Clackamas County
Tax Lot Mapping Strategic Plan
January 2003

I. Introduction and Background:

Clackamas County is relatively new to GIS, using this technology since 1994. One of the first layers to be produced was the representation of the ownership or tax lot layer based on the mylar maps produced by the County's Assessor's Office. Through the use of in-house staff, consultants, and outside contractors, a tax lot layer emerged and has been maintained faithfully ever sense. Over the years, as demand for GIS products grew, so did the need to increase the relative accuracy and mapping precision of this layer. Prior to ORMAP's conception, the County and a few of the jurisdictions within the County began an effort to vastly improve the relative accuracy of the ownership tax lot GIS layer. In 1999, the City of Lake Oswego and the County embarked on a re-mapping project utilizing Coordinate Geometry (COGO) data capture and high precision surveyed ground control to map tax lots. Also in 1999, the City of West Linn joined the re-mapping effort but had limited resources for ground control. Instead an experiment to use digital orthophotography with 6 inch pixel resolution was to rectify tax lot captured by COGO. This method proved to be very successful.

With the increased use of technologies such as GPS and digital orthophotography, the demand to re-map tax lots in other jurisdictions quickly increased. By partnering with ORMAP, the County Surveyor Office, and several of the cities and special districts in the County, we are beginning to accomplish our goal of complete tax lot re-mapping to ORMAP Goal 4 standards (see ORMAP Goal 4 Standards at www.ormap.org).

This project will take Clackamas County several years to complete. It is very complex and requires to cooperation and coordination of numerous county departments. This strategic plan will serve as guidance to efficiently complete this project.

II. Current Status of the Tax Lot Layer, Mapping Efforts, and Production Details:

Though Clackamas County has a robust GIS and has made every effort to maintain an accurate and comprehensive GIS tax lot layer, there are several challenges ahead. Here is the current status of tax lot mapping in the County.

- GIS Tax Lot Layer: A complete GIS digital tax lot layer has existed in the county for a number of years and conforms to ORMAP Goal 2. Based on the mylar tax maps the County Assessor continues to use, GIS personnel used heads up digitizing methods to capture line work in a GIS digital format. Two systems are

actively used in Clackamas County. While the digital GIS layer in continually maintained, so is the hand produced mylar tax maps created by cartographers in the Assessor's Office. The structure of the two systems in similar in that the GIS tax lot data layers are stored as section tiles in the Arc/Info GIS software as most Assessment maps are in section size.

The GIS Division of Clackamas County's Information Services Department has the primary responsibility to create and maintain all GIS data, including the tax lot layer. We receive new plats or other actions that affect tax lots from the Assessor's Office to be inputted into the GIS. COGO is used to update and maintain the current GIS tax lot layer.

- Status of Tax Maps to ORMAP Standards: The strategy for remapping tax lots in Clackamas County is to strive for Goal 4 standards. We are combining the requirements of Goal 3 with Goal 4. This strategy maximizes the resources available to strive for the final goal. The County measures its progress in terms of number of tax lots completed rather than the number of tax maps. To date, the Clackamas County Assessor is deferring the use of digital GIS information to create tax lot maps.

  To conform to all ORMAP data standards, Clackamas County utilizes ESRI GIS software products. Data to generate the tax lots using COGO techniques comes directly from originally filed surveys. Drafted tax lot maps from the Assessor's Office are not used directly to mitigate any errors that might be found on those maps. Once maps are created, they are rectified to the best available ground control. The County's remapping strategy is to capture the 78,000 tax lots in the urban areas first. This is the bulk of the tax lots and where more modern survey information exists. To date, the cities of Lake Oswego, West Linn, Oregon City and Molalla have been completed. The current effort is concentrating COGO remapping efforts in the cities of Milwaukie and Happy Valley as well as the urbanized unincorporated areas around those cities. As cities are completed, they are placed in our centralized GIS libraries and maintained as necessary. Once the urban areas are completed, the 58,000 rural tax lots will remapped using a combination of COGO techniques and raster to vector conversion using new tools in ArcScan. These tax lots will be rectified to any available surveyed ground control and/or high precision digital orthophotos that were acquired with the help of ORMAP funding.

