Cadastral Mapping GIS

"Best Practices"

October 2004

VESTRA

Best Practices

Topics

- Striving for Improvement
- Understanding the Process
- Planning for Change
- Do What Works

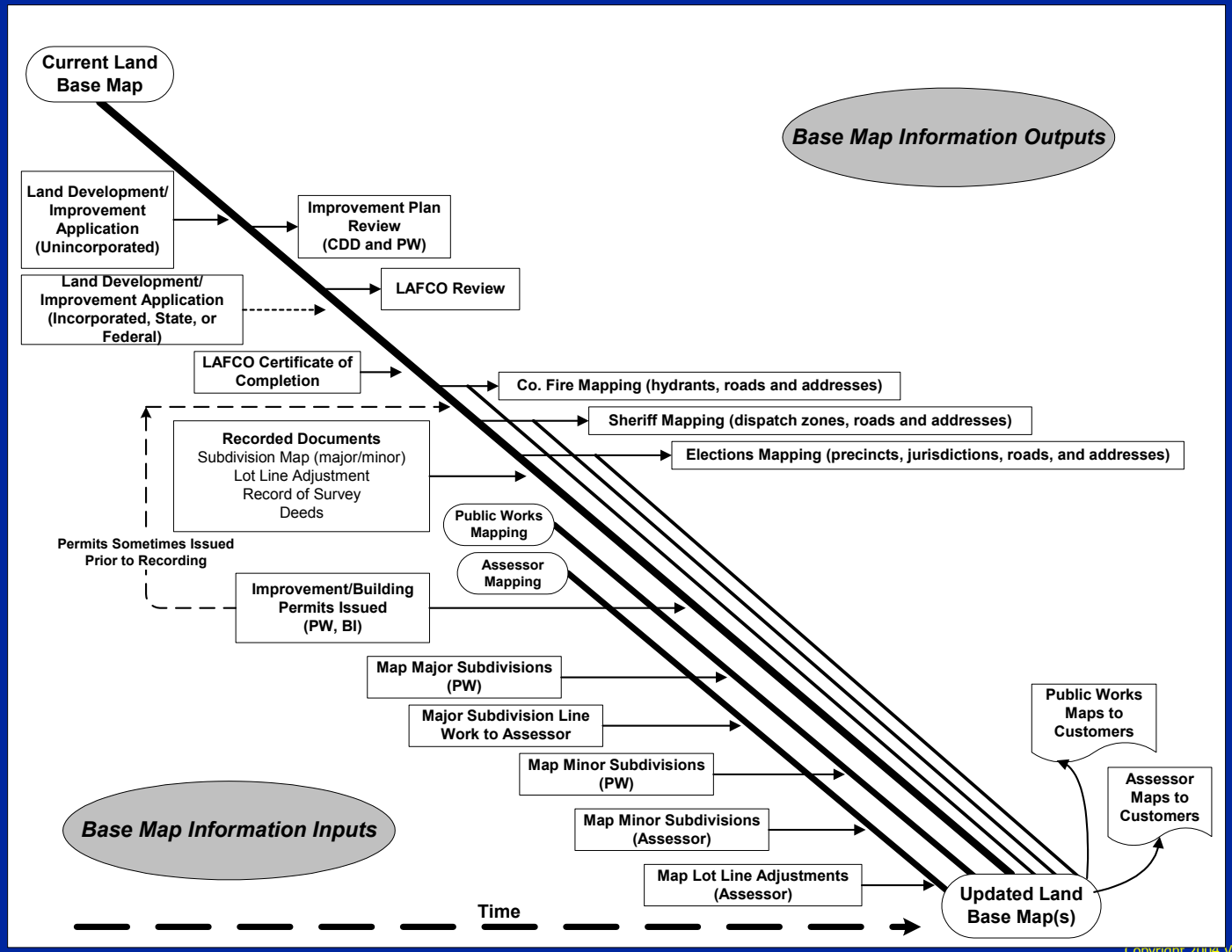
Best Practices

Striving for Improvement

- Maintaining land records is a *COMPLEX* endeavor
- The business process is largely misunderstood by most
- Everybody wants ***something*** from us (NOW!)
- Mapping departments are dedicated to improving service to many constituencies

