A grant application submitted to the

Montana Land Information Act (MLIA) Grant Program

by

Carbon County

February 14, 2014

Primary Applicant:

Name of principle individual**: John Grewell, Chairman**

Name of agency\entity: **Board of Carbon County Commissioners**

Street: **17 W 11th St, PO Box 887**

City: **Red Lodge**

County: **Carbon**

State: **Montana**

Zip Code: **59068**

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Date Submitted (Required):	Date Received by State:
February 14, 2014	

Descriptive Title of Applicant's Project (Required):

Enhancement of Geodetic Control in Carbon County

1. Relevance and Public Benefit

Montana's cadastral framework layer is based on the Bureau of Land Management (BLM) Geographic Coordinate Database or GCDB (now referred to as CadNSDI). This database is known to be spatially inaccurate in some areas of Carbon County. The Clarks Fork Valley, encompassing the communities of Belfry, Bridger, Fromberg and Edgar, is an area where the accuracy of the CadNSDI is especially poor. For example, in Township 4 South Range 23 East, the majority of the geodetic control has an estimated positional error of 50 feet or more (Figure 1.). As the result, the positional error of the cadastral layer in the City of Fromberg has been measured to be over 200 feet (Figure 2).

These inaccuracies are especially problematic when more spatially accurate data is overlaid on the cadastral framework in the GIS. These offsets often confuse non-GIS users and may produce inaccurate results when analyzing data which rely on accurate horizontal alignment.

The solution to this problem is to acquire better survey control using Global Navigation Satellite System (GNSS) technology and to contribute this enhanced control to the geodetic control framework. This will ultimately increase the accuracy of the cadastral and other Montana Spatial Data Infrastructure (MSDI) framework layers.

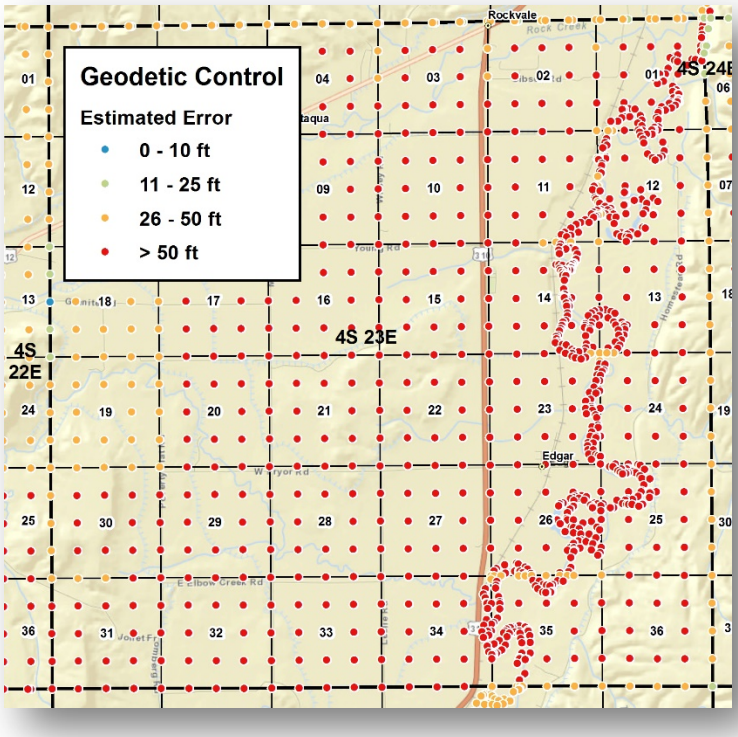


Figure 1. Estimated positional error of survey control in T4SR23E.

This solution directly ties to the FY14 Land Plan Priority B1.1 in which MSDI data partners contribute to statewide framework data. This project will result in the collection of more accurate survey control which will advance the MSDI and benefit federal, state, local government and private interests in the following ways:

1. **Improve the MSDI geodetic control framework layer**

   GNSS positioning of existing survey monuments will be completed as part of this project and new, more accurate coordinates will be contributed to the Multistate Control Point Database (MCPD). The positioning of approximately 200 Public Land Survey System (PLSS) corners will be improved which will benefit the geodetic control framework. In addition, this project will benefit the BLM and future efforts to enhance the CadNSDI. It will also benefit the MT Department of Transportation doing highway work along Highways 72 and 310. Finally, more accurate survey control will benefit private firms doing survey work in the Clarks Fork Valley.