  Thus far, all remapped tax lots conform to ORMAP Goal 4 standards. As of January 2003, 36, 800 tax lots were completed and rectified to the best available ground control. This accounts for 27% of the 136,000 tax lots in the County. In addition, another 12,360 are completed but not quality checked and 13,600 are currently under construction. This effort has been accomplished in the 40 months since precision tax lot remapping began.

Below is a summary of the completion of tax lots to ORMAP standards:

Urban Tax Lots	
Tax Lots Completed (COGO and rectified)	36,800 (47%)
Tax Lots Completed but missing a minor element	2,350 (3%)
Tax Lots Completed but not Quality Checked	12,360 (16%)
Tax Lots Under Construction	13,600 (17%)
Tax Lots Not Begun	12,987 (17%)
Total Urban Tax Lots	78,097 (100%)
Rural Tax Lots	
Tax Lots Completed	0
Tax Lots Not Begun	58,000 (100%)

As you will note, Clackamas County assesses its progress through the number of tax *lots* completed and not the number of tax *maps*. No digitally created tax maps are being used at this time and hence, we have know way of providing statistics on the number of tax maps that would be created by the tax lots completed. Please note, however, that once tax lots are completed, they immediately fall into a maintenance status and updates are made with COGO processes as needed.

III. Tax Lot Remapping Process and Strategic Approach:

The fundamental objective of ORMAP is to build a State-wide GIS tax lot layer to a level of accuracy and detail to theoretically replace the traditional drafted tax lots maps. To accomplish these goals, Clackamas County has teamed with Multnomah and Washington Counties to develop a regional tax lot GIS layer that will fit into the State-wide effort. The primary regional strategies are to resolve County boundary issues; insure spatial tax lot data is compatible with the shared system, namely shapefile formats; use a common datum for a regional solution; and to support each County's efforts in mapping their tax lots to ORMAP Goal 4 standards. Thus far, this strategy is producing very favorable results.

The successful completion of tax lot remapping to ORMAP Goal 4 standards will require the cooperation of several agencies within the County. Thus far, this project is being assisted by the County Surveyor in providing scanned images of the plats and surveys to aid in the capture of tax lots through COGO techniques. The Surveyor also is actively acquiring high precision ground control in which to rectify the mapped tax lots. The Assessor's Office has been assisting in providing their hand drafted tax maps for quality control checks. However, because of the County's limited resources dedicated to GIS, and especially to the ORMAP project (1.0 FTE), we have had to rely on our outside contractor, the Oregon State Department of Correction, Engineering Support Unit (ESU). This group is been very instrumental in the success of our remapping efforts. ESU is very well versed in the capture of tax lots using COGO and the combining plats in

preparation to rectification to ground control. ESU has a very professional staff overseeing the work, including a licensed land surveyor. The inmates working on our project have been well trained and very qualified to be doing the work. Very few errors have been found in our quality control reviews.

For the most part, ESU is utilized to use COGO to map tax lot based exclusively on surveyed plats, surveys, or other recorded documents describing the legal description of tax lots. No drafted Assessment maps are used as authoritative sources for mapping tax lots. Very detailed procedures are detailed in Attachment 'A'. Also, it should be noted that no rubber sheeting or other adjustments to the COGO mapped tax lots are done. Major conflicts between what is mapped and how it appears when rectified (i.e. gaps and overlaps between plats, subdivisions, etc.) are left to surveyors to resolve.

Once tax lots are captured through COGO methods, the Surveyor's Office comes into play. Currently the County Surveyor is actively determining very accurate ground control via the corner restoration program. To date, 34 ground control points suitable to use for plat rectification have been surveyed. In addition, the County has completed the National Geodetic Survey and have monumented some 59 points to extremely high precision. The Surveyor's Office is in the process of setting up an RTK network to greatly speed up the process of acquiring control points using survey quality GPS. In addition, the cities of Lake Oswego and Oregon City have provided surveyed ground control that exceeds ORMAP standards. As for BLM GCDB points which may be suitable for some rural tax lot mapping, it is unclear how many points have been mapped in Clackamas County.

