



# City of Grand Island

Tuesday, March 22, 2005

Council Session

## Item G6

**#2005-79- Approving Interlocal Cooperative Agreement for High Resolution Orthophotos Project**

Staff Contact: Chad Nabity

# **Council Agenda Memo**

**From:** Chad Nabity, AICP Hall County Regional Planning Director

**Meeting:** March 22, 2005

**Subject:** Approving Interlocal Cooperative Agreement for High Resolution Orthophoto Project

**Item #'s:** G-6

**Presenter(s):** Chad Nabity, AICP Hall County Regional Planning Director

## **Background**

The Nebraska Department of Health and Human Services along with the Central Platte Natural Resources District, Grand Island, Kearney Hastings Scottsbluff, Gering, Norfolk, Lancaster County and Scotts Bluff County are working together to provide high resolution aerial photography for their respective jurisdictions. This project involves cooperation on many levels and will result in a significant cost savings to all entities involved in this project.

## **Discussion**

The City of Grand Island along with Hall County purchased aerial photography in 2002. At that time approximately \$120,000 was spent on the photography and processing. The City of Grand Island has the opportunity to update photos for Grand Island and surrounding areas for a maximum cost to the City of \$20,000. These funds are available within the current Public Works Engineering and Utilities budgets.

The attached map shows the areas that were photographed in 2002 and those areas that would be included in the current project. The 2005 area is almost 50% larger than the area photographed in 2002.

## **Alternatives**

It appears that the Council has the following alternatives concerning the issue at hand. The Council may:

1. Approve the interlocal agreement.
2. Disapprove or /Deny the interlocal agreement
3. Table the issue

### **Recommendation**

City Administration recommends that the Council approve participation in the interlocal agreement as presented.

### **Sample Motion**

Approve the interlocal agreement as presented.

**Company Profile: Introduction and Strategy***Bidding Source*

Cornerstone Mapping, Inc.  
Attn: Aaron Schepers  
3131 Merrill St.  
Lincoln, NE 68503

*Revised: 01 February 2005*

*Introduction*

Cornerstone Mapping, Inc. provides high-quality aerial photography for a wide array of applications such as monitoring construction progress, urban and regional planning, natural resources, and agriculture. Our mission is to deliver high-quality imagery that exceeds client expectations, in a responsive and professional manner that will lead to project success.

Cornerstone Mapping operates a light aircraft equipped with a medium-format digital imaging system. The aircrew consists of a seasoned pilot and experienced aerial photographer. They apply rigorous standards to capture high-quality airborne imagery.

We are committed to total client satisfaction through delivery of complete photogrammetric solutions. Cornerstone Mapping pledges to work closely with Nebraska HHS and municipality staff to develop and implement aerial photography for GIS applications.

*Proposed Strategy*

Cornerstone Mapping uses a medium-format digital camera system that is well suited for city and county level projects. The Digital Sensor System (DSS) is optimized for small block/irregular areas/corridor/rapid response surveys. The directly georeferenced imagery streamlines the production workflow with a corresponding cost advantage.

**MAPPING GRADE SYSTEM AS CHARACTERIZED BY NASA STENNIS**

- ✦ Meets USGS and NASA image geometry and radiometry standards for mapping applications

**QUICK DATA TURNAROUND**

- ✦ Totally digital process from data acquisition through product delivery

**BENEFITS OF DIRECT GEOREFERENCING**

- ✦ Limited ground control required for quality control checkpoint purposes
- ✦ No need for full ground survey, further reducing image production cost

**VALUE-ADDED PRODUCTS**

- ✦ The image extent of the final product is always greater than the project boundary provided by the client. In effect, more imagery is delivered than quoted.

***Recommendation***

Cornerstone Mapping recommends choosing us to provide digital aerial photography services to maximize project resources. The imagery products will be delivered on time with quality that meets or exceeds expectations.

