



STATE OF MISSOURI  
OFFICE OF ADMINISTRATION  
DIVISION OF PURCHASING

**NOTIFICATION OF STATEWIDE CONTRACT**

Date: September 11, 2017

**CONTRACT TITLE:** Photogrammetric Mapping Products and Services

|                                 |                                                                                                                              |                                               |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| <b>CURRENT CONTRACT PERIOD:</b> | September 15, 2017 through September 14, 2018                                                                                |                                               |
| <b>RENEWAL INFORMATION:</b>     | Original Contract Period:                                                                                                    | September 15, 2017 through September 14, 2018 |
|                                 | Renewal Options Available:                                                                                                   | 2                                             |
|                                 | Potential Final Expiration:                                                                                                  | September 14, 2020                            |
| <b>BUYER INFORMATION:</b>       | Jacqueline Satterlee<br>(573) 751-4925<br><a href="mailto:Jacqueline.satterlee@oa.mo.gov">Jacqueline.satterlee@oa.mo.gov</a> |                                               |

ALL PURCHASES MADE UNDER THIS CONTRACT MUST BE FOR **PUBLIC USE ONLY**.  
PURCHASES FOR PERSONAL USE BY PUBLIC EMPLOYEES OR OFFICIALS ARE PROHIBITED.

THE USE OF THIS CONTRACT IS **PREFERRED** FOR ALL STATE AGENCIES.

Local Purchase Authority **should not** be used to purchase supplies/services included in this contract unless it is determined to be in the best interest of the State of Missouri for a state agency at its own discretion, to obtain alternate services elsewhere.

The entire contract document may be viewed and printed from the Division of Purchasing's **Awarded Bid & Contract Document Search** located on the Internet at

<http://oa.mo.gov/purchasing>.

*~ Instructions for use of the contract, specifications, requirements, and pricing are attached ~.*

| CONTRACT NUMBER | SAM II VENDOR NUMBER/ MissouriBUYS SYSTEM ID | VENDOR INFORMATION                                                                                                                                                                                                             | MBE/WBE | COOP PROCUREMENT |
|-----------------|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------|
| CS170285001     | 3911331810 3/ MB00069510                     | Quantum Spatial, Inc.<br>523 Wellington Way<br>Lexington KY 40503<br>Contact: Bill Walker<br>Phone: (314) 550-3117<br>Fax: (920) 467-1220<br>Email: <a href="mailto:bwalker@quantumspatial.com">bwalker@quantumspatial.com</a> | No      | Yes              |

| CONTRACT NUMBER | SAM II VENDOR NUMBER/<br>MissouriBUYS SYSTEM ID | VENDOR INFORMATION                                                                                                                                                                                                                        | MBE/<br>WBE                                                                 | COOP<br>PROCUREMENT |
|-----------------|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|---------------------|
| CS170285002     | 4306906410 1/<br>MB00048428                     | Surdex Corporation<br>520 Spirit of St. Louis Blvd.<br>Chesterfield MO 63005<br>Contact: Tim Donze<br>Phone: (636) 368-4400<br>Fax: (636) 368-4401<br>Email: <a href="mailto:timd@surdex.com">timd@surdex.com</a>                         | 10% MBE<br>David Mason &<br>Associates, Inc.<br><br>5% WBE<br>EFK Moen, LLC | Yes                 |
| CS170285003     | 1339803330 0/<br>MB00050028                     | The Sanborn Map Company, Inc.<br>1935 Jamboree Dr., Suite 100<br>Colorado Springs CO 80920<br>Contact: Brad Arshat<br>Phone: (443) 603-7725<br>Fax: (719) 593-0093<br>Email: <a href="mailto:barshat@sanborn.com">barshat@sanborn.com</a> | 10% MBE<br>Sabur<br>Surveying, Inc.<br><br>5% WBE<br>Civil Design,<br>Inc.  | Yes                 |
| CS170285004     | 2013914060 1/<br>MB00031770                     | Woolpert, Inc.<br>PO Box 641998<br>Cincinnati OH 45264-1998<br>Contact: Kent Park<br>Phone: (317) 281-2092<br>Fax: (317) 291-5805<br>Email: <a href="mailto:kent.park@woolpert.com">kent.park@woolpert.com</a>                            | 10% MBE<br>David Mason &<br>Associates, Inc.                                | Yes                 |

## STATEWIDE CONTRACT HISTORY

The following summarizes actions related to this Notification of Statewide Contract since its initial issuance. Any and all revisions have been incorporated into the attached document.

| <b>Contract Period</b>    | <b>Issue Date</b> | <b>Summary of Changes</b>                         |
|---------------------------|-------------------|---------------------------------------------------|
| 09/15/17 thru<br>09/14/18 | 09/11/17          | <b>Initial issuance of new statewide contract</b> |

# 1. CONTRACTUAL REQUIREMENTS

## 1.1 General Requirements:

- 1.1.1 The contractor shall provide photogrammetric mapping products and services for various state agencies throughout the State of Missouri (hereinafter referred to as the state agency).
- a. For purposes of the contract, a state agency shall be defined as a division, section, bureau, office, program, board, regional/district office, etc., that exists within a department of Missouri State Government. For the purposes of this document, this shall also include the University of Missouri system and the Judicial and Legislative branches of the State of Missouri.
  - b. State agencies anticipated to utilize the contracts include but are not necessarily limited to:
    - 1) Missouri Department of Conservation (MDC);
    - 2) Missouri Department of Natural Resources (DNR);
    - 3) Missouri Department of Transportation (MoDOT);
    - 4) Missouri State Emergency Management Agency (SEMA); and
    - 5) Missouri Department of Public Safety (DPS).
- 1.1.2 The contractor must provide an American Society of Photogrammetry and Remote Sensing (ASPRS) certified Photogrammetrist as the contractor's Project Manager.
- 1.1.3 The contractor shall provide one or more of the following photogrammetric mapping products and services as requested by the state agency. However, the State of Missouri does not guarantee that the following list is inclusive of all the photogrammetric mapping products and services that may be required by the state agency. The State of Missouri reserves the right to request related photogrammetric mapping products and services.
- a. Acquisition of Digital Orthoimagery;
  - b. Acquisition of LiDAR Elevation Data;
  - c. Creation of Digital Terrain Model from LiDAR;
  - d. Creation of Digital Elevation Model from LiDAR;
  - e. Creation of Contours Lines; and
  - f. Planimetric Mapping.
- 1.1.4 The contractor shall understand and agree that the photogrammetric mapping products and services required herein will not require prevailing wage determinations or utilization of professional land surveyors as defined in section 327.272, RSMo.
- a. The contractor shall not perform any services requiring payment of prevailing wage pursuant to section 290.250, RSMo. At any time during the effective period of the contract, if any requested or required services would involve prevailing wage, the contractor shall not perform the service and shall notify the state agency in writing of the reason. In such event, the State of Missouri shall obtain the needed services through alternative means in accordance with state law and regulations.
  - b. The contractor shall not perform any services requiring utilization of a professional land surveyor, as defined in section 327.272, RSMo, as the ground control surveyors performing work under the contract shall not be required to establish land boundary lines which would affect real property rights. At any time during the effective period of the contract, if any requested or required services would require utilization of a professional land surveyor, the contractor shall not perform the service and shall notify the state agency in writing of the reason. In such event, the State of Missouri shall obtain the needed services through alternative means in accordance with state law and regulations.
- 1.1.5 The contractor shall not provide raw or processed imagery or metadata obtained or created in performance of work related to this contract to any facility or individual located outside the United States.

