

## Board of Alderman Request for Action

#### **MEETING DATE:** 7/12/2021

**DEPARTMENT:** Public Works

**AGENDA ITEM:** Approve Resolution 999 awarding RFQ 21-18 to Surveying and Mapping, LLC. (SAM) for geographic information services in an amount not to exceed \$212,080.

### RECOMMENDED ACTION:

Approve Resolution 999

#### SUMMARY:

RFQ 21-18 for Geographic Information Services (GIS) was advertise September 3, 2021. Five proposals were received. A selection committee including Alderman Chevalier, Mayor Boley, Allen Jensen, Bob Lemley, Gina Pate, Jack Hendrix, and Chuck Soules interviewed three firms and are forwarding the recommendation for Surveying and Mapping LLC. (SAM) to complete the mapping of the City's infrastructure.

SAM has assisted many communities in setting up and maintaining GIS systems. The project will start with locating and surveying the water, sewer and storm sewer infrastructure. Street pavement condition indexes (PCI's) will also be included. Staff will work with Clay and Platte Counties for base mapping and aerial photography. SAM will locate all the City infrastructure on the base map. All the information gathered will be owned by the City.

The proposal provides for SAM to maintain the system but the City can also acquire separate licenses from ESRI for staff to edit and add new information.

The scope is attached for the Board's review. The first step of this project will take several months. The GIS system will need to be updated on an ongoing basis. Annual expenditures of approximately \$5,000 should be budgeted for updates and licensing.

#### **PREVIOUS ACTION:**

Project is included in the 2021 CIP

#### POLICY ISSUE:

Strategic Planning, Infrastructure Maintenance

#### FINANCIAL CONSIDERATIONS:

This Project is included in the 2021 CIP. Budgeted funds in both the General Fund and Utilities Funds will be used based upon the cost of the infrastructure being identified. An annual budget for licensing and updates should be included in future City budgets.

#### **ATTACHMENTS:**

- $\hfill\square$  Ordinance
- ☑ Resolution
- □ Staff Report
- Other: proposal

- □ Plans
- $\Box$  Minutes

#### **RESOLUTION 999**

#### A RESOLUTION AWARDING RFQ 21-18 TO SURVEYING AND MAPPING, LLC. (SAM) FOR GEOGRAPHIC INFORMATION SERVICES IN AN AMOUNT NOT OT EXCEED \$212,080

**WHEREAS**, the fiscal year 2022 budget allocated funds for a Geographic Information System; and

WHEREAS, the City issued a Request for Qualifications, RFQ 22-18; and

**WHEREAS**, a selection committee reviewed the submissions and conducted interviews with the three most qualified respondents; and

WHEREAS, the committee recommends SAM as the best proposal for the process; and

**WHEREAS**, staff has completed negotiations with SAM for the development of the GIS system in an amount not to exceed \$212,080.

## NOW THEREFORE BE IT RESOLVED BY THE BOARD OF ALDERMEN OF THE CITY OF SMITHVILLE, MISSOURI, AS FOLLOWS:

**That** the Mayor is hereby authorized to execute an agreement with Surveying and Mapping, LLC for the completion of a Geographic Information System for the City of Smithville in an amount not to exceed \$212,080.

**PASSED AND ADOPTED** by the Board of Aldermen and **APPROVED** by the Mayor of the City of Smithville, Missouri, the 7<sup>th</sup> day of December 2022.

Damien Boley, Mayor

ATTEST:

Linda Drummond, City Clerk

#### PROFESSIONAL FIRMING SERVICES AGREEMENT

This is an Agreement (hereafter referred to as the "Agreement" or "Contract") by and between City of Smithville, MO ("City") located at 107 W. Main Street, Smithville, MO 64089 and <u>SAM</u>, LLC. ("Firm" or "Firm") a <u>LLC</u>. Corporation registered to do business in the State of Missouri located at <u>501 N. Market</u>, <u>Maryville</u>, <u>MO 64468</u>

#### WITNESSETH:

WHEREAS the City desires to procure geographical information system services pertaining to City infrastructure, planning and parks and is desirous of retaining a Firm for such works for a term of three years; and

WHEREAS the Firm is qualified by experience and training and is willing to perform the geographical information systems services necessary to said work.

