



October 9, 2014

Mr. Todd Pulsifer
GIS Manager
Department of Public Utilities
City of Columbus
910 Dublin Road, 3rd Floor
Columbus, Ohio 43215

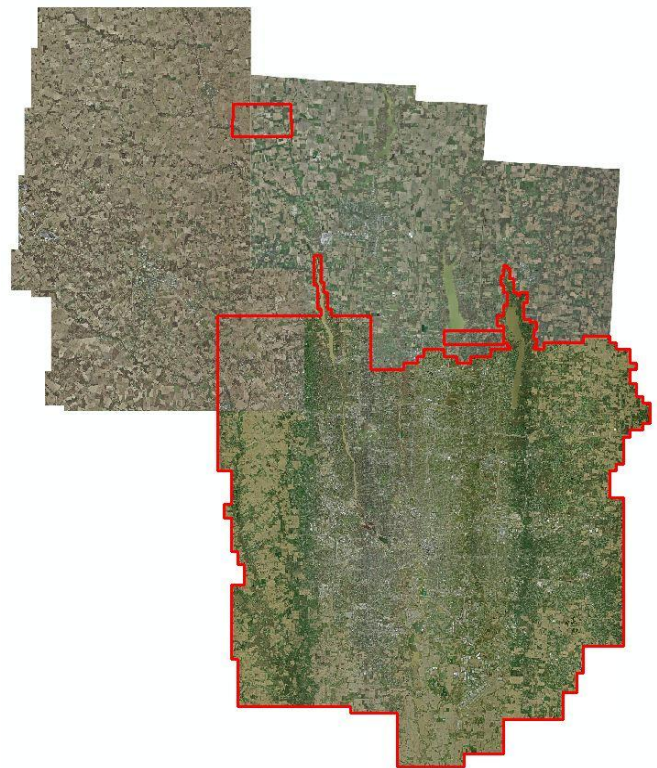
RE: 2015 City of Columbus Ortho-Imagery Project

Dear Mr. Pulsifer:

Woolpert is pleased to submit our scope and fee proposal for the 2015 City of Columbus Ortho Project.

Project Boundary

The image to the right depicts the 2015 City of Columbus Ortho Project Coverage Area, which now includes the upland reservoir located in northwest Delaware County (~9.53 square miles) and the area extending from the west side of Hoover Reservoir extending toward Alum Creek (~4.12 square miles). The 2015 project area includes all of Franklin and portions of Delaware, Union, Licking, Fairfield, Pickaway and Madison Counties. In total, the project area is comprised of approximately 726 square miles.



Regional Participation

For 2015, both Fairfield and Licking Counties are also acquiring 3-inch aerial imagery (4-band, 8-bit with an average sidelap of 30%). The Columbus Service Area covers 20.59 square miles within Fairfield County and 32.54 square miles within Licking County.

Delaware and Union Counties, as well as the



City of Dublin are not participating in a spring 2015 flight. Madison and Pickaway Counties are also not participating with a spring 2015 flight.

Even though a majority of the neighboring counties are not participating in a spring 2015 flight, the City of Columbus is still receiving a cost savings due to Fairfield and Licking Counties participation, albeit not as large a saving as was provided in 2013, when Delaware County and Dublin participated.

Primary Project Tasks

Aerial Imagery Acquisition

Woolpert will acquire new 4-band, 8-bit aerial imagery covering the City of Columbus. Aerial imagery will be acquired during the spring of 2015 (leaf-off conditions and during the absence of snow and when rivers and streams are within their normal banks) with an average sidelap of 60%. The aerial imagery will support the generation of project area wide 1"=50' scale ortho-imagery with a pixel resolution of 3-inches. The imagery will be acquired when the sun angle is 30-degrees or greater and supplemental flights will be acquired over downtown when the sun-angle is at or near its greatest to minimize building shadows.

Ground Control

Woolpert will utilize existing ground control established for the 2011 Ortho, 2012 Contour and 2013 Ortho projects to support the 1"=50' scale ortho base mapping.

If any new ground control points are needed (i.e. due to an existing point being destroyed or obscured), Woolpert will perform the survey and supply a control diagram to the City of Columbus depicting the proposed location(s) of the new horizontal and vertical GPS control points. Each new control point (if necessary) will consist of a photo identifiable point (i.e. North edge of sidewalk at east edge of paved driveway).

The datums, coordinate system and units to be used are as follows:

Datums

Horizontal: North American Datum 1983 (HARN)

Vertical: North American Vertical Datum 1988

Coordinate System

Ohio State Plane, South Zone

Units

US Survey Feet



Aerial Triangulation

Woolpert will perform aerial triangulation on the newly acquired aerial imagery acquired during the spring of 2015. Triangulation extends and densifies the ground control and will subsequently support the 1"=50' scale ortho base mapping.

Ortho Base Mapping

Woolpert will produce project area wide (~726 square miles) 1"=50' scale ortho-imagery, with a pixel resolution of 3-inches.