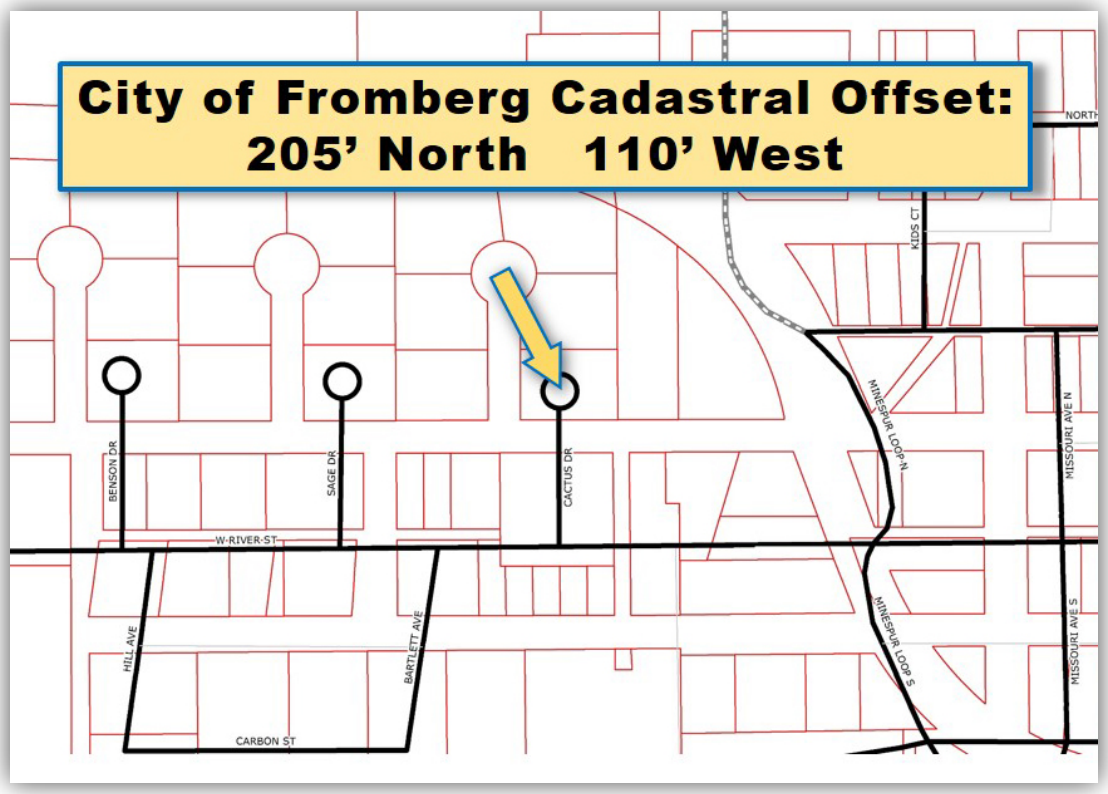


Figure 2. Map showing current cadastral offset in the City of Fromberg.

2. Improve MSDI cadastral framework layer

Geodetic Control supports accurate horizontal placement of the MSDI cadastral framework layer that is maintained by the Montana State Library (MSL). More accurate cadastral data will directly benefit the MT Department of Revenue in dealing with property assessments (see attached DOR letter of support). Improved cadastral data will also benefit the County in many ways. The cadastral layer is used by the County to develop many other GIS layers such as voting precincts, commissioner districts, emergency service zones, fire districts, zip code boundaries and others. Improvements to the cadastral layer will contribute to the accuracy of all derivative GIS layers. This will benefit not only the County, but property owners in the County and the many public interests that use the Montana Cadastral Map Viewer.

3. Improve additional MSDI framework layers such as boundaries, orthoimagery and hypsography

Boundaries for the County, cities and towns, school districts and other special districts will improve with the addition of more accurate geodetic control. Spatially accurate boundaries will benefit the County and the communities of Clarks Fork Valley including Bridger, Fromberg, Edgar and Belfry. MSDI's orthoimagery and hypsography framework programs will also benefit from the improved geodetic control provided by this project.

4. Establish collaborative partnerships between the GIS and surveying communities in Montana

The local surveying community will benefit from the additional PLSS survey control collected as part of this project. Improved coordinates for survey monuments will be available as part of the MCPD and new PLSS corner records will be filed and kept in the Carbon County Clerk and Recorder's Office for future reference by land surveyors and the public.