WHEREAS the City issued RFQ 21-18 Geographic Information Systems Services on September 3, 2021, a copy of which is attached hereto as **Exhibit A**.

WHEREAS the Firm provided a response on the  $28^{th}$  day of September 2021, a copy of which is attached hereto as **Exhibit C**, with the qualifications and scope of services as identified therein.

WHEREAS the Firm was deemed by the City as the company most qualified to work on this project.

WHEREAS upon consultation between the parties it was agree that the Firm would provide the services as set forth in **Exhibit B** which is attached hereto and incorporated as if more fully set forth verbatim.

NOW THEREFORE, in consideration of the mutual covenants and promises contained herein the parties agree as follows:

1. <u>CONTRACT DOCUMENTS</u>: The Agreement between the parties shall consist of this Agreement, Exhibit A, B and C. The Parties further agree that this Agreement is a memorialization and a supplement to Exhibits A, B and C attached hereto. In the event of a conflict in the interpretation of the contract/Agreement documents, the parties agree that the terms within the Agreement documents shall be construed or given binding effect in the following order:

- a) This Agreement; and then
- b) Exhibit A; and then
- c) Exhibit B; and then
- d) Exhibit C.

2. <u>GENERAL SCOPE OF THE WORK</u>: Firm shall furnish all of the labor and materials and perform all of the work set out in **Exhibit B** and incorporated in this Agreement, to the same extent and effect as if fully set out herein.

3. <u>CONTRACT/AGREEMENT PRICE</u>: The total price for all work, materials, and labor to be furnished and performed by the Firm shall not exceed <u>\$212,080.00</u>. Other than as set forth in paragraph 11, this price is a fixed fee and shall not increase for any reason including but not limited to convenience of the City, unknown site conditions, delays, weather or other Firm claims. Firm may submit monthly invoices to the City Director of Public Works (or such other person as designated by the City) detailing the hours of services provided and the percentage of the project completed. Upon verification by

the City that the invoice does not exceed the percentage of the project completed, the City will pay said invoice within thirty (30) days. The City will not make any payments for invoiced amounts which exceed the percentage of completed project.

4. <u>TIME</u>: Time is of the essence of this Agreement. The work to be performed hereunder shall be commenced as soon as reasonably possible after the execution of this Agreement and is subject to authorized adjustments. The work contemplated by this agreement shall be completed by the Firm within \_\_\_\_\_\_ days of the Notice to Proceed on this Agreement or by the \_\_\_\_\_\_ day of \_\_\_\_\_\_, 2021.

5. <u>NOTICES</u> Any Notice as set forth herein must be served by Federal Express or similar overnight delivery service or by certified mail, return receipt requested, addressed to the party and shall be deemed given as of the deposit in the U. S. Mails or with overnight delivery service. Notice to the City shall be sent to the Director of Public Works and the City Administrator, City of Smithville, 107 W. Main Street Smithville MO 64089. Notice to Firm shall be sent to the Firm at 544 Columbia Drive, Lawrence, KS 66049. Either party may designate such other Person and/or delivery address from time to time by written Notice.

6. **INDEPENDENT CONTRACTOR**: The Firm represents to the City that it is fully experienced and properly qualified as a professional Firm to perform the services provided for herein and that it is properly equipped organized and financed to perform such services. The Firm shall finance its own operations and shall operate as an Independent Contractor and not as an agent of the City and shall indemnify and hold the City free and harmless from all liabilities, losses, and judgement by reason of any negligent act, omission or representation of the Firm or of its subcontractors, agents, and employees, including reasonable attorney's fees.

Firm shall at all times cause all its workers, laborers, employees, independent contractors and subcontractors and agents and employees of such persons to be fully covered with Worker's Compensation insurance at the amounts required by law. The Firm will indemnify and hold the City harmless for all damages and liabilities, including reasonable attorney's fees and costs for injuries to its employees, agents, servants, and/or subcontractors, for failure to obtain and maintain worker's compensation insurance or failure to provide a safe place to work, and Firm will also be responsible to ensure that its subcontractors carry workers compensation insurance.