- 1.1.6 The contractor shall not utilize individuals or facilities located outside the United States to perform services related to the contract.
- 1.1.7 The contractor shall provide all photogrammetric mapping products on mutually agreed upon media such as a portable hard drive. Interim, verification imagery may be verified by on-line verification tools. Partial deliveries may be made on DVD as appropriate. The state agencies may supply their own hard drives for all photogrammetric mapping products.
- 1.1.8 The contractor shall provide the services on an as needed, if needed basis. The State of Missouri does not guarantee any usage of the contract whatsoever. The contractor shall agree and understand that the contract shall be construed as a preferred use contract but shall not be construed as an exclusive arrangement. Preferred use means that any state agency needing the services should use the established contract unless it is determined to be in the best interest of the State of Missouri for a state agency at its own discretion, to obtain alternate services elsewhere.
- 1.1.9 All photogrammetric mapping products shall be in UTM, NAD83, ZONE 15 projection.
- 1.1.10 Cooperative Procurement Program - The contractor shall participate in the State of Missouri's Cooperative Procurement Program. The contractor shall provide photogrammetric mapping services and products as described herein under the terms and conditions, requirements, and specifications of the contract, including prices, to other government entities in accordance with the Technical Services Act (section 67.360, RSMo, which is available on the internet at: <http://www.moga.mo.gov/mostatutes/stathtml/06700003601.html?&me=67.360>.) The contractor shall further understand and agree that participation by other governmental entities is discretionary on the part of that governmental entity and the State of Missouri bears no financial responsibility for any payments due the contractor by such governmental entities.
- a. Such governmental entities may include but are not limited to; counties, municipalities, school districts, fire departments, first aid squads, colleges, and universities. A list of entities eligible to purchase via the cooperative procurement program is available by clicking on the "Cooperative Procurement Members Listing" file located at the following link: <http://oa.mo.gov/purchasing/cooperative-procurement-services>.
  - b. The contractor shall agree and understand that it is possible that various governmental entities may partner to share costs of obtaining the photogrammetric mapping products and services available.
  - c. All photogrammetric mapping products acquired via the contract, that are jointly funded by the state and an authorized cooperative procurement entity(ies), including but not limited to:1 digital orthoimagery, digital elevation models, digital terrain models, metadata, etc. shall be the joint property of the State of Missouri and the cooperative procurement entity(ies) providing funds, without restrictions. All such photogrammetric mapping products shall be deemed to be in the public domain.
  - d. All photogrammetric mapping products acquired via the contract, that are acquired without the use of state agency funds, including but not limited to: digital orthoimagery, digital elevation models, digital terrain models, metadata, etc. shall be the sole property of the public entity acquiring the product. Such photogrammetric mapping products shall **not** be considered to be in the public domain.
- 1.1.11 The contractor shall perform all services in accordance with the provisions and requirements stated herein and to the sole satisfaction of the state agency.

## **1.2 Work Plan Requirements:**

- 1.2.1 When the state agency has a need for photogrammetric mapping products and services (hereinafter referred to as "project," in this section), the state agency shall seek a work plan from all contractors as a means to (1) competitively bid a specific project, (2) to identify the specific tasks to be performed, and (3) to establish the total price to be paid to the awarded contractor upon completion of the specified tasks. The work plan process shall occur in a controlled sequence of proposals and approvals by the state agency's designated Project Manager as outlined below.
- a. State agencies may decide to break up projects into multiple work plans. In that event, subsequent work plans may be issued to the contractor that was awarded the initial work plan without requesting competitive work

plans provided (1) the state agency clearly indicates their intent to do so in the initial work plan request and (2) the scope of the entire project is considered in the evaluation of the initial work plan.

- b. At the time the state agency needs to purchase a project, current pricing and availability to perform the work will be requested of all contractors, and the state agency will award the purchase to the “lowest and best” contractor at the time, in accordance with the requirements stated herein.

1.2.2 Work Plan Request- The state agency’s designated Project Manager will present a written request for each work plan to all contractors for the project required, in a standard format. The state agency’s request must explain the scope of the project and the tasks the state agency desires to be performed, including applicable business and technical specifications. In addition, the state agency will specify the evaluation criteria that will be utilized to determine the work plan award. If the contractor cannot provide services according to the state agency’s needs or if the contractor does not provide the type of services required by the state agency, the contractor must immediately notify the state agency. The contractor shall make every effort to meet the needs of the state agency. The state agency shall document each instance of the contractor’s inability to provide the required services. If the contractor continually or consistently is unable to provide the required services, the Division of Purchasing may elect to cancel the contract.

1.2.3 At a minimum, the state agency’s work plan request should include the following information:

- a. Introduction/Overview: Brief description of the project. Information provided to acquaint the contractor with the planned acquisition. In addition, the following information shall be provided:
  - 1) state agency name/address
  - 2) state agency designated Project Manager name, email, and phone number
  - 3) brief title of specific work plan project
  - 4) Work plan issue date
  - 5) Work plan response due date
- b. Background: A description of how the project came to be, a description of why the project is being pursued and how it relates to other projects, summarization of any statutory authority or regulations affecting the overall requirement; and identification of any background materials attached to the work plan.
- c. Objectives: Specific objectives that the project will achieve. This section should provide a concise overview of the project effort goals and objectives, and how the results or end products will be used.
- d. Requirements/Tasks: Listing of specifications/performance requirements, standards, locations, tasks, deliverables, schedule, and assumptions. This section defines the tasks that the contractor must complete for the project. This section should provide a detailed itemization and description of all of the project tasks which shall be completed by the contractor (i.e. project work), including requirements for and specified frequency of any required status reports. The specified project tasks must be clearly stated and must be quantifiable.
- e. Deliverables: This section should clearly state what the contractor must deliver. If different tasks have different delivery requirements, they must be clearly identified along with times within which the contractor must deliver. A description of the acceptance criteria as well as what documentation the contractor will obtain from the state agency to verify the state agency’s receipt and approval of the deliverable work product.
- f. Government Furnished Property: This section will identify any government-furnished property provided to the contractor such as Digital Elevation Model (DEM), specific data/information, etc.

