



# Intergovernmental Agreement

Metro Contract No. 928540

## Purchase of Light Detection and Ranging ("LiDAR") Data

THIS AGREEMENT is between Metro, a metropolitan service district organized under the laws of the State of Oregon and Metro Charter, located at 600 NE Grand Avenue, Portland, Oregon 97232-2736 (hereinafter "Metro"), and the City of Portland, a municipal corporation of the State of Oregon (hereinafter "the Local Government"), located at 1221 SW 4<sup>th</sup> Avenue, Portland, Oregon 97204 (collectively hereinafter referred to as "the Parties").

### RECITALS

1. Kitsap, County Washington has entered into a contract with Watershed Sciences, Inc., an Oregon corporation, or purchase of public domain high resolution Light Detection and Ranging data (the "LiDAR data") over portions of eight Oregon counties, including counties included with the Metro district boundaries; and
2. Metro and Kitsap County have determined that it is in their mutual interest for Kitsap County to make some of the LiDAR data Kitsap County has acquired available for sale to Metro; and
3. Metro and Kitsap County have entered into Intergovernmental Agreement No. 928176 under which Metro will purchase from Kitsap County certain of LiDAR data and will then sell such data available to certain Oregon local governments; and
4. Metro wishes to sell to the Local Government, and the Local Government wishes to purchase from Metro a portion of LiDAR data relating to the geographic area with the boundaries of the Local Government;

NOW THEREFORE, the premises being in general as stated in the foregoing recitals, it is agreed by and between the Parties hereto as follows:

### PROVISIONS OF AGREEMENT

1. **TERM OF AGREEMENT.** This agreement shall be effective June 1, 2008 with the Parties' option to renew annually in perpetuity.

**METRO'S RESPONSIBILITIES.** Provided that Kitsap County complies completely with its obligations to Metro under the terms of the Intergovernmental Agreement No. 928176 for the purchase by Metro of certain LiDAR data in the possession of Kitsap County, Metro shall make available to LOCAL GOVERNMENT the LiDAR data set forth on the attached Exhibit A, which is incorporated by this reference as if set forth in full, together with Metro's itemized statement of the LiDAR data purchased by LOCAL GOVERNMENT. If Kitsap County breaches its contractual obligations with Metro, then Metro shall have no further obligation under this Agreement to provide such LiDAR data to LOCAL GOVERNMENT, and this Intergovernmental Agreement shall be deemed terminated. Metro will advise Local Government of such termination in writing.

2. **LOCAL GOVERNMENT'S RESPONSIBILITIES.** In exchange for the 2007-2008 LiDAR data set forth on the attached Exhibit A, LOCAL GOVERNMENT shall pay Metro the sum of **NINETY THOUSAND SEVEN HUNDRED SIXTY-TWO AND NO/100THS DOLLARS (\$90,762.00)**. LOCAL GOVERNMENT shall pay Metro within 30 days of receipt of the LiDAR data and Metro's billing statement, and shall direct payment to Metro, ATTENTION: Metro Accounts Payable, at 600 NE Grand Avenue, Portland, OR 97232-2736. Subsequent years of LiDAR data will be purchased based on a per square mile rate of \$428 (for contract work greater than 250

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square miles), (plus 10 percent for optional 2-foot contour maps) and a 10 percent Puget Sound LiDAR Consortium fee.

3. Annual purchases will be reflected in updated Exhibits A and B, provided by Metro for each year of LiDAR data LOCAL GOVERNMENT elects to buy, and executed in a formal written amendment, signed by the Directors of the Water Bureau and Technology Services.