The Firm will also conduct the services in such a manner as to keep members of the public safe and represents and warrants that it has General Liability insurance in a sum no less than \$2,000,000.00 in the aggregate. The Firm will provide the City with a Certificate of Insurance evidencing the same and excluding Professional Liability and Workers Compensation policies shall name the City as "additional named insured" and will indemnify and save the City harmless from all liability and costs, including attorney's fees claimed by any person who claims an injury as a result of the work. All insurance coverage must be written by companies that have an A.M. Best's rating of "A-VII" or better or as specifically approved by the City and are licensed or approved by the State of Missouri to do business in Missouri.

Regardless of any approval by the City, it is the responsibility of the Firm to always maintain the required insurance coverage in force; its failure to do so will not relieve it of any agreement, obligation or responsibility. In the event of the Firm 's failure to maintain the required insurance in effect, the City may order the Firm to immediately terminate its work until the breach has been cured or terminate this Contract.

7. <u>COMPLIANCE AND REQUIREMENTS</u>: The Firm shall perform its services consisted with the professional skill and care ordinarily provided by professionals practicing in the same or similar locality under the same or similar circumstances ("The Standard of Care"). Firm shall perform its services as expeditiously as is consistent with such professional skill and care and the orderly progress of the Project.

Subject to the Standard of Care all work, labor and materials to be furnished and performed by the Firm shall be to the satisfaction of the City Director of Public Works (or such other person as designated by the City) acting on behalf of the City, and payment shall be made only for such work and materials as are accepted in writing by the City Director of Public Works (or such other person as designated by the City) provided, however, that the City shall not arbitrarily withhold acceptance of such work and materials or payment so long as the Firm makes satisfactory progress and performs all of its obligations in accordance with the Standard Care or pursuant to all the terms and conditions of this Agreement.

8. <u>CORRECTION OF DEFAULTS</u>: The Firm will, at the request of the City Director of Public Works (or such other person as designated by the City), correct any defects to the materials or workmanship, and neither final payment by the City nor the final acceptance by the City of the work and materials shall relieve Firm from responsibility for any defect in materials and workmanship.

**9.** <u>ASSIGNMENT</u>: The Firm shall not assign this Agreement or any amount payable hereunder without the prior written consent of the City. The Firm shall upon request of the City, disclose to the City the names, addresses and owners of all subcontractors or other persons with whom it intends to contract with or hereafter contracts in connection with the performance of this Agreement.

10. <u>CONFLICTS OF INTEREST</u>: The Firm warrants and represents that neither the Firm nor its officers, directors, agents, employees, or subcontractors are related within the second degree of affinity or consanguinity with any elected officials or employees of the City.

The Firm will not offer, give, or agree to give any employee or former employee of the City, anything of a pecuniary value for or because of:

- a. Any official action taken, or to be taken, or which could be taken; or
- b. A legal duty performed or to be performed, or which could be performed; or
- c. A legal duty violated, or to be violated, or which could be violated by such employee or former employee.

No regular employee or elected or appointed member of the City shall be permitted to obtain any benefit of this Contract, or to obtain any benefit that may accrue there from.

11. <u>EXTRAS</u>: No claim for payment (more than the amount set forth in this Agreement for extra services or materials of any kind shall be made by the Firm or shall be paid by the City unless the same is performed or furnished pursuant to a written agreement executed by the City and the Firm.

12. <u>COMPLIANCE WITH LAW</u>: This Agreement is entered into subject to the federal, state, and local laws, charters, ordinances, and regulations. The Firm shall comply with all federal, state and local laws, ordinances and regulations and shall ensure all such compliance with regard to its subcontractors, including but not limited to the Americans with Disabilities Act and the Equal Employment Opportunity Law. Firm shall secure all occupational and professional licenses and permits from public and private sources necessary for the performance of the services contemplated by this Agreement as well as the placement and/or use of any equipment at the location specified.

**13.** <u>AFFIDAVIT OF WORK AUTHORIZATION AND DOCUMENTATION</u>: Pursuant to 285.530 R.S.Mo, the Firm must affirm its enrollment and participation in a federal work authorization program with respect to the employees proposed to work in connection with the services requested herein by

• submitting a completed, notarized copy of RFQ#21-18 Geographic Information Systems Services, AFFIDAVIT OF WORK AUTHORIZATION and

• providing documentation affirming the bidder's enrollment and participation in a federal work authorization program (see below) with respect to the employees proposed to work in connection with the services requested herein.