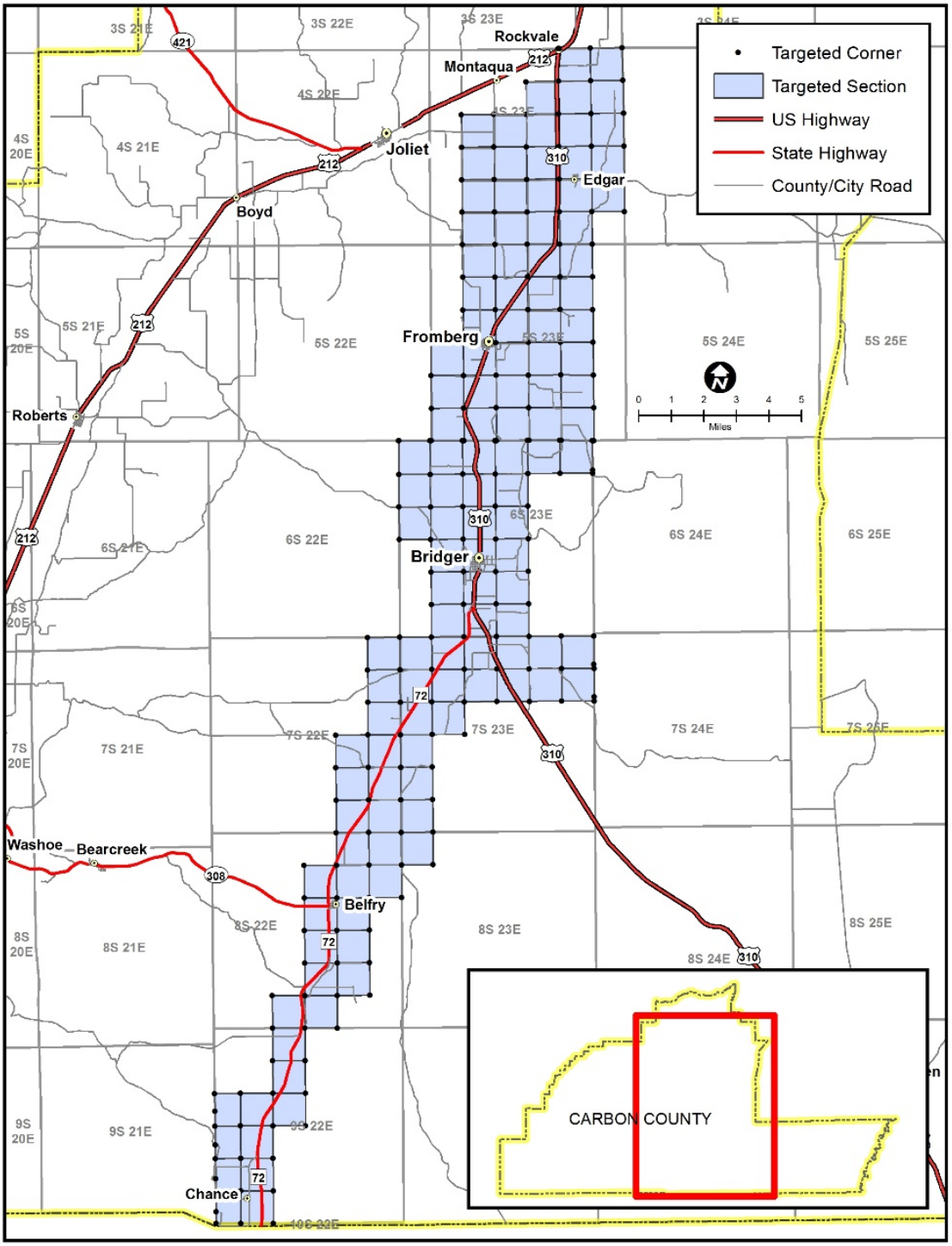


Figure 3. Preliminary selection of sections (125) and section corners (200) to be surveyed as part of this project.

2. Scope of Work

2.1. Goals and Objectives

Project Goal. Improve the spatial accuracy of geodetic control in the Clarks Fork Valley of Carbon County.

