



RICHARD SANCHEZ
CHIEF INFORMATION OFFICER

**COUNTY OF LOS ANGELES
CHIEF INFORMATION OFFICE**

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ADOPTED

BOARD OF SUPERVISORS
COUNTY OF LOS ANGELES

12 March 31, 2015


PATRICK O'GAWA
ACTING EXECUTIVE OFFICER

March 31, 2015

The Honorable Board of Supervisors
County of Los Angeles
383 Kenneth Hahn Hall of Administration
500 West Temple Street
Los Angeles, California 90012

Dear Supervisors:

**ACCEPTANCE OF A GRANT FROM THE UNITED STATES 3D ELEVATION PROGRAM TO
EXECUTE AMENDMENT NO. 1 TO MASTER SERVICES AGREEMENT NO. 78077 WITH
PICTOMETRY INTERNATIONAL CORPORATION FOR ACQUISITION OF ADDITIONAL DIGITAL
AERIAL DATA
(ALL SUPERVISORIAL DISTRICTS) (3 VOTES)**

SUBJECT

The Chief Information Office is requesting Board acceptance of a \$300,000 grant from the United States Geological Survey 3D Elevation Program, which will be combined with existing contributions from project participants to fund the acquisition of high resolution digital terrain data as part of the Los Angeles Regional Imagery Acquisition Consortium.

The Chief Information Office is also notifying your Board that, contingent upon the acceptance of the grant, the County of Los Angeles and Pictometry International Corporation (Pictometry) have negotiated and will execute Amendment No. 1 (Attachment A) to Master Services Agreement No. 78077 for the Acquisition of Digital Aerial Data.

IT IS RECOMMENDED THAT THE BOARD:

1. Accept a \$300,000 grant from the United States Geological Survey's (USGS) 3D Elevation Program (3DEP), which will be used to fund the acquisition of high resolution digital terrain data and distribution to participants of the Los Angeles Regional Imagery Acquisition Consortium 4 (LAR-IAC4).

PURPOSE/JUSTIFICATION OF RECOMMENDED ACTION

Acceptance of the USGS 3DEP grant will help defray the cost for acquisition of high resolution digital terrain data for the LAR-IAC initiative. This new data will update existing data acquired in 2006, enabling enhanced flood modeling, emergency response, property assessment, road design, and solar potential analysis among many other benefits. The Department of Public Works (DPW) plans to utilize this data to assist in determining the source of pollutants entering the Santa Monica Bay.

The County's Enterprise GIS Program will store and provide centralized access to this high resolution digital terrain data from the County's Central GIS Repository.

Performance Measures

A separate Agreement with Dewberry & Davis Services Operations, Inc. provides quality assurance and control services to measure Pictometry's work performance on deliverables outlined in the Agreement. This includes review of project work plans, data quality and accuracy, delivery schedule, and success of online access methods.

Implementation of Strategic Plan Goals

This Board action supports the following County Strategic Goals:

1. Service Excellence - The acquired data will assist in providing the public with personalized spatially specific information and direct services through web-based spatially enabled imagery and elevation data;
2. Workforce Excellence - Use of this terrain data, combined with other data layers, enables better decisions by adding a visual context to constituent issues and needs; and
3. Fiscal Responsibility - By sharing the cost for acquiring this data, the County will save 60 percent over the cost of obtaining this necessary terrain data independently.

FISCAL IMPACT/FINANCING

The maximum obligation for Amendment No. 1 is \$1,617,478, funded by existing LAR IAC participating public entities and the USGS grant. No additional County funds are required.

FACTS AND PROVISIONS/LEGAL REQUIREMENTS

On December 3, 2013, your Board approved the Pictometry Agreement No. 78077 and delegated authority to the Chief Information Officer (CIO) to execute future Amendments subject to full cost recovery by LAR-IAC participants, review and approval by County Counsel, and notification to your Board.

This Amendment has been reviewed and approved as to form by County Counsel.

IMPACT ON CURRENT SERVICES (OR PROJECTS)

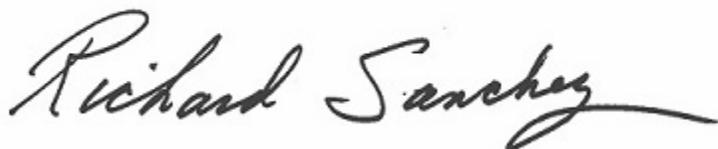
The acquisition of updated digital terrain data as part of LAR-IAC4 will achieve the following benefits:

- Cost savings: 60 percent on digital terrain acquisition costs based on the collaboration with other public entities, volume discount pricing, and cost-sharing through the joint acquisition strategy;
- Increased worker productivity: High levels of precision in digital terrain data tools will reduce time spent on site visits and provide a more comprehensive view of land use issues; and
- Service enhancement: Integration of digital terrain data with GIS parcel databases and other GIS layers will provide a better context for improving the decision-making process.

CONCLUSION

The acceptance of the grant from the USGS 3DEP will allow LAR-IAC to move forward with the acquisition and deployment of digital terrain data and increased benefits to constituents through meaningful public agency collaboration and partnerships.

Respectfully submitted,

A handwritten signature in black ink that reads "Richard Sanchez". The signature is written in a cursive style with a long, sweeping underline.

RICHARD SANCHEZ
Chief Information Officer

RS:MG:pa

Enclosures

c: Executive Office, Board of Supervisors
County Counsel

**AMENDMENT NUMBER ONE
TO
AGREEMENT
BY AND BETWEEN
COUNTY OF LOS ANGELES
AND
PICTOMETRY INTERNATIONAL CORP.
FOR
DIGITAL AERIAL DATA**

This Amendment Number One (hereinafter "Amendment") is entered this _ day of _____, 2015 by and between the County of Los Angeles, a political subdivision of the State of California (hereinafter "County"), and Pictometry International Corp, a Delaware corporation (hereinafter "Contractor") and amends that certain Agreement for Digital Aerial Data dated December 3, 2013 (hereinafter "Agreement").