1.2.4 Work Plan Response – By the date specified by the state agency in the work plan request, the contractor must respond with a work plan response which provides a statement of firm, fixed cost for the project and technical/service solution to fulfill the work plan request. At a minimum, the contractor’s work plan response should include the following:

- a. Project Overview: Statement of the contractor’s understanding of the photogrammetric mapping project and the technical needs of the project.

- b. Resources: A description of the contractor's resources that shall be provided to fulfill the work plan project to include but not limited to: personnel resources to be provided, facility/supply resources, aircraft and other equipment availability, etc. A description of the minimum qualifications for an individual including description outlining the skills, experience, and knowledge/education of the contractor's staff being offered for the work plan project.
- c. Approach/Methodology: A description of how the contractor shall specifically go about completion of the work for the project. This description should include:
  - 1) Project Management Plan, project tracking and reporting the progress of the project, etc.
  - 2) Functional definition of requirements that outlines how the services and/or products shall be provided by the contractor. This description should describe how the requirements/specifications will be fulfilled by the proposed service offerings and to what degree the requirements are met and/or exceeded. This description should also include by whom, when, with what, why, where, etc., the requirements shall be satisfied by the contractor's proposed solution for the project.
  - 3) Change Control Plan,
  - 4) Issue Tracking Plan,
  - 5) Assumptions, and
  - 6) Quality Assurance (QA) Plan: A description should be included of the contractor's QA process to be utilized for the project tasks, schedule, deliverables, and testing in order to ensure that work related to the production of acceptable deliverables is on track and expectations are met or exceeded. The QA process shall be expected to be proactive to ensure not only that the schedule is met, but also that product and service quality is maintained.
- d. Cost Response: Firm, fixed price(s) to fulfill the project defined in the work plan. All expenses, including travel-related expenses, must be included within the firm, fixed price(s). No separate or additional reimbursement shall be made for travel related expenses.
  - 1) The firm, fixed price stated in the awarded work plan shall not be increased unless the state agency requests a corresponding increase in the scope of work under the work plan. In no event shall the contractor charge more than the total firm, fixed price for all deliverables as approved in the work plan by the state agency, unless the state agency later amends the work plan to increase the scope of work. Federally funded projects may require added levels of work plan cost response detail such as delineation of hourly rates and the number of hours used to derive the firm, fixed work plan project cost(s).
  - 2) Work plan pricing shall be based on specific deliverable components of the project and shall not be based on monthly billing. If the contractor fails to deliver all the products/services specified in the work plan for a given deliverable, the payment for the deliverable shall be withheld until the deliverable has been provided to and accepted by the agency. Payment shall not be made in advance for any deliverable; all payments shall be made in arrears (i.e., upon delivery and acceptance of a deliverable).

1.2.5 Evaluation Of Work Plan Responses - Each competitive work plan shall be evaluated based on a 200 evaluation point scale with the cost analysis representing fifty percent (50%) of the evaluation points. The state agency shall document in writing their evaluation justification regarding their award determination. The state agency will choose the "lowest and best" among the contractors at the time each photogrammetric mapping product or service is needed.

- a. The state agency shall have the right to reject a work plan proposal for a product/service due to, but not limited to, noncompliance with the following: proposed method, availability, delivery time, etc. If the unit of measure specified by the state agency is different than the manner in which the contractor offers the product/service, the contractor must clearly identify the proposed unit of measure in the contractor's cost quote. A unit price conversion will be done, by the state agency at the time of quotation, to fairly evaluate proposed prices.
- b. Evaluation of Cost - The following evaluation point formula shall apply to determine cost evaluation points for each specific purchase:

|                                                                            |   |                                       |   |                                   |
|----------------------------------------------------------------------------|---|---------------------------------------|---|-----------------------------------|
| <u>Lowest Responsive Contractor's Price</u><br>Compared Contractor's Price | x | 100 Maximum Cost<br>Evaluation Points | = | Awarded Cost<br>Evaluation Points |
|----------------------------------------------------------------------------|---|---------------------------------------|---|-----------------------------------|

- c. Evaluation of Subjective (“best” score) - For each work plan response received, the state agency shall conduct a subjective analysis in conducting a comparative assessment of the work plan responses and shall subjectively assign a point value of up to 100 points for the subjective portion of the evaluation. The state agency shall document in writing their evaluation justification regarding their assignment of points.

1.2.6 Approval and Award of Work Plan

- a. For each work plan response, the state agency shall total (1) the cost points derived from the cost analysis and (2) the subjective evaluation score (“best” score) awarded during the work plan response evaluation process. The contractor with the highest total points shall be awarded the specific project.
- b. The awarded contractor and the state agency’s designated Project Manager must indicate mutual acceptance of the project by signing and dating the work plan response document. The state agency’s designated Project Manager (1) must retain one signed copy; and(2) must send one copy of the signed and awarded work plan to the contractor awardee. The state agency will inform all responding contractors as to who received the award.

1.2.7 Implementation/Execution of Work Plan - After receipt of state agency written acceptance of a work plan for the project, the contractor shall perform the services required in accordance with the approved work plan accepted by the state agency. Unless otherwise specified in the work plan, the contractor shall furnish all material, labor, facilities, equipment, and supplies necessary to perform the services.