4. **INDEMNITY.** Metro agrees, to the greatest extent permitted by the Oregon Constitution and subject to the limitations of the Oregon Tort Claims Act, to indemnify and hold harmless, LOCAL GOVERNMENT, its agents, employees, successors and assigns from any and all liability, damages, claims, demands, actions, causes of action, attorney fees (including on appeal), costs and expenses of whatsoever nature arising directly or indirectly from or relating to any of Metro's obligations under this Agreement, including but not limited to preparation for, promotion of and conduct of the Competition and any other activity associated with or related to the Competition, except to the extent arising from the negligence or intentional misconduct of LOCAL GOVERNMENT. LOCAL GOVERNMENT agrees to indemnify and hold harmless Metro, its officials, officers, employees, and agents from any and all liability, damages, claims, demands, actions causes of action, attorney fees (including on appeal), costs and expenses of whatsoever nature arising directly or indirectly from or relating to any of LOCAL Government's obligations under this Agreement, except to the extent arising from the negligence or intentional misconduct of Metro.

5. **ACCESS TO RECORDS.** Metro and LOCAL GOVERNMENT shall have access to the books, documents, papers and records that are directly related to this Agreement for the purpose of making any audit or performance examination.

6. **OWNERSHIP OF WORK PRODUCT.** All work products relating to this agreement shall become the exclusive property of Metro. Notwithstanding the foregoing, LOCAL GOVERNMENT reserves the right to retain copies of any such work products related to its sponsorship for its records.

7. **COMPLIANCE WITH LAWS.** Metro and LOCAL GOVERNMENT shall comply with all federal, state, and local laws, regulations, executive orders and ordinances applicable to this Intergovernmental Agreement. Without limitation, the parties expressly agree to comply with Title VI of the Civil Rights Act of 1964; Section V of the Rehabilitation Act of 1973; the provisions of the Americans with Disabilities Act of 1990 and ORS 659.425; all regulations and administrative rules establish pursuant to the foregoing laws; and all other applicable requirements of federal and state civil rights and rehabilitation statutes, rules and regulations.

8. **INDEPENDENT CONTRACTORS.** Each of the parties hereto is an independent contractor, and neither party shall have the authority to act on behalf of or incur obligations on behalf of the other party.

9. **NO THIRD PARTY BENEFICIARY.** Except as set forth herein, this Agreement is between Metro and LOCAL GOVERNMENT and creates no third party beneficiaries. Nothing in this Agreement gives or shall be construed to give or provide any benefit, direct, indirect or otherwise to any third parties unless such third party is expressly described as an intended beneficiary under this Agreement. Metro and LOCAL GOVERNMENT are the only parties to this Agreement and as such are the only parties entitled to enforce its terms.

10. **SEVERABILITY & SURVIVAL OF PROVISIONS.** The illegality of any provision of this Intergovernmental Agreement shall not affect the remainder of the Agreement. Any provisions concerning the limitation of liability, indemnity or conflicts of interest shall survive the termination of this Agreement.

11. **APPLICABLE LAW & VENUE OF DISPUTES.** This Agreement is entered into within the State of Oregon, the laws of which, whether substantive or procedural, shall apply and be followed, without regard to conflict of laws provisions. Venue for all disputes and any litigation arising under or concerning this Agreement shall be in Multnomah County, Oregon.

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12. CAPTIONS. The captions or headings in this Agreement are for convenience only and in no way define, limit or describe the scope or intent of any provisions of this Agreement.

13. ENTIRE AGREEMENT. This Agreement constitutes the entire agreement between the LOCAL GOVERNMENT and Metro. This Agreement supersedes all prior understandings and agreements between LOCAL GOVERNMENT and Metro. This Agreement may not be modified or amended except by a writing executed by LOCAL GOVERNMENT and Metro. The failure of a party to enforce any provision of this Agreement shall not constitute a waiver by any party of that or any other provision.

City of Portland

Metro

By: \_\_\_\_\_



\_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

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

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

<p><i>C. Kalu'au</i> Approved as to form by City Attorney</p> <p>Date: <i>4/23/08</i></p>	<p>Approved by the Office of the Metro Attorney</p> <p>Date: _____</p>
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# EXHIBIT A



## Exhibit A

### Statement of Work for LiDAR, 2006-2007 Portland Area LiDAR Consortium

The Portland Area LiDAR Consortium proposes to contract with Kitsap County in 2007 to obtain Light Detection And Ranging (LiDAR) data over portions of Clatsop, Tillamook, Washington, Clackamas, Multnomah, Hood River Marion and Yamhill Counties in Northwestern Oregon. The proposed data collection is supported and funded by a loose consortium of state, Federal and local government agencies (see Table 1), and is being coordinated by the Oregon Department of Geology and Mineral Industries at the request of the U.S. Geological Survey (USGS).