WHEREAS, County and Contractor entered into the Agreement, which was approved and executed by County's Board of Supervisors on December 3, 2013; and

WHEREAS, the parties now wish to further amend the Agreement to, among other things, as listed below, acquire additional digital aerial data products and to increase the Maximum Contract Sum under the Agreement in accordance with the additional products.

NOW, THEREFORE, in consideration of the foregoing, and pursuant to Paragraph 4 (Changes Notices and Amendments) of the Agreement, Contractor and County hereby agree to amend the Agreement as follows:

1. The Agreement is hereby incorporated by reference, and all of its terms and conditions, including capitalized terms defined therein, shall be given full force and effect as if fully set forth herein.
2. Paragraph 8.1 (Maximum Contract Sum) of the Agreement is hereby deleted in its entirety and replaced with revised Paragraph 8.2 (Maximum Contract Sum) to read as follows:

8.1 MAXIMUM CONTRACT SUM

The Contract Sum under this Agreement shall be the total monetary amount payable by County to Contractor for supplying all the tasks, subtasks, deliverables, goods, services and other Work required or requested by County under this Agreement. All Work completed by Contractor must be approved in writing by County in accordance with Paragraph 2.4. If County does not approve Work in writing, no payment shall be due Contractor for that Work. The Contract Sum, including all applicable taxes and Pool Dollars, authorized by County hereunder shall not exceed Three Million Eight Hundred Seventy Eight Thousand Five Hundred Seventy Three dollars and Eighty-Five Cents (\$3,878,573.85), as further detailed in the Exhibit A Section 5 (Scope of Work - Schedule of Payments), unless the Contract Sum is modified pursuant to a duly approved Amendment to this Agreement by County's and Contractor's authorized representative(s) pursuant to Paragraph 4. The Contract Sum under this Agreement shall cover the authorized payments for all Work provided by Contractor, including the Required Work and any Optional Work.

3. Paragraph 10.2, Item 5 of the Agreement is hereby deleted in its entirety and replaced with revised Paragraph 10.2, Item 5 to read as follows:

5. To insert the Orthogonal Images or Digital Terrain Data into the public domain as deemed necessary or authorized by County and Pictometry.

4. Exhibit A (Scope of Work) of the Agreement is deleted in its entirety and replaced with revised Exhibit A (Scope of Work), attached hereto as Attachment 1 and incorporated herein by reference.

5. Exhibit A.4 (Statement of Work – Digital Terrain Data) of the Agreement is deleted in its entirety and replaced with revised Exhibit A.4 (Statement of Work – Digital Terrain Data), attached hereto as Attachment 2 and incorporated herein by reference.

6. Except as provided in this Amendment Number One, all other terms and conditions of the Agreement shall remain unchanged and in full force and effect.

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IN WITNESS WHEREOF, Contractor has executed this Amendment or caused it to be duly executed, and the County of Los Angeles, by order of its Board of Supervisors has caused this Amendment to be executed on its behalf by the Chairman of said Board and attested by the Executive Officer-Clerk of the Board of Supervisors thereof, the day and year first above written.

CONTRACTOR: Pictometry International Corp.

By:

Signature

Print Name

Title

COUNTY OF LOS ANGELES

By:

Richard Sanchez
Chief Information Officer

APPROVED AS TO FORM:

JOHN F. KRATTLI
County Counsel

By _____

VICTORIA MANSOURIAN
Principal Deputy County Counsel

ATTACHMENT 1

EXHIBIT A
SCOPE OF WORK
FOR
DIGITAL AERIAL DATA

1. GENERAL

1.1 INTRODUCTION

This Exhibit A (Scope of Work) consists of tasks, subtasks, deliverables, goods, services and other work the selected Contractor shall be required to provide around the period from December 2013 through March 2016, weather and Air Traffic Control (ATC) permitting.

The following Exhibits are attached to and form part of this Scope of Work:

1. Exhibit A.1 (Statement of Work – Oblique Images)
2. Exhibit A.2 (Statement of Work – Orthogonal Images)
3. Exhibit A.3 (Statement of Work – Building Representations)
4. Exhibit A.4 (Statement of Work – Digital Terrain Data)

1.2 SCOPE OF WORK AND DELIVERABLES

1.2.1 REQUIRED WORK

Contractor shall deliver the following digital mapping products (Digital Aerial Data) under this Scope of Work, as described in Exhibits A.1 through A.4 to this Exhibit A.

1. Oblique Images: See Exhibit A.1 (Statement of Work – Oblique Images) to this Exhibit A.
2. Orthogonal Images: See Exhibit A.2 (Statement of Work – Orthogonal Images) to this Exhibit A.
3. Building Representations: See Exhibit A.3 (Statement of Work - Building Representations) to this Exhibit A.
4. Digital Terrain Data: See Exhibit A.4 (Statement of Work – Digital Terrain Data) to this Exhibit A.

1.2.2 OPTIONAL WORK

County may from time to time, during the term of the Agreement, submit to Contractor written requests for Optional Work relating to the Licensed Products or Licensed Services, including any type of Digital Aerial Data, as further provided in Paragraph 5.2 (Optional Work) of the Base Agreement and the corresponding Tasks and Deliverables in each of Exhibits A.1 through A.4 of this Exhibit A.

1.2.3 APPROVAL OF WORK

All Work must be approved by County, as evidenced by County's Project Manager and County's Project Director, as provided in Paragraph 2.4 (Approval of Work) of the Base Agreement.

1.3 DEFINITIONS

The capitalized terms listed below that are used throughout this Exhibit A shall have the definitions given to such terms in this Exhibit A. All other capitalized terms used in this Exhibit A without definitions shall have the meanings given to such terms in the Agreement, as applicable.

1. Building Representation

The term "Building Representation" shall have the meaning specified in Exhibit A.3 (Statement of Work – Building Representations).

2. Community Image(s)

The term “Community Image” shall have the meaning specified in Exhibit A.1 (Statement of Work – Oblique Images).