**Proposed Equipment*****Aircraft***

Cornerstone Mapping operates a Cessna 182 located in Lincoln, NE. The aircraft is maintained and operated in accordance with regulations of the Federal Aviation Administration.

***Camera System***

The DSS Digital Sensor System is a direct georeferencing solution based on a medium-format, airborne digital camera. It is the digital imaging answer for aerial survey and remote sensing applications requiring a rapid, cost-effective solution. As a mapping-quality alternative to large-format sensors, the DSS offers a complete solution and a competitive advantage.

***Flight Management System***

The sophisticated flight management system (FMS) is coupled with a GPS and connected to the camera system. The FMS provides navigation guidance for the pilot and triggers the camera for accurate image overlap and sidelap.

***Direct Georeferencing***

The camera system is tightly integrated with an airborne GPS coupled with an Inertial Measurement Unit (IMU). The GPS/IMU provide exterior orientation (EO) parameters required for direct georeferencing. In addition, the camera mount is equipped with a rotating azimuth mount that removes the crab angle during image acquisition.

***Software*****ORTHOPHOTO PRODUCTION**

Cornerstone Mapping utilizes Leica Photogrammetry Suite image processing software with Erdas Imagine, Image Equalizer and image dodging tools to minimize scene differences during digital orthophoto production.

**GIS**

ArcGIS software is integrated into our workflow. The ArcGIS framework allows us to manage many aspects of our imagery services.

## Scope of Work

### *Areas to be Photographed*

The areas to be photographed include the cities Norfolk, Grand Island, Hastings, Kearney, Lincoln, and Scottsbluff, Nebraska. In addition, Lancaster and Scotts Bluff Counties in Nebraska will be photographed as part of this project.

### *Flight Planning*

The aerial photography will cover the areas identified in the shapefiles provided by Nebraska HHS. The specifics of the photo acquisition are:

Urban areas will be imaged at 1"=100' photo scale, which corresponds to 6-inch ground sample distance (GSD). The images will be acquired with the DSS Digital Sensor System. The flight lines will be designed with 30% forward lap and 30% sidelap covering adjacent flight lines.

Rural areas (Lancaster and Scotts Bluff Counties) will be imaged at 1"=200' photo scale, which corresponds to 1-foot GSD. The images will be acquired with the DSS Digital Sensor System. The flight lines will be designed with 30% forward lap and 30% sidelap covering adjacent flight lines.

### *Photographic Acquisition*

The aerial photo mission plan will be downloaded to the aircraft's computer and used to manage the acquisition of the aerial photography. The imagery will be acquired during March through April, 2005.

### *Conditions During Photography*

The photography will be taken when the sky is clear of clouds and the ground is free of excessive haze, dust, smoke, and cloud shadows. The photos will be taken when the solar angle is 30 degrees or more above the horizon at the time of exposure.

### *Permits and Clearances*

Cornerstone Mapping will obtain the necessary clearances to conduct photo work in the respective FAA designated airspace.

### *Services and Materials*

Cornerstone Mapping will furnish all personnel, equipment, materials, transportation, and quality control to ensure the capture and production of high-quality digital color imagery and subsequent products.

## Deliverables and Proposed Cost

### *Proposed Cost of Image Acquisition*

Nebraska Cities	Square Miles	GSD	Cost of Orthophotos
1. Norfolk	82	6 inch	\$ 20,419
2. Hastings	127	6 inch	\$ 31,624
3. Grand Island	152	6 inch	\$ 37,848
4. Kearney	68	6 inch	\$ 16,932
5. Lincoln	248	6 inch	\$ 61,753
6. Scottsbluff/Gering	86	6 inch	\$ <u>21,414</u>
<b>CITY TOTAL</b>			<b>\$ 189,990</b>

### **Additional Nebraska Counties requested for quotation**

1. Lancaster County <i>(except city of Lincoln)</i>	598	1 foot	\$ 49,365
2. Scotts Bluff County <i>(except cities Scottsbluff and Gering)</i>	659	1 foot	\$ <u>54,400</u>

**COUNTY TOTAL \$ 103,765**

**GRAND TOTAL \$ 293,755**

### *Progressive Product Delivery*

The aerial photography will likely be acquired during a relatively short period of time. The production of orthophotos requires time to generate. For this reason, Cornerstone Mapping will offer progressive delivery of each city, as the orthophotos are ready for delivery.