**Table 1.**

Participant	Contribution	Contact	Phone	Email
USGS Urban Corridor	\$83,350	Ray Wells	650-329-4933	rwells@usgs.gov
USGS Landslide	\$74,000	Jeff Coe	303 273-8606	jcoe@usgs.gov
USGS NEHRP	\$100,000	Craig Weaver	206-553-0627	craig@ess.washington.edu
METRO	\$204,571	Richard Bolen	503-797-1582	bolend@metro.dst.or.us
USFS Cloyd	\$5,700	Courtney Cloyd	503-808-2705	jcloyd@fs.fed.us
USFS Golden	\$5,000	Michael Golden	503-808-2324	mdgolden@fs.fed.us
City of Silverton	\$5,225	Sue DeVore	503-874-2211	sdevore@silverton.or.us
City of Hood River	\$2,090	Dave Bick	541.387.5200	mailto:daveb@ci.hood-river.or.us
Hood River County	\$36,053	Mike Schrankel	541-387-7104	
Oregon Department of Transportation	\$58,000	Paul Wirfs	(503) 986-3526	Paul.R.Wirfs@state.or.us
US Bureau of Land Management	\$5,700	Susan Nelson	503.808.6139	Susan_Nelson@or.blm.gov
Oregon Department of Geology and Mineral Industries	Coordinator	Ian Madin	971 673 1542	ian.madin@dogami.state.or.us
<b>Total</b>	<b>\$579,043</b>			

The Puget Sound LiDAR Consortium (PSLC) has collected LiDAR data in the Portland, Oregon urban areas in past years using USGS funding. In January 2006, the PSLC selected Watershed Sciences of Portland, Oregon, through competitive bid, for LiDAR data acquisition and preliminary analysis. Kitsap County will contract with Watershed Sciences to have LiDAR flown for the Portland Area LiDAR Consortium over the area described below for the data collection work of this program. All of the collected data will be available in the public domain.

The Puget Sound LiDAR Consortium (PSLC) consists of a core group of agencies – Kitsap County, Kitsap County Public Utilities District Number 1 (PUD), City of Seattle, Puget Sound Regional Council, the United States Geological Survey, and the National Aeronautics and Space Administration (NASA). The core group is responsible for data quality, overall survey design, and coordination with the contractor, Watershed Sciences. The core group determines if data delivered meets the contract specifications and authorizes payment. Kitsap County Department of Emergency Management is the fiscal agent of the program and is responsible for contract monitoring and for the administrative services necessary to collect, evaluate the quality, and distribute the LiDAR data. This Statement of Work involves only that portion of the LiDAR data to be collected over portions northwestern Oregon. The overall LiDAR survey design will be established by the PSLC.



## Exhibit A

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### **2006-2007 Portland Area LiDAR Consortium Project**

The proposed 2006-2007 Portland Area LiDAR Consortium Project will be to obtain approximately 1,653 square miles of aerial digital LiDAR DEM and DTM images and data for a swath of Northwestern Oregon stretching from Hood River County in the East into Clatsop County to the west, and covering all of the Portland metropolitan region (Figure 1). The exact area of coverage required is defined by an ESRI shape format GIS file supplied with this exhibit (Portland 2007 survey). In addition, 2 ft contours will be prepared for portions of the Survey covering Hood River County, the City of Hood River, and the City of Silverton. The exact extents of the contour coverage are specified in the attached shapefiles (Hood River Contours, Silverton Flyover Area). The collected data will meet the specifications listed below, and will be delivered to DOGAMI on portable hard drives. The coordinate system for the data will be:

System: Oregon State Plane, North (FIPS 3601)

Horizontal Datum: North American Datum of 1983 with 1991 Adjustments (HARN)

Vertical Datum /North American Vertical Datum of 1988 (Geoid03)

Units: International Feet (Horizontal), Feet (Vertical)

The approximate total budget is \$579,043, which includes LiDAR DEM, DTM data, contours as specified, and Kitsap County PSLC/LiDAR administrative fees.