The preceding accounts for the process used to map tax lots in urban areas, those areas within the designated Urban Growth Boundary. The following describes the proposed method to remap tax lots to ORMAP standards in rural areas. ORMAP rural tax lot mapping standards are more relaxed than urban areas. As such, a different method will be used to map these parcels. Planned is a combination of COGO mapping where clusters of modern surveys exist and using GIS software technology to convert scanned information from raster to vector then rectifying the resulting tax lots to available ground control, hopefully surveyed section corners. Digital orthophotography acquired in the summer of 2002, with the help of ORMAP discretionary funding, will be used to help rectify tax lots. Also, when necessary and as a last resort, tax lots will be mapped using heads up digitizing. The most time consuming portion will be the annotation of tax lot dimensions and other assessment map information. OCR technology is improving dramatically for GIS use and will be used to capture text off the scanned documents. The OCR technology will have the greatest impact in that annotation will be the most time consuming part of the rural tax lot mapping process.

IV. Project Timeline

While Clackamas County has accomplished significant progress remapping tax lots, many more years will be required to complete ORMAP Goal 4. Based on current resources and funding, we estimate completion in 2009. Thus far, we have remapped or

in the process or remapping 65,110 tax lots (47%) of the total. However, half of that amount has been rectified to ground control. Acceptable ground control is lacking in the County and will be a significant factor in the timeline to completion. It is hoped that RTK GPS technology, once implemented, will alleviate this backlog.

While production estimates for each year are in place and thus far have been meeting those benchmarks, factors that can adversely affect the successful outcome of this project need to be mentioned. First, and most importantly, is a funding issue. The County is currently experiencing a severe decrease in revenues. The budget for ORMAP tax lot mapping has already been affected. In 2001, the budget was cut 50%. In 2002, the budget was cut an additional 30%. This year we are projecting a modest increase in the budget for tax lot mapping but only as a match for ORMAP funds. If ORMAP funds to the County is reduced (i.e. a change to the allocation formula) County funding will decrease proportionately. Second, we rely heavily on ESU to work on our project. Though we do not anticipate any changes to the structure or availability of this organization, their future is well outside our control.

We have developed many tools to track the progress of our mapping efforts. Levels of completion are mapped monthly and reviewed with all stakeholders, especially the County Assessor and Surveyor. These review sessions also identify any potential issues and resolution to problems. Finally, we are in the process of developing a plan with the Assessor to begin to migrate GIS produced tax maps to replace the drafted maps.

Attachment A

Project Specifications
For
Clackamas County

Scope of Project

ESU will digitally convert plats, surveys, and partition plats using Coordinate Geometry (COGO) techniques outlined in the original scope of work. The items below will supersede any conflicting language. ESU will create a tax lot cover using ground control provided by Clackamas County. The Assessor's Tax Lot maps will be the models for each tax lot section.

Plats Digitizing

1. Clackamas County will provide plats in a tiff file with a resolution of 400 dpi.
2. ESU will digitize the plats using Coordinate Geometry techniques.
3. The tolerances for plat closure for the plats are as follows
   - For plats done before 1993: a relative error of 1:5000

- For plats done 1993 and after: a relative error of 1:10000

4. If the plat does not close with the above tolerances, ESU will ask the County for Clarification
5. If there are easements in the plats, ESU will digitize them using Coordinate Geometry Techniques.
   - The easements will be provided in an Arc/Info export Files.
6. The plat will be delivered to Clackamas County in an Arc/Info export files.
7. The following annotation will be included in the plats cover: dimensions, lot and block numbers, street name, street width, plat name, and plat number.

Tax Lot Cover Creation

1. Clackamas County will provide digital copies of the Tax Lot Maps.
2. Clackamas County will provide a dbase file containing the tax lot number and deed number
3. Clackamas County will provide the necessary ground control for the project.
4. ESU will append the plats and partition plats
5. ESU perform lot line adjustments
6. The metes and bounds will be fitted within and around the platted information
   1. The metes and bounds information will come from the Tax Lot Maps
   2. Maximum acceptable closure error is 3-ft.
   3. If there is not enough information, ESU will provide a list to the county with the following information: map number, tax lot number, survey number (if on map), and deed number.
   4. If the county cannot find enough information, the lines may be digitized at the discretion of the county.
7. If any lines are adjusted made to fit, or digitized, that will be documented in anno.note.
8. In the cogosource item, the source of the line will be documented. The plat number, deed number, survey number, partition plat number, tax map number, or digitized may be used in this field.
9. Lot lines that are deleted because a lot lines adjustment will be placed in a history cover.
10. The annotation that is deleted because of a lot line adjustment will be placed in a history cover
11. For Clackamas County Service District 1, the easements will be placed to match the tax lot cover. The easements will be placed in a cover titled Easements.