### *Image Accuracy*

The orthophotos will meet National Map Accuracy Standards.

1":100'      3.3 feet with CE90%

1":200'      6.7 feet with CE90%

### *Digital Elevation Model (DEM)*

Vertical control for the ortho-rectification process will be obtained from USGS 10-meter DEM's. If higher resolution DEM's are available they will be used.

### *Map Projection*

Orthophotos will be referenced to the desired map projection for each individual city.

***Data Format***

The Orthophotos will be delivered in GeoTiff image format. The imagery will be diced up using United States National Grid standards.

**Responsibilities of each respective city*****Ground Control***

It is the responsibility of each municipality to provide existing ground control points (GCP) for orthophoto production. If existing ground control is not available, then the municipality shall coordinate data collection efforts. In the event the GCP's are not provided, the imagery will be orthorectified using direct georeferencing techniques. The resulting spatial accuracy may be slightly lower.

***Digital Elevation Model***

USGS 10-meter DEM's will be used for vertical control. If higher resolution DEM's are available it is the responsibility of the municipality to make the alternative DEM's available to Cornerstone Mapping.

**Disclaimer**

This is a preliminary bid. Pricing is subject to change as project parameters may be revised.



February 24, 2005

RE: Follow up questions for Cornerstone Mapping

1. Information regarding other contracts or commitments that might impact Cornerstone's ability to meet the aggressive timeline of this project.

**During March through June 2005 there is one primary contract that will be fulfilled parallel to the city/county imagery. The project is for the Rain Water Basin Joint Venture. This project only requires Cornerstone Mapping to acquire the imagery (no processing). The expected flight time for the project is approximately 65 hours.**

**Cornerstone will fly the RWB primarily early March. A few cities will be flown during this time. Flying some cities early will allow image processing to take place while the RWB contract is being fulfilled. There are no expected time conflicts with the two projects.**

2. Information regarding the subcontractor who will process the imagery -- project history and capabilities

**A subcontractor will be used to help process the imagery. The contractor (Kingwood Forestry) is located in Monticello, Arkansas. They have extensive experience with high-resolution orthophotography. They provide imagery for forestry applications as well as disaster relief, cities and municipalities. Kingwood Forestry operates two(2) camera systems identical to Cornerstone Mapping. They have a computer lab capable of processing large amounts of data in a timely fashion.**

3. Information regarding the subcontractor who will process the imagery -- other commitment they may have that will impact the project

**During the summers, flying conditions in the South are not optimal due to haze/humidity. The flying workload for Kingwood will taper off in March. As a result, they will have resources available to aid in this project.**

**Kingwood has three dedicated personnel that are available "as-needed" for this project. Cornerstone Mapping plans to subcontract approximately 50% of the image processing.**

4. An approximate schedule of flights and data processing, with milestones

**The flying will likely begin approximately second or third week of March. Depending on the total number of "quality" flying days, all of the imagery should be acquired before the end of April. April imagery will lend itself to higher quality imagery. The grass will be turning green, but the trees will still be leaf-off conditions.**

While the imagery is being flown, image processing will be taking place. Some of the cities will be ready for delivery while other cities are being processed.

5. Information on the camera to be used.

The camera system is built by Applanix. It is called the Digital Sensor System (DSS). Details can be read on the Applanix website [www.applanix.com](http://www.applanix.com).

