

*City of Three Rivers,
Michigan*

Request for Proposal

2012 Geographic Information Systems
(GIS) and Orthoimagery Project

February 1, 2012

Project Overview

The City of Three Rivers requests your firm to submit a written proposal to provide all services, supervision, labor, equipment, products and materials necessary to provide aerial photography, ground control services, orthoimages and topographic mapping services as described herein. Additionally, there is an opportunity to submit a written proposal for some or all of the above mentioned services for Westside Landfill (A Waste Management of Michigan, Inc. Facility) located in the greater Three Rivers area; separate RFP enclosed.

It is the intent of the City of Three Rivers (hereinafter known as the City) to establish a mutually beneficial relationship with a Contractor who is committed to providing solutions to meet all of our aerial orthophotography and related Geographic Information System (GIS) mapping needs.

The City has determined that photogrammetric services are required to increase the resolution of, and replace existing out-of-date aerial photography. Contiguous up-to-date orthophotography is necessary for the many GIS projects that the City is currently working on. The City utilizes existing, and historic orthophotography obtained from different Contractors primarily for mapping infrastructure, cemeteries and various GIS data purposes. In 2007, the City expanded their coverage area and acquired one-half foot (0.5') natural color digital orthophotography (DOP) at a scale of 1"=100' (please see *Exhibit "A"* for the existing and proposed project boundary).

This written Request for Proposal (RFP) states the scope of the City's requirements and specifies the general rules for preparing the proposal.

The proposal shall clearly demonstrate how the Contractor can best satisfy the requirements of the City. The City shall reserve the right to enter into an agreement with the Contractor presenting the proposal that is most advantageous to the City.

Overall Scope of Project

It is not the intent of the City to identify the overall scope of the services necessary to best accomplish this project. Contractors are encouraged to identify problems, solutions, or any additional features which would be of benefit to the City and pertinent to their proposals.

This RFP requires the Contractor to provide an itemized detailed project description of necessary tasks to complete this project and how best to accomplish those tasks.

There are however, some criteria that we deem important and should be addressed in the bid proposal. Please consider these criteria while defining the best methods to complete this project.

Ground Controls and Verification

The City will provide information on 15 semi-permanent photo control stations to the accepted Contractor. These monuments have been established for previous aerial orthoimagery utilizing both conventional and GPS survey procedures with Second-Order horizontal and Third-Order vertical survey. The City's coordinates are based on Michigan High Accuracy Reference Network of 1994 (HARN94) which is a refinement of the North American Datum of 1983 (NAD83), with further reference to the Michigan State Plane Coordinate System, South Zone and the North American Vertical Datum of 1988 (NAVD88) in international feet.

Also available within the County is a fully functional Michigan Spatial Reference Network (MSRN) Continuously Operating Reference Station (CORS) which shall be utilized during this project.

Prior to the use of any control points, the Contractor shall check the monuments to ensure that they have not been disturbed nor shifted. The Contractor shall perform surveys connecting existing project controls to assure that such controls obtain adequate relative accuracy for the overall project. Should these surveys indicate inadequacies in the existing controls, the Contractor shall notify the City that adjustments to the project may be necessary in order to perform resurveys of the existing networks.

Resolution, Scale, and Format Requirements

The City is requiring new natural color, geo-referenced digital orthoimagery be produced with complete tiles.

The City is requesting the Contractor to provide separate information for two (2) options.

Option 1: The digital orthoimagery shall be delivered in one-quarter foot (0.25') native ("native" meaning: pixel resolution of final orthoimagery should match the pixel resolution of the raw imagery) resolution at 1" = 100' (1:1200) map scale to meet or exceed the American Society of Photogrammetry and Remote Sensing ASPRS Class I Mapping Accuracy Standards for Digital Orthophotography and Large-Scale Mapping. Products not meeting or exceeding the ASPRS Class I Mapping Accuracy Standards shall be interpreted as errors and must be corrected. Currently, the City's orthoimagery is divided into one hundred six (106 - 2500' x 2500') complete GEOTiff tiles; two (2) of which are shared with Westside Landfill, as shown on said **Exhibit "A"**. Furthermore, the City is requesting a single compressed MrSID of the entire project boundary.

