

## Project Description

The Institute for Geospatial Research & Education conducted a pilot parcel conversion project for Mills Township, Ogemaw County, Michigan. The purpose of the project was to act as a Pilot Project for Ogemaw County, to identify conversion procedures and data model requirements in order to publish digital base maps created from the paper parcel section maps on the Internet.

The projection selected for the conversion project was the Michigan GeoRef projection developed by Michigan State University. This projection provided the spatial framework so that other Michigan Center for Geographic Information (MCGI) GIS datasets, developed for that projection, could be used to create a full featured GIS base map for the township.

In addition to converting the parcel section maps to digital form, additional tasks were performed to link assessor data to the digital parcels so that users of the website could conduct online queries for Owner Name, Address, Parcel ID and Assessed Valuation, in addition to the standard Zoom, Pan and Identify functions.

As a final step, an ESRI ArcIMS website was created and customized <http://maps.acad.emich.edu/millsparcelquery/> to host the data for demonstration purposes. The digital base map provides a critical digital data layer, which can be used for many purposes including planning, taxation, economic development and owner notification.

The parcel map delivered was in GIS industry standard shapefile format. The parcel conversion and quality control procedures performed are described below..

### **Deliverables**

Digital parcel base map layer with associated text annotation layers

Parcel ID linkage to Assessment and Equalization database

Parcel Data Dictionary and Metadata describing the development processes

## **PARCEL CONVERSION Technical Procedures**

**Step 1** – After acquiring the source documents, IGRE scanned the paper parcel maps to produce a raster image of each. The scan will clearly identify all lines, lot dimensions and other text annotations that are on the paper parcel map

**Table 1 - Data Layer Structure**

Layer	Color	Text Size/Style	Line Type
PARCEL	Green	NA	Continuous
PID_LONG	Lt. Blue (140)	10	NA
PID_SHORT	Lt. Blue (140)	10	NA
LOT_NO	Dark Green (77)	10 / Italic	NA
LOT_DIM	Orange	5	NA
SUB_BND	Red	NA	Continuous
SUB_NAME	Red	40	NA
SUB_BLOCK	Red	40	NA

**Step 2** - Normalize the map scale of each vector data layer captured from the scanned files.

**Step 3** – Use heads-up digitizing techniques to capture the vector line work in CAD software, while using the scanned parcel map as a visual reference.

**Step 4** – Create separate text annotation layers, which captured the correct text data and their physical map locations, as depicted on the scans.

**Step 5** – Mosaic the individual parcel map CAD files into section size areas using available section corner remonumentation points or other control (registration) from MCGI.

**Step 6** - Mosaic the individual section CAD maps into a township size areas using available section corner remonumentation points or other control (registration).

**Step 7** – Use parcel AML (arc-macro language) programs developed by IGRÉ, to convert the registered CAD line files into Arc Coverages as per Table 2.

Table 2 - Conversion Relationships between AutoCAD Layers & Arc Coverages

AutoCAD	ArcInfo	Coverage Structures
PARCEL	Polygon	Parcel Coverage
PID_LONG	Attribute in Parcel Table	Parcel Coverage
PID_SHORT	Attribute in Parcel Table	Parcel Coverage
LOT_NO	Annotation Layer	Parcel Coverage
DIM	Attribute in Parcel Arc Table	Parcel Coverage
SUB_BND	Polygon	Sub_Division Coverage
SUB_NAME	Attribute in Sub Table	Sub_Division Coverage
SUB_BLOCK	Attribute in Sub Table	Sub_Division Coverage

**Step 8** – Using CAD and GIS software, check for closed polygons, correct text annotations and build topology.

**Step 9** – Link the digital parcel ID with the townships Equalization and Assessment database and create the deliverable parcel product.

## **PARCEL CONVERSION**

### **Quality Control / Quality Assurance Procedures**

#### **1.0 LINE STANDARDS**

##### **1.1 PARCELS**

Each parcel map source document is scanned to capture the map as an image. Using the scanned image as a guide in the background, individual parcel and subdivision boundaries are captured digitally using heads-up digitizing techniques into AutoCAD. All parcel lines found on the existing parcel maps maintained by Equalization should be found on the new, digital parcel map.

##### **1.2 SUBDIVISIONS & CONDOS**

The outer boundary of each subdivision or condo development will be captured to the SUB\_BND layer. The subdivision/condo name and block number text will be placed inside the subdivision/condo boundary on the new map.

#### **2.0 TEXT STANDARDS**

##### **2.1 BACKGROUND**

Each parcel drawn is text labeled with the long parcel ID, short parcel ID, lot dimensions, and lot number when available. Long & short parcel IDs, lot numbers and lot dimensions are manually entered into the correct AutoCAD text annotation layer.

##### **2.2 LONG PARCEL ID**

The long parcel ID number is usually the tax ID number without the county number designation (e.g., 01-01-100-001). The long ID number should be placed completely inside the parcel if possible. In small parcels, the first two numbers of the long ID should be placed inside the correct parcel; however, the long id may overlay adjoining parcels. Parcels that do not have a long tax ID should be text labeled as “open space” or “gap”.