Cost is based on a per square mile rate of \$428 (for contract work greater than 250 square miles), (plus 10% for optional 2-foot contour maps) and a 10% Puget Sound LiDAR Consortium fee.

Exhibit A

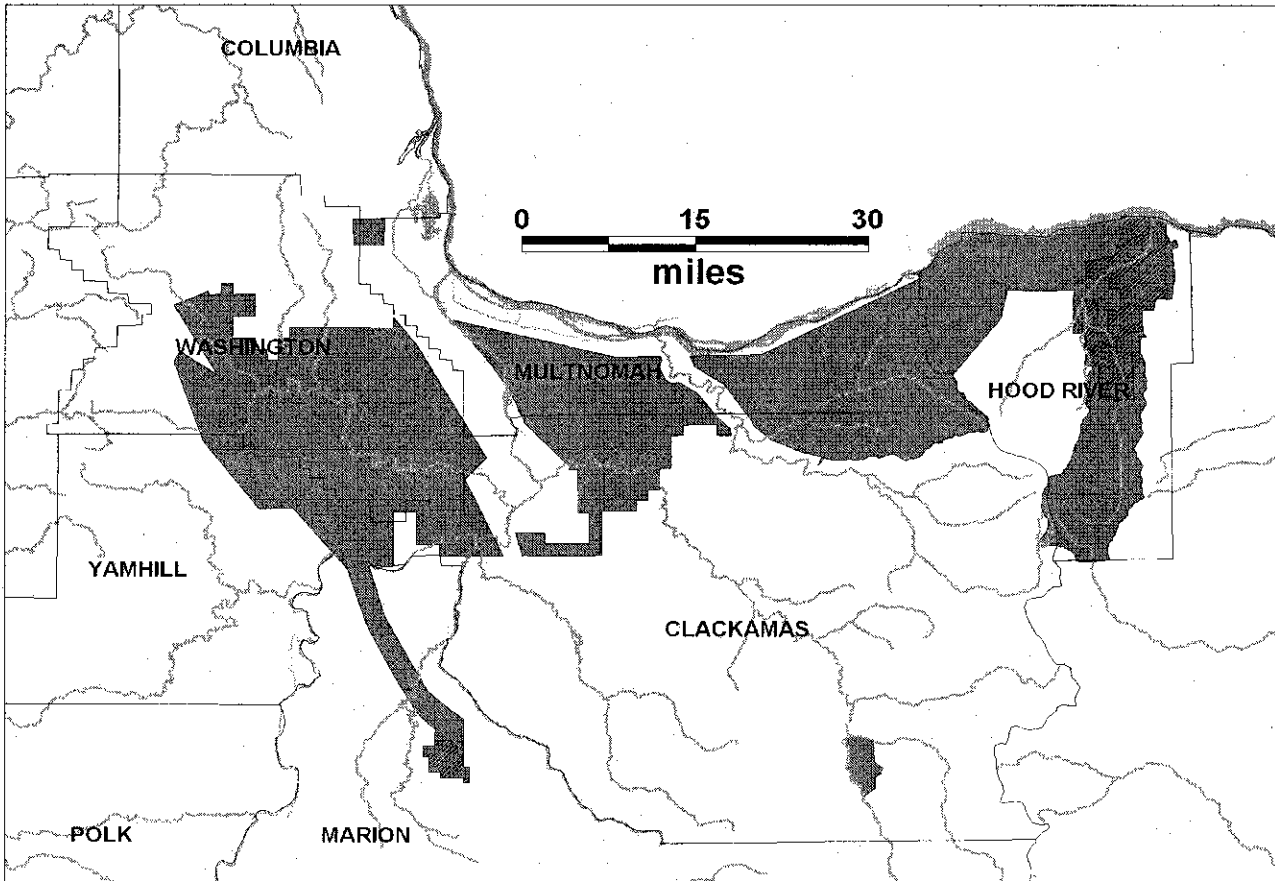


Figure 1. Proposed LIDAR survey area shown in green areas for optional contours in diagonal hatch.