3. Digital Elevation Model (DEM)

The terms “Digital Elevation Model” and “DEM” shall have the meaning specified in Exhibit A.4 (Statement of Work – Digital Terrain Data).

4. Digital Surface Model (DSM)

The terms “Digital Surface Model” and “DSM” shall have the meaning specified in Exhibit A.4 (Statement of Work – Digital Terrain Data).

5. Digital Terrain Model (DTM)

The terms “Digital Terrain Model” and “DTM” shall have the meaning specified in Exhibit A.4 (Statement of Work – Digital Terrain Data).

6. Images

The term “Image(s)”, whether singular or plural, shall mean digital images, automatically captured from airborne platforms without geo-referencing.

7. LiDAR Point Cloud

The term “LiDAR Point Cloud” shall have the meaning specified in Exhibit A.4 (Statement of Work – Digital Terrain Data).

8. Neighborhood Image

The term “Neighborhood Image” shall have the meaning specified in Exhibit A.1 (Statement of Work – Oblique Images).

9. Primary Site

The term “Primary Site” shall have the meaning specified in Exhibit A.1 (Statement of Work – Oblique Images).

10. Planimetric Feature

The term “Planimetric Feature” shall have the meaning specified in Exhibit A.3 (Statement of Work – Building Representations).

11. Oblique Images

The term “Oblique Image” shall mean an oblique digital image (including vector trapezoids), automatically captured and geo-referenced from airborne platforms in accordance with Exhibit A.1 (Statement of Work – Oblique Images).

12. Project Area 1; Area 1

The terms “Project Area 1” and “Area 1” shall mean the “urban” areas of Los Angeles County encompassing approximately 2,898 square miles and Santa Catalina Island, an island off the coast of Los Angeles County encompassing approximately 75 square miles, as set forth in Section 1.7 (Reference Maps) of Exhibit A.2 (Statement of Work – Orthogonal Images).

13. Project Area 2; Area 2

The terms “Project Area 2” and “Area 2” shall mean the national forest areas of Los Angeles County encompassing approximately 1,056 square miles, , as set forth in Section 1.7

(Reference Maps) of Exhibit A.2 (Statement of Work – Orthogonal Images).

4. **Sector**

The terms “Image Sector” and “Sector” shall have the meaning specified in Exhibit A.1 (Statement of Work – Oblique Images).

2. **QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC PROCESS)**

All finished products and final deliverables under this Agreement will be subject to systematic Quality Assurance and Quality Control (“QA/QC”), which will be done by an independent photogrammetric firm, whose services will be solicited by County in conjunction with the Agreement.

For this purpose, the County and cooperating cities/agencies (Participating Entities) will prepare a set of “hidden” control points, which will be used by the above mentioned firm(s). Also, County and Participating Entities will do additional random QA/QC to assure that all received products are in compliance with specified technical specifications and standards.

3. **LICENSING**

All finished products and final deliverables (excluding access to the Licensed Services) will be perpetually licensed to County upon completion of the Work in accordance with the License terms set forth in Paragraphs 10.1 (Scope of License for Licensed Products) through 10.4 (Software Updates) of the Base Agreement.

The Licensed Services shall be subject to the License terms set forth in Paragraph 10.5 (License for Licensed Services) of the Base Agreement.

4. **DATA PROVIDED BY COUNTY**

1. County will make available the following countywide information to Contractor:

- a) LAR-IAC Project Area Boundaries (shapefile format)
- b) Detailed County/City Boundaries (for orientation only - shapefile format)
- c) Grid for project tiles (shapefile format)
- d) Oblique Aerial Digital Imagery 1 sq. mile sector grid (for orientation only – shapefile format)
- e) Boundary of Urban Canyons “Downtown Areas” high-rise areas (shapefile format)
- f) Parcel vector database (for orientation only – shapefile format)
- g) Existing control cadastral monuments (shapefile format)
- h) Existing LAR-IAC deliverables in various formats as mutually agreed upon (ie. DTM and/or DSM, first generation 4” ortho imagery)
- i) Proposed Delivery Areas (shapefile format)
- j) Proposed Mosaic Tile Areas (shapefile format)
- k) Boundary of locations that could potentially have large changes in elevation (ie. Significant grading) that would affect ortho imagery rectification
- l) Other relevant GIS layers mutually determined by the Contractor and County.

2. Digital Elevation Data (from LiDAR and stereo compilation) provided by County for Contractor will be in ESRI raster format in California State Plane Coordinate System, Zone 5, NAD83, NAVD88.

3. All vector data sets provided by County for Contractor will be in ESRI shapefile format in California State Plane Coordinate System, Zone 5, NAD83, U.S. Survey Feet.
4. County will be responsible for:
 - a) Assignment of all point numbers;
 - b) Provision of blank monument record forms;
 - c) Providing the County Survey Monuments digital files.

5. SCHEDULE OF PAYMENTS

The Contract Sum includes amounts allocated for the following components of Work to be provided by Contractor to County during the term of the Agreement:

Scope of Work – Oblique Images	\$1,169,057.50
Scope of Work – Orthogonal Images	\$ 757,038.35
Scope of Work – Building Representations	\$135,000.00
Scope of Work – Digital Terrain Data	\$1,617,478.00
Optional Work (Pool Dollars)	\$200,000.00
<hr/>	
Total:	\$3,878,573.85

EXHIBIT A.1
SCOPE OF WORK – OBLIQUE IMAGES
FOR
DIGITAL AERIAL DATA

SECTION 1 – STATEMENT OF WORK

[Insert Exhibit A.1 (Statement of Work – Oblique Images)]

SECTION 2 – SCHEDULE OF DELIVERABLES AND PAYMENTS

2.1 DELIVERABLES

Contractor shall complete the Required Work Deliverables, including all Tasks and Subtasks associated therewith as specified in the applicable Statement of Work, by the associated Due Dates listed below.