1.2.8 Modifications to Work Plan - After implementation/execution of a work plan, modifications to the approved work plan shall be permitted due to changing economic conditions, changes to state and federal laws or regulations, or for other reasons pursuant to the following conditions:

- a. State Agency Requested Changes – If the state agency determines that modifications to the approved work plan are necessary or desired, the state agency will document the requested changes to the contractor with any new instructions for the project. Based on the written instructions provided by the state agency, the contractor must revise the work plan according to the requirements for the work plan specified herein, including any resulting changes in the timeline, amount to be paid to the contractor, etc.
- b. Contractor Requested Changes - If, after implementation of services, the contractor determines that modifications to the approved work plan are necessary, the contractor must submit a written request to the state agency for changes. The written request must include the reason for the modification and must detail the contractor’s proposed changes to the approved work plan, including any resulting changes in the timeline, amount to be paid to the contractor, etc. The contractor shall agree and understand that the state agency will review the written request of the contractor and the contractor shall be notified in writing by the project manager of approval or disapproval of the request.
- c. The contractor shall agree and understand that the state agency shall have the final approval of all individual components of the approved work plan revised as specified herein and reserves the right to require modifications (including changes in the price, completion date, etc), deletions, and or additional elaboration to the approved work plan. The contractor shall agree and understand that the decision by the state agency shall be final and without recourse.
- d. The contractor shall not proceed with implementation of services related to the modifications until final written approval of the state agency is obtained.

1.2.9 Termination of Work Plan - The state agency shall have the right to terminate any project at any time at the sole discretion of the state agency, without penalty or recourse, by giving written notice to the contractor at least five working days prior to the effective date of such termination. However, the state agency will make every attempt to provide the contractor with more than five working days notice. In the event of termination pursuant to this paragraph, all documents, data, reports, and accomplishments prepared, furnished or completed by the contractor pursuant to the terms of the contract shall, at the option of the State of Missouri, become the property of the State



of Missouri. The contractor shall be entitled to receive just and equitable compensation for work completed in accordance with the work plan prior to the effective date of the termination.

**1.3 Acquisition of Digital Orthoimagery Requirements:** If the state agency's work plan request is for digital orthoimagery, the contractor shall comply with the following when providing digital orthoimagery services:

1.3.1 Upon request of the state agency, the contractor shall provide complete, true color, CIR, or 4-band near infrared, leaf-off digital orthoimagery services and metadata for one, some, or all of the Missouri counties listed in Attachment 2.

- a. The leaf-off flying season for Missouri shall be considered as the period February 15th through April 15th. All leaf-off imagery must be acquired during this period unless otherwise approved, in writing by the ordering state agency, by the Director of the Office of Geospatial Information (OGI) or his/her designee.
- b. All imagery shall be two (2) foot pixel resolution meeting the ASPRS Accuracy Standards at 1" = 400' scale, unless a higher resolution is specified by the state agency.
- c. The contractor must deliver full tiles for all imagery of areas on and within the State of Missouri's borders.
  - 1) The contractor should provide full tiles for all imagery that includes the State of Missouri's borders. However, at the sole discretion of the state agency, tiles with partial image coverage may be allowed for specific projects that include areas along the State of Missouri's borders. In the event the state agency allows tiles with partial image coverage, the tiles must include a minimum 600 meter buffer outside the State of Missouri's borders.
- d. The contractor's survey control shall be considered part of the deliverable product. All survey control performed by the contractor must be done by a surveyor registered in the state of Missouri. The contractor shall be responsible for providing surveyors when needed to meet the requirements of a project.
- e. All metadata records, including those from any buy-ups, shall become part of the State Clearinghouse hosted by the Missouri Spatial Data Information Service (MSDIS).
- f. The contractor must provide the actual dates that imagery was collected. This information must be incorporated in the metadata and may also be supplied in a separate shapefile, or geodatabase for incorporation into mapping systems.
- g. All imagery shall be delivered in a MrSid and GeoTIFF format. GeoTIFFs will include an infotag as describe in Attachment 3.

1.3.2 The contractor should use a digital sensor camera to acquire the imagery; however, the contractor may utilize an analog (film) camera for smaller areas of higher resolution based on the contractor's best judgment and subject to the state agency's approval. The contractor shall not mix digital and analog cameras at the same resolution (e.g. 2-foot).

- a. If digital sensors are utilized by the contractor, the digital sensors should be of the same type and model to ensure homogeneous coverage throughout the entire project.
- b. The contractor shall collect elevation data, at no charge to the State of Missouri, where required to prepare digital imagery that meet the requirements contained in this document. The State of Missouri has 10 meter Digital Elevation Model (DEM) coverage that can be provided for use by the contractor. In addition, LiDAR data for select areas is available through MSDIS to supplement the elevation base.
- c. The contractor shall ensure all bridges and highway overpasses are in the correct position on each tile delivered.
- d. The contractor shall ensure all divided highways in the coverage area are properly controlled to eliminate wavy linear features on the tile.

- 1.3.3 The contractor shall deliver imagery tiles meeting all mandatory requirements, specifications, and guidelines of the Digital Orthoimagery, FGDC-STD-014.2-2008: [http://www.fgdc.gov/standards/projects/FGDC-standards-projects/framework-data-standard/GI\\_FrameworkDataStandard\\_Part2\\_DigitalOrthoimagery.pdf](http://www.fgdc.gov/standards/projects/FGDC-standards-projects/framework-data-standard/GI_FrameworkDataStandard_Part2_DigitalOrthoimagery.pdf)
- 1.4 Acquisition of LiDAR Elevation and Terrain Data Requirements:** If the state agency's work plan request is for LiDAR Acquisition, the contractor shall comply with the following when providing LiDAR Acquisition services:
- 1.4.1 Unless specified otherwise in a state agency work plan, the contractor shall deliver LiDAR imagery meeting all mandatory requirements, specifications, and guidelines of the National Geospatial Program LiDAR Guidelines and Base Specification Version 1: <https://pubs.usgs.gov/tm/11b4/pdf/tm11-B4.pdf>
- 1.4.2 The contractor shall collect LiDAR data using a fully calibrated system capable of collecting multiple echoes per pulse with a minimum of a first, last, and one intermediate return. The contractor's system must also be able to collect the intensity (LiDAR pulse signal strength) for each return signal.
- 1.4.3 Quality Assurance –The contractor shall provide two (2) copies of an accuracy report. The contractor shall produce, for the state agency, an accuracy report in the form of a letter type report detailing all aspects of the LIDAR flight, including a description of the fieldwork and detailed office data processing procedures. The contractor's description shall include location, navigation and control, operations, all survey logs and data sheets used or acquired under the task order, any difficulties encountered, (including discrepancies with maps, etc.), and how the discrepancies were resolved. The contractor's accuracy report shall include interpretation and analysis of the results of the survey, including data quality, coverage of the area, and a summary of the findings. The accuracy report summary shall be included in the transmittal letter documenting the electronic data delivered as a result of the survey.
- 1.4.4 Quality Control Plan – The contractor shall have a Quality Control Plan in place that the contractor's assigned individual of the contractor must implement. The contractor's Quality Control Plan must have parameters in place to assure that all services required by the project are performed and provided in a manner that meets professional architectural and engineering quality standards. At a minimum, competent, independent reviewers shall technically review all documents. Performance of the independent technical review (ITR) should not be accomplished by the same element that produced the product.
- a. The contractor's person assigned to carry out the Quality Control Plan must be present during the times work is in progress and shall be responsible for assuring that all documents on the project have been coordinated. This individual shall possess extensive, verifiable LiDAR and photogrammetric experience. The contractor shall notify the state agency, in writing, of the name of the individual and the name of an alternate person assigned to the position.
- 1.4.5 Metadata and Reports for LiDAR
- a. The contractor must submit metadata compliant with the Federal Geographic Data Committee's (FGDC) Content Standard for Digital Geospatial Metadata in extensible markup language (.xml) format. The contractor must create Metadata on a sub-project tile level for each product deliverable.
- b. Metadata shall include as a minimum the following sections:
- 1) Identification Information
  - 2) Data quality information (this section of the Metadata may be updated after the quantitative assessment) and must include all process steps.
  - 3) Spatial Data Organization Information
  - 4) Spatial Reference Information
  - 5) Entity and Attribute Information
  - 6) Metadata Reference Information
  - 7) Date of acquisitions
  - 8) System type and system collection parameters (flying height, Scan FOV full angle, pulse rate, scanner frequency, side-lap percentage, point density etc.)
  - 9) Nominal point density
  - 10) Calibration procedures