Objective 1: Finalize scope of work. The initial plan is to survey 125 sections (200 section corners; 4 per section) along Highways 310 and 72, extending from the Wyoming state line to Rockvale (Figure 3). This area follows the Clarks Fork of the Yellowstone River and is referred to as the Clarks Fork Valley. These 125 sections were selected based on 1) structure (population) density, 2) existing road infrastructure, and 3) estimated PLSS error. The County will prioritize data collection for this area in the event contractor bids are higher than expected.

Task 1.1 Carbon County will prioritize PLSS corners for collection and develop a final scope of work.

Deliverables:

- Scope of work document
- Maps that prioritize data collection

Objective 2: Contract with registered land surveyor to collect PLSS corners.

Task 2.1 Carbon County will create and advertise an Invitation to Bid
Task 2.2 Carbon County will review bids and select contractor

Deliverable:

- Signed contract with registered land surveying firm

Objective 3: Research and prepare for field work

Task 3.1 Contractor will research survey documents (corner records, plats, existing surveys, etc.) to ascertain if PLSS control has been previously collected and is publicly available.
Task 3.2 Carbon County will produce field-ready maps for collection area that identify PLSS corners to be collected differentiating those with and without corner records. Maps will contain PLSS, land ownership, water features, road centerlines and other relevant data.
Task 3.3 Contractor will develop a data collection plan based on their estimation of the ease of coordinate collection, availability of existing coordinates, and relative existing accuracy of corners.
Task 3.4 Carbon County will produce and provide a letter for use by the Contractor to serve as an introduction to landowners as to the purpose of the project

Deliverables:

- Document describing collection plan
- Field maps of collection area
- Letter describing project Intent

Objective 4: Collect/obtain approximately 200 PLSS corner locations

Task 4.1 Collect survey data. Contractor will collect, or obtain from existing sources, coordinate positions on all points designated in the collection plan. Coordinates collected by the Contractor will have a certifiable accuracy of less than 1 foot using either Real Time Kinematic (RTK) or post-processed GNSS data.

Contractor must be able to certify an accuracy for coordinates obtained from other sources, however that accuracy may not greater than 1 meter.

Deliverable:

- Certification by land Surveyor stating that all points collected or obtained from other sources meets accuracy requirements defined by this project.

Objective 5: Submit collected data.

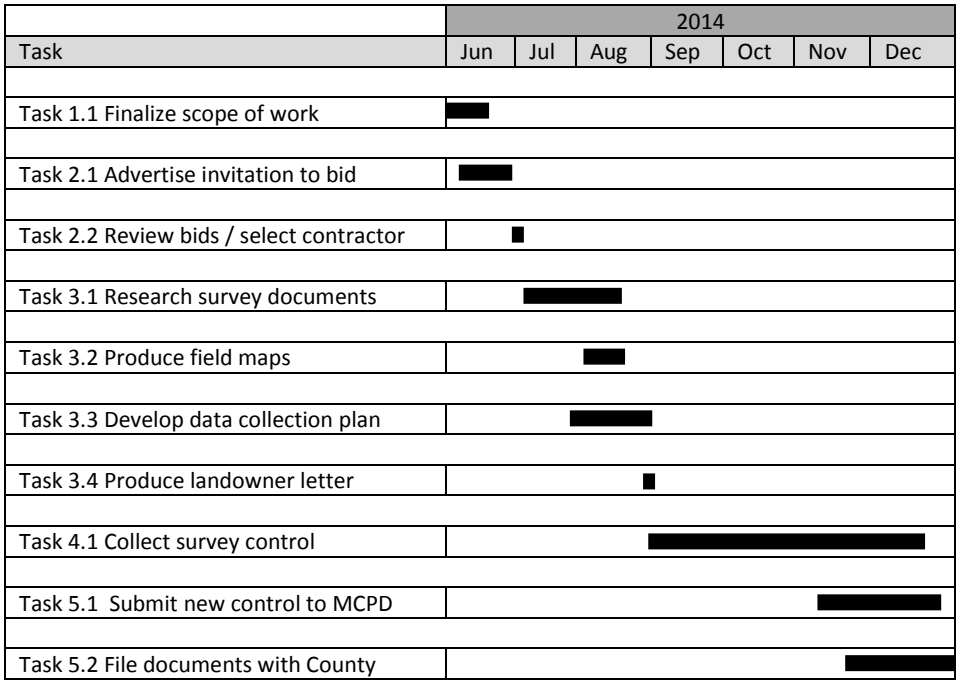
Task 5.1 County and contractor will work collaboratively to submit all metadata on collected or obtained points in a format that meets the specifications of the Multistate Control Point Database (MCPD). The coordinates and metadata will be entered into the MCPD input spreadsheet to meet the specifications of the database.
Task 5.2 Contractor will deliver new/updated corner recordation forms with the Carbon County Clerk & Recorder

Deliverables:

- Coordinates and accompanying metadata entered in the MCPD Input spreadsheet
- Corner documents are recorded at County

2.2. Project Schedule

This project has a planned duration of seven months starting in June and ending in December 2014. The following timeline shows the duration (by month) of the ten planned tasks.



