

**COUNTY PARCEL, LAND USE & SOIL EXTRACTION PROJECT OUTLINES**

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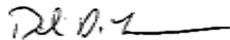
I have constructed the following project outline to provide the Nebraska State Records Board the supplemental information it requested, regarding project goals and related technical information.

This scope of work includes:

- Project descriptions
- Project Assumptions and Procedures
- Data Standards
- Project Deliverables
- Data Access

Please feel free to contact me with any questions you may have, or to request additional information.

Sincerely,



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## PROJECT DESCRIPTIONS

The counties of Arthur, Blaine, Grant, Hooker, Logan, and McPherson (Nebraska) are seeking assistance with the incorporation of recently updated Natural Resources Conservation Service (NRCS) Soil Survey Data into current property assessment software (TerraScan & MIPS), thus allowing the counties to achieve compliance with Neb. Rev. Stat. Sec. 77-1363, requiring:

Agricultural land and horticultural land shall be divided into classes and subclasses of real property under section 77-103.01, including, but not limited to, irrigated cropland, dryland cropland, grassland, wasteland, nurseries, feedlots, and orchards, so that the categories reflect uses appropriate for the valuation of such land according to law. Classes shall be inventoried by subclasses of real property based on soil classification standards developed by the Natural Resources Conservation Service of the United States Department of Agriculture as converted into land capability groups by the Property Tax Administrator. County assessors shall utilize and implement soil surveys in the assessment year after the soil survey maps become available from the Natural Resources Conservation Service of the United States Department of Agriculture. Nothing in this section shall be construed to limit the classes and subclasses of real property that may be used by county assessors or the Tax Equalization and Review Commission to achieve more uniform and proportionate valuations.

Source: Laws 1985, LB 271, § 8; Laws 1988, LB 1207, § 5; Laws 1989, LB 361, § 17; Laws 1991, LB 320, § 9; Laws 1994, LB 902, § 19; Laws 1995, LB 490, § 139; Laws 1997, LB 270, § 81; Laws 1999, LB 403, § 7; Laws 2001, LB 170, § 15; Laws 2004, LB 973, § 30; Laws 2006, LB 808, § 36.

To help the counties achieve their goals, GIS Western Resources, Inc. will utilize Geospatial Information System (GIS) tools and geospatial models to:

1. Extract parcel, section, and land use boundaries.
2. Calculate the total area of each NRCS Soil Survey type for each parcel land use.
3. Assign Land Capability Group (LAND USE or LVG) codes to each land use based on intersecting soils, using customized geospatial models.
4. Incorporate updated land use and soil databases into existing property assessment software (TerraScan/MIPS).
5. Export and integrate parcel land use and soil maps into reports using Microsoft Access Parcel Report Generator developed and provided at no additional cost by GIS Western Resources, Inc.
6. Ensure that all extracted data (parcels, sections, and land use) meet Nebraska Information Technology Commission (NITC) Geospatial Metadata and Land Record Information and Mapping Standards.
7. Export parcel and land use layers to formats (.kml) that can be used in open source mapping applications such as Google Earth and ArcExplorer.

**PROJECT ASSUMPTIONS & PROCEDURES**

This project outline is based on the following assumptions.