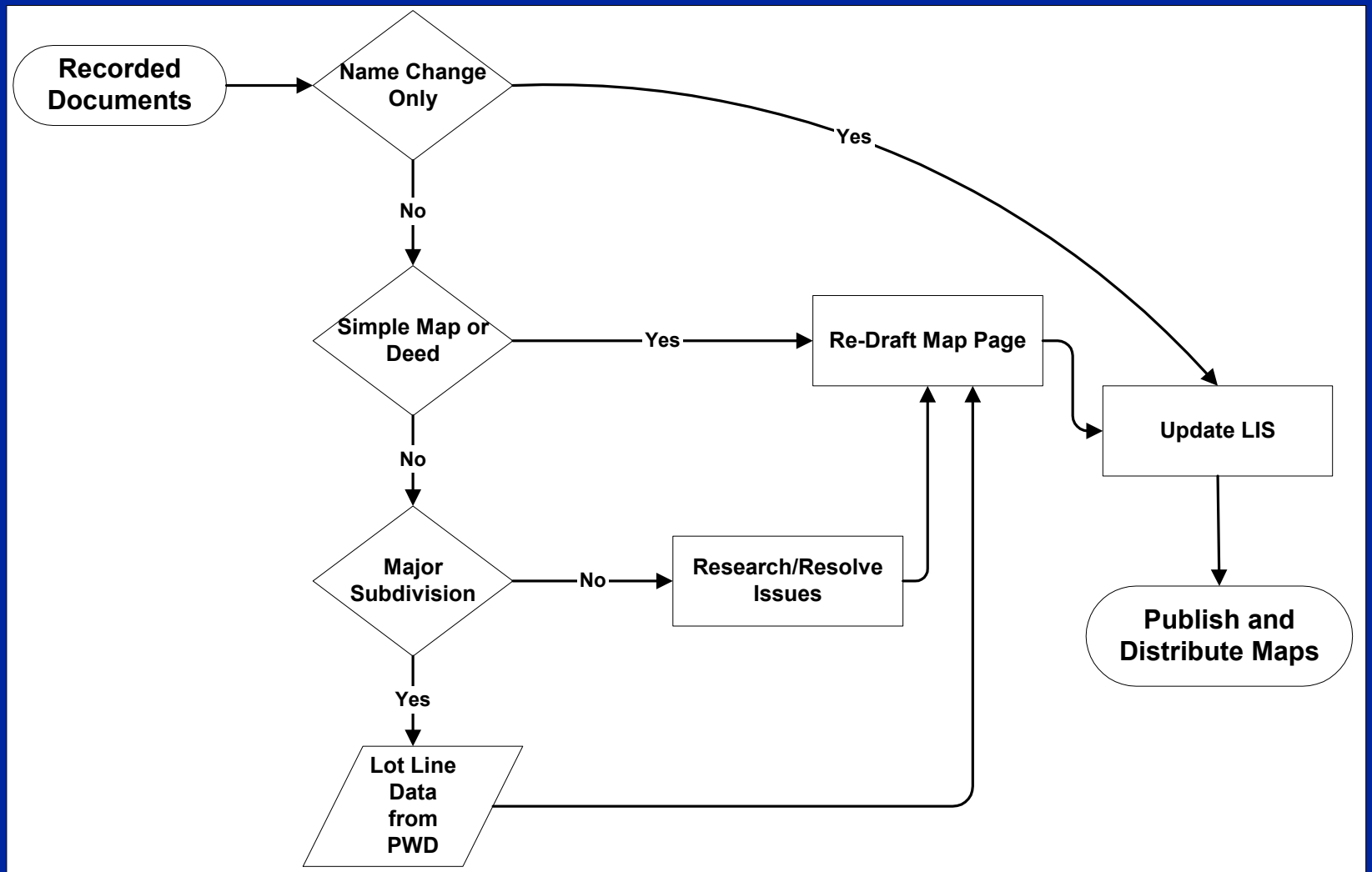
Best Practices

Understanding the Process



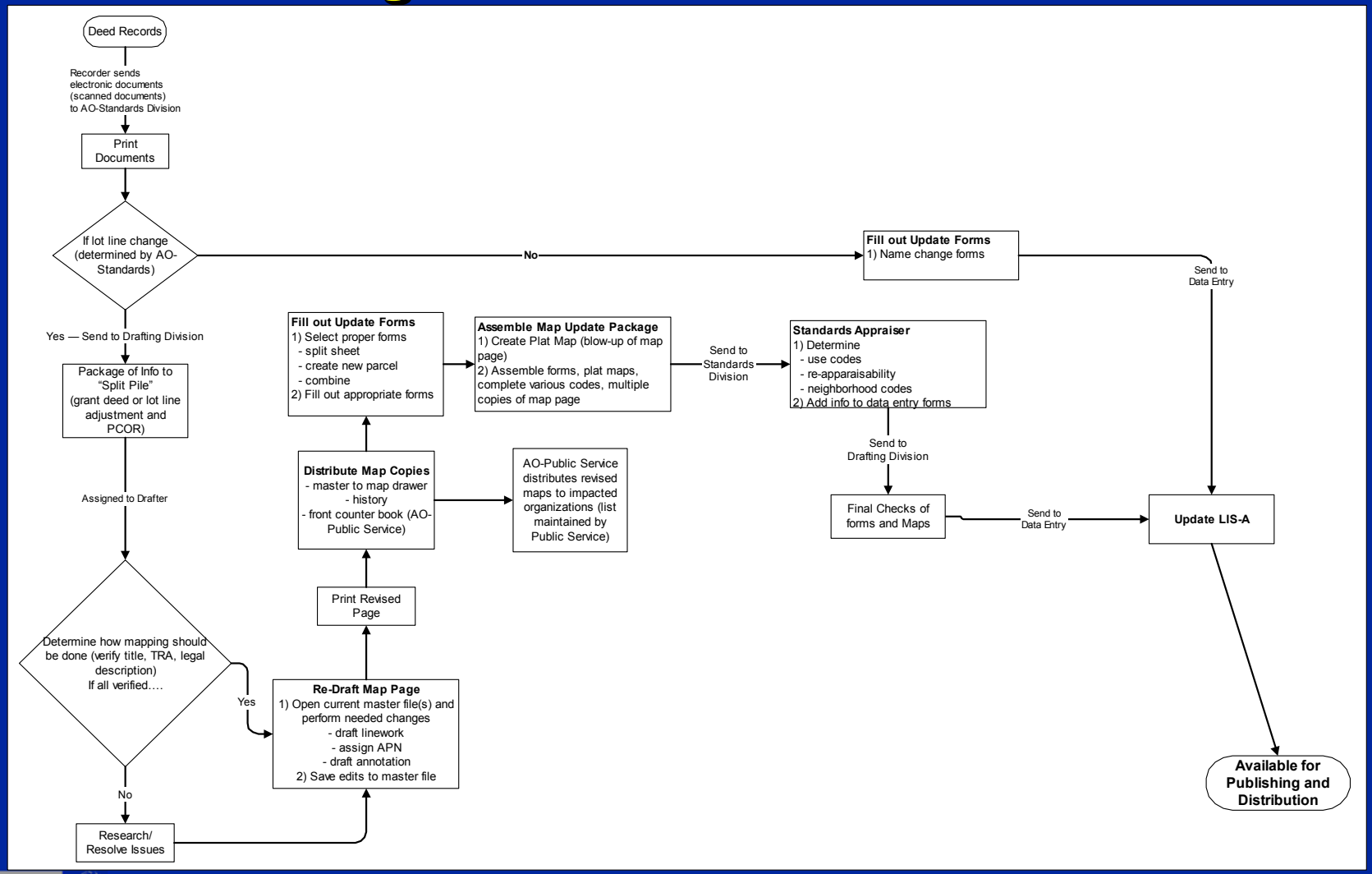
Best Practices

Understanding the Process



Best Practices

Understanding the Process



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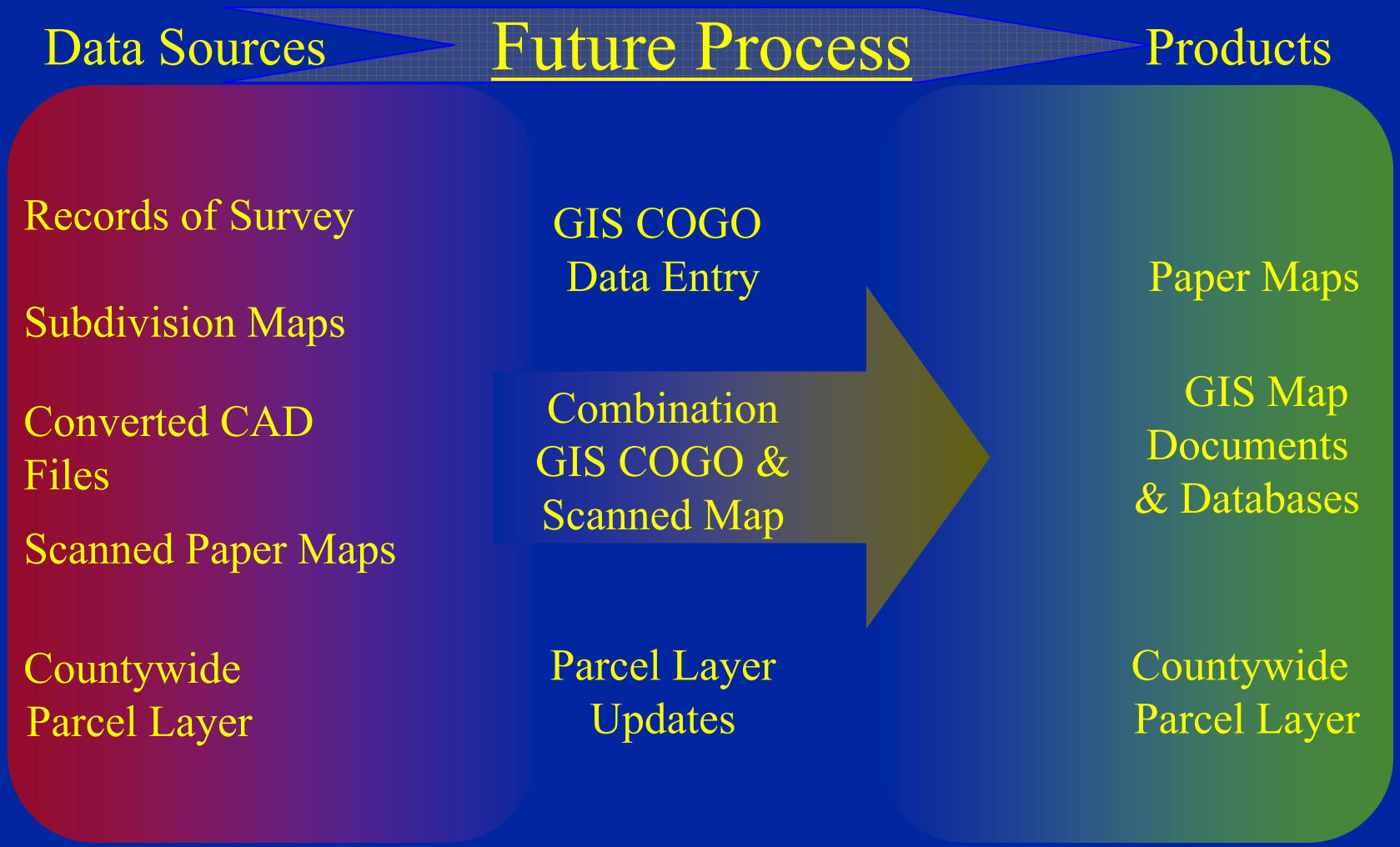

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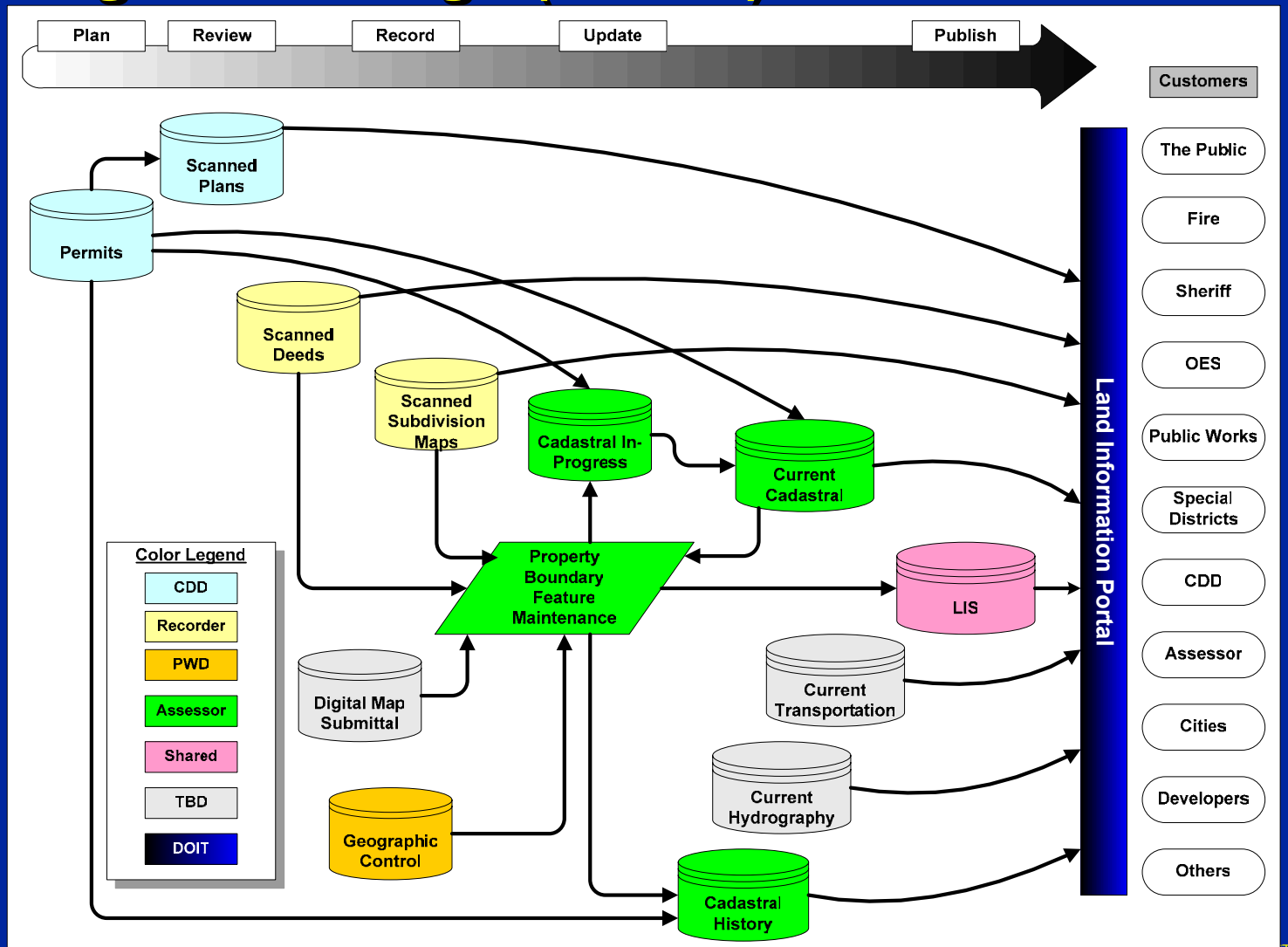
Planning For Change (Vision)



Best Practices

Phase I – Initiate Basic Structure

- Initiate a cross-departmental governance committee,
- Re-allocate staff resources,
- Upgrade hardware and software,
- Provide training,
- Begin restructuring workflow to more closely tie property boundary feature maintenance to recording transactions, and
- Identify and resolve problems with existing property boundary feature data.

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Phase II – Enhanced Integration of Data and Workflow

- Actively engage various departments to take responsibility for providing commonly used land information data,
- Provide training,
- Improve the integration of data maintenance with property recording workflow, and
- Continue to resolve any outstanding problems with property boundary feature data as encountered, and

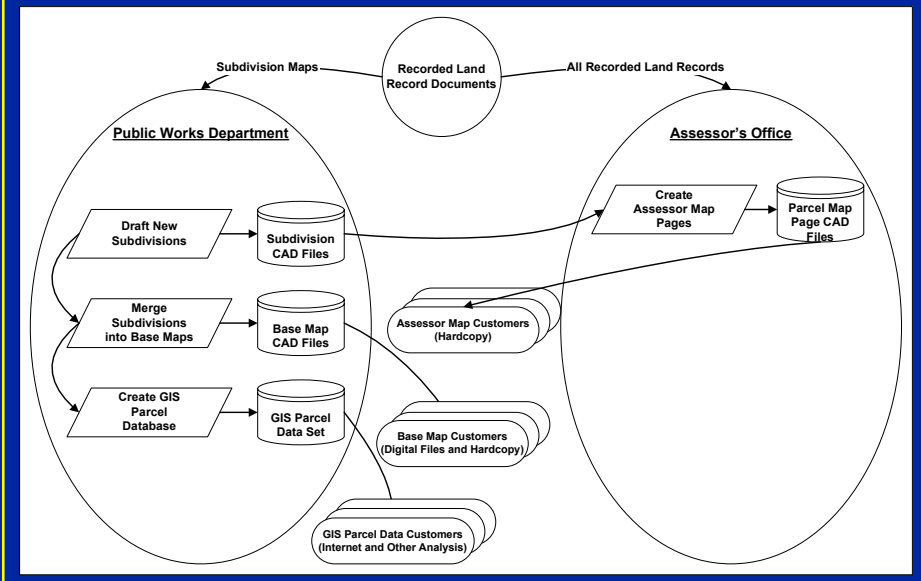
Best Practices

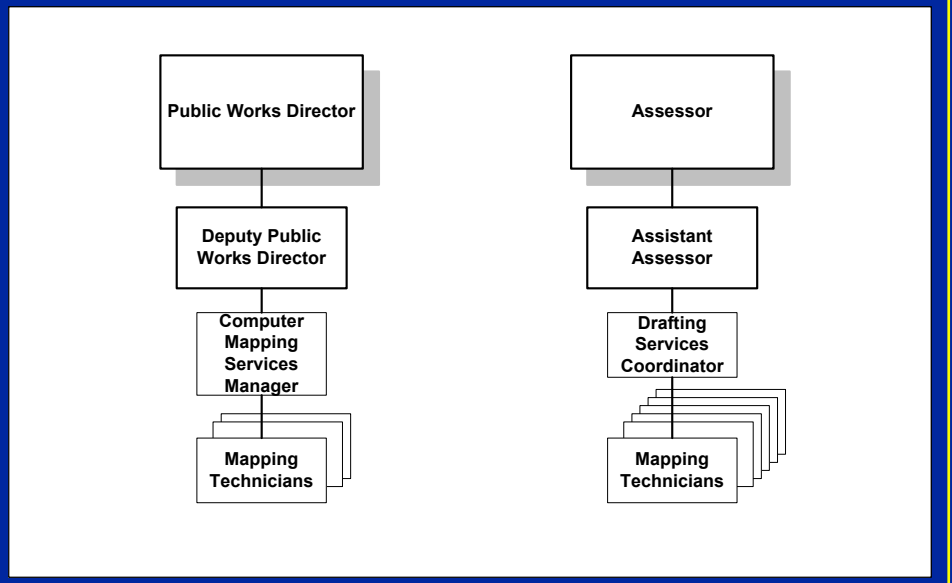
Phase III – Implement Parcel Management System.