##### **2.3 SHORT PARCEL ID**

The short parcel ID number is usually the last three digits of the long parcel ID number and is indicated by a dash followed by the numbers (e.g., -001). The short ID number should be placed completely inside the parcel near the center of the parcel.

Short ID numbers should be perpendicular to the adjacent road or right-of-way. All short ID numbers should read in the same direction on the map:

- 1) Parcels in a row running east to west should have short ID numbers readable from the right edge of the page,
- 2) Parcels in a row running north to south should have short ID numbers readable from the bottom edge of the page

Parcels labeled as “open space” or “gap” should have the same labels on the Short ID layer. Parcels ending in –990 usually indicate open parcels in subdivisions and may be labeled as “open space,” “park,” or “buffer.”

#### **2.4 LOT NUMBER**

The lot number is the number found on the original subdivision or condominium parcel. The lot number should be placed inside the parcel where it will fit best with the short ID and the lot dimensions. Placing the lot number in the parcel as it appears on the original plat is the best location.

#### **2.5 LOT DIMENSIONS**

Lot dimensions are the length of the parcel segments as shown on the parcel map, survey, or deed. Lot dimensions should be placed inside the parcel at the middle of each line segment. Coincident line segments shared by adjoining parcels should be labeled with one lot dimension only.

### **3.0 QUALITY CONTROL**

#### **3.1 BACKGROUND**

Quality control procedures are used as the parcel fabric is developed. The quality control processes will be performed in the AutoCAD and GIS software environment.

#### **3.2 PARCEL FABRIC CONSTRUCTION**

Each parcel map that is scanned and digitized must be moved, rotated, etc. to its correct geographic location in the township section. This is required because the parcels, when digitized, were not associated with any geographic reference. This process is termed registration or geo-referencing.

The actual process involves finding a minimum of 5 points on each plat map and referencing these five points to real-world geographical features. Often remonumentation points or digital orthographic images are used in this process.

#### **3.3 QUALITY CONTROL PROCESSES**

##### **Parcel (Vector) Information**

- Verify all plats are accounted for, i.e. no missing plats, or inaccurate gaps.
- Verify all line work is in the correct layer with the correct line type, color, and symbology.
- Mosaic parcel groups into section size areas. Perform registration on these parcel groups and visually examine registration with digital orthophotos in the background to determine spatial accuracy.
- Provide text labels for parcels without tax ID numbers (e.g., indicate gap parcels or open space, etc.)
- After parcel fabric construction, add subdivision/condo outlines to SUB\_OUTLINE layer.

- Add subdivision/condo names and block numbers to SUB\_NAMES layer and SUB\_BLOCK.

### **Annotation**

Verify that all annotations are in the correct layer with the correct line type, color, and symbology.

Verify location of long tax ID numbers within the parcels (as per Text Standards).

Verify that long tax ID numbers and short tax ID numbers match at the end.

## **4.0 QUALITY ASSURANCE**

### **4.1 INTRODUCTION**

The Quality Assurance (QA) procedures described were developed to create consistent and accurate parcel base maps. Each township section will be reviewed in compliance with the processes described and each section will be printed for visual review.

### **4.2 ACCEPTANCE RATE**

The Township will accept any section map that is 95% free of minor errors. These errors will include line type, line layers, annotation errors, text placement, etc. The QA procedures that are run within the AutoCAD software environment will be repeated as many times as needed to achieve a 5% error rate.

Major errors will not be accepted. Major errors include missing plats, parcel fabric construction errors, incomplete topology, and inaccurate gaps and overlaps.

### **4.3 PARCEL QUALITY ASSURANCE FORM**

A Parcel QA Form was developed to track the accuracy of the sections as they are completed. The mapping technician completing the quality assurance will fill out the QA Form as the quality assurance procedures are completed.

### **4.4 QUALITY ASSURANCE PROCESSES**

A QA/QC field will be added to Parcel coverage to record QA/QC results. Thematic maps can therefore be created based on different QA/QC error flags.

### **Parcel (Vector) Information**

Compare printout of completed section with available existing scanned tax maps.

Verify all plats are accounted for, i.e. no missing plats or inaccurate gaps.

Verify all parcels are have the correct line type, color, and symbology.

All errors in vector information should be flagged as “1” .

### **Annotation**

Verify all annotation has the correct line type, color, and symbology.

Note missing information including short tax ID numbers, lot numbers, and dimensions.

Missing short tax ID number parcels should be flagged as “2”.

Missing dimension parcels should be flagged as “3”.

Missing lot number parcels should be flagged as “4”.

**Note errors in annotation location or display direction.**

Location or direction errors for short tax ID numbers should be flagged as “5”.

Location or direction errors for dimensions should be flagged as “6”.

Location or direction errors for lot numbers should be flagged as “7”.

**5.0 DATA DICTIONARY**

**5.1 Introduction**

The Parcel Data Dictionary outlines the properties assigned to each layer used in the parcel conversion process. This list does not include Assessment and Equalization fields.

**5.1 Data Table**

<b>Layer</b>	<b>Color</b>	<b>Text Size/Style</b>	<b>Line Type</b>
PARCEL	Green	NA	Continuous
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