DELIVERABLE NUMBER	DESCRIPTION	AMOUNT	DUE DATE*
1	Provided and Configured Software	\$0	July 1, 2014
2	Provided Hosted Solution	\$0	July 1, 2014
3	Provided Oblique Images	\$0	July 1, 2014
4	Technical Support, Documentation and Training	\$0	n/a
5	Final Acceptance	50% of Total Cost (\$584,528.75)	September 1, 2014
	Second Year Payment due	50% of Total Cost (\$584,528.75)	July 1, 2015
6	Optional Work	TBD	n/a

* Due dates are approximate and dependent on image capture and processing. Such capture dates may be affected by weather conditions and/or Air Traffic Control.

All invoices shall be prepared and paid in accordance with the terms of the Agreement. In the event Contractor fails to achieve Final Acceptance by the due date above, County will assess credits for delay as described in Paragraph 6.4 (Credits for Delays) of the Base Agreement.

2.2 PAYMENT TERMS

The fee components for the Required Work relating to Oblique Images under this Agreement are as follows:

TASK	DESCRIPTION	QUANTITY	UNIT COST	COST
1.1	Provide Desktop Software	1	\$0	\$0
1.2	Provide ArcGIS Extension Software	1	\$0	\$0
1.3	Provide Ability to View Existing Oblique Images	1	\$0	\$0
1.4	Provide Other Software	1	\$0	\$0
1.5	Provide Public Safety Answering Point Support	1	\$0	\$0
2.1	Provide Hosted Solution	2 years	\$50,000	\$100,000
2.2	Provide Application Programming Interface	1	\$0	\$0
2.3	Maintain GIS Layers for Hosted Solution	1	\$0	\$0
	SUBTOTAL FOR TASKS 1 & 2			\$100,000
3	Community 2-Way Oblique images (Area 1 – Urban)	3075	\$45	\$138,375
	Community 4-Way Oblique images (Catalina)	107	\$45	\$4,815
	Neighborhood 4-Way Oblique images	3182	\$275	\$875,050

TASK	DESCRIPTION	QUANTITY	UNIT COST	COST
	Community 2-Way Oblique images (Area 2 – National Forest)	1031.5	\$45	\$46,417.50
	Neighborhood 8-Way Oblique images	16	\$275	\$4,400
	SUBTOTAL FOR TASK 3			\$1,069,057.50
4	Provide Technical Support, Documentation and Training		n/a	\$0
5	Correct Image Deficiencies – Final Acceptance		n/a	\$0
6	Provide Optional Work		\$	\$0
	IMAGING COST			\$1,169,057.50

2.3 OPTIONAL WORK

Optional Work, including any Optional Products and Optional Services, shall be provided by Contractor in accordance with Paragraph 5.2 (Optional Work) of the Base Agreement. The discounts granted by Contractor for such Optional Work shall be no less than the discounts guaranteed by Contractor for the Required Work.

EXHIBIT A.2
SCOPE OF WORK – ORTHOGONAL IMAGES
FOR
DIGITAL AERIAL DATA

SECTION 1 – STATEMENT OF WORK

[Insert Exhibit A.2 (Statement of Work – Orthogonal Images)]

SECTION 2 – SCHEDULE OF DELIVERABLES AND PAYMENTS

2.1 DELIVERABLES

Contractor shall complete the Required Work Deliverables, including all Tasks and Subtasks associated therewith as specified in the applicable Statement of Work, by the associated Due Dates listed below.

DELIVERABLE NUMBER	DESCRIPTION	AMOUNT	DUE DATE*
1	Project Work Plan	10%	January 1, 2014
2	Geodetic Control and Pre-Marking	0%	April 1, 2014
3	Aerial Triangulation	20%	March 1, 2014
4	DTM Updates – Project Area 1	0%	July 1, 2014
5	Ortho Imagery (True Color) – Project Area 1	30%	July 1, 2014
6	Ortho Imagery (True Color) – Project Area 2	10%	July 1, 2014
7	DTM Updates – Project Area 2	0%	July 1, 2014
8	Final Acceptance	30%	September 15, 2014

* Due dates are approximate and dependent on image capture and processing. Such capture dates may be effected by weather conditions and/or Air Traffic Control.

All invoices shall be prepared and paid in accordance with the terms of Agreement. In the event Contractor fails to achieve Final Acceptance by the due date above, County may assess credits for delay as described in Paragraph 6.4 (Credits for Delays) of the Base Agreement.

2.2 PAYMENT TERMS

The fee components for the Required Work relating to Orthogonal Images under this Agreement are as follows:

TASK	DESCRIPTION	COST
1	Develop Project Work Plan	\$0
2	Provide Geodetic Control and Pre-Marking	\$35,200
3	Perform Aerial Triangulation	\$180,000
4	Provide DTM Updates – Project Area 1	\$18,829
5	Generate Ortho Imagery (True Color) – Project Area 1	\$479,435.60
6	Generate Ortho Imagery (True Color) – Area 2	\$37,472.75
7	Provide DTM Updates – Project Area 2	\$6,101
	Total	\$757,038.35

2.3 OPTIONAL WORK

Optional Work, including any Optional Products and Optional Services, shall be provided by Contractor in accordance with Paragraph 5.2 (Optional Work) of the Base Agreement. The discounts granted by Contractor for such Optional Work shall be no less than the discounts guaranteed by Contractor for the Required Work.

EXHIBIT A.3
SCOPE OF WORK – BUILDING REPRESENTATIONS
FOR
DIGITAL AERIAL DATA

SECTION 1 – STATEMENT OF WORK

[Insert Exhibit A.3 (Statement of Work – Building Representations)]

SECTION 2 – SCHEDULE OF DELIVERABLES AND PAYMENTS

2.1 DELIVERABLES

Contractor shall complete the Required Work Deliverables, including all Tasks and Subtasks associated therewith as specified in the applicable Statement of Work, by the associated Due Dates listed below.