- Expand the governance structure to include organizations interested in land information countywide,
- Implement tight integration between the LIS and GIS-based parcel management system,
- Implement new software and systems,
- Provide training,
- Modify workflow, and
- Maintain accurate, consistent, current and historical land information

Best Practices

Current Information Flow and Structure





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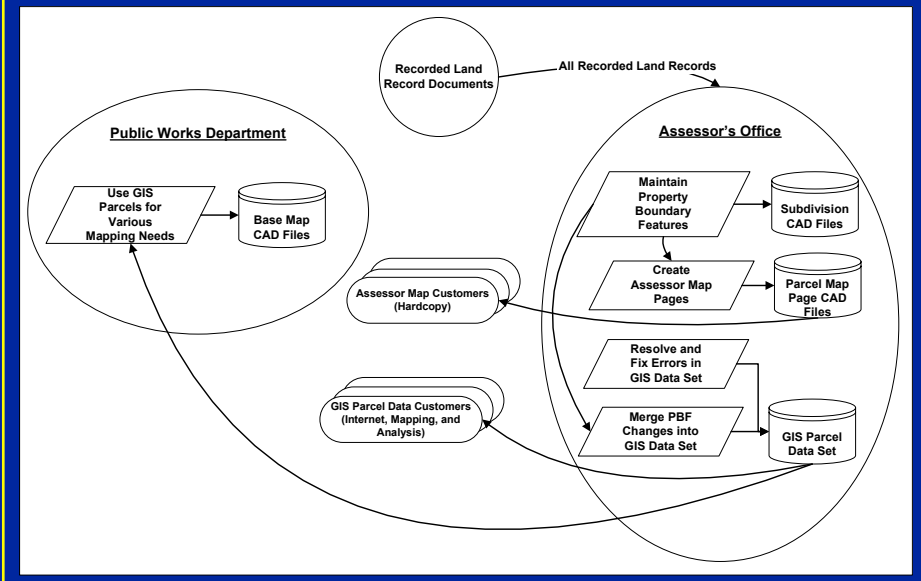
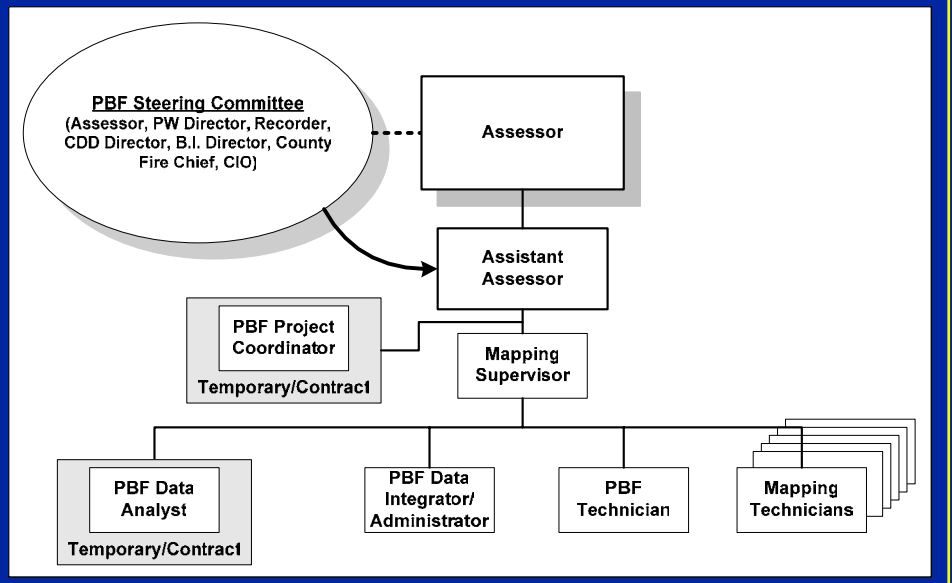
Phase I





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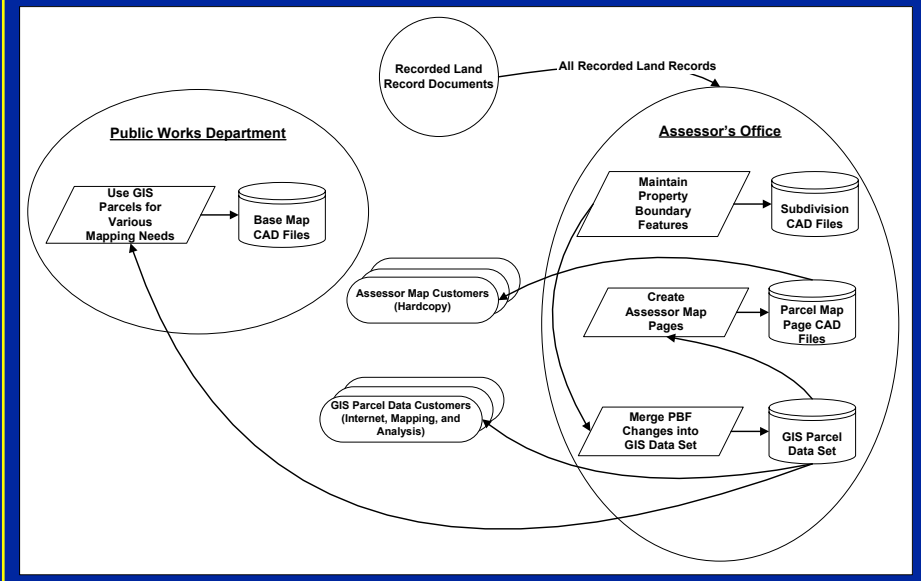
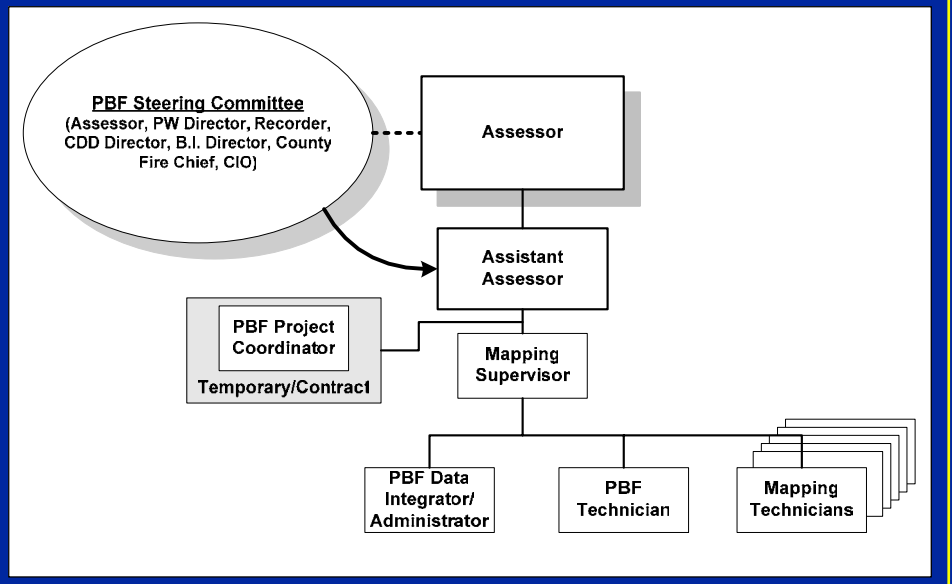
Phase II





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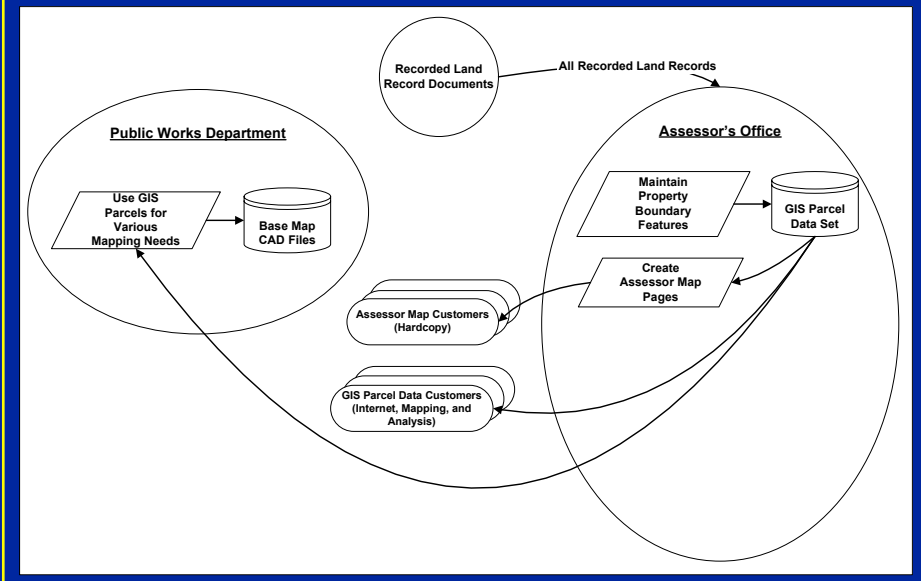
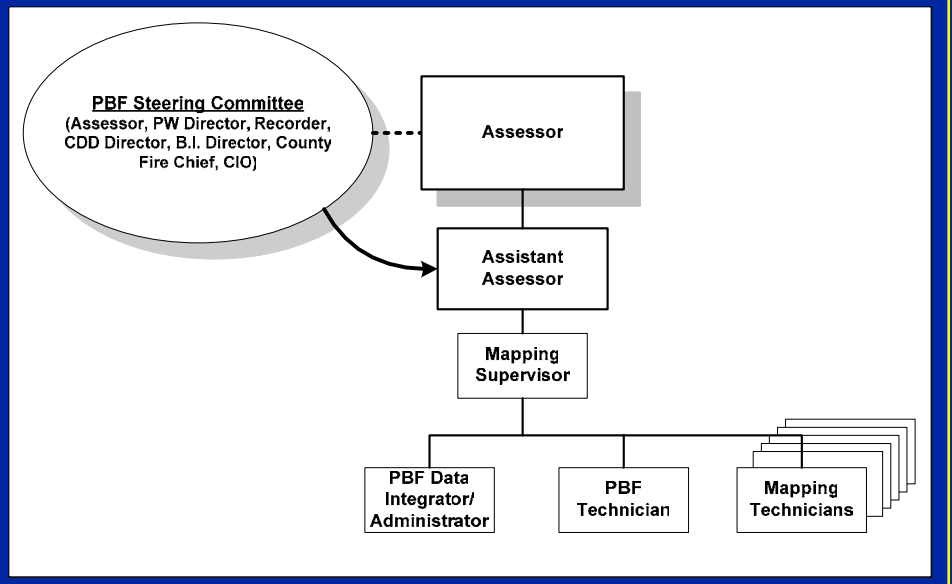
Phase III