The existing OSIP LiDAR DEM (2011) will be used to rectify the new 3-inch aerial imagery, unless the optional 2015 LiDAR is selected, which in this case will be used to rectify the new 3-inch aerial imagery.

The final ortho tiles will be delivered as 4-band (RGBN), 8-bit imagery. Utilizing the existing tiling system (1,250' x 1,250' tiles), the ortho tiles will be approximately 100 megabytes in size.

A buffer zone of 100-feet beyond the city boundary will be established and any location where an ortho tile touches or is within this buffer, a full image tile will be produced and delivered.

For the City's Review, the new ortho-imagery will be cached to Woolpert's SmartView Connect Redline Server. Woolpert will provide user accounts and instructions on the use of the web server.

After the City has reviewed and accepted the ortho-imagery, the imagery will be processed and delivered in geotiff format (with the appropriate tiff world files and metadata) and MrSID Image Format (based upon the MrSIDs previously delivered as part of the 2013 ortho project, unless the City requests a different configuration; the upland reservoir area will be delivered as a separate MrSID).

An ESRI Image Cache will also be produced after the City has reviewed and accepted the ortho-imagery. The same parameters that were used for the image cache produced for the 2013 3-inch ortho-imagery will be reused.

Optional Project Tasks

Aerial LiDAR Acquisition

Woolpert will acquire new LiDAR at a 1-meter maximum point density (equivalent to two points per square meter). The LiDAR will be acquired during the spring of 2015 (leaf-off conditions and during the absence of snow and when rivers and streams are within their normal banks) with an average sidelap of 30%.

Option1. The citywide LiDAR will be delivered in LAS (ground and non-ground) and ArcGRID (ground only) formats, with the LiDAR classification conforming to the OSIP Standard LiDAR Delivery.



Option2. The citywide LiDAR will be delivered in LAS (ground and non-ground) and ArcGRID (ground only) formats, with the LiDAR classification conforming to the USGS QL2 Standard. In addition to the LiDAR classification, the LiDAR data will also undergo hydro-flattening and field verification for the LiDAR classifications required by the USGS.

Sample Change Detection for Impervious Surfaces

After the new ortho-imagery and LiDAR has been processed, Woolpert will produce a sample change detection dataset to identify changes of impervious surfaces. Woolpert has assumed the sample area to be one square mile and which will be identified by the City. Below are a series of screenshots that depicts the manually cleaned product option.

The cost associated for this sample is not directly related to a citywide project, as the cost for the ruleset development and startup is being included entirely within this sample and for a citywide project would be spread over the entire project cost.

We have included two quotes. One dataset fully reviewed and cleaned-up, the second being a fully automated dataset.



Deliverables

Primary Project Tasks. Woolpert will supply the City of Columbus with an external hard drive containing the digital ortho-imagery dataset (tiled geotiffs and citywide MrSID images).

Optional Project Tasks. Woolpert will supply the City of Columbus with an external hard drive containing the LiDAR and sample change detection datasets. The LiDAR will be delivered in tiled format conforming to the size and naming convention used for the ortho-imagery.

Schedule

Primary Project Tasks

- Woolpert will acquire new aerial imagery on or before April 30, 2015.
- Woolpert will produce and cache the 3-inch ortho-imagery (for Columbus' Review) to Woolpert's SmartView Connect Server on or before July 31, 2015.
- Upon acceptance (by Columbus) of the base ortho-imagery, Woolpert will process the citywide SIDs (separate natural color and color infrared SIDs) and deliver all ortho data (SIDs and geotiffs) on an external hard drive. This process will require approximately 30 days from the date of acceptance by Columbus.



Optional Project Tasks

- Woolpert will acquire new aerial LiDAR on or before April 30, 2015.
- If the standard OSIP LiDAR is selected, Woolpert will process and deliver the LiDAR products on or before July 31, 2015.
- If the USGS QL2 LiDAR is selected, Woolpert will process and deliver the LiDAR products on or before August 31, 2015.

Estimated Fees

City of Columbus Service Area (approximately 726 square miles in size)

4-Band, 8-Bit Ortho-Imagery 1"=50' Scale Base Mapping	
<i>Service</i>	<i>Fee</i>
Citywide 3-Inch Ortho-Imagery (4-band, 8-bit)	\$278,568.00
Optional - Standard OSIP Citywide 1-Meter Maximum LiDAR (two points per square meter)	\$120,626.00
Optional - USGS QL2 Citywide LiDAR (0.7-meter point density; equates to two points per square meter)	\$163,350.00
Sample Change Detection for Impervious Surfaces – fully reviewed and cleaned-up dataset	\$10,000.00
Sample Change Detection for Impervious Surfaces – fully automated with no manual cleanup	\$7,000.00

We appreciate the opportunity to present this price proposal and look forward to again working with you and your team. If you have any questions or need further clarification regarding the above, please call me at 614.827.6155. I can also be reached via my e-mail address: brian.stevens@woolpert.com.

Sincerely,

Woolpert, Inc.



Brian Stevens, CP
 Project Manager