6. Information on the data collection parameters (flight height, overlap, solar angle, databit size, etc.) (some of this is already available but it would be nice to have it all together somewhere so that it could be incorporated into a contract)

<b>Flying Height</b>	<b>3,050 feet AGL (6-inch)</b> <b>6,100 feet AGL (1-foot)</b>
<b>Overlap</b>	<b>30% sidelap, 30% forwardlap</b>
<b>Solar Angle</b>	<b>30 degrees or higher above the horizon</b>
<b>Databit</b>	<b>Imagery will be collected in 12-bit, delivered in 8-bit for file size considerations</b>
<b>Tone matching</b>	<b>The imagery will be tone matched to eliminate the “checker board” appearance</b>
<b>Mosaic</b>	<b>Mosaicked, but tiled for delivery in GeoTiff format</b>
<b>Map Accuracy</b>	<b>NMAS 1:100 scale      3.3ft</b> <b>NMAS 1:200 scale      6.6ft</b>
<b>Image Acquisition</b>	<b>March/April</b>
<b>Image Delivery</b>	<b>June 30</b>

7. Information on how the imagery quality and accuracy will be tested, who will do this, what is needed? What is the recourse if quality is not up to National Map Accuracy Standards?

The cities will provide a dataset of ground control points. Most of the points will be used in the orthorectification process. The remaining points will be used as “check” points. The check points will serve as QA/QC during the orthorectification process.

If the final product does not meet NMAS standards, the imagery will be checked for errors and reprocessed using additional ground control if necessary. There will be no additional cost to the cities. However, Cornerstone may ask the city(ies) to collect additional ground control be collected if necessary.



8. Bonding and/or Insurance.

**Cornerstone Mapping is fully insured for aerial photography operations. We comply with all FAA regulations and maintenance requirements. In addition, we carry personal liability umbrella insurance.**

**Aircraft Insurance:      Bodily Injury \$100,000 per Person  
   Property Liability \$1,000,000 per occurrence**

**Umbrella Insurance:      Liability \$1,000,000 per occurrence**

Let me know if there are additional questions that should be addressed.

Regards,

*Aaron Schepers*

Aaron Schepers

**INTERLOCAL COOPERATIVE AGREEMENT FOR**  
**HIGH RESOLUTION ORTHOPHOTOS PROJECT**

THIS INTERLOCAL COOPERATIVE AGREEMENT (Agreement) is made on March 7, 2005, by and between the CENTRAL PLATTE NATURAL RESOURCES DISTRICT, a Political Subdivision (CPNRD), the CITY OF GRAND ISLAND, NEBRASKA, a Municipal Corporation (City), the CITY OF KEARNEY, NEBRASKA, a Municipal Corporation (City), the CITY OF HASTINGS, NEBRASKA, a Municipal Corporation (City), the CITY OF SCOTTSBLUFF, NEBRASKA, a Municipal Corporation (City), the CITY OF GERING, NEBRASKA, a Municipal Corporation (City), the CITY OF NORFOLK, NEBRASKA, a Municipal Corporation (City), LANCASTER COUNTY, a Political Subdivision, SCOTTS BLUFF COUNTY, a Political Subdivision, and the NEBRASKA DEPARTMENT OF HEALTH AND HUMAN SERVICES (HHS), a State Department , collectively referred to as "local sponsors". This Interlocal Cooperative Agreement was developed with the understanding that all of the above public entities were inclined to participate in this Agreement. If however, in the course of securing final approval of this Agreement by the governing bodies of each public entity, a decision is made by one or more to not participate, this Agreement will still be valid and binding on all signers unless a determination is made by CPNRD, in consultation with the other signers, that the intended purpose of the Agreement is no longer financially viable.

1. DURATION: The term of this Agreement shall commence upon approval and execution by all parties and shall continue until December 31, 2005, or until termination as provided in paragraph 5 below

2. **AGREEMENT ADMINISTRATION:** No new legal or administrative entity is created by this Agreement. This Agreement shall be administered by CPNRD with advice and recommendations from a joint board composed of one designated representative from each party. Each designated representative shall be that party's Public Works Director or equivalent or such other representative as is selected by the party and shall serve for the term specified by the designating party.