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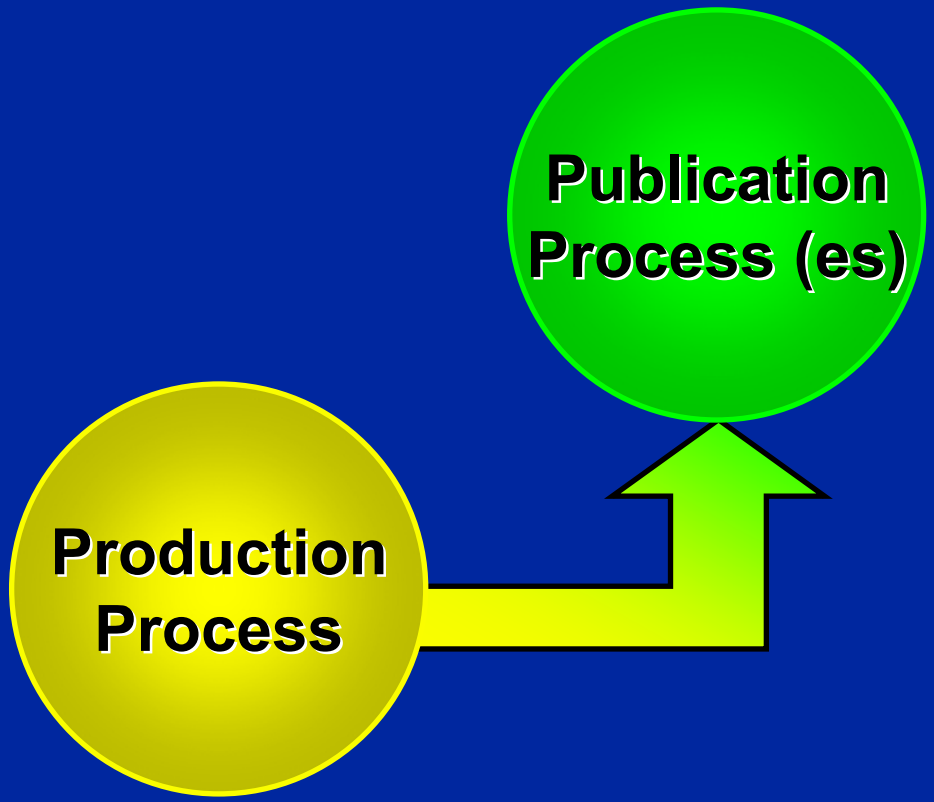
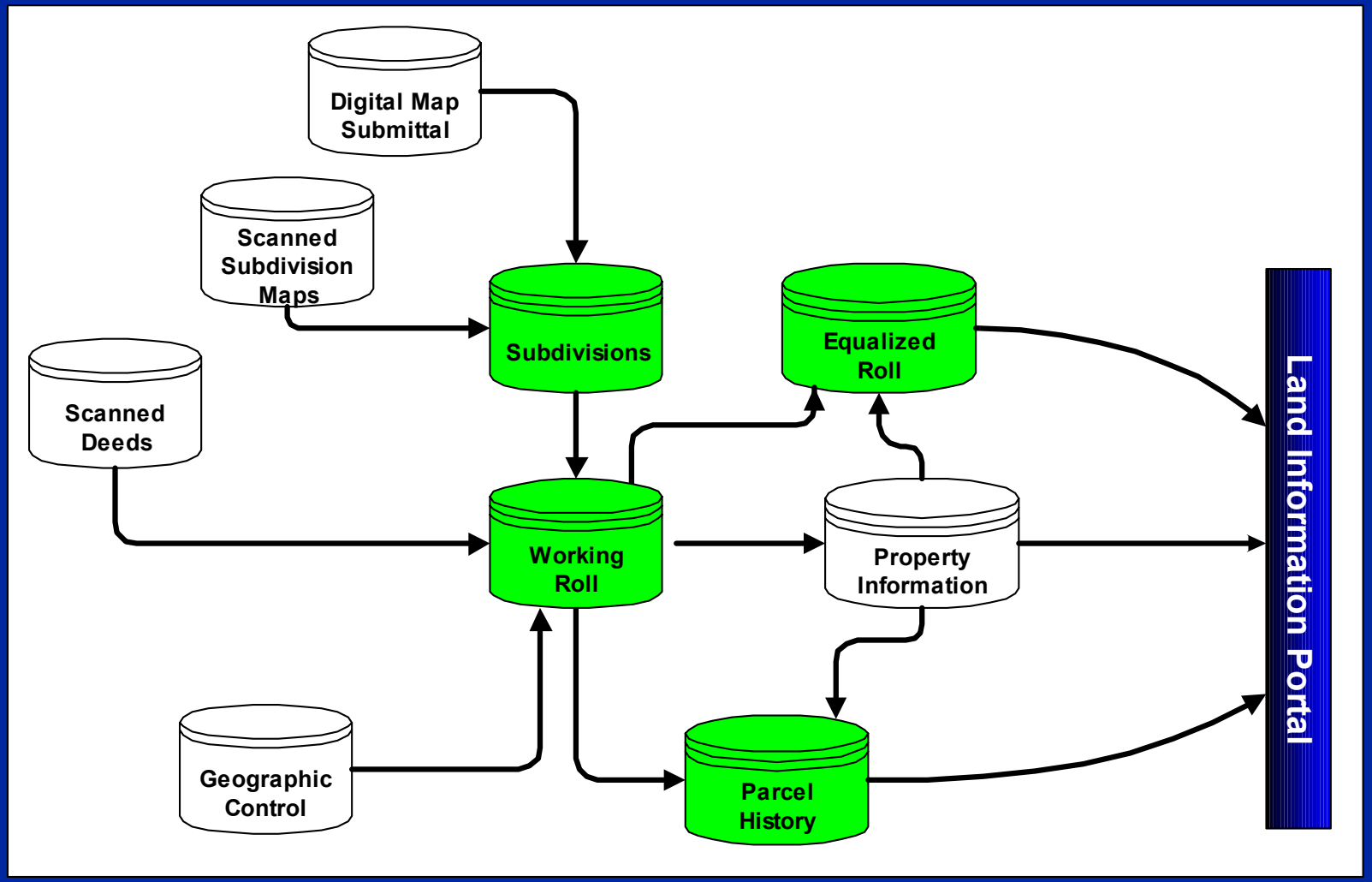
A Liberating Concept



Best Practices

Workflow Overview



Best Practices

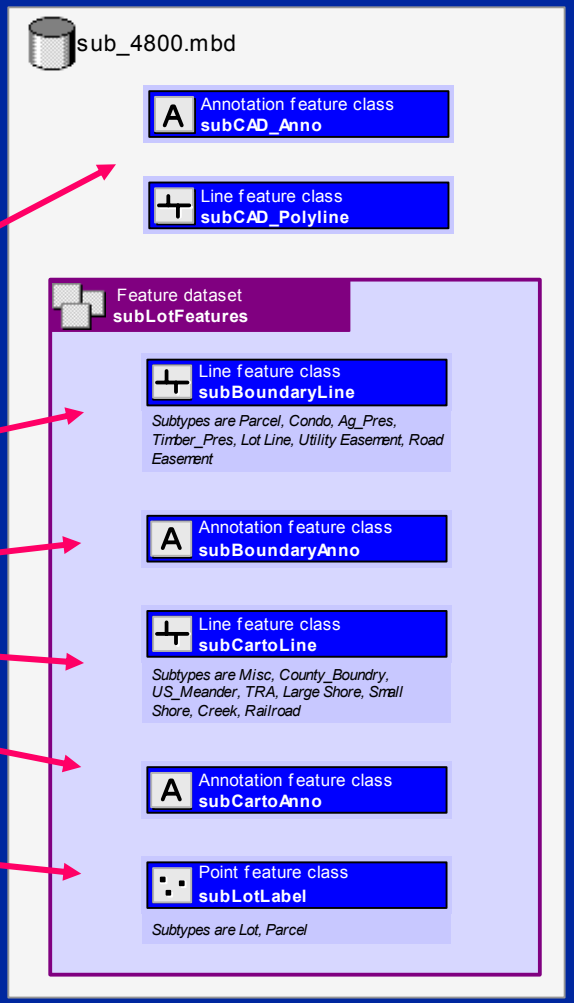
Example Components to Design

- Assessor Page Geodatabase design
- Countywide Parcel Layer Geodatabase design
- Subdivision Geodatabase design
- Assessor page Status Database design
- ArcMap templates for standard SBE assessor maps
- Directory structure to store all parcel mapping data
- Procedures and Parcel Editor workflows for:
  - Adjusting parcels (parcel split, parcel merge, lot line adjustment)
  - Importing data to assessor page geodatabases
  - Creating and updating assessor parcel maps
  - Updating the Countywide Parcel Layer
  - Comparing the Property database and the Countywide Parcel Layer
  - Updating the assessor page Status Database

Best Practices

Subdivision Geodatabase Design

- Directly imported from CAD files
- Boundary lines
- Boundary line annotation (bearing/distance)
- Mapping lines (road ROW, hooks, etc.)
- Mapping annotation (blocks, neighboring pages, page titles, road names, etc.)
- Lot labels



Best Practices

Countywide Parcel Layer Geodatabase Design

Temporary (working) feature classes

- For importing parcel labels
- For constructing polygons
- For georeferencing data

Topology to enforce data integrity

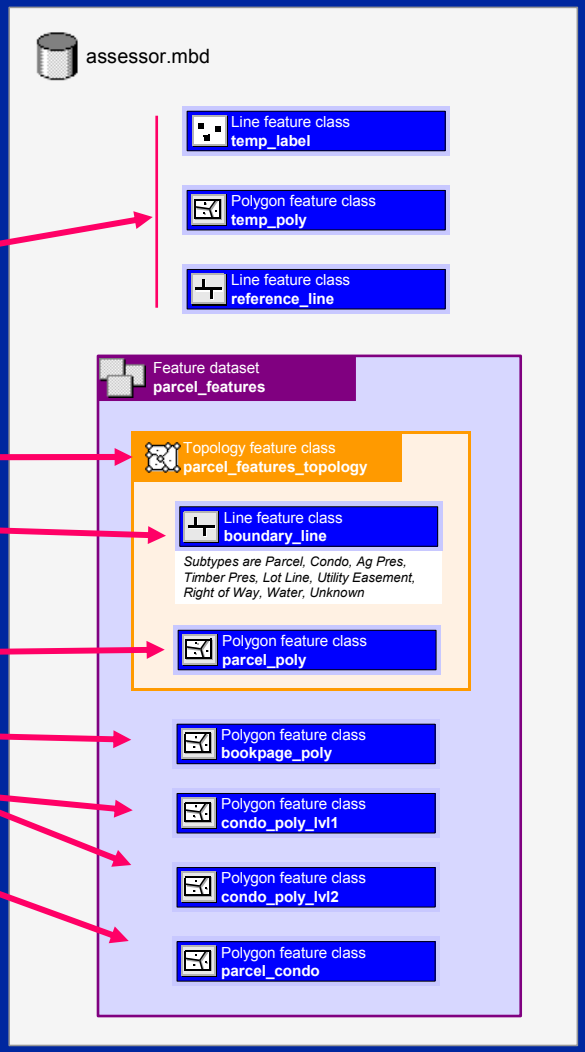
Boundary lines will store several boundary types with source data

Parcel polygons will store APNs

Book and Page feature class

Condominium feature classes (one per level)

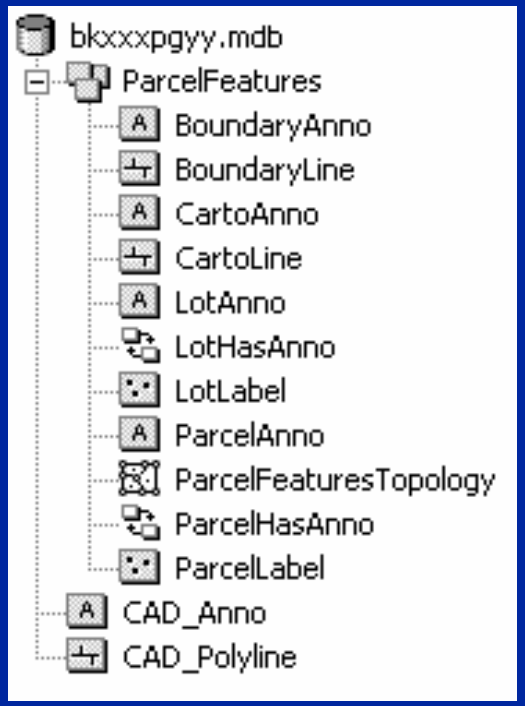
All parcels and condos in one feature class