DEL	TITLE	TOTAL COST	DUE DATE*
1	Project Work Plan	\$0	December 21, 2013
2	Final Acceptance	\$135,000	August 1, 2014
3	Optional Work		
3.1			
3.2			
3.3			

* Actual due dates are dependent on the Agreement Effective Date and image capture and processing. Such capture dates may be effected by weather conditions and/or Air Traffic Control.

All invoices shall be prepared and paid in accordance with the terms of Agreement. In the event Contractor fails to achieve Final Acceptance by the due date above, County may assess credits for delay as described in Paragraph 6.4 (Credits for Delay) of the Base Agreement.

2.2 PAYMENT TERMS

The fee components for the Required Work relating to Building Representations under this Agreement are as follows:

DEL	TITLE	TOTAL COST
1	Project Work Plan	\$0
2	Final Acceptance	\$135,000
3	Optional Work	
3.1		
3.2		
3.3		

2.3 OPTIONAL WORK

Optional Work, including any Optional Products and Optional Services, shall be provided by Contractor in accordance with Paragraph 5.2 (Optional Work) of the Base Agreement. The discounts granted by Contractor for such Optional Work shall be no less than the discounts guaranteed by Contractor for the Required Work.

EXHIBIT A.4
SCOPE OF WORK – DIGITAL TERRAIN DATA
FOR
DIGITAL AERIAL DATA

SECTION 1 – STATEMENT OF WORK

[Insert Exhibit A.4 (Statement of Work – Digital Terrain Data)]

SECTION 2 – SCHEDULE OF DELIVERABLES AND PAYMENTS

2.1 DELIVERABLES

Contractor shall complete the Required Work Deliverables, including all Tasks and Subtasks associated therewith as specified in the applicable Statement of Work, by the associated Due Dates listed below.

DELIVERABLE NUMBER	DESCRIPTION	AMOUNT	DUE DATE*
1	Project Work Plan	10%	September 1, 2015
2	Digital Terrain Datasets – Project Areas 1 and 2	40%	January 31, 2016
3	1 Foot Contours – Project Area 1	20%	February 29, 2016
4	2 Foot Contours – Project Area 2	10%	February 29, 2016
5	Final Acceptance	20%	March 31, 2016
6	Optional Work	TBD	TBD

* Due dates are approximate and dependent on LiDAR capture and processing. Such capture dates may be effected by weather conditions and/or Air Traffic Control.

All invoices shall be prepared and paid in accordance with the terms of Agreement. In the event Contractor fails to achieve Final Acceptance by the due date above, County may assess credits for delay as described in Paragraph 6.4 (Credits for Delay) of the Base Agreement.

2.2 PAYMENT TERMS

TASK	DESCRIPTION	PRICE	
Task 1	Develop Project Work Plan	County approved Project Work Plan	\$0
Task 2	Provide Digital Terrain Datasets (DSM, DTM and DEM) – Project Areas 1 and 2	Costs of acquisition and production of digital terrain data from LIDAR.	1,411,523
Task 3	Generate Contours with One Foot Interval – Project Area 1	Costs of production of 1 foot contour data from Digital Terrain data	\$175,010
Task 4	Generate Contours with Two Foot Interval – Project Area 2	Costs of production of 2 foot contour data from Digital Terrain data	\$30,945
Task 5	Correct Digital Terrain Data Deficiencies	Correction of Deficiencies identified by County during the Warranty Period	\$0
	Public Domain	Placing <u>digital terrain</u> data into the Public Domain	\$50,000
	Credit	Scheduling Credit	-\$50,000
		TOTAL	\$1,617,478

2.3 OPTIONAL WORK

Optional Work, including any Optional Products and Optional Services, shall be provided by Contractor in accordance with Paragraph 5.2 (Optional Work) of the Base Agreement. The discounts granted by Contractor for such Optional Work shall be no less than the discounts guaranteed by Contractor for the Required Work.

ATTACHMENT 2

EXHIBIT A.4

**STATEMENT OF WORK – DIGITAL TERRAIN DATA
FOR
DIGITAL AERIAL DATA**

SECTION 1 – STATEMENT OF WORK

1.1 GENERAL

1.1.1 INTRODUCTION

Contractor shall deliver under this Statement of Work Digital Terrain Data collected and Delivered in accordance with the USGS LiDAR Base Specification V1.2, November 2014, and incorporating the changes in specification version 1.1, for **Project Areas 1 and 2**.

1.1.2 DEFINITIONS

In addition to the terms defined in the Base Agreement, the following definitions shall apply throughout this Exhibit A.4 (Statement of Work – Digital Terrain Data): No additional definitions.

1. **Digital Terrain Model (DTM)**

The terms “Digital Terrain Model” and “DTM” shall mean the bare earth terrain, LAS Class 2, from which elevated surface features, such as buildings and trees, have been reclassified as LAS Class 1, with the addition of breaklines as needed for hydro-flattening of water bodies.

2. **Digital Elevation Model (DEM)**

The terms “Digital Elevation Model” and “DEM” shall mean the bare earth terrain (like the DTM), LAS Class 2, from which elevated surface features, such as buildings and trees, have been reclassified as LAS Class 1 – but is represented as a raster (regularly spaced GRID).

3. **Digital Surface Model (DSM)**

The terms “Digital Surface Model” and “DSM” shall mean the top reflective surface and includes all objects on it (including buildings and trees). Sometimes referred to as “first return” data.

4. **LiDAR Point Cloud**

The term “LiDAR Point Cloud” shall mean a large set of three dimensional points, collected from LiDAR. Points clouds are almost always 3D. Point clouds have an order of magnitude more features than point datasets. Individual features in point clouds do not typically possess individually meaningful attributes; the information value in a point cloud is derived from the relations among large numbers of features.

1.2 TASKS AND DELIVERABLES

TASK 1 – DEVELOP PROJECT WORK PLAN

Contractor shall review and analyze the Digital Terrain Data deliverable to be provided under this Agreement and develop a Project Work Plan, which shall be used to accomplish the following:

1. Guide project planning;
2. Document project planning assumptions and constraints;
3. Document project-planning decisions regarding alternatives chosen;
4. Facilitate communication between project stakeholders;

5. Define key management reviews as to content, extent and timing; and
6. Provide a baseline for progress measurement and project control.