Option 2: The digital orthoimagery shall be delivered in one-quarter foot (0.25') native resolution at 1" = 50' (1:600) map scale to meet or exceed the American Society of Photogrammetry and Remote Sensing ASPRS Class I Mapping Accuracy Standards for Digital Orthophotography and Large-Scale Mapping. Products not meeting or exceeding the ASPRS Class I Mapping Accuracy Standards shall be interpreted as errors and must

be corrected. Currently, the City's orthoimagery is as stated in Option 1 and as shown on said *Exhibit "A"*. Furthermore, the City is requesting a single compressed MrSID of the entire project boundary.

For consistency, the City would like to keep the existing naming convention modified as follows: i.e.: 2767159 (existing 2500' x 2500' tile) should become 2767159.1, .2, etc.; or the Contractor may suggest and present to the Project Administrator in advance of the completed project an alternate naming convention.

Aerial Camera and Ancillary Instruments

The City requires that current, up-to-date high resolution camera(s) be used in the acquisition of the imagery. The returned proposal shall include complete camera specifications along with a current Calibration Report. Additionally, the operator of the camera shall be able to examine image exposure at the time of collection and make proper adjustments to obtain the largest amount of usable imagery data.

Airborne differential GPS measurements may be used to increase the density of ground control value. To assure accuracy, a minimum of two ground receivers are required to be operated during all flights (this includes County's MSRN CORS). The Contractor will be responsible to assure that airborne GPS data are of sufficient accuracy to meet the project mapping requirements. Furthermore, high-accuracy position and attitude sensors shall be functioning simultaneously with the camera(s) to help ensure minimal flight path derivation and maintain operation needs based on set specifications.

Preflight Requirements

The aircraft shall be maintained and operated in accordance with regulations of the Federal Aviation Administration and Civil Aeronautics Board. A preflight inspection of the aircraft and instruments must be performed prior to each photographic mission as recommended by the FAA. Aircraft shall have a service ceiling (with operating load of crew, camera, oxygen, and other required equipment) not less than five (5) percent above the highest altitude necessary to achieve the smallest aerial image scale required. If the project is in controlled air space, the appropriate Air Route Traffic Control Center (ARTCC) must be contacted. If any military bases, nuclear power plants or secured government installations are within the project area, the Contractor must contact the appropriate agency(s) and comply with security regulations of this or any other sensitive area.

Aerial Camera(s) Installation

The camera(s) shall be installed in a mount that isolates the effects of aircraft vibration. Angular vibration of the camera shall be reduced to a level where no significant detrimental effect on the image and its resolution occur. All aircraft exhaust gases shall be vented away from the camera(s) opening.

A check to ensure the proper camera(s) mounting and installation (including cable connections) should be conducted prior to the flight. The camera(s) lens, filters, and camera(s) port must be inspected to assure that the surfaces are not scratched, etched, or discolored and that they are free of foreign particles and condensation.

Imagery Flight Requirements

Imagery acquisition is to be performed in the late winter or early spring of 2012 before the presence of spring vegetation (leaf-off) and with an absence of snow. All images shall have zero percent (0%) cloud cover on each frame, and zero percent (0%) cloud shadow on each frame. Imagery acquisition shall not be attempted when the ground is obscured by haze, dust, snow, floodwaters and/or other environmental factors that may obscure ground detail. All efforts should be taken to minimize the exposure to smoke plumes from fires and the flight mission should be discontinued if any major fires are occurring during this time. The aerial imagery must be taken when there are bright sun conditions, and the sun angle is greater than thirty (30) degrees (typically, ± 2 hours from solar noon). Additionally, the images shall not contain objectionable shadows caused by relief or low solar altitude.