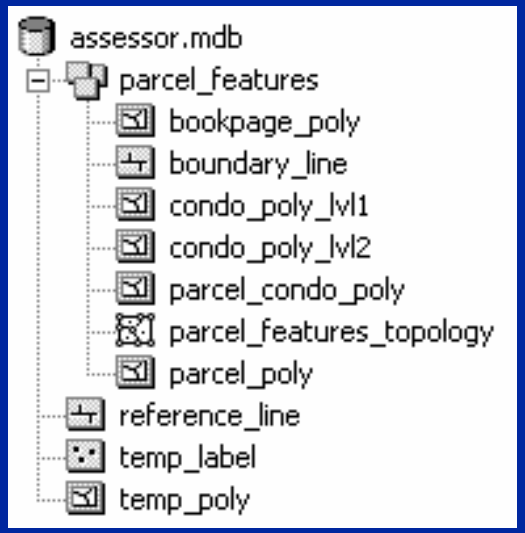


Best Practices

The ArcCatalog tree views

- Assessor Page Geodatabase template
- Countywide Parcel Layer

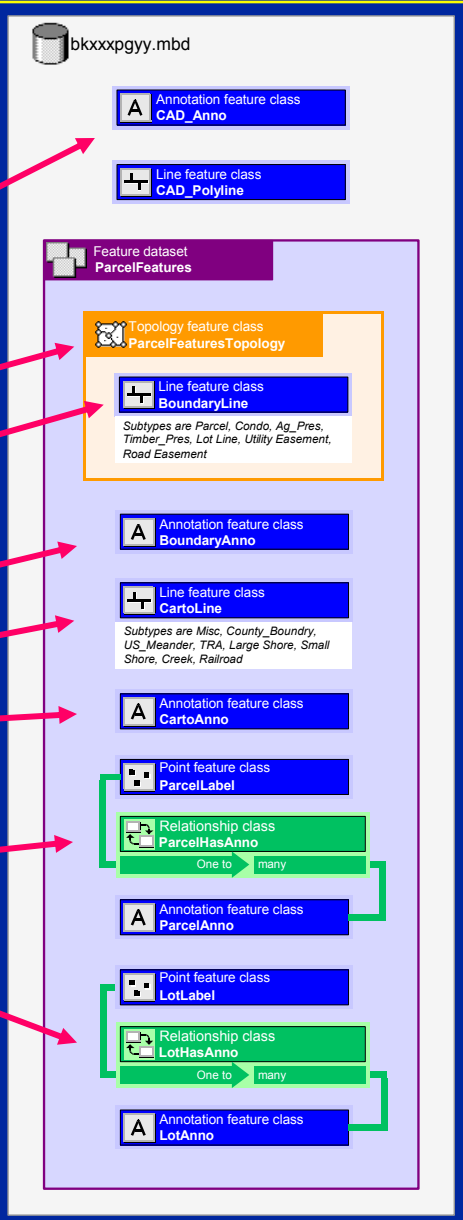




Best Practices

Assessor Page Geodatabase Design

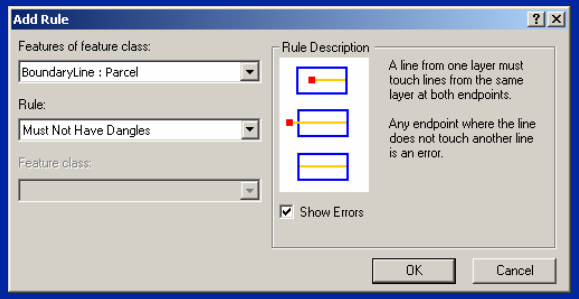
- Directly imported from CAD files
- Topology to enforce data integrity
- Boundary lines
- Boundary line annotation (bearing/distance)
- Mapping lines (road ROW, hooks, etc.)
- Mapping annotation (blocks, neighboring pages, page titles, road names, etc.)
- Parcel labels with feature linked annotation
- Lot labels with feature linked annotation

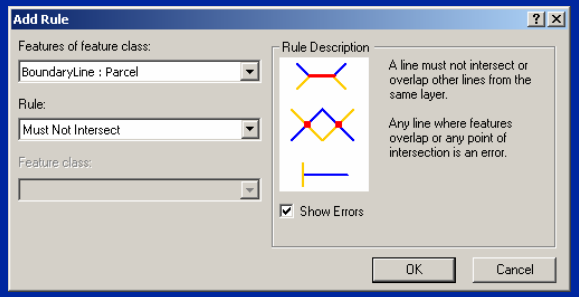


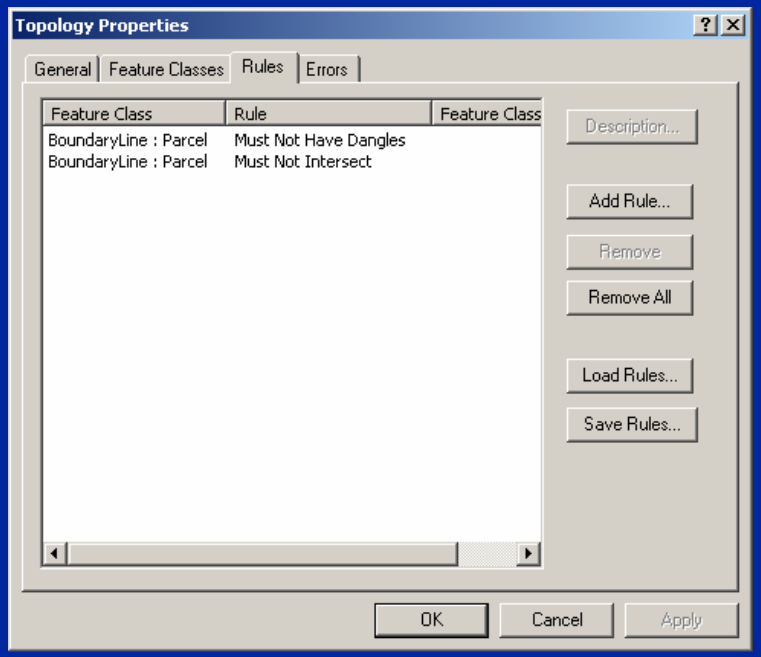
Best Practices

Topological rules help ensure data integrity

- Topology rules built for the assessor page geodatabase include
  - Parcel lines must not not have dangles
  - Parcel lines must not intersect







Best Practices

Boundary lines are divided into ‘subtypes’

- A single feature class stores multiple line types
- Simple model of ‘real-world’ lines
- Conforms to ESRI’s parcel data model

Simple feature class
BoundaryLine

Geometry *Polyline*
Contains M values *No*
Contains Z values *No*

Field name	Data type	Allow nulls	Default value	Domain	Prec-ision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
Type_ID	Short integer	No	0		0		
Type	String	Yes					30
Direction	String	Yes					24
Distance	String	Yes					12
Radius	String	Yes					12
Delta	String	Yes					20
Tangent	String	Yes					12
Arclength	String	Yes					12
Side	String	Yes					1
Source	String	Yes	Generic CAD	Line_Source			15
SHAPE_Length	Double	Yes			0	0	
Source_Date	Date	Yes			0	0	8

Subtypes of BoundaryLine

Subtype field *Type_ID*
Default subtype *0*

List of defined default values and domains for subtypes in this class

Subtype Code	Subtype Description	Field name	Default value	Domain
0	Parcel	Source	Generic CAD	Line_Source
1	Condo	Source	Generic CAD	Line_Source
2	Ag_Pres	Source	Generic CAD	Line_Source
3	Timber_Pres	Source	Generic CAD	Line_Source
4	Lot Line	Source	Generic CAD	Line_Source
5	Utility Easement	Source	Generic CAD	Line_Source
6	Road Easement	Source	Generic CAD	Line_Source

VESTRA

Best Practices

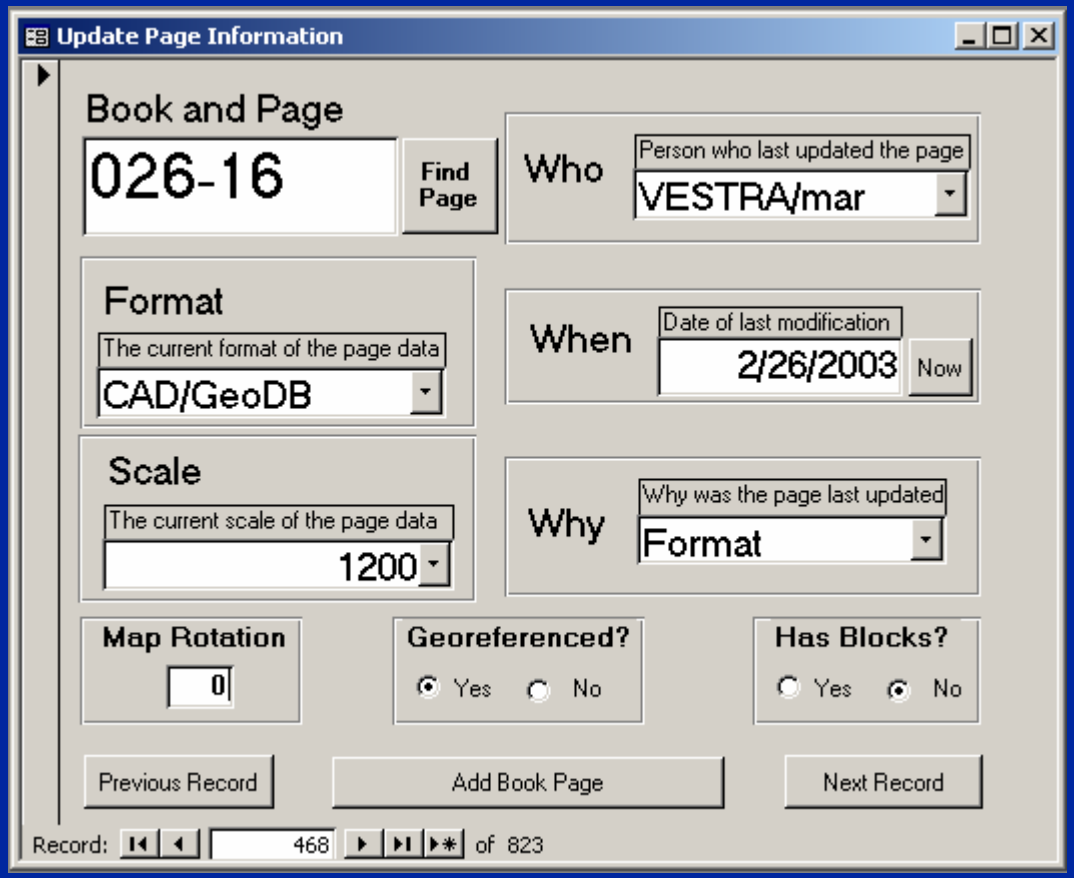
Tracking Page Status

- A single database used to report the status for each book-page (as a Microsoft Access database)
- Fields to include:
  - Book-Page
  - Date of last update
  - Person who last updated the page
  - Type of last update eg. parcel split, lot line adjustment
  - Current format of the page data
  - Scale and Rotation
  - Is the page georeferenced?
- Updated with map changes – providing capability to summarize current status of mapping efforts

Best Practices

Status Database

- A single user interface provided through the ‘Update Page’ Form



Best Practices

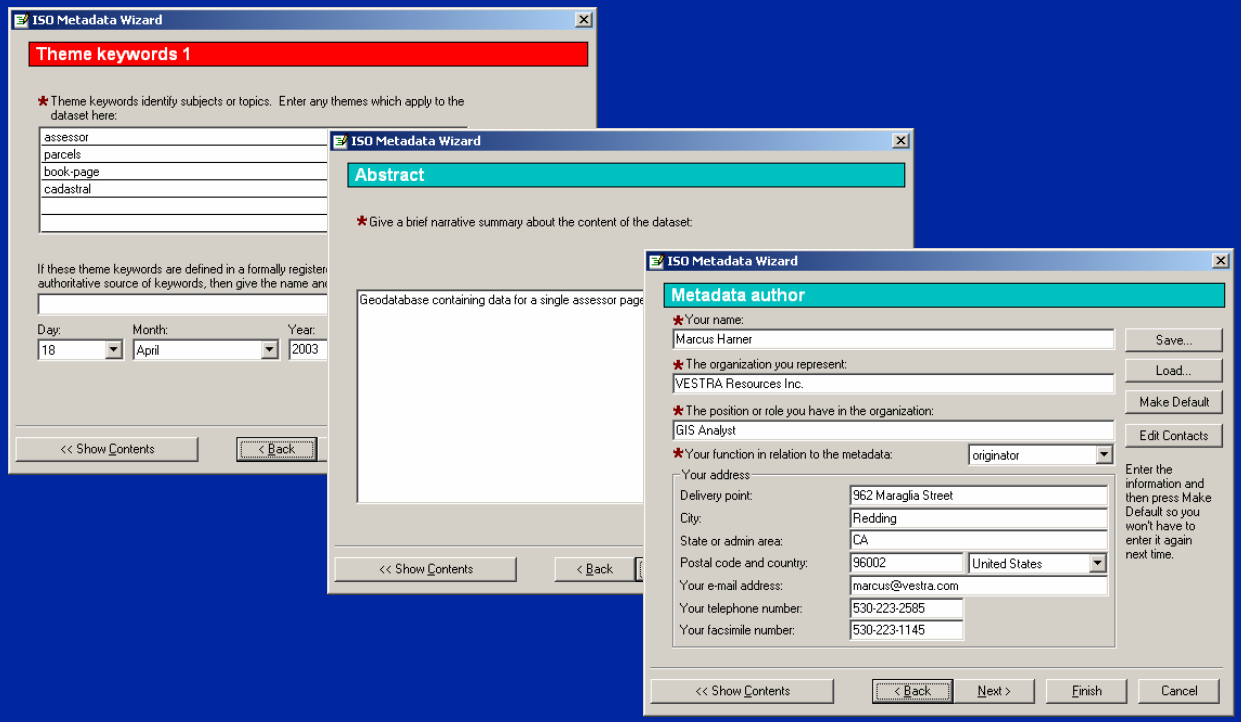
Metadata (Documenting Data)