DELIVERABLE 1 – PROJECT WORK PLAN

Contractor shall provide for County approval a Project Work Plan document in Word and Portable Document Format (PDF) developed in accordance with Task 1 (Develop Project Work Plan).

TASK 2 – PROVIDE DIGITAL TERRAIN DATASETS (DSM, DTM AND DEM) – PROJECT AREAS 1 AND 2

Contractor shall produce Digital Terrain Datasets for **Project Areas 1 and 2** to support generation of ortho imagery, 3D visualization, change detection and 1 and 2 foot contour generation with breakline data. Digital Terrain Datasets should be produced using LiDAR technology with a combination of stereo compilation for breaklines specified in Acceptance Criterion C.8 for control of bridges, edge of pavement, hydrographic features, ridgelines, and retaining walls as needed for orthorectification and contouring.

The Digital Terrain Datasets shall comply with the following requirements:

1. The DTM nominal pulse spacing (NPS) shall be 0.707 meters or less per LiDAR swath to achieve a density of 2 points per square meter or better.
2. The DTM's vertical accuracy shall be suitable for 1 foot contouring, i.e., Accuracy (z) of 0.60 foot at the ninety-five percent (95%) confidence level.
3. The DTM's horizontal accuracy shall be suitable for 1:1200 mapping, i.e., Accuracy (r) of 3.80 foot at the ninety-five percent (95%) confidence level.
4. The DEM with cell size no greater than 0.7 meters or 2.5 feet, and no less than the design Nominal Pulse Spacing (NPS). Delivery should be in an industry-standard, GIS compatible, 32-bit floating point raster format (ERDAS .IMG preferred). Tiled delivery without overlap; and will show no edge artifacts or mismatch.
5. DEM Void areas shall be coded using a unique NODATA value. This value shall be identified in the appropriate location within the raster file header or external support files (for example, .aux).
6. The DSM is usually referred to as 'first return data'; requirements are the same as the DTM; with a different delivery format.

DELIVERABLE 2 – DIGITAL TERRAIN DATASETS – PROJECT AREAS 1 AND 2

Contractor shall provide the following Deliverables in accordance with Task 2 (Provide Digital Terrain Datasets (DSM), DTM and DEM) – Project Areas 1 and 2):

- 2.1 Project documentation outlining procedures and data collected, and reports of accuracy evaluation.
- 2.2 First return data (DSM) in ArcGIS compatible format and CAD compatible format.

2.3 Bare-earth DTM incorporating the last return LiDAR data in ArcGIS raster format and CAD compatible format.

2.4 **Raw point cloud data that includes the following:**

- a) All swaths, returns, and collected points, fully calibrated and adjusted to ground, by swath.
- b) Fully compliant LAS v 1.2 or v1.3, point Data Record Format 1, 3, 4 or 5.
- c) LAS v1.3 deliverables with waveform data are to use external auxiliary files with the extension .wdp for the storage of waveform packet data.
- d) Correct and properly formatted georeferenced information must be included in all LAS file headers.
- e) GPS times are to be recorded as Adjusted GPS Time, at a precision sufficient to allow unique timestamps for each pulse.
- f) One file per swath per file, file size not to exceed 2 GB.

2.5 **Classified point cloud includes the information in 2.3 above; but also includes a classification scheme. Minimum classified point cloud classification scheme should be as follows:**

CODE	DESCRIPTION
1	Processed, but unclassified
2	Bare-earth ground
7*	Noise (low or high; manually identified; if needed)
9	Water
10*	Ignored Ground (Breakline proximity)
11	Withheld (if the Withheld is not implemented in processing software)

* Class 7, Noise, is included as an adjunct to the Withheld bit. All noise points are to be identified using one of these two methods.

* Class 10, Ignored Ground, is for points previously classified as bare-earth but whose proximity to a subsequently added breakline requires that it be excluded during DEM generation.

2.6 FGDC compliant metadata.

TASK 3 – GENERATE CONTOURS WITH ONE FOOT INTERVAL – PROJECT AREA 1

Contractor shall generate contours with 1 foot intervals for **Project Area 1** using DTM prepared in Task 2 (Provide Digital Terrain Datasets (DSM, DTM and DEM) – Project Area 1). Contour lines should be seamless for the entire area as specified in the Statement of Work.

DELIVERABLE 3 – 1 FOOT CONTOURS – PROJECT AREA 1

Contractor shall provide the following Deliverables in accordance with Task 3A (Contours with One Foot Interval – Project Area 1):

3.1 ArcGIS shapefiles with contours tiled to LAR-IAC grid system.

3.2 AutoCAD drawing file with contours tiled to LAR-IAC grid system.

TASK 4 – GENERATE CONTOURS WITH TWO FOOT INTERVAL – PROJECT AREA 2

Contractor shall generate contours with 2 foot intervals for **Project Area 2** using DTM prepared in Task 4 (Provide Digital Terrain Datasets (DSM, DTM and DEM) – Project Area 2). Contour lines should be seamless for the entire area as specified in the Statement of Work.

DELIVERABLE 4 – 2 FOOT CONTOURS – PROJECT AREA 2

Contractor shall provide the following Deliverables in accordance with Task 5A (Contours with Two Foot Interval – Project Area 2):

5.1 ArcGIS shapefiles with contours tiled to LAR-IAC grid system.

5.2 AutoCAD drawing file with contours tiled to LAR-IAC grid system.

TASK 5 – CORRECT DIGITAL TERRAIN DATA DEFICIENCIES

Contractor shall correct all Digital Terrain Data Deficiencies identified by County within the Warranty Period, as further described in the Base Agreement of Appendix A (Required Agreement) to the RFP.

DELIVERABLE 5 – FINAL ACCEPTANCE

Final Acceptance shall be reached when Contractor has corrected all Digital Terrain Data Deficiencies.