11) Base station control information

c. Metadata shall be supplemented with projects reports where the report conveys additional information not suitable for metadata. If surveying to establish new stations was performed, a survey report that includes the following information must be provided by the contractor:

- 1) Collection Report (detailing mission planning and flight logs)
- 2) Survey Report (detailing the collection of control and reference points used for calibration and QA/QC).
- 3) Processing Report (detailing calibration, classification, and product generation procedures)
- 4) QA/QC Reports detailing the analysis, accuracy assessment, and validation of:
  - The point data (absolute, within swath, and between swath)
  - The bare-earth surface (absolute)
  - Other optional deliverables as appropriate
  - Control and Calibration points: All control and reference points used to calibrate, control, process, and validate the LiDAR point data or any derivative products are to be delivered.
  - Geo-referenced, digital spatial representation of the extents of each delivered dataset. Polygon shapefile is preferred.
  - Deliverables metadata (FGDC compliant, XML format metadata).
- 5) One file for each: county, lift, and tiled deliverable product group (classified point data, bare-earth DEMs)

d. The contractor shall understand and agree that Metadata files for individual original tiles are not required.

**1.5 Creation of Digital Elevation Models (DEM) and Digital Terrain Models (DTM) from the LiDAR Requirements:** If the state agency's work plan request is for DEM/DTM, the contractor shall comply with the following when providing DEM services:

1.5.1 Unless specified otherwise in the state agency's work plan, the contractor shall deliver DEM/DTM meeting all mandatory requirements, specifications, and guidelines of the National Geospatial Program LiDAR Guidelines and Base Specification Version 1: <https://pubs.usgs.gov/tm/11b4/pdf/tm11-B4.pdf> .

**1.6 Creation of Contour Line Requirements:** If the state agency's work plan request is for contour creation, the contractor shall comply with the following when providing contour creation services:

1.6.1 The contractor shall develop contours that are certified to meet or exceed ASPRS Accuracy Standards at the state agency's requested scale. Contours must be delivered in the format approved by the state agency.

1.6.2 Unless specified otherwise in the state agency's work plan, the contractor shall deliver contours derived from DEM/DTM meeting all mandatory requirements, specifications, and guidelines of the National Geospatial Program LiDAR Guidelines and Base Specification Version 1: <https://pubs.usgs.gov/tm/11b4/pdf/tm11-B4.pdf>

**1.7 Planimetric Mapping Requirements:** If the state agency's work plan request is for planimetric mapping, the contractor shall comply with the following when providing planimetric mapping services:

1.7.1 The contractor's planimetric mapping task shall compile hydrographic and impervious features, using analytical stereo photogrammetric methods that meet ASPRS Class 1 accuracy standards at the state agency's requested scale.

1.7.2 The contractor shall compile any-and-or-all planimetric layers listed in Attachment 4 below as specified by the state agency.

1.7.3 The contractor shall compile features as coincident lines if more than one (1) line feature is coincident with another line feature.

1.7.4 The contractor's point, line, and polygon features shall be constructed as topologically correct geometries in ESRI geodatabase, DGN, DWG, or other format that will allow the state agency to easily integrate the layers with existing GIS layers.

- 1.7.5 The contractor must deliver all feature layers listed in Attachment 4 as separate layers. A tiling system approved by the state agency may be used by the contractor to facilitate the pilot area map and to check plot production.
- a. The state agency reserves the right to request alternative deliverable options for the purpose of reducing cost, including limited data collection to collection of changed features only, mapping a reduced set of features, etc.
- 1.8 Buy-Up Requirements:** If the state agency's work plan request is for buy-up services, the contractor shall comply with the following when providing buy-up services:
- 1.8.1 If requested by a state agency, the contractor shall deliver imagery that may be used for stereo coverage of a specified project area.
- 1.8.2 Buy-ups shall be defined as improvements over the standard two (2)-ft leaf-off True Color /CIR that may be purchased by a state agency.
- a. The contractor's one (1)-foot imagery shall meet the accuracy specifications for 1"=400' mapping with a RMSE of 8.0 feet using ASPRS Accuracy Standard for Large Scale Maps, Class 1 Map Accuracy.
  - b. The contractor's file naming for higher resolution buy-up areas shall be determined by the state agency.
  - c. The contractor's six (6) inch imagery shall meet accuracy specifications for 1"=100' mapping with a RMSE of 2.0 feet using ASPRS Accuracy Standard for Large Scale Maps, Class 1 Map Accuracy.
  - d. The contractor's three (3)-inch imagery shall meet accuracy specifications for 1"=25' mapping with a RMSE of 0.5 feet using ASPRS Accuracy Standard for Large Scale Maps, Class 1 Map Accuracy.
- 1.8.3 Improved Elevation Data: If requested by a state agency, the contractor shall deliver any improved elevation model information collected for the buy-up project area. Any such adjusted elevation models delivered by the contractor shall be public domain. If specified in the state agency's work plan, the contractor shall provide an elevation model with the level of detail required for submission to the USGS National Elevation Dataset. At the sole option of the state agency, the state agency shall be responsible for submission of the elevation model to the USGS National Elevation Dataset as well as to the Missouri Spatial Data Information Service. The contractor shall not be required to submit elevation models to the USGS National Elevation Dataset and the Missouri Spatial Data Information Service.
- 1.8.4 The contractor shall provide prior notification to the Director of OGI when the contractor is requested to provide buy-up services.
- 1.9 Reporting Requirements:**
- 1.9.1 The contractor must submit the reports electronically, in an analysis-ready format specified by the state agency, such as Microsoft Excel or Access. Reports in PDF or similar format shall be considered unacceptable unless specifically requested by or approved by the state agency.
- 1.9.2 The contractor must maintain financial and accounting records and evidence pertaining to the contract in accordance with generally accepted accounting principles and other procedures specified by the state agency.
- a. The contractor shall make all such records, books, and other documents relevant to the contract available to the state agency and its designees and the Missouri State Auditor in a format acceptable to the state agency at all reasonable times during the term of the contract.
  - b. The contractor shall retain all such records according to the state agency's retention period or the completion of an independent audit, whichever is later. If any litigation, claim, negotiation, audit, investigation, or other actions involving the records has been started before the expiration of the retention period, the contractor shall retain such records until completion of such action and resolution of all issues that arise from it.