E-Verify is an example of a federal work authorization program. Acceptable enrollment and participation documentation consists of the following two pages of the E-Verify Memorandum of Understanding (MOU): 1) a valid, completed copy of the first page identifying the bidder and 2) a valid copy of the signature page completed and signed by the bidder, the Social Security Administration, and the Department of Homeland Security – Verification Division.

14. <u>UNITED STATES GOODS</u>: Firm agrees and understands that any manufactured goods or commodities used or supplied in the performance of the Agreement, or any subcontract thereto shall be manufactured or produced in the United States unless exempt from such requirement pursuant to §34.353 R.S.MO.

15. <u>NOT A JOINT VENTURE</u>: Nothing contained in this Agreement shall be deemed to constitute the City and the Firm as partners in a partnership or joint venture for any purpose whatsoever.

16. <u>NO PERSONAL LIABILITY OF CITY PERSONNEL</u>: Neither the Board of Alderpersons, Board Members, nor any other officer, official, employee, or agent of the City, nor any partner or employee of the Firm shall be *personally* responsible for any liability arising under or growing out of this Agreement or operations of the Firm.

17. <u>ENTIRE CONTRACT/AGREEMENT</u>: This Agreement and the Exhibits attached hereto constitute the entire agreement between the parties. Terms not specifically set out herein and no verbal agreement or conversation with any officer, official, agent or employee of the City, either before or after the execution of the Agreement, shall affect, modify or add to the terms or obligations contained in this Agreement. Any such purported term, verbal agreement or conversation shall in no way be binding upon the City or the Firm.

18. <u>**RECORDS</u>**: The Firm shall maintain all records for inspection by City representatives during the Contract period and for three (3) years after the date of termination of the Contract. The Firm agrees that the City Auditor, or any of his/her duly authorized representatives shall, until the expiration of three (3) years after final payment under this Contract, have access to and the right to examine any and all pertinent books, documents, papers and records of the Firm involving the transactions related to this Agreement.</u>

**19.** <u>SURVIVAL OF WARRANTIES</u>: All warranties and representations of the Firm hereunder shall survive final payment and acceptance of the work.

20. <u>APPLICABLE LAW</u>: the laws of the State of Missouri shall govern this contract. Any action regarding the consent or arising out of the terms and conditions shall be instituted and litigated in the courts of the State of Missouri, County of Clay and in no other. Firm is validly registered to do business in Missouri. The parties submit to the jurisdiction of the courts of the State of Missouri and to venue in Clay County.

21. **<u>REMEDIES</u>**: In addition to all other remedies at law or in equity, if Firm shall fail to complete and/or meet any of its obligations under the terms of this Agreement, the City may, by giving

the Firm written Notice, cancel and terminate this Contract if the breach is not cured within Thirty (30) days after the sending of such Notice (unless otherwise set forth herein).

22. <u>NONRESIDENT/FOREIGN CONTRACTORS</u>. The Firm shall procure and maintain during the life of this contract:

**a.** A certificate from the Missouri Director of Revenue evidencing compliance with the transient employer financial assurance law, unless exempt pursuant to the provisions of Section 285.230 R.S.Mo.

23. <u>INTELLECTUAL PROPERTY RIGHTS</u>: Firm shall pay all license, royalty or similar intellectual property fess or costs. Firm shall hold City harmless and shall indemnify and defend (in a joint defense approach) City against all claims, damages, suits or losses for any and all infringements on any intellectual property rights of another (whether patents, copyrights, etc.) relating to or caused by the work of the Firm.

24. <u>CONTRACT LANGUAGE</u> The language of this Contract reflects negotiations between Firm and City, each of whom have had the opportunity to modify the text. In the event of litigation or other dispute concerning the language of this Contract, general rules construing ambiguities against the drafter shall not apply. It is agreed that if more than one copy of this document may be executed and that the original filed with the City Clerk shall pursuant to §432.080 R.S. Mo be deemed to be the controlling original.

**25.** <u>CHANGE ORDERS:</u> Change Orders which are approved by the Firm and the City's designee in writing which do <u>not</u> increase the cost of the project may be utilized to make needed changes to the scope of the work and to manage minor changes necessary.