TASK 6 – PROVIDE OPTIONAL WORK

SUBTASK 6.1 – PROVIDE OPTIONAL PRODUCTS

If requested and approved by County, Contractor shall provide to County software, tools, data, and other products related to the Digital Terrain data. The Optional Products shall be provided in accordance with Paragraph 5.2 (Optional Work) and Paragraph 4 (Change Notices and Amendments) of the Base Agreement of Appendix A (Required Agreement) to the RFP.

SUBTASK 6.2 – PROVIDE OPTIONAL SERVICES

If requested and approved by County, Contractor shall provide to County on-site implementation support, additional training and other consulting services related to the Digital Terrain Data. The Optional Services shall be provided in accordance with Paragraph 5.2 (Optional Work) and Paragraph 4 (Change Notices and Amendments) of the Base Agreement of Appendix A (Required Agreement) to the RFP.

DELIVERABLE 6 – OPTIONAL WORK

Contractor shall successfully provide Optional Work, including Optional Products and Optional Services, in accordance with Task 6 (Provide Optional Work).

1.3 DIGITAL TERRAIN REQUIREMENTS

1.3.1 DATA REQUIREMENTS

Remote-sensed digital terrain data will be collected to provide source data for creation of the digital terrain model. Due to the County's desire to have a very high resolution digital

terrain data, all data shall be collected to support a minimum 0.707 meter nominal pulse spacing (NPS) for Project Areas 1 and 2.

1.3.2 EQUIPMENT REQUIREMENTS

Prior to commencing flyovers, Contractor shall clearly identify the equipment (aircraft, digital sensor, etc.) to be used to collect data.

1.3.3 CONTROL ESTABLISHMENT

If it is determined to be necessary by Contractor, additional ground control points, augmenting the county's control points as needed (approximately 200 to 300) to meet the accuracy requirements of this proposal, will be collected by Contractor. All control used in the production of products for this effort shall conform to acceptable errors as set forth by the FGDC. If additional control points are generated as a result of this effort, Contractor will be required to provide these points as an attributed feature layer. The Project Work Plan shall contain a detailed explanation of control methodology and a listing of control data that will be provided under this effort. Collection of up to one hundred (100) additional ground control points may be considered Optional Work.

1.3.4 COLLECTION

Specifications and methodology for the LiDAR flight should include documentation of mission date(s), time, flight altitude, overlap, and airspeed. Flight plans shall be generated and should cover the proposed project areas. Proposal should address how various environmental conditions will be handled and any special considerations for areas of dense coverage (e.g., locations containing dense foliage).

A complete survey control plan shall be submitted to include collection, processing and incorporation of survey control in the LiDAR processing. The plan should include a detailed description of survey control for quality control and validation checks of the LiDAR dataset.

Specifications for the data collection should include scan angle, along-track, and cross-track, pulse spacing, pulse width and density, and number of returns. LiDAR derived data will have the accuracy required to produce topographic maps including 1-foot elevation contours. Proposed data products shall meet the accuracy requirements of ASPRS Guidelines for Vertical Accuracy Reporting for LiDAR Data, Version 1, May 2004. Proposed data products shall also meet USGS LIDAR acquisition specification version 1.0, quality level 2, and incorporating the changes in specification version 1.1

Proposer should describe the production process used for LAS classification of vegetation or structures in order to determine bare-earth representation. Proposer should describe the approach to definition and resolution of data voids and data artifacts resulting from the mission. Proposer should describe quality assurance and quality control (QA/QC) procedures to ensure the integrity of the LiDAR data. Proposer should describe acceptance test procedures to be used to ensure data conforms to the accuracy requirements.

1.3.5 ACCURACY

DTM accuracy testing will be performed by LAR-IAC consistent with ASPRS Guidelines for Vertical Accuracy Reporting for LiDAR Data, Version 1, May 2004.

In Project Areas 1 and 2, the Fundamental Vertical Accuracy (FVA) in open terrain shall be 18.13-cm or better at the 95% confidence level, based on RMSEz of 9.25-cm in open terrain. The Consolidated Vertical Accuracy (CVA) in all land cover categories combined shall be 27.2-cm at the 95th percentile.

Proposer should describe the methodology for creating the Digital Terrain Datasets using stereo edited LiDAR data. To generate accurate contours at a 1 and 2 foot interval the LiDAR DTM points will be enhanced with photogrammetrically or lidargrammetrically compiled breaklines. Breaklines are defined as ridgelines, retaining walls, edges of pavements or hydrographic features. The LiDAR data points together with the breaklines will form a TIN (Triangular Irregular Network) from which the contours are generated.

Proposals should provide a detailed description of the input data, production process, quality assurance/quality control, and proposed acceptance test methodology for providing the digital terrain data required by this effort.

1.3.6 RE-FLIGHTS

If required, the Contractor will correct unacceptable digital terrain data at no additional cost to LA County. All re-flight coverage shall overlap the accepted LiDAR data by at least two swaths.

1.3.7 PROTOTYPE (TEST) AREA

Contractor will provide County with sample digital terrain data, which will be provided to the QA/QC vendor as well as to County. County will have an opportunity to review the samples, and will give written acceptance of the enhancements prior to the Contractor processing the remainder of the project.

1.3.8 METADATA

FGDC-compliant metadata will be provided for the digital terrain data and elevation contours data sets. These metadata will be completed using standard industry metadata tools and output in standard file formats for viewing in all widely available viewing utilities.

1.4 ACCEPTANCE CRITERIA

Contractor (and subcontractor) acknowledges that all finished products and final deliverables will be subject to systematic QA/QC, which will be done by an independent geospatial firm, whose services will be solicited by County in conjunction with this Agreement.

The Acceptance Criteria Table with “Tested Characteristics” and “Measure of Acceptability” will be finalized by Contractor and County’s QA/QC vendor during the first month of the project. Contractor will provide in its subcontractor’s Project Work Plan (which is Contractor’s first project deliverable) and County’s QA/QC vendor will provide in its Quality Plan document.