1. All parcel boundary, land use boundary, and soil extraction and acreage calculations will be performed by GIS Western Resources, Inc. Following project completion, datasets will be maintained by GIS Western Resources, Inc. at an hourly rate. All updated information (TerraScan/MIPS updates, and parcel soil and land use maps) will be remotely loaded into existing databases by GIS Western Resources, Inc.
2. To assist with parcel and land use boundary extraction and decrease the overall cost of the project, the assessor office's will provide GIS Western Resources, Inc. with all sources pertaining to the delineation of current property boundaries, including but not limited to:
  - a. Recent property assessment reports
  - b. Cadastral maps
  - c. Surveys
  - d. Past county soil surveys
  - e. Plat maps
3. To assist with conversion from existing soil codes to current NRCS soil codes, county assessors will provide GIS Western Resources, Inc. with a Microsoft Excel spreadsheet containing the most current soil conversion information.
4. GIS Western Resources, Inc. will acquire the following data required for parcel boundary, land use boundary, and soil extraction:
  - a. Natural Resources Conservation Service / United States Department of Agriculture, National Agriculture Imagery Program County Mosaics (2003 through 2007), Digital Ortho Quad County Mosaic, and enhanced Digital Ortho Quad imagery.
  - b. Natural Resources Conservation Service, SSURGO Soil Survey Spatial and Tabular Data (2008).
  - c. Nebraska Department of Roads, General Highway Maps (1999).
  - d. United States Geological Survey (USGS) 1:24,000 topographic maps.
  - e. Nebraska State Surveyor's Office GLO Original & Resurvey Plat Maps, and Bureau of Land Management (BLM) surveys.
5. Prior to project initiation, GIS Western Resources, Inc. and county representatives (county assessors) will construct a Standard Operating Procedure that will provide guidelines for project initiation, execution, and completion.
6. GIS Western Resources, Inc. will provide county officials and the Nebraska State Record Board with periodic reports outlining project progress. This report will also identify any potential problems which might affect project completion.
7. GIS Western Resources, Inc. will integrate the extracted soils database into the current property assessment software (TerraScan or MIPS), with technical assistance from the software provider. **Counties will be responsible for any charges the software provider might implement for integration of the updated soils database.**

8. To minimize cost, GIS Western Resources, Inc. will provide each county with a customized Microsoft Access Parcel Report Generator (assuming that suitable hardware/software is available to run the program), so that county officials and landowners can generate and review updated parcel soil reports. Following review and verification of each parcel summary, all summaries will be provided to the county assessors for attachment to assessment files and parcel records, and for dispersal to the public. Each county will be allowed to retain the Parcel Report Generator following project completion to generate parcel soil and land use maps and reports for customers.
9. All data generated will be non-propriety and will be distributed by each county. Data can be distributed to the public as Parcel Reports (including land use and soil maps), or as .kml or .shp files that can be utilized in open source mapping applications such as Google Earth and ArcExplorer. Requests for data would be submitted directly to each county.
10. GIS Western Resources, Inc. will make every effort to complete all projects by December 31, 2009. GIS Western Resources, Inc. will contact the client if issues arise that will prevent the project from being completed by the established deadline.
11. Copies of the parcel, land use, and soil databases will be kept at GIS Western Resources, Inc. main office (109 E 2<sup>nd</sup> St. Suite 2, North Platte, NE 69101) for backup and maintenance purposes.

## DATA STANDARDS

Data will be extracted/formatted according to Land Record Information and Mapping, and Geospatial Metadata Standards.

1. All original datasets (parcel and land use) will be assigned the following datum and projection information when database is created:
  - Projected coordinate system: NAD 1983 State Plane Nebraska FIPS 2600 (Feet)
  - Geographic coordinate system: North American Datum 1983, North American Vertical Datum 88.
2. Primary corners for each county will be identified and used to verify county jurisdictional boundaries. Identification of primary corners will be conducted using one of the following methods:
  - a. GIS Western Resources, Inc. will use a Global Positioning System (GPS), to record geographic coordinates of existing section markers (if available).
  - b. County surveyor will survey and mark the corner of the county boundary and then make the geographic location of the marker available to GIS Western Resources, Inc for incorporation into county parcel datasets.

3. GIS Western Resources, Inc. has conducted thorough research to identify the best data available for identifying section boundaries, which will then be used for parcel boundary extraction. Mr. Steven Cobb of the Nebraska State Surveyor's Office was contacted to determine the best available source of PLSS data for the region (Sandhills) in which the counties reside. Mr. Cobb stated that most section boundary markers within the region have been lost or buried throughout the years, and the best dataset available for section boundary identification in the Sandhills region is the United States Geological Survey's (USGS) 1:24,000 scale Topographic Maps. He also stated that caution should be taken when using the USGS Topographic Maps due to inaccuracies in the data. The USGS was contacted regarding the topographic map datasets, and verified that the maps were created using original GLO surveys, but that the maps are not to be considered "legal documents" identifying section boundaries. The Nebraska State Surveyors Office has original GLO and Resurvey Maps available for the region, however, the accuracy of these maps is unknown.