3. **STATEMENT OF PURPOSE:** The purpose of this Agreement is to set forth the terms and conditions under which the parties will participate as the local sponsors in the planning, and acquisition of High Resolution Ortho-photos. Further, it is the purpose of this Agreement to define responsibilities for the performance of this Agreement among the parties.

4. **MANNER OF FINANCING AND MAINTAINING OF BUDGET:** Each party shall adopt and maintain appropriations as required by law to fund its obligations under this Agreement. A separate budget shall not be required of any party by this Agreement.

5. **TERMINATION:** This Agreement shall terminate upon any of the following conditions:

- a. Unanimous consent and agreement of all parties having members on the joint board.
- b. Expiration of the term of this Agreement

6. **ORTHO-PHOTOGRAPHY ACQUISITION:** CPNRD shall purchase aerial photography services and digital orthophoto products for the local sponsors from Cornerstone Mapping Inc. under it's existing agreement. The scope of work, cost,

accuracy, and delivery of the ortho-photography to be acquired is based on the February 1, 2005 Cornerstone proposal and the February 24, 2005 addendum.

7. **COST SHARE:** The local sponsors' agree to share in the cost of purchasing the aerial photography services and digital orthophoto products and will provide funding to the CPNRD for that purpose. The U.S. Geological Survey (USGS) has indicated its intent to support this project by providing \$25,000 in funding to support this intergovernmental orthophoto acquisition. In exchange for its support, the USGS will receive copies of the orthophoto products, which it will make publicly available through its various data distribution mechanisms, such as the online National Map. If this USGS support is ultimately forthcoming, the costs to the participating local government subdivisions will be proportionally reduced from the original Cornerstone Mapping proposal. The following is a list of the funding amount by the local sponsors. These local sponsors shall not be required to pay any further sums than those set forth hereafter:

<b>Nebraska Cities</b>	<b>Funding</b>
1. Norfolk	\$11,100
2. Hastings	\$16,800
3. Grand Island	\$20,000
4. Kearney	\$9,200
5. Lincoln (Lancaster County)	\$32,000
6. Scottsbluff	\$5,350
7. Gering	\$5,350
<b>Nebraska Counties</b>	<b>Funding</b>
1. Lancaster	\$26,000
2. Scotts Bluff	\$27,200

State	Funding
1. HHSS	<u>\$150,000</u>
Total funding	\$303,000

8. COMMUNICATIONS: Routine communications between local sponsors of this agreement shall be made through each party's designated representative to the joint board. For purposes of this Agreement, the following are the telephone numbers and street and post office addresses of the respective parties:

	<u>Street Address</u>	<u>Post Office Address</u>	<u>Telephone No.</u>
Central Platte Natural Resources District	Duane Woodward 215 N. Kaufman Ave. Grand Island, NE 68803	Duane Woodward 215 N. Kaufman Ave. Grand Island, NE 68803	(308) 385-6282
City of Grand Island	Chad Nabity 100 E. First Street Grand Island, NE 68801	Chad Nabity P.O. Box 1968 Grand Island, NE 68802	(308) 385-5240
City of Kearney	Mike Klaus 18 East 22nd Street Kearney, NE 68848-1180	Mike Klaus P.O. Box 1180 Kearney, NE 68848-1180	308-224-9015
City of Hastings	Jane Morris 220 N Hastings Ave Hastings NE 68901	Jane Morris P.O. Box 1085 Hastings NE 68902	402-461-2332
City of Scottsbluff	Jim Gasper 1818 Avenue A Scottsbluff, NE 69361	Jim Gasper 1818 Avenue A Scottsbluff, NE 69361	308-632-2177
City of Gering	Brian Sweeney 1025 "P" Street Gering, NE 69341	Brian Sweeney 1025 "P" Street Gering, NE 69341	308-436-5096
City of Norfolk	Dennis J Smith 127 North 1st Street Norfolk, NE 68701	Dennis J Smith 127 North 1st Street Norfolk, NE 68701	402-844-2020
Lancaster County	James Langtry 444Cherrycreek Road, Bldg. C Lincoln, NE	James Langtry 444Cherrycreek Road, Bldg. C Lincoln, NE	402-441-8337
Scotts Bluff County	Duane Stott Adm. Bldg., 1825 10 <sup>th</sup> St. Gering, NE 69341	Duane Stott Adm. Bldg., 1825 10 <sup>th</sup> St. Gering, NE 69341	308-436-6654
Nebraska Department Of Health and Human Services System	Chris Chalmers 301 Centennial Mall South Lincoln, NE 68509-5007	Chris Chalmers P.O. 95007 Lincoln, NE 68509-5007	402-471-4598