- Use the 'ISO' stylesheet and wizard in ArcCatalog
- Suggested fields to populate
  - Originator
  - Abstract
  - Keywords
  - Update Cycle
  - Accuracy and Precision
- Important information on appropriate use of your data that is being published

Best Practices

Metadata Suggestions

- 'ISO' wizard greatly simplifies metadata editing

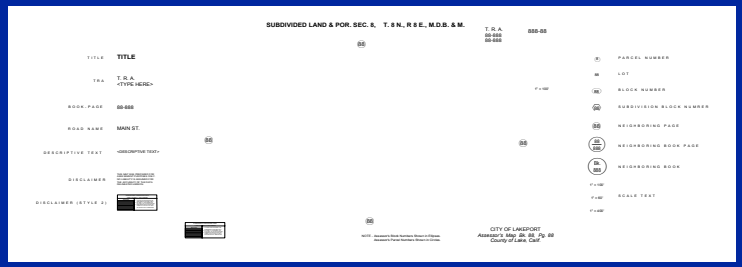


Best Practices

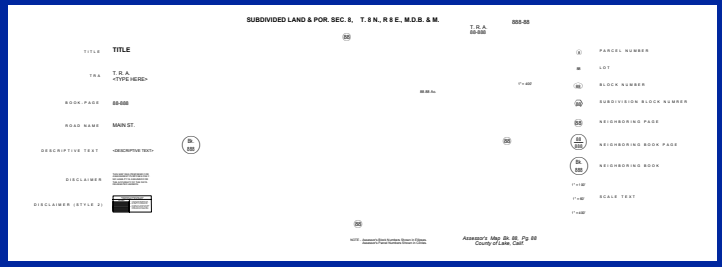
Sample SBE Standard Layouts

Standard No. 3
County Index to
Assessor's Map Books

Standard No. 7
Detailed Map – Urban Property,
Scale 1" = 100'

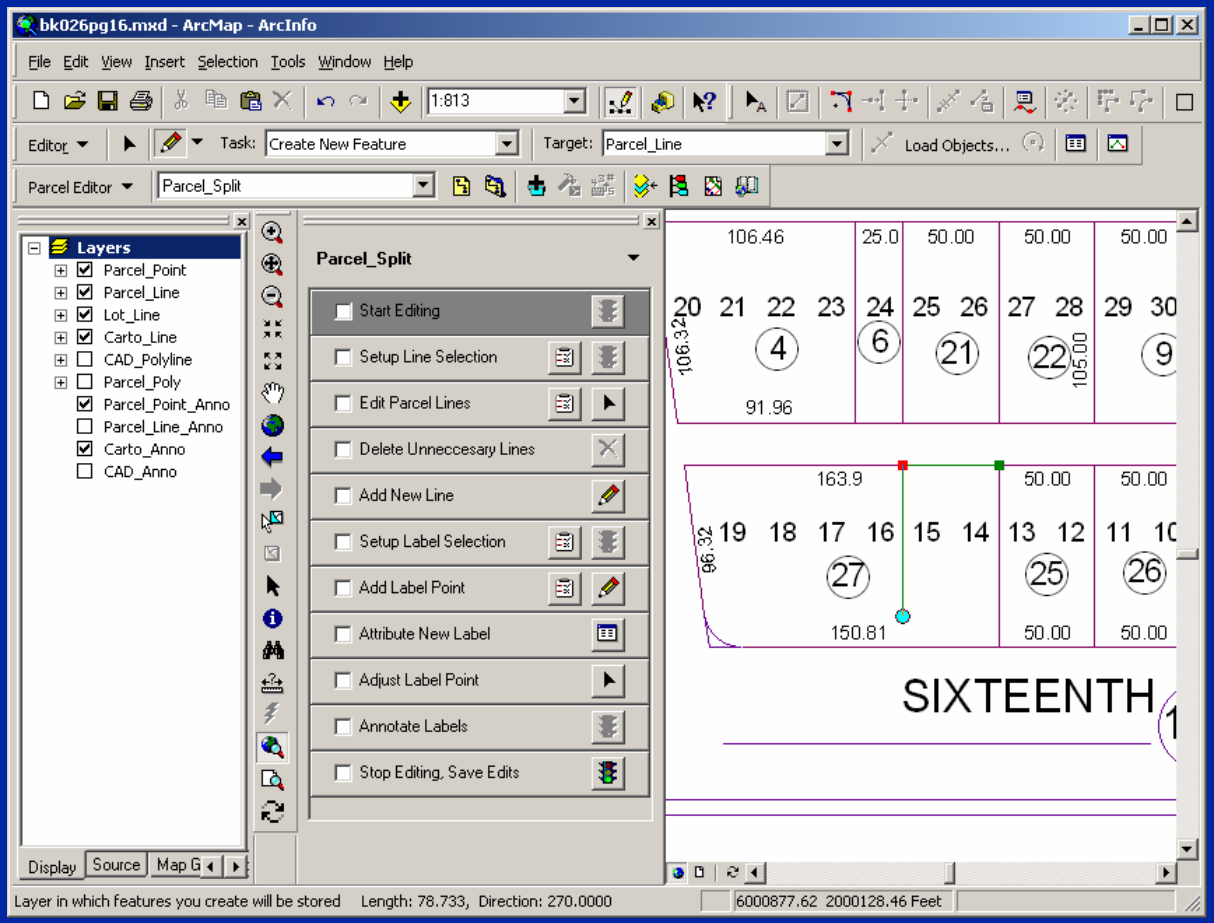


Standard No. 9
Detailed Map – Orchard
and Small Farm Property,
Scale 1" = 400'



Best Practices

Parcel Editor Workflows

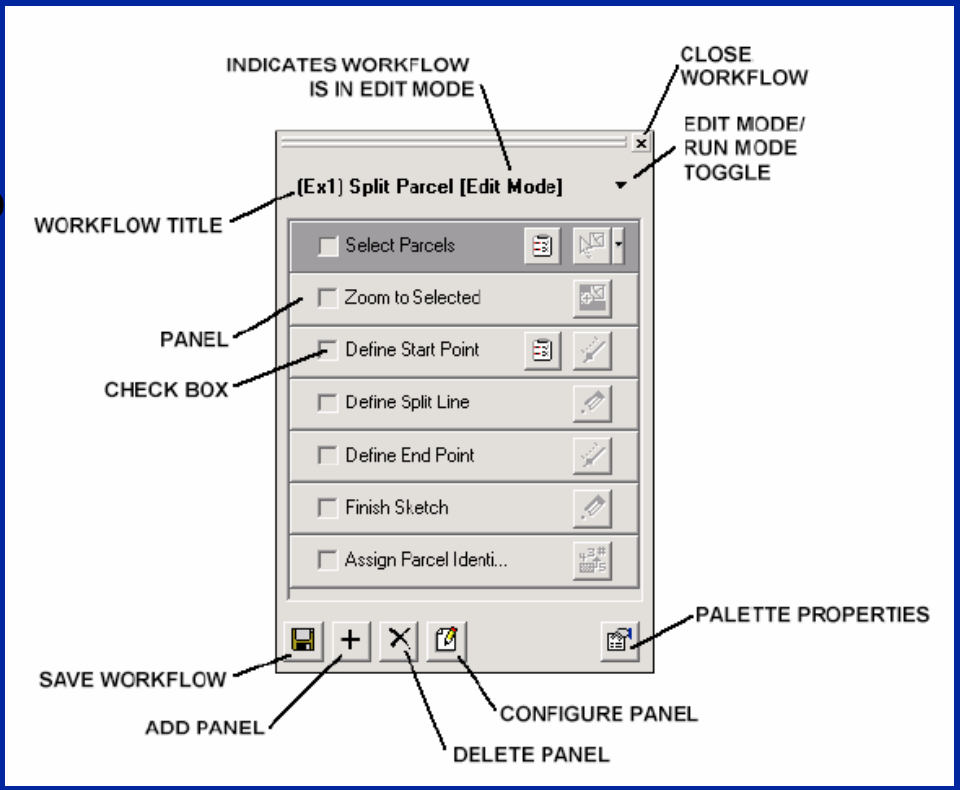


Best Practices

Parcel Editor Workflows

Workflows will be used as a guide through the steps of creating and maintaining parcel data.

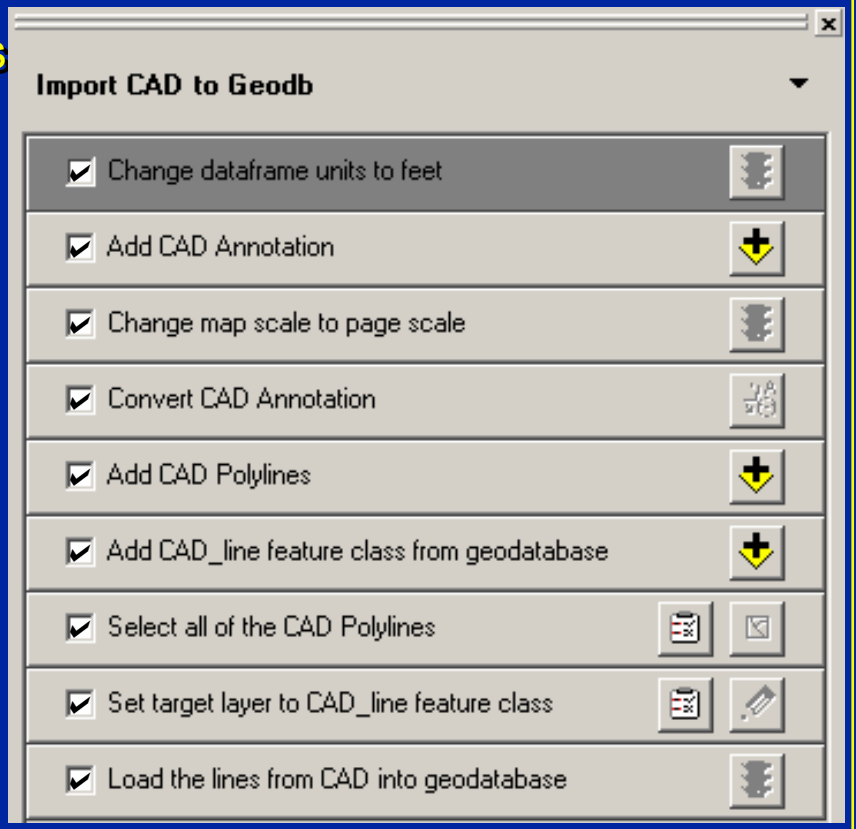
Workflows can only describe actions, simplify tool selection, and set up the working environment, they do not perform any editing actions.