- c. The contractor shall permit the state agency, governmental auditors, and authorized representatives of the State of Missouri to audit or examine, copy, or investigate any of the contractor's records, procedures, books, documents, papers, and records recording receipts and disbursements of any of the funds paid to the contractor. Failure to retain adequate documentation for any service billed may result in recovery of payments for services not adequately documented. Any audit exception noted by governmental auditors shall not be paid by the state agency and shall be the sole responsibility of the contractor. However, the contractor may contest any such exception by any legal procedure the contractor deems appropriate. The state agency will pay the contractor all amounts which the contractor may ultimately be held entitled to receive as a result of any such legal action.

### 1.9.3 Missouri Statewide Contract Quarterly Administrative Fee:

- a. The contractor shall pay a one percent (1%) administrative fee to the State of Missouri which shall apply to all payments received by the contractor for all products and services provided under the contract. Payment of the one percent administrative fee shall be non-negotiable.
- b. The contractor shall pay the administrative fee at the end of each calendar quarter (i.e. March 31, June 30, September 30, December 31). The total administrative fee for a given quarter must equal one percent (1%) of the total payments (minus returns and credits) received by the contractor during the calendar quarter as reported on the contractor's Missouri Statewide Contract Quarterly Administrative Fee Report specified below. The administrative fee must be received by the Division of Purchasing (Purchasing) no later than the 15<sup>th</sup> calendar day of the month immediately following the end of the calendar quarter, unless the 15<sup>th</sup> is not a business day in which case the next business day thereafter shall be considered the administrative fee deadline.
  - 1) Payments shall be made using one of the following acceptable payment methods:
    - **Check:** Personal check, company check, cashier's check, or money order made payable to the "Missouri Revolving Information Technology Trust Fund" and sent to the following mailing address: Division of Purchasing, P.O. Box 809, Jefferson City, MO 65102 – 0809 OR Division of Purchasing, 301 West High Street, Room 630, Jefferson City, MO 65101-1517. The contractor's payment by check shall authorize the State of Missouri to process the check electronically. The contractor understands and agrees that any returned check from the contractor may be presented again electronically and may be subject to additional actions and/or handling fees.
    - **Electronic Payment:** Instructions on how to submit payments electronically by automated clearing house (ACH) will be provided upon request by contacting the Division of Purchasing at (573) 751-2387.
- c. All payments of the administrative fee shall include the contract number on any check or transmittal document. However, only one contract number must be entered on a check or transmittal document. If submitting an administrative fee payment for more than one contract, then a separate check or electronic payment and associated transmittal document must be submitted by the contractor for each contract.

### 1.10 Invoicing and Payment Requirements:

- 1.10.1 Prior to any payments becoming due under the contract, the contractor must update their vendor registration with their ACH-EFT payment information at <https://MissouriBUYS.mo.gov>.
  - a. The contractor understands and agrees that the State of Missouri reserves the right to make contract payments through electronic funds transfer (EFT).
  - b. The contractor must submit invoices on the contractor's original descriptive business invoice form and must use a unique invoice number with each invoice submitted. The unique invoice number will be listed on the State of Missouri's EFT addendum record to enable the contractor to properly apply the state agency's payment to the invoice submitted. The contractor may obtain detailed information for payments issued for the past 24 months from the State of Missouri's central accounting system (SAM II) on the Vendor Services Portal at: <https://www.vendorservices.mo.gov/vendorservices/Portal/Default.aspx>

1.10.2 Invoicing –

- a. Within thirty (30) calendar days after completion of the project and in accordance with the mutually agreed work plan, the contractor shall submit an invoice to the state agency. The contractor shall submit all invoices to the invoice address noted on the authorized order received from the state agency requesting services.

1.10.3 Payments – Upon receipt and approval of any specific reports and the contractor's invoice, the contractor shall be paid in accordance with the approved invoice prices.

1.10.4 Other than the payments specified above, no other payments or reimbursements shall be made to the contractor for any reason whatsoever including, but not limited to taxes, travel expenses, shipping charges, insurance, interest, penalties, termination payments, attorney fees, liquidated damages, etc.

1.10.5 Notwithstanding any other payment provision of the contract, if the contractor fails to perform required work or services, fails to submit reports when due, or is indebted to the United States, the state agency may withhold payment or reject invoices under the contract.

1.10.6 Final invoices are due by no later than thirty (30) calendar days of the expiration of the contract. The state agency shall have no obligation to pay any invoice submitted after the due date.

1.10.7 If a request by the contractor for payment or reimbursement is denied, the state agency shall provide the contractor with written notice of the reason(s) for denial.

1.10.8 If the contractor is overpaid by the state agency, upon official notification by the state agency, the contractor shall provide the state agency (1) with a check payable as instructed by the state agency in the amount of such overpayment at the address specified by the state agency or (2) deduct the overpayment from the monthly invoices as requested by the state agency.

1.10.9 The contractor shall understand that each state agency utilizing the contractor's services shall be solely responsible for payment for only those services requested by that state agency.