1.4.1 ACCEPTANCE CRITERIA: COMPLETENESS

	TESTED CHARACTERISTIC	MEASURE OF ACCEPTABILITY
A	All Scales	
A.1.	Information will be delivered by contractor to County, who will load data onto County Servers.	All files successfully copied to County servers, all files accessible, no files corrupted.
A.2.	File organization	Files written in tile sheet order
A.3.	File name	Conforms to required convention- based on CA SPCS Zone 5 L4_ xxxx_yyyya (a-d).
A.4.	Files must open in correct location	Files must open with ESRI software
A.5.	Vertical Datum	NAVD88 (Feet to 2 decimal places)
A.6.	Projection	NAD 1983 State Plane – California Zone V
A.7.	Horizontal Datum	NAD 83 reference datum
A.8.	Units	U.S. Survey Feet (to 2 decimal places)
A.9	Conformance with tile index grid	Tile matches grid, no gaps between tiles at 1:1 view.
A.10.	Coverage	Full tiles; no data holidays. As indicated in County Data and Reference Maps. The basic rule is at least 500' buffer around County boundary (no partial tiles, no seams and no overlaps). Flying and image capture teams should be aware of this.
A.11.	Tile grid layout	Full tiles only with no gaps or seams between 4 inch and 1 ft. areas. Flying and image capture teams should be aware of this.
A.12.	Metadata	Complies with standard (to be determined by County; to match LAR-IAC4 metadata). Meets minimum FGDC Content Standard.

1.4.2 ACCEPTANCE CRITERIA B: GROUND CONTROL ACCEPTANCE – COUNTY AND CONTRACTOR RESPONSIBILITY

B	Tested Characteristic	Measure of Acceptability
B.1.	Report Format	Conforms to required convention
B.2.	Report Completeness	All information complete and readable
B.3.	Approval	CA Licensed Surveyor Signature and Seal
B.4.	Monument Record Form	Sufficient information to revisit point, description and picture
B.5.	Network	Meet NGS specifications for Order and Class
B.6.	Geodetic Survey: Horizontal Accuracy	Second Order Class 1 tied to NGS monuments.
B.7.	Geodetic Survey: Vertical Accuracy	Third Order.

B	Tested Characteristic	Measure of Acceptability
B.8	Coordinate System	California Coordinate System of 1983, Zone 5, US Feet
B.9	Epoch	Epoch date: 2004.0 unless otherwise determined.

1.4.3 ACCEPTANCE CRITERIA C: DIGITAL TERRAIN MODEL QA (SUITABLE ONLY FOR ORTHORECTIFICATION) – CONTRACTOR RESPONSIBILITY

C	Tested Characteristic All Scales	Measure of Acceptability
C.1.	Information will be delivered by contractor to County, who will load data onto County Servers.	All files successfully copied to County servers, all files accessible, no files corrupted.
C.2.	File organization	Files written one per ortho tile provided. Only updated tiles are provided.
C.3.	File name	Conforms to required convention
C.4.	Format	ArcGIS compatible format
C.5.	Format	CAD compatible format
C.6.	Georeferencing	Locates in proper tile grid cell
C.7.	Mass point locations	Mass points updated as needed to accurately build terrain to support orthophotos;
C.8.	Breakline locations	Breaklines updated as needed to control bridges, edge of pavement, hydrographic features, ridgelines, retaining walls as needed for orthorectification and contouring, none in open water.
C.9.	Continuity	No spikes, holes or blunders; no gaps of sufficient size to affect orthorectification, regardless of perspective center.
C.10.	Breakline Format	Arc generated .lin and pnt files

1.5 SOFTWARE REQUIREMENTS

Digital Terrain Data from the project can be viewed using any software that can read and display standard digital terrain data file formats. The LAS format is widely used and software that supports this file format can generally be grouped into two categories; LiDAR viewers and GIS software.

1.6 COUNTY OBLIGATIONS – ORTHOGONAL IMAGES

1.6.1 SYSTEM REQUIREMENTS

County's system for use of the digital terrain data will have sufficient capabilities and capacity to view and manage digital images.

1.6.2 COUNTY RESPONSIBILITIES

1. County will make available the following countywide information to Contractor at the following URL: <http://egis3.lacounty.gov/dataportal/lariac/lar-iac4/rfp-data/>
 - g) LAR-IAC Project Area Boundaries (shapefile format)
 - h) Detailed County/City Boundaries (for orientation only - shapefile format)
 - i) Grid for project tiles (shapefile format)
 - j) Oblique Aerial Digital Imagery 1 sq. mile sector grid (for orientation only – shapefile format)
 - k) Boundary of Urban Canyons “Downtown Areas” high-rise areas (shapefile format)
 - l) Parcel vector database (for orientation only – shapefile format)
 - m) Existing control cadastral monuments (shapefile format)
 - n) Existing LAR-IAC deliverables in various formats as mutually agreed upon (ie. DTM and/or DSM, first generation 4” ortho imagery)
 - o) Proposed Delivery Areas (shapefile format)
 - p) Proposed Mosaic Tile Areas (shapefile format)
 - q) Boundary of locations that could potentially have large changes in elevation (ie. Significant grading) that would affect ortho imagery rectification
 - r) Other relevant GIS layers mutually determined by the Contractor and County.
2. Digital Terrain Data (from LiDAR and stereo compilation) provided by County for Contractor will be in ESRI raster format in California State Plane Coordinate System, Zone 5, NAD83, NAVD88.
3. All vector data sets provided by County for Contractor will be in ESRI shapefile format in California State Plane Coordinate System, Zone 5, NAD83, U.S. Survey Feet.
4. County will be responsible for:
 - a) Assignment of all point numbers;
 - b) Provision of blank monument record forms;
 - c) Providing the County Survey Monuments digital files.

1.7 REFERENCE MAPS

1.7.1 PROJECT AREAS AND TILE GRID