Best Practices

How workflows work

- Each panel is a prescribed action or set of actions
- Some panels are only descriptions of tasks
- Some panels set environment variables, such as selection, editing, and snapping
- Start with the top panel and work down
- As each task is completed, check the ‘check box’ to avoid duplicating or skipping a step



Best Practices

Workflows break complex tasks into simple steps

- An initial set of workflows have been created to do:
  - Simple assessor page maintenance
    - *Parcel_Split, Parcel_Merge, Lot_Line_Adjustment*
  - Adjusting and importing whole assessor pages
    - *Georeference_AssrPg, Import_CAD_to_AssrPg, Build_AssrPg_from_RoS*
  - Editing Countywide Parcel Layer
    - *Edit_CPL, Load_AssrPg_to_CPL*
  - Assessor page mapping
    - *Edit_Hybrid_Raster, Edit_Hybrid_Vector, Edit_Carto_Anno*
  - Importing subdivisions building assessor pages
    - *Import_CAD_to_sub, Split_sub, Load_sub_to_CPL, Build_sub_from_RoS*

Best Practices

Sample Editing Steps

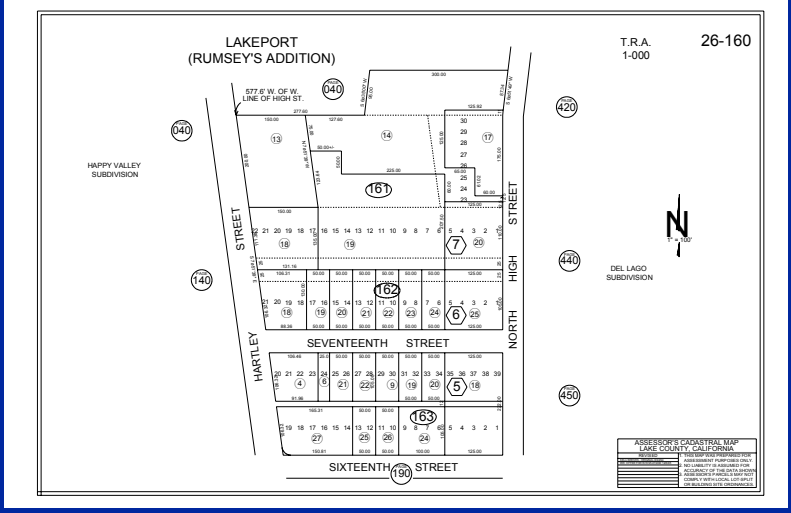
1. Review source material
2. Identify type of edit
3. Open assessor page map document
4. Choose workflow
5. Edit assessor page geodatabase
6. Print new assessor page
7. Update countywide parcel layer
8. Update status database

Best Practices

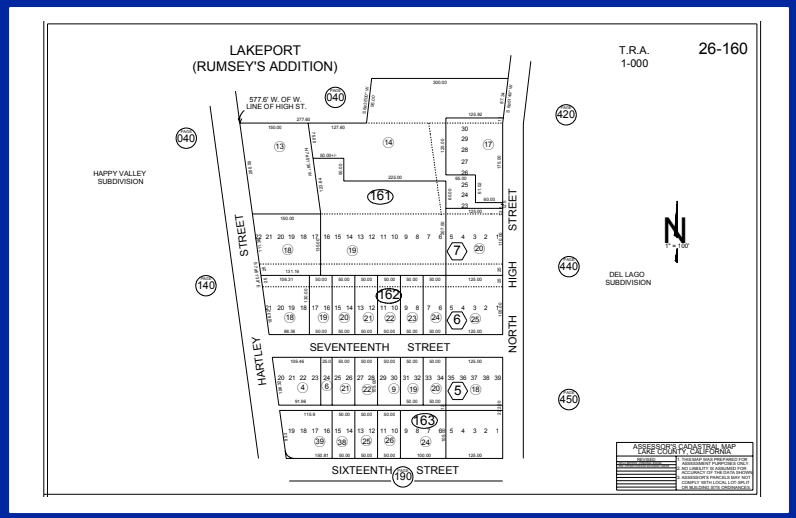
Editing Steps

1) Review source material

Current assessor page



New page with edits drawn in from Record of Survey



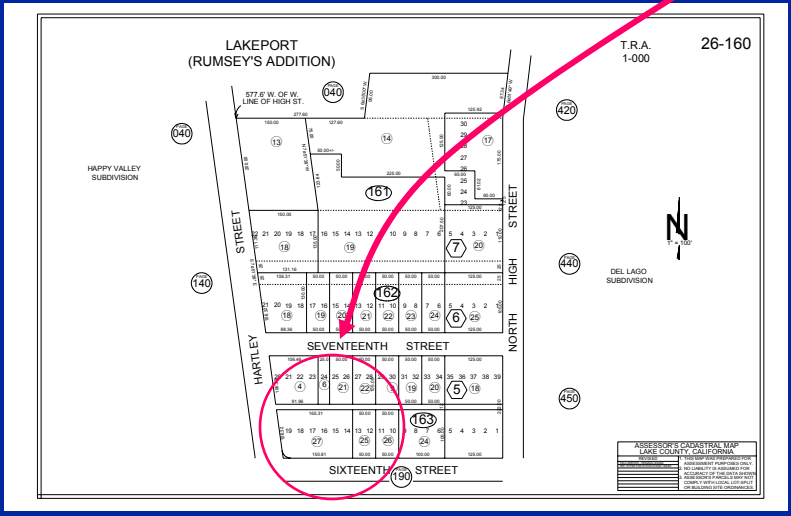
Best Practices

Editing Steps

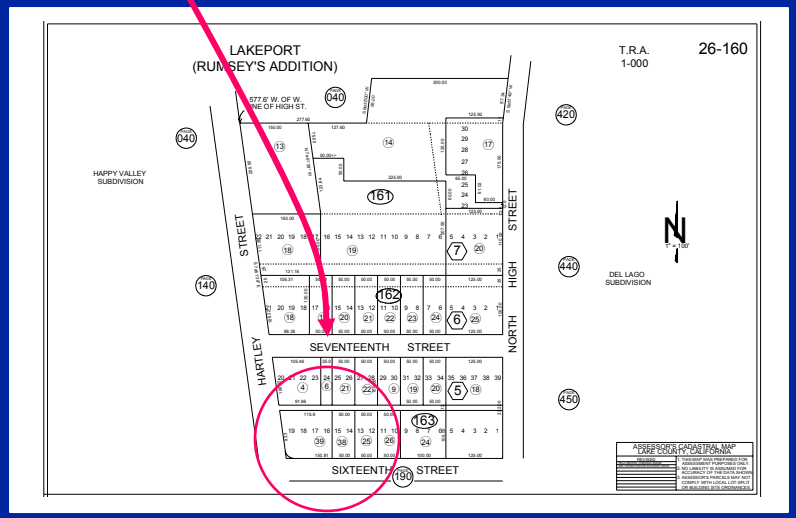
2) Identify type of edit

Edit identified as a parcel split

Current assessor page



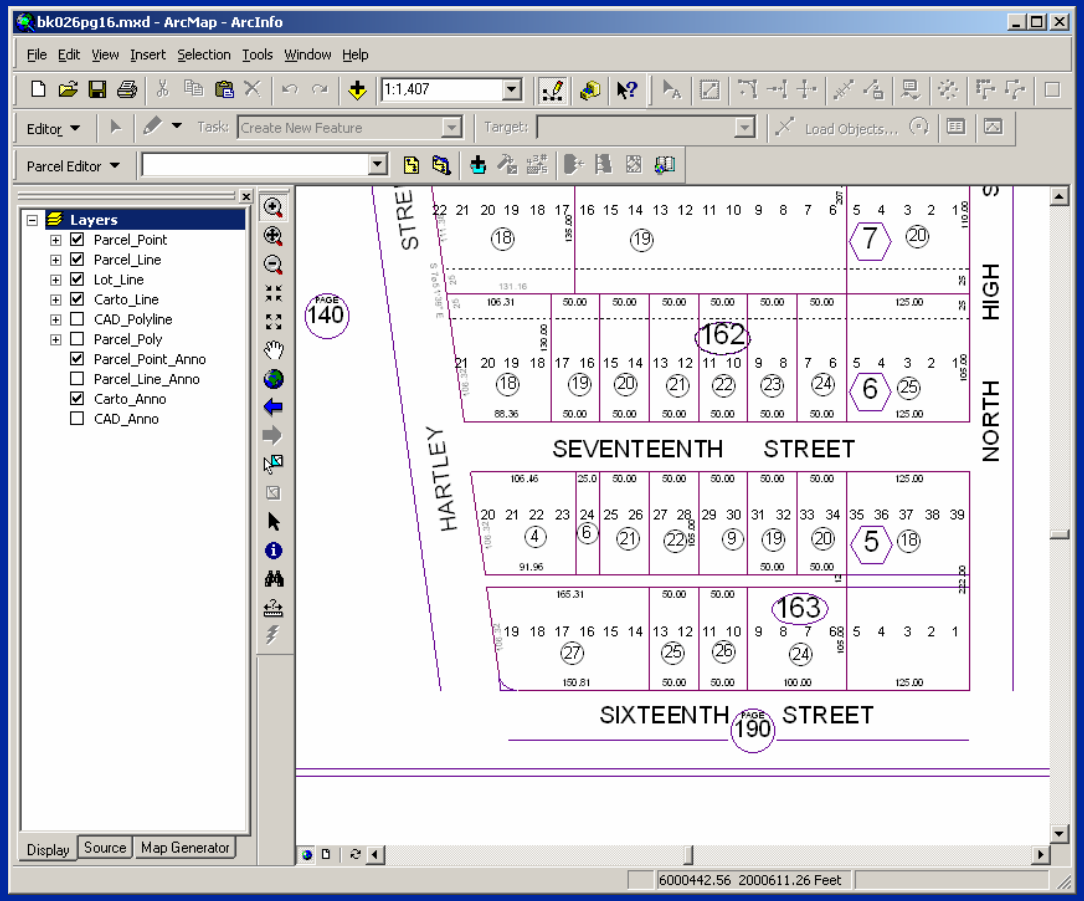
New page with edits drawn in from Recorded Deed