All aerial images shall be acquired with sufficient forward and side overlap to ensure one hundred (100) percent coverage of the project area. The aerial images will have sixty percent (60%) endlap and thirty (30%) sidelap coverage to ensure full stereo coverage of the entire study area. Every effort must be made to prevent object displacement.

Post-Flight Camera(s) and Image Examination

Immediately after the mission flight, the Contractor shall determine whether the camera(s) operated properly by reviewing the images. If the review indicates a malfunction or failure, the aerial mission must be re-flown at no additional cost to the City.

Re-flights shall be performed immediately (weather and environmental conditions permitting) for the purpose of generating replacement images for all which fail to meet the minimum standards set forth by these specifications. If the ground conditions have adversely changed during this time period (i.e. vegetative growth or other environmental changes), effectively terminating the image acquisition timeframe (season), a re-flight shall be scheduled appropriately to meet the specifications outlined in this project at no

additional costs to the City. Inspections of aerial imagery should be performed immediately after the aerial imagery mission. Unacceptable aerial imagery (as determined by the City) shall be re-flown by the Contractor at no additional costs to the City, with the re-flight coverage overlapping the acceptable digital images.

Orthoimagery Creation

Orthoimages are orthographic images and do not contain scale, tilt, and relief distortions. Creation of digital orthoimagery shall utilize several types of inputs. These inputs shall include and are not limited to the unrectified raster image from project flight scanned sufficiently to meet or exceed the previously stated scale requirements, the highest density DTM available, which meets accuracy needs, image identifiable ground control coordinates, camera(s) and airborne platform calibration data. These inputs shall be used to register the raw image data mathematically to match the raster data location with the ground while removing distortions created by relief displacement.

Orthoimagery covering the complete geographic extent of the project shall be generated utilizing digital means exclusively. A rigorous, photogrammetric model of each image shall be prepared and utilized to relate image coordinates to ground coordinates and vice-versa. This model's parameters shall be adjusted accordingly to the high-accuracy ground controls to compensate for inaccuracies within the model.

Each image shall be orthorectified utilizing an elevation model to generate an orthoimage. The orthoimages shall be combined into a seamless orthomosaic. A fully automated process may be acceptable. The orthomosaic shall be partitioned into individual image tiles corresponding to the specified image tile scheme. The orthoimage tiles shall be transferred to a data storage medium with adequate support data to allow for the accurate geo-referencing of each image tile.

The final mosaic of the City will be uniform in hue, contrast, and shade to remove any discernable variations from the aerial imagery or during digital orthoimage creation. Each image shall be radiometrically adjusted to compensate for non-uniformities present in the sensing device of the camera and further adjusted to compensate for the color/tonal differences due to inconsistent environmental conditions and surface response. In addition, the orthoimages shall not contain defects or inconsistencies in color/tone and density between individual and/or adjacent image tiles that adversely affect the usage of the orthoimages. The "no data" areas of the remaining image tile without orthoimagery shall default to white in color.

Digital Terrain Model (DTM)

The City will provide the existing 2002 and expanded 2007 Digital Terrain Models (DTM) to the accepted Contractor, provided that the Contractor will sign the City's Data

Transmission Agreement, which restricts the use of this existing DTM to the scope of this project.

Option 1: The City's existing DTM shall be corrected and updated as needed for this project. The existing/2012 DTM [1" = 100' (1:1200) map scale] will be sufficient to support two foot (2') contours to meet or exceed ASPRS Class I Mapping Accuracy Standards for Large-Scale Mapping. The existing/2012 DTM, flight paths and ground control, shall be corrected, expanded and updated if necessary and shall be used to ensure that the new orthoimagery is positionally the same as the existing imagery.