3. Project Management and Organization Capability

Carbon County has the project management and organizational capacity needed to complete this project on time and within budget. The following individuals offer a unique combination knowledge, technical skills and experience necessary to accomplish the objectives and tasks outlined in this proposal.

Tom Kohley – Project Manager / GIS Specialist. The County is supported by Tom Kohley, a contractor who has provided GIS services for the County for the past eight years. Mr. Kohley has 22 years of GIS experience and is registered as a GISP. He has developed nearly all the GIS databases for the County and is familiar with land records management at the County. He has also worked over two years for a local land surveying firm and is knowledgeable with the public land survey, CadNSDI, survey control and monumentation. Mr. Kohley has managed four previous MLIA grants for both the County and the City of Red Lodge and is very familiar with the scope and grant requirements of the program. Mr. Kohley will serve as project manager and will provide GIS support to the contracted land surveying firm as necessary.

Angela Newell – Administrative Assistant to the Commissioners. Ms. Newell will serve as grant administrator and will be responsible for integrating the grant money into appropriate County budgets, preparation of grant reimbursement paperwork and final closeout of the grant in accordance with state and county standards. Ms. Newell has served as Administrative Assistant to the Commissioners for over 2 years. During that tenure she has administered several grants for the County including CTEP, TSEP, COPS, RTP and FEMA. She also administered the County's 2011 MLIA grant entitled, "*Development of an Emergency Notification System For Carbon County*". Ms. Newell successfully completed the Grant Writing USA workshop on grant management in 2013.

Marcia Henigman – Clerk & Recorder. Ms. Henigman will assist the project manager and the surveyors in researching plats and corner records prior to field season. She will also be responsible for filing the completed corner records upon project completion. Ms. Henigman is the Clerk & Recorder for the County and has been with the County for 11 years. She worked at a private title company for seven years prior to joining the County. She is responsible for administering records for the County including all plats, titles, deeds, mortgages, and right-of-ways. She is familiar with land survey principles and is a frequent user of the State's cadastral Web map.

4. Budget Justification Narrative and Tables

The total budget for this project is $64,050 with $33,000 being requested from the MLIA grant program. The applicant will contribute and a cash and in-kind total of $31,050 towards the project.

MLIA Share. The majority of the MLIA share ($30,000) will be used to update survey control using a contracted, registered land surveyor. We estimate that 200 survey control points can be updated at a cost of $300 per point. This estimate is based on MLIA work completed in Yellowstone County in 2009 and 2013 and also from recommendations provide by experienced local land surveyors knowledgeable of the terrain and existing survey control in the Clarks Fork Valley. We anticipate that some undocumented corners will require additional time to research, locate and collect positions – resulting in a higher cost per point. However, for some section corners it may be possible to collect positions of monuments using a mapping-grade GNSS receiver and post-processing of positions (now approved by MSL and BLM) as long as they meet the accuracy standards of 1 foot or less. Use of mapping-grade GNSS may help offset the additional cost of collecting undocumented corners.

$2800 of MLIA grant money will also be used to pay for project management and GIS support (Tom Kohley). Tom will coordinate the overall project, oversee procurement procedures, act as a liaison to the land surveyors, create field maps and assist with submission of new control to the MCPD.

The remainder of the MLIA share ($200) will be used to purchase miscellaneous supplies such as paper and ink for maps, reports, photocopying, etc. No travel is anticipated and no new equipment will be needed to complete this project.

Applicant Share. Carbon County will contribute cash and in-kind services totaled at $31,050. $30,000 cash is being provided from recording fees collected by the County and will be used to pay for the services of the land surveyor. In addition, the County will provide the following in-kind contributions:

- 10 hours at $35 per hour (including fringe benefits) for grant administration to manage the budget and submit reimbursement paperwork (Angela Newell).
- 20 hours at $35 per hour (including fringe benefits) for section corner research and document preparation (Marcia Henigman).