9. CHOICES OF LAWS: This Agreement shall be construed in accordance with the laws of the United States of America and the State of Nebraska.

10. AMENDMENTS: Amendments to this Agreement shall be made in writing, duly approved and executed by all parties hereto and made a part of this Agreement by reference.

11. ENTIRE AGREEMENT: This Agreement and any subsequent amendments shall constitute the entire agreement among the parties. Each party to this agreement shall execute duplicate copies of this agreement and provide one executed copy to the CPNRD. The parties agree that the separately executed copies of this agreement which shall constitute the Interlocal Cooperative Agreement for the High Resolution Orthophotos Project shall be given full force and effect.



Signature Page for

**INTERLOCAL COOPERATIVE AGREEMENT FOR**  
**HIGH RESOLUTION ORTHOPHOTOS PROJECT**

Attest:

CITY OF GRAND ISLAND, NEBRASKA  
a Municipal Corporation

\_\_\_\_\_  
RaNae Edwards, Grand Island City Clerk

Date: \_\_\_\_\_

By: \_\_\_\_\_  
Jay Vavricek, Mayor

RESOLUTION 2005-79

WHEREAS, in 2002, the City of Grand Island and the County of Hall spent approximately \$120,000 on photography and processing for aerial photographs to be taken of the area; and

WHEREAS, it is has been recommended that a group of government entities unite to update the aerial photographs in their respective regions at a more cost effective rate; and

WHEREAS, the Nebraska Department of Health and Human Services along with the Central Platte Natural Resources District, the cities of Grand Island, Kearney, Hastings, Scottsbluff, Gering and Norfolk, and the counties of Lancaster and Scotts Bluff have indicated an interest in working together to provide high resolution aerial photography for their respective jurisdictions; and

WHEREAS, this project involves cooperation on many levels and will result in a significant cost savings to all entities involved in this project; and

WHEREAS, the City's cost share of the project will be no more than \$20,000; and

WHEREAS, the City Attorney has reviewed and approved the proposed Interlocal Cooperative Agreement; and

NOW, THEREFORE, BE IT RESOLVED BY THE MAYOR AND COUNCIL OF THE CITY OF GRAND ISLAND, NEBRASKA, that the Interlocal Cooperative Agreement by and between the City, the Central Platte Natural Resources District, the City of Kearney, the City of Hastings, the City of Scottsbluff, the City of Gering, the City of Norfolk, the County of Lancaster, the County of Scotts Bluff, and the Nebraska Department of Health and Human Services for the High Resolution Orthophotos Project is hereby approved according to the terms set out in the agreement.

BE IT FURTHER RESOLVED, that the Mayor is hereby authorized and directed to execute such Interlocal Cooperative Agreement on behalf of the City of Grand Island.

- - -

Adopted by the City Council of the City of Grand Island, Nebraska, March 22, 2005.

---

RaNae Edwards, City Clerk

Approved as to Form	☐ _____
March 17, 2005	☐ City Attorney