Option 2: In this option the new 2012 DTM [1" = 50' (1:600) map scale] will be derived from the existing DTM, corrected and updated as needed to be sufficient to support one foot (1') contours to meet or exceed ASPRS Class I Mapping Accuracy Standards for Large-Scale Mapping. The new DTM, and if necessary, the corrected, expanded and updated flight paths and ground control, shall ensure that the new orthoimagery is positionally the same as the existing imagery.

Contour Mapping

Option 1: The City has existing two foot (2') contours that have been derived from the existing DTM [1" = 100' (1:1200) map scale] for the project boundary, as shown on *Exhibit "A"* and should be corrected and updated if necessary. The maximum error tolerance of two foot (2') contouring should not exceed ASPRS Class I Mapping Accuracy Standards for Large-Scale Mapping of the mapped scale. The Contractor shall work with the City to develop acceptable contour smoothness, placement of index contours, and acceptable file size. The contour elevations shall be attribute data.

Option 2: The City requests that one foot (1') contouring shall be derived from the new DTM [1" = 50' (1:600) map scale] for the project boundary, as shown on *Exhibit "A"*. The maximum error tolerance of one foot (1') contouring should not exceed ASPRS Class I Mapping Accuracy Standards for Large-Scale Mapping of the mapped scale. The Contractor shall work with the City to develop acceptable contour smoothness, placement of index contours, and acceptable file size. The contour elevations shall be attribute data.

Quality Control

The Contractor must provide the City with a description of the quality control methods and procedures used in all aspects of the project. This description shall incorporate the acquisition and development of aerial imagery and the processing of the digital orthoimages. Descriptions of field verification measures utilized to ensure that the products meet or exceed the ASPRS Class I criteria for the City for the appropriate images, are needed. Overall verification of image completeness to confirm that no gaps exist within the digital orthoimage coverage shall also be performed.

Inspection of the original images to check for tilt, crab, overlap, cloud cover, snow cover, and proper sun angle must be carried out before the images are compiled for the creation of the digital orthoimages.

Documentation of the orthoimagery in a comprehensive, efficient, and logical manner shall be provided with the digital orthoimagery for characteristic reference of the delivered products.

A pilot project covering a small designated area for the City shall be rendered prior to the completion of the entire project. The Contractor shall provide a complete set of deliverables for the pilot areas to the City. A review and verification of materials will be conducted to ensure that the necessary procedures, quality, accuracies, and formats have been fulfilled. The Contractor will not proceed beyond this point until the pilot work has been fully accepted.

Deliverables

All data that are used in the production of this project shall be rendered to the City and be in compliance with the specifications described in this agreement. The City shall retain ownership of any and all data produced. In addition, a reasonable timeframe for project benchmarks shall be suggested by the Contractor in the returned proposal.

Items to be furnished by the Contractor

One (1) complete set of data for the City **shall be projected in North American Datum 1983 (NAD83), Michigan State Plane Coordinate System, South Zone and the North American Vertical Datum of 1988 (NAVD88) in international feet** and shall be labeled and delivered on CDs/DVDs as well as hardcopy reports, which shall include the following:

1. Metadata files for each product generated for the City.
2. DOP's in both Geotiff and MrSID formats one-quarter foot (0.25') native resolution (1:100 or 1:50 map scale, as determined by Project Administrator).
3. DTM (1:100 or 1:50 map scale, as determined by Project Administrator).
4. Two foot (2') contouring or one foot (1') contouring (as determined by Project Administrator).
5. Hardcopy reports of survey worksheets, aerotriangulation printouts, and all other relevant data.

All data for the City shall be compatible with and delivered in both ESRI shapefile formats and Autodesk Map 3D file formats.

Project Administrator Contact Information

City of Three Rivers
Georgina Shafer, GIS Specialist
Department of Public Services
1015 South Lincoln Avenue
Three Rivers, Michigan 49093
(269) 273-1845
gshafer@threeriversmi.org

Pre-Proposal Meeting

A pre-proposal meeting shall be held on **February 16, 2012** at **9:00AM** in the City Commission Room located at City Hall (333 West Michigan Avenue, Three Rivers, Michigan 49093).