A long term funding plan for this project is not necessary. However, the County is committed to improving its existing GIS layers that are dependent upon the cadastral layer. Once the cadastral layer is adjusted, the County will allocated the resources necessary update any boundaries affected by this adjustment.

Category	MLIA Share	Applicant Share	Total
a. Personnel			
Grant administrator	$ -	$ 350	$ 350
Project Manager / GIS	$ 2,800	$ -	$ 2,800
Clerk & Recorder	$ -	$ 700	$ 700
b. Travel			
N/A	$ -	$ -	$ -
c. Equipment			
N/A	$ -	$ -	$ -
d. Supplies			
Misc. Supplies	$ 200	$ -	$ 200
e. Contractual			
Registered Land Surveyor	$ 30,000	$ 30,000	$ 60,000
f. Other			
N/A	$ -	$ -	$ -
Totals	$ 33,000	$ 31,050	$ 64,050

5. Statements of Support

Below are statements of support from 1) Stewart Kirkpatrick, Montana State Library and 2) Kathryn Smiley and Jennifer Jessen, Montana Department of Revenue – Property Assessment Division.

MONTANA State Library

PO Box 201800 1515 East 6th Avenue Helena, MT 59620 (406) 444-3115

February 12, 2014

John Grewell
Board of Carbon County Commissioners
17 W 11th St, PO Box 887
Red Lodge, MT 59068

Dear John:

As Montana Spatial Data Infrastructure stewards of the Cadastral, Geodetic Control and Administrative Boundary themes, we highly encourage data contributors to use and improve the accuracy of the digital Public Land Survey System. We are excited to hear that Carbon County is embarking on a PLSS accuracy enhancement program similar to other Montana counties such as Gallatin, Park and Yellowstone. By working with the Montana State Library we can get new survey control entered in to the State's parcel fabric and the Montana Control Point Database. After entry into the parcel fabric, the State Library can assist Park County in an adjustment of the Cadastral database and corresponding administrative boundaries for better vertical alignment with aerial photography and other features like road centerlines and structures collected using GPS. As State GIS Coordinator, and along with the MSDI theme leads for Cadastral, Geodetic Control and Administrative Boundaries, we strongly support Park County's long term PLSS enhancement program and their FY 2015 request for MLIA funding.

Sincerely,

Stewart Kirkpatrick
State GIS Coordinator
Montana State Library

Montana Department of Revenue

Mike Kadas
Director

Steve Bullock
Governor

2/10/14

Letter of Support for the Enhancement of Geodetic Control in Carbon County

To whom it may concern:

A project to improve the spatial accuracy of geodetic control in the Clarks Fork Valley would be tremendously beneficial both to this office and to the taxpayers in that area.

We (the Property Assessment Division) use that database to help us assess agricultural land among other things. This is very difficult to do correctly when the section corners don't match up to the aerial photos when we are outlining field boundaries.

It is very confusing for taxpayers to look at the cadastral maps on our website, when our ownership boundary lines are so far off compared to what they see. This impacts our relations with our customers in a negative way, sometimes. (They're already angry when they call)

It is sometimes difficult to ascertain on which parcel a building has been built, as well if we cannot verify a property boundary on the ground – the spatial accuracy is so far off in parts of the Clark's Fork Valley that we worry about making mistakes on the tax rolls.

We are most wholeheartedly in support of this project.

Sincerely,

Kathryn Smiley

Kathryn Smiley, Lead Appraiser

Jennifer A Jessen

Jennifer Jessen, Lead PVS

Carbon County Property Assessment Office
PO Box 647, Red Lodge MT 59068-0647▲ Phone: (406) 446-1223▲ Fax: (406) 446-1224
TDD (406) 444-2830▲ revenue.mt.gov

6. Renewable Grant Accountability Narrative

Carbon County did not apply for a fiscal year 2014 MLIA grant so no progress report is included in this application.

7. Signatures

Authorizing Statement

I hereby certify that the information and all statements in this application are true, complete and accurate to the best of my knowledge and that the project or activity complies with all applicable state, local and federal laws and regulations.

I further certify that this project will comply with applicable statutory and regulatory standards.

I further certify that I am (by my signature) authorized to enter into a binding agreement with the Montana Department of Administration to obtain a grant if this application receives approval.

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John Grewell, Chairman – Carbon County Board of Commissioners