## Exhibit B

### Watershed Sciences – Puget Sound LiDAR Consortium LiDAR Survey Specifications

<b>Data acquisition</b>	<i>Survey Design</i>	<i>Minimum requirements<sup>1</sup></i>
Laser pulse rate	Up to 116,000 pulses per second	
Returns per pulse	Up to 4	First and last (up to 2)
On-ground laser beam diameter	Approx 25 cm	Between 10 cm and 100 cm
Scan angle	±13 degrees	≤ ±20 degrees
Aircraft altitude	800 m above ground	
Aircraft speed	105 knots	
Ground swath width	<500 meters	
Swath overlap	50% sidelap (100% overlap)	No voids between swaths. No voids because of cloud cover or instrument failure. <20% no-overlap area per project. No arbitrary 1 km x 1 km square with >50% no-overlap area
Aggregate pulse density	>8/m <sup>2</sup>	Barring non-reflective areas (e.g., open water, wet asphalt): <ul style="list-style-type: none"> <li>• ≥85% design pulse density for entire project area.</li> <li>• Within areas of swath overlap, no 30m x 30m area with &lt;50% design pulse density</li> </ul>
Flight line direction	Opposing	
GPS base-line length	≤24 km	
GPS PDOP	≤3.0, ≥6 satellites in view	≤3.5, ≥6 satellites in view
Survey conditions		Leaf-off and no significant snow cover at discretion of Puget Sound LiDAR Consortium
<b>Accuracy</b>	<i>Survey Design</i>	<i>Minimum requirements</i>
Absolute accuracy	<13 cm vertical, <10 cm horizontal (RMSE) <sup>2</sup>	≤20 cm vertical (RMSE) <sup>3</sup>
Between-swath		≤15 cm vertical on horizontal surfaces (RMSE)

1 Local relief, turbulence, inability to maintain an exact flying height, and aircraft and instrument availability routinely lead to departures from the survey design. *Minimum requirements* listed here are the minimum acceptable under this contract. PSLC routinely evaluates delivered data to ensure compliance with minimum swath overlap and aggregate pulse density.

2 Watershed Sciences survey practices are optimized to achieve this absolute accuracy. Performance is verified by vendor-established ground control using hundreds of points per project.

3 Routinely evaluated by PSLC using available ground control points (GCPs). Number of available GCPs in a survey area is commonly small thus required RMSE is calculated using the formula

$$RMSE \leq 20 \text{ cm} * ((n-1) - 2.326 * (n-1)^{1/2}) / n)^{1/2}$$

where n is the number of GCPs.

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reproducibility <sup>4</sup>		
Reproducibility of range measurements <sup>5</sup>		≤5 cm (RMSE)
<b>Spatial reference framework</b>		
Vertical Datum	NAVD88, Geoid03 (unless otherwise specified)	
Horizontal Datum	NAD83	
Projection	UTM, State Plane, Oregon Lambert (as requested)	
Units	Meters (UTM) or survey/international feet (State Plane, Oregon Lambert)	
<b>Deliverables</b>		
Report of Survey	Text report that describes survey methods; results; vendor's accuracy assessments, including internal consistency and absolute accuracy; and metadata <i>.pdf, .doc, or .odt format</i>	
Aircraft trajectories (SBET files)	Aircraft position (easting, northing, elevation) and attitude (heading, pitch, roll) and GPS time recorded at regular intervals of 1 second or less. May include additional attributes. <i>ASCII text or shapefile format</i>	
All-return point cloud	List of all valid returns. For each return: GPS week, GPS second, easting, northing, elevation, intensity, return#, return classification. May include additional attributes. No duplicate entries. <i>ASCII text and LAS version 1.1 format</i> <i>1/64<sup>th</sup> USGS 7.5-minute quadrangle (0.9375 minute by 0.9375 minute) tiles</i>	
Ground point list	List of X, Y, Z coordinates of all identified ground points. <i>ASCII text.</i> <i>1/4<sup>th</sup> USGS 7.5-minute quadrangle (0.375 minute by 0.375 minute) tiles</i>	
Ground surface model	Raster of ground surface, interpolated via triangulated irregular network from identified ground points. No unavoidable point misclassification <sup>6</sup> <i>ESRI floating point grid, 6 ft or 3 ft (2m or 1m) cell size, snapped to (0,0), 1/4<sup>th</sup> USGS 7.5-minute quadrangle (0.375 minute by 0.375 minute) tiles</i>	
First-return (highest-hit) surface model	Raster of first-return surface, cell heights are highest recorded value within that cell, voids may be filled with ground surface model <i>ESRI floating point grid, 6 ft or 3 ft (2m or 1m) cell size, snapped to (0,0), 1/4<sup>th</sup> USGS 7.5-minute quadrangle (0.375 minute by 0.375 minute) tiles</i>	
Surface models shall have no tiling artifacts and no gaps at tile boundaries. Areas outside survey boundary		