Current PLSS section boundary geospatial datasets published by the Nebraska Department of Natural Resources (DNR) will not be used in parcel boundary extraction because the datasets were created by digitizing the SE corner of each section and then using these points to construct a polygon representing the four corners of each section. This procedure did not take into account section offset between township, range, and county boundaries, resulting in angled and inaccurate section boundaries. In addition, it is believed that the data was extracted at a much smaller scale (1:50,000 or 1:100,000), resulting in reduced accuracy. The Nebraska DNR was contacted regarding the PLSS data, and confirmed the potential inaccuracies in the PLSS section dataset.

Due the known inaccuracies of existing geospatial data sources, GIS Western Resources, Inc. will use GLO surveys, resurveys, and known section marker locations as the primary sources for identifying section boundaries, and will utilize USGS 1:24, 000 Topographic Maps for "general" comparison purposes. The area (acres) of each extracted section boundary will be calculated and compared to the "recorded" acreages that each county assessor has on file. Extracted sections will only be considered "acceptable" if their calculated acreages that are within +/- 1% of the total "recorded" acres. Unacceptable sections will then be reviewed by GIS Western Resources, Inc. and the individual county to resolve the error. Sections containing errors that cannot be resolved may require the county to request a resurvey of the boundary.

4. Parcel data will be extracted using legal descriptions provided the county assessor's offices, and the extracted section boundaries. Extracted parcels will only be considered

“acceptable” if their calculated acreages that are within +/- 1% of the total “recorded” acres. Unacceptable sections will then be reviewed by GIS Western Resources, Inc. and the individual county to resolve the error.

5. The most current Aerial imagery (NRCS/USDA NAIP county mosaics, USGS DOQs, etc.) and current county assessor land use descriptions for each parcel will be used to extract all land use information. Imagery will also be used as a “general” guide to gage the accuracy of parcel boundaries by comparing extracted boundaries to features such as roads and fence lines.
6. Datasets will be extracted between 1:4,800 and 1:9,600 scale for rural areas, and 1:1,200 scale for towns and villages. Plat maps and county surveys of both rural and urban areas will also be used to increase data accuracy where available.
7. The parcel, land use, and section data will be collected and stored in a “master” file geodatabase. From this “master” database, data can be exported to other common formats (.shp, .kml, personal database, etc.), for use in open source GIS applications.
8. Parcels and lots will be assigned a unique identifier as defined by each county. All of the counties currently use parcel and lot identification numbers, which are stored in TerraScan and MIPS assessor software databases. All other attribute data that is stored in TerraScan and MIPS databases will be joined to the datasets using the parcel and lot identification numbers.

## **DELIVERABLES**

GIS Western Resources, Inc. will provide each county with the following deliverables:

1. Database containing updated soil acreages, land use acreages, and land value codes for each county parcel, and formatted so that it can be loaded into existing TerraScan and MIPS assessor software.
2. Section boundary geodatabase.
3. Parcel boundary geodatabase (attributed and projected NITC Geospatial Metadata and Land Record Information and Mapping Standards).
4. Land use boundary geodatabase.

5. Microsoft Access Parcel Report Generator for reviewing parcel, land use, and soil data, and for creating parcel summaries, which include parcel land use and parcel soil maps and acreage summaries for each parcel.

## **DATA ACCESS**

The manner in which project related geospatial datasets (parcel boundary, land use boundary, and section boundary datasets) and databases are distributed will be up to the individual county.

However, it is proposed that the counties consider the following recommendations for data distribution to the public.

1. Requests can be submitted directly to the county assessor's office or to GIS Western Resources, Inc. Upon receiving a request, compact disks containing geospatial datasets or databases will be mailed to or be made available for pickup at the county courthouse or at GIS Western Resource's main office.
2. Datasets can be freely downloaded by the public from established File Transfer Protocol (FTP) web services and county websites. Counties have the option to subscribe to online web hosting services to establish FTP accounts for dataset storage, and create county websites containing hyperlinks to FTP sites that host the datasets. This would provide open access to geospatial datasets to the public for download without having to request the information from the county assessor's offices or from GIS Western Resources, Inc. As datasets are updated, they can be loaded by the site manager to the FTP site to ensure that the most current data is available to the public.