**Attachment 2**

**List of Missouri Counties**

| County         | Square Miles (est.) |
|----------------|---------------------|
| Adair          | 569                 |
| Andrew         | 436                 |
| Atchison       | 550                 |
| Audrain        | 696                 |
| Barry          | 790                 |
| Barton         | 596                 |
| Bates          | 851                 |
| Benton         | 752                 |
| Bollinger      | 622                 |
| Boone          | 690                 |
| Buchanan       | 415                 |
| Butler         | 700                 |
| Caldwell       | 429                 |
| Callaway       | 847                 |
| Camden         | 708                 |
| Cape Girardeau | 587                 |
| Carroll        | 701                 |
| Carter         | 509                 |
| Cass           | 702                 |
| Cedar          | 498                 |
| Chariton       | 766                 |
| Christian      | 563                 |
| Clark          | 512                 |
| Clay           | 409                 |
| Clinton        | 423                 |
| Cole           | 399                 |
| Cooper         | 569                 |
| Crawford       | 743                 |
| Dade           | 506                 |
| Dallas         | 543                 |
| Daviess        | 569                 |
| Dekalb         | 426                 |
| Dent           | 754                 |
| Douglas        | 814                 |
| Dunklin        | 548                 |
| Franklin       | 929                 |
| Gasconade      | 526                 |
| Gentry         | 492                 |
| Greene         | 677                 |

**Attachment 2 (continued)**

**List of Missouri Counties**

|             |     |
|-------------|-----|
| Grundy      | 438 |
| Harrison    | 726 |
| Henry       | 732 |
| Hickory     | 411 |
| Holt        | 471 |
| Howard      | 471 |
| Howell      | 928 |
| Iron        | 552 |
| Jackson     | 616 |
| Jasper      | 641 |
| Jefferson   | 664 |
| Johnson     | 833 |
| Knox        | 506 |
| Laclede     | 767 |
| Lafayette   | 638 |
| Lawrence    | 613 |
| Lewis       | 511 |
| Lincoln     | 641 |
| Linn        | 621 |
| Livingston  | 538 |
| Macon       | 812 |
| Madison     | 498 |
| Maries      | 530 |
| Marion      | 444 |
| McDonald    | 539 |
| Mercer      | 455 |
| Miller      | 600 |
| Mississippi | 430 |
| Moniteau    | 418 |
| Monroe      | 670 |
| Montgomery  | 541 |
| Morgan      | 613 |
| New Madrid  | 698 |
| Newton      | 626 |
| Nodaway     | 878 |
| Oregon      | 791 |
| Osage       | 612 |
| Ozark       | 755 |
| Pemiscot    | 510 |
| Perry       | 485 |
| Pettis      | 686 |
| Phelps      | 674 |



**Attachment 2 (continued)**

**List of Missouri Counties**

|                          |        |
|--------------------------|--------|
| Pike                     | 687    |
| Platte                   | 427    |
| Polk                     | 642    |
| Pulaski                  | 552    |
| Putnam                   | 519    |
| Ralls                    | 483    |
| Randolph                 | 487    |
| Ray                      | 574    |
| Reynolds                 | 814    |
| Ripley                   | 632    |
| Saline                   | 766    |
| Schuyler                 | 308    |
| Scotland                 | 439    |
| Scott                    | 426    |
| Shannon                  | 1,004  |
| Shelby                   | 502    |
| St Charles               | 593    |
| St Clair                 | 702    |
| St Francois              | 454    |
| St Louis                 | 523    |
| St Louis City            | 66     |
| Ste Genevieve            | 507    |
| Stoddard                 | 830    |
| Stone                    | 510    |
| Sullivan                 | 651    |
| Taney                    | 651    |
| Texas                    | 1,178  |
| Vernon                   | 836    |
| Warren                   | 438    |
| Washington               | 763    |
| Wayne                    | 774    |
| Webster                  | 593    |
| Worth                    | 267    |
| Wright                   | 683    |
|                          |        |
| Total square miles(est.) | 69,680 |

### Attachment 3

## TAG LISTINGS AND TIFFINFO/LISTGEO SAMPLE OUTPUTS

### Tag Listings

The following table summarizes the TIFF 6.0, GeoTIFF 1.0, and GeoKey requirements. The values in the table are consistent with the TIFF 6.0 and GeoTIFF 1.0 standards, but there are fewer options than are allowed by TIFF. Additional guidelines and requirements for the values of tags and keys are detailed in the Annex A. Additional tags and keys may be used at the data producer's option, providing they do not conflict with the required tags.

#### TIFF tags required by baseline color TIFF:

| <u>TagName</u>            | <u>Decimal</u> | <u>Hex</u> | <u>Type</u>   | <u>Value</u> |
|---------------------------|----------------|------------|---------------|--------------|
| ImageWidth                | 256            | 100        | SHORT or LONG |              |
| ImageLength               | 257            | 101        | SHORT or LONG |              |
| BitsPerSample             | 258            | 102        | SHORT         | 8,8,8        |
| Compression               | 259            | 103        | SHORT         | 1            |
| PhotometricInterpretation | 262            | 106        | SHORT         | 2            |
| Orientation               | 274            | 112        | SHORT         | 1            |
| StripOffsets              | 273            | 111        | SHORT or LONG |              |
| SamplesPerPixel           | 277            | 115        | SHORT or LONG | 3            |
| RowsPerStrip              | 278            | 116        | SHORT or LONG | 1            |
| StripByteCounts           | 279            | 117        | LONG or SHORT |              |

#### TIFF tags defined by GeoTIFF:

| <u>TagName</u>     | <u>Decimal</u> | <u>Hex</u> | <u>Type</u> | <u>Value</u> |
|--------------------|----------------|------------|-------------|--------------|
| ModelPixelScaleTag | 33550          | 830E       | DOUBLE      |              |
| ModelTiepointTag   | 33922          | 8482       | DOUBLE      |              |
| GeoAsciiParamsTag  | 34737          | 87B1       | ASCII       |              |
| GeoKeyDirectoryTag | 34735          | 87AF       | SHORT       |              |

#### GeoKeys defined by GeoTIFF:

| <u>TagName</u>        | <u>Decimal</u> | <u>Hex</u> | <u>Type</u>  | <u>Value</u> |
|-----------------------|----------------|------------|--------------|--------------|
| GTModelTypeGeoKey     | 1024           | 400        | 6.3.1.1 code | 1            |
| GTRasterTypeGeoKey    | 1025           | 401        | 6.3.1.2 code | 1            |
| GTCitationGeoKey      |                | 1026       | 402          | ASCII        |
| ProjectedCSTypeGeoKey | 3072           | C00        | 6.3.3.1 code |              |
| PCSCitationGeoKey     | 3073           | C01        | ASCII        |              |
| ProjLinearUnitsGeoKey | 3076           | C04        | SHORT        |              |

#### Utility *tiffinfo* sample output

This listing is an output of the libtiff utility program "*tiffinfo*".