4 Extensive swath overlap allows for robust estimation of intra-survey reproducibility. Intra-survey measurement errors on flat ground are commonly 4-6 cm RMSE<sub>Z</sub>, with an increase in Z errors as local slope increases. PSLC routinely analyzes samples of delivered data for conformance with this specification.

Because errors related to dense forest cover are outside the vendor's control, this contract includes no specification for the accuracy of bare-earth DEMs. The error of a bare-earth DEM includes errors in classifying points as ground and errors introduced by interpolation from scattered ground points to a continuous surface, as well as measurement errors. Analyses of swath-to-swath reproducibility suggest that, barring wholesale vertical shifts, errors of bare-earth DEMs produced by Watershed Sciences surveys of western Washington and northwest Oregon are circa 15 cm (RMSE<sub>Z</sub>) or less.

5 Evaluated by measuring departures from planarity of returns from planar surfaces (e.g., building roofs)

6 PSLC evaluates conformance by visual inspection of large-scale shaded-relief images. Tiling artifacts and measurement errors may also be identified during this inspection



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shall be coded as NoData. Internal voids (e.g., open water areas, shadowed areas in first-return surface) may be coded as NoData.

Intensity image	<i>GeoTIFF, 3 ft (1m) pixel size, 1/4<sup>th</sup> USGS 7.5-minute quadrangle (0.375 minute by 0.375 minute) tiles</i>
Contours <b>*OPTIONAL*</b> (add 10% to total cost)	2-ft contours <i>AutoCAD .dxf or ESRI shapefile format</i> <i>1/64<sup>th</sup> USGS 7.5-minute quadrangle (0.9375 minute by 0.9375 minute) tiles</i>
<b>Files shall conform to a consistent naming scheme. Files shall have consistent internal formats.</b>	



## Exhibit B

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### COMPENSATION

Fixed Cost: \$685,625.00

For the services performed hereunder, the CONTRACTOR shall be paid as per the fee scheduled outlined below based upon contiguous survey area size. Included in the fee schedule are all mobilizations cost, all phases of acquisition and processing and delivery of the data in digital form. Data Specifications are listed in Exhibit A. Fee schedule as follows:

Survey Area Distributions	Cost per Acre
50mi <sup>2</sup> - 32,000 acres	\$1.34
>100 mi <sup>2</sup> - 64,000 acres	\$1.00
>150 mi <sup>2</sup> - 96,000 acres	\$0.84
>200 mi <sup>2</sup> - 128,000 acres	\$0.74
>250 mi <sup>2</sup> - 160,000 acres	\$0.67

Note: 640 acres in a square mile

The CONTRACTOR may bill as follows: Exhibit B Compensation: 50 percent of the fees charged may be billed upon collection of data, 30% upon delivery of the data and the remaining 20 percent upon acceptance by Kitsap County.

Included in all cost shall be a 10 percent Administration fee to be paid to Kitsap County Department of Emergency Management. Five percent (5%) of the fee shall be for contract administration and 5 percent of the fee shall be for quality control monitoring.