Best Practices

Editing Steps

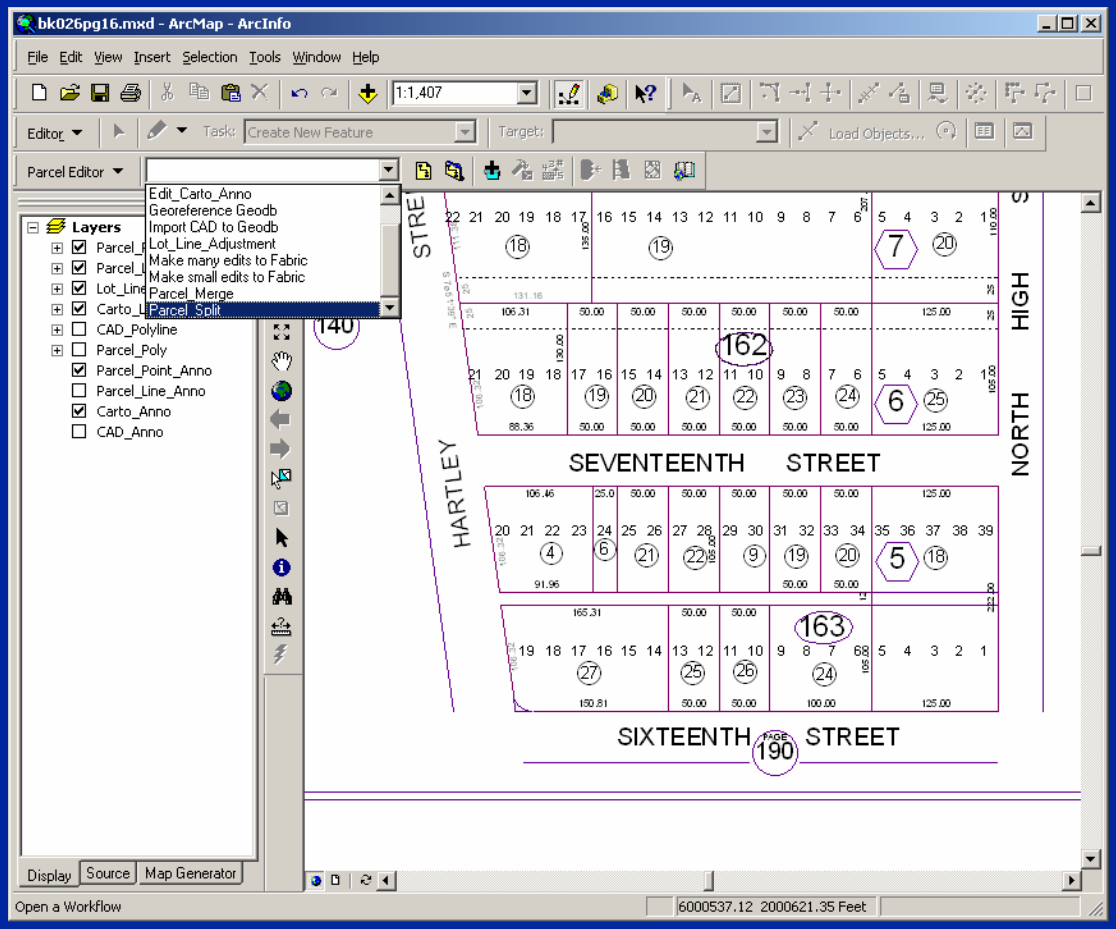
3) Open assessor page map document



Best Practices

Editing Steps

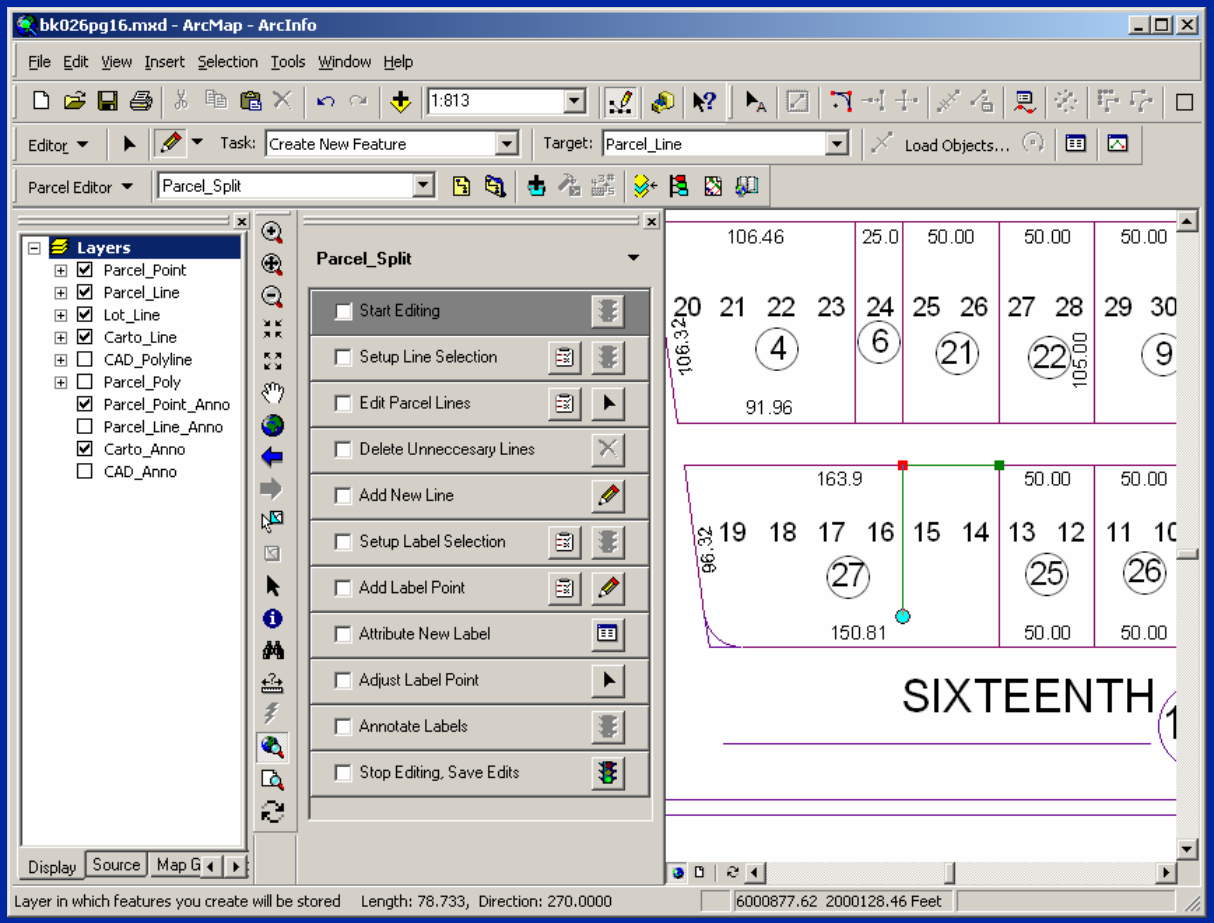
4) Choose workflow



Best Practices

Editing Steps

5) Edit assessor page geodatabase



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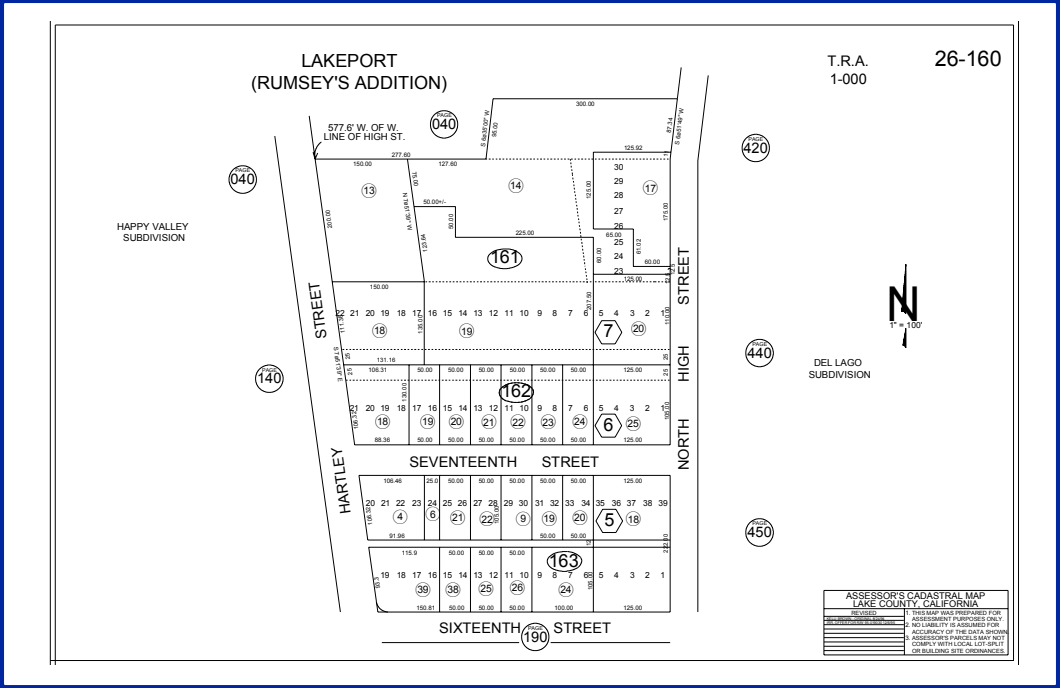
Editing Steps

6) Print new assessor page

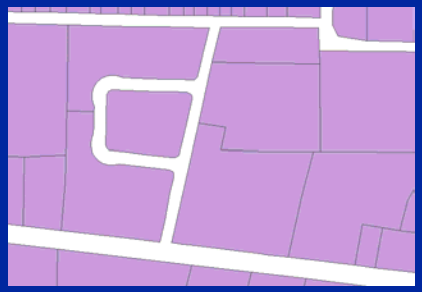


Best Practices

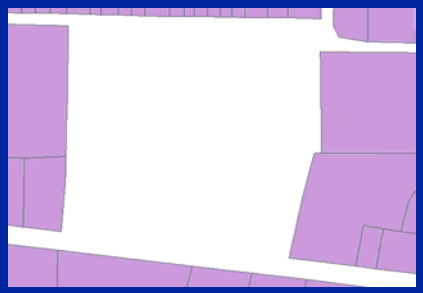
Editing Steps

7) Updating Parcel Layer with Assessor Geodatabase features

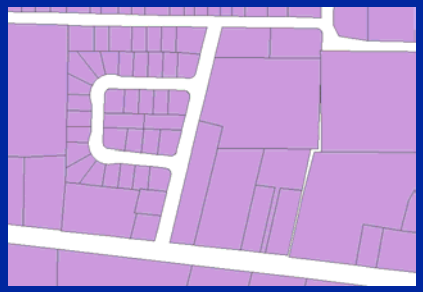
Initial Parcel Layer
(without new subdivision)



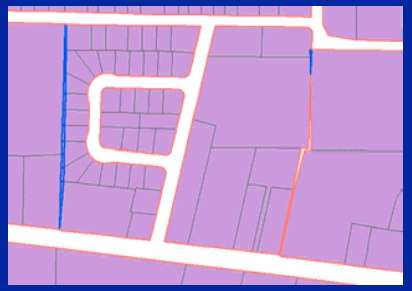
Delete old boundaries
and polygons



Add new boundaries
from Assessor page



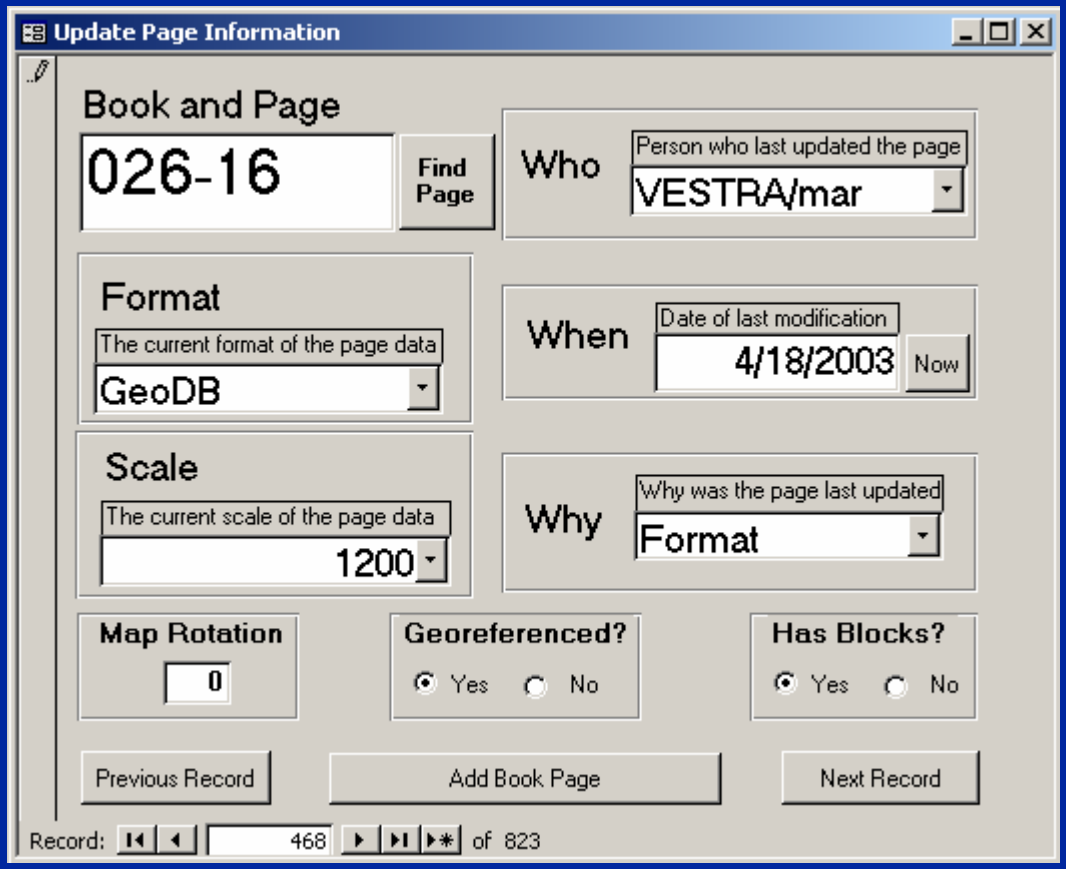
Use topology to fix
errors and
construct polygons



Best Practices

Editing Steps

8) Update Status Database



Best Practices

Do What Works!!