TIFF Directory at offset 0x2370bc4  
Image Width: 3247 Image Length: 3815  
Resolution: 200, 200 (unitless)  
Bits/Sample: 8  
Compression Scheme: none  
Photometric Interpretation: RGB color  
Samples/Pixel: 3  
Rows/Strip: 1  
Planar Configuration: single image plane

## Utility *listgeo* sample output

The following is an example of a GeoTIFF tag and GeoKey listing from a USGS image. This listing is the output of the libgeotiff utility program "*listgeo*". The projection information below the line "End\_Of\_Geotiff" is implied by the standard projection and is not stored explicitly in the data file. The descriptions are retrieved from libgeotiff lookup tables in the listgeo application.

### Geotiff\_Information:

Version: 1

Key\_Revision: 1.0

### Tagged\_Information:

ModelTiepointTag (2,3):

0 0 0  
337962 3763838 0

ModelPixelScaleTag (1,3):

2 2 1

End\_Of\_Tags.

### Keyed\_Information:

GTModelTypeGeoKey (Short,1): ModelTypeProjected

GTRasterTypeGeoKey (Short,1): RasterPixelIsArea

GTCitationGeoKey (Ascii,45): "USGS n3309403nw\_2\_20050714"

ProjectedCSTypeGeoKey (Short,1): PCS\_NAD83\_UTM\_zone\_15N

PCSCitationGeoKey (Ascii,21): "NAD83 / UTM zone 15N"

ProjLinearUnitsGeoKey (Short,1): Linear\_Meter

End\_Of\_Keys.

End\_Of\_Geotiff.

PCS = 26915 (name unknown)

Projection = 16015 ()

Projection Method: CT\_TransverseMercator

ProjNatOriginLatGeoKey: 0.000000 ( 0d 0' 0.00"N)

ProjNatOriginLongGeoKey: -93.000000 ( 93d 0' 0.00"W)

ProjScaleAtNatOriginGeoKey: 0.999600

ProjFalseEastingGeoKey: 500000.000000

ProjFalseNorthingGeoKey: 0.000000

GCS: 4269/NAD83

Datum: 6269/North American Datum 1983

Ellipsoid: 7019/GRS 1980 (6378137.00,6356752.31)

Prime Meridian: 8901/Greenwich (0.000000/ 0d 0' 0.00"E)

Projection Linear Units: 9001/metre (1.000000m)

### Corner Coordinates:

Upper Left ( 337962.000,3763838.000) ( 94d45'16.56"W, 34d 0' 9.55"N)

Lower Left ( 337962.000,3756208.000) ( 94d45'11.47"W, 33d56' 1.94"N)

Upper Right ( 344456.000,3763838.000) ( 94d41' 3.51"W, 34d 0'13.09"N)

Lower Right ( 344456.000,3756208.000) ( 94d40'58.63"W, 33d56' 5.47"N)

Center ( 341209.000,3760023.000) ( 94d43' 7.54"W, 33d58' 7.53"N)

## Attachment 4

| <u>Description</u>             | <u>Sub Type</u>                                            | <u>Feature Type</u>                | <u>Comments</u>                                                                                                                                                        |
|--------------------------------|------------------------------------------------------------|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Buildings Features</b>      |                                                            |                                    |                                                                                                                                                                        |
| Buildings General              | BLDG_GEN                                                   | Polygon                            | All residential, commercial, industrial and institutional                                                                                                              |
| Out Buildings                  | BLDG_OUT                                                   | Polygon                            | Out buildings such as sheds, detached garages, carports, etc.                                                                                                          |
| Mobile Homes                   | BLDG_MH                                                    | Polygon                            | All visible mobile homes                                                                                                                                               |
| Swimming Pools                 | BLDG_POOL                                                  | Polygon                            | All visible pools; Must contain field to discern above ground vs. in-ground                                                                                            |
| Docks and Piers                | DOCKS                                                      | Polygon                            | All visible docks/piers                                                                                                                                                |
| Foundations                    | BLDG_FDN                                                   | Polygon                            | All visible foundations and ruins                                                                                                                                      |
| Decks and Porches              | BLDG_DECK<br>BLDG_PORCH                                    | Polygon                            | All visible decks/porches                                                                                                                                              |
| Canopies                       | BLDG_CANOPY                                                | Polygon                            | All visible canopies                                                                                                                                                   |
| Tanks                          | BLDG_TANK                                                  | Polygon                            | All water, gas, and other tanks                                                                                                                                        |
| <b>Hydrographic Features</b>   |                                                            |                                    |                                                                                                                                                                        |
| Rivers                         | HYDRO_RIVER                                                | Line/Polygon                       | Collect all rivers                                                                                                                                                     |
| Streams and Brooks             | HYDRO_STREAM                                               | Line/Polygon                       | All visible streams and brooks                                                                                                                                         |
| Ponds and Lakes                | HYDRO_LAKE                                                 | Polygon                            | Closed, permanent bodies of water                                                                                                                                      |
| Intermittent Streams           | HYDRO_STREAM_INT                                           | Line                               | Visible intermittent streams                                                                                                                                           |
| <b>Transportation Features</b> |                                                            |                                    |                                                                                                                                                                        |
| Street and Pavement Edge       | RD_EDGE_PAVED<br>RD_EDGE-UNPAVED<br>RD_PAVED<br>RD_UNPAVED | Line<br>Line<br>Polygon<br>Polygon | All paved and unpaved edges of street pavement including alleys. Pavement edges must be continuous and should not break at driveways, parking lots, or other features. |
| Curb Lines                     | RD_CURB                                                    | Line                               | All curb lines. Lines must be continuous and should not break at driveways, etc.                                                                                       |
| Sidewalk-Public                | RD_SDWLK                                                   | Polygon                            | Front and Back of sidewalk. If front of sidewalk is coincident with curb or road features, road features take a precedent.                                             |
| Parking Areas                  | PARKING_PAVED<br>PARKING_UNPAVED                           | Polygon                            | Identify all areas having more than 5 parking spaces. Attribute table must have a field to discern Paved vs. Unpaved.                                                  |
| Driveways                      | BRIVE_PAVED<br>DRIVE_UNPAVED                               | Polygon                            | Identify all public and private driveways. Attribute table must have a field to discern paved vs. unpaved.                                                             |
| Airport                        | AIRPORT                                                    | Polygon                            | Concord Airport paved area.                                                                                                                                            |