Submission of Proposals

Please submit one (1) clearly labeled “*2012 Geographic Information Systems (GIS) and Orthoimagery Project Sealed Bid*” copy of the proposal to the **City Clerk** at 333 West Michigan Avenue, Three Rivers, Michigan 49093 sealed bids will be received until **11:00 AM (EST)** on **March 9, 2012** and will be opened at that time.

If the Contractor is unable to meet the required date of delivery, the Contractor must contact the Project Administrator prior to that date or have their proposal returned unaccepted and unopened once delivered late.

The City will not be held responsible and will not pay for any and all costs incurred by the Contractor in preparation of the proposals. Respectively, the City is generally exempt from all taxes. No tax shall be added into the project costs. All submitted proposals will become the property of the City.

The proposals should include (but are not limited to) a description of its business experience, technical approach, management approach, quality controls, qualifications, and references for similar projects. The proposals must also include *digital samples* of each option (accessed through an FTP site, CD, etc.), which meet the requirements outlined above, of a *cemetery*, which contains both ground and raised monuments and of a *local streets* area, with infrastructure (provided said streets are not newly paved major streets or boulevards). The techniques, methods, equipment, personnel **and all data used for the creation of products** proposed for this project shall be clearly and fully described.

All inputs (hard copy and soft-copy) utilized for the creation and updating of information and products must be itemized and listed in the returned proposal. This includes any ancillary data not listed above.

Cost Schedule

An individual, comprehensive breakdown of all costs [for the two (2) separate options] shall be included in the returned proposal for the City according to the provisions set forth in the “Project Overview.” This breakdown shall include (but is not limited to) the costs for surveying, aerial imagery acquisition, aerotriangulation, digital product compilation, and any needed field verifications. If the Contractor has proposed alternatives to this RFP, an additional and separate cost breakdown shall be included.

Withdrawal of Proposals

Proposals may be modified or withdrawn by an authorized representative of the Contractor or by formal written notice prior to the final due date and time specified for proposal submission.

Right to Reject Proposals

The City reserves the right to reject any and all proposals or any part of any proposal, to waive minor defects or technicalities, or to solicit new proposals on the same project, or on a modified project that may include portions of the originally proposed project that the City may deem necessary and in its best interest. The City also reserves the right to negotiate with any Contractor, on all or any part of any proposal that is their best interest.

Work Contracting

All work performed for this project shall be conducted within the United States of America (the lower, contiguous 48 states, Alaska, and Hawaii). It is not acceptable for *any* portion of this project to be performed in a foreign country.

No part of this proposal shall be subcontracted without the prior knowledge and written approval of the City. If subcontractors are requested and approved, the Contractor shall retain full responsibility to the City for all work completed or uncompleted by the subcontractor.

Terms and Interpretations

Any interpretation of this RFP made to a respondent shall *not* be held binding to the City unless it is repeated in writing as an addendum. Should addendums become necessary, they will be incorporated with the contract for this project.

Indemnification and Insurance

The successful Contractor shall indemnify and hold the City, its officers, agents, employees and assigns, harmless from any liability imposed for injury; whether arising before or after completion of work here above; or in any manner directly or indirectly caused, occasioned or contributed to, or claimed to be caused, occasioned or contributed to, in whole or in part, by reason of any act or omission, including strict liability or negligence of the Contractor, or of anyone acting under the Contractor's direction or control or on its behalf, in connection with or incident to, or arising out of the performance of this contract.

The successful Contractor shall be adequately insured and provide proof of insurance at the submission of the proposal.

Notice of Contract

All potential Contractors shall receive a written notice of their proposals acceptance or rejection. These notices will be sent to the address provided on the Contractor's proposal.