coordinate Systems Commonly Used in Michigan

References

- [1] Artiflex, *ghostscript.com*, 2018. 32
- [2] Martin Scharrer, *The standalone package*, [CTAN](#), 1.3a ed., 03 2018. 25

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