26. <u>CITY OWNERSHIP AND PROPRIETARY INFORMATION</u> – Contingent upon full payment of undisputed amounts in accordance with this Agreement, the parties expressly agree that all data, documents, records, studies, or other information generated, created, found or otherwise completed by Firm in the performance of Firm's duties under the terms of this Agreement shall be considered as works for hire, and shall at all times be considered the proprietary information of and under the ownership of the City. All data, documents, records, studies, or other information generated, referred to above, shall be provided to the City by Firm upon request so long as the City is not in default under other terms of this Agreement. City grants the Firm the right to use all data, documents, records, studies, or other information generated, referred to above, show the terms of this Agreement. Agreement

27. **TERMINATION**. The City reserves the right to terminate this Agreement by giving at least five (5) days prior written notice to the Firm, without prejudice to any other rights or remedies of the City should the Firm be in breach of this Agreement, be adjudged a bankrupt, or if Firm should make a general assignment for the benefit of its creditors, or if a receiver should be appointed for Firm, or if Firm should persistently or repeatedly refuse or fail to supply enough properly skilled workmen for the work under the Agreement, or persistently disregard instructions of the City or fail to observe or perform any provisions of the Agreement.

28. <u>COMPLIANCE WITH LAW</u>. This Agreement and the goods and services rendered herein are subject to all federal laws, the Constitution of the State of Missouri, the Revised Statutes of Missouri. Any specific provision contained herein which is contrary to federal laws or the Constitution of the State of Missouri and the Revised Statues of Missouri shall be considered void without invalidating or otherwise affecting the remainder of the Agreement.

**29. EFFECTIVE DATE:** The effective date of the Agreement shall be deemed to be when all the required signatures have been executed by the City and the Firm.

**30.** <u>WAIVER</u>: The waiver by either party of any term, covenant, or condition hereof shall not operate as a waiver of any subsequent breach of the same or any other term. No term, covenant, or condition of this Agreement can be waived except by the written consent of the City, and forbearance or indulgence by the City in any regard whatsoever shall not constitute a waiver of any term, covenant, or condition to be performed by Firm to which the same may apply and, until complete performance by the Firm of said term, covenant or condition, the City shall be entitled to invoke any remedy available to it under this Agreement or by law despite any such forbearance or indulgence.

**31. SEVERABILITY**: All of the provisions of this Agreement shall be severable. In the event that any provision of this Agreement is found by a court of competent jurisdiction to be unconstitutional or unlawful, the remaining provisions of this Agreement shall be valid unless the court finds the valid provisions of this Agreement are so essentially and inseparably connected with and so dependent upon the invalid provisions that it cannot be presumed that the parties to this Agreement could have included the valid provisions without invalid provisions; or unless the court finds that the valid provisions, standing alone, are incapable of being performed in accordance with the intentions of the parties.

32. <u>UNEMPLOYMENT INSURANCE AND TAXES</u>: The Firm shall pay, at the Firm 's own cost, all relevant taxes in connection with the work or materials to be performed, including but not limited to State and Federal, Unemployment and old age benefit taxes, sales and use taxes, income tax, withholding tax or other work or payroll related taxes. No payments to the Firm will be approved unless the Firm is current with tax payments to the City or unless satisfactory arrangements have been made for payment with the City.

**33. FORCE MAJEURE:** In the event that either party hereto shall be delayed or hindered in or prevented from the performance of any act required hereunder by reason of restrictive governmental laws or regulations, riots, insurrection, war, or other reason of a like nature not the fault of the party delayed in performing work or doing acts required under the terms of this Agreement, then the time allowed for performance of such act shall be extended by a period equivalent to the period of such delay.

**34.** <u>CONDITION PRECEDENT:</u> This Agreement shall be null and void and of no effect unless and until the City has by Ordinance or Resolution passed by the City Board of Alderpersons, obtained the authority to enter into this Agreement.

**IN WITNESS WHEREOF**, the parties have set their hands and seals the date and year first above written. The parties represent that the signatories below have full authority and authorization to sign on behalf of the respective parties.

#### THE CITY OF SMITHVILLE

By:\_\_\_

Mayor or City Administrator

Name:

FIRM SAM 61C By: Title Dir of 675 opprations

#### <u>Exhibit A</u>

RFQ#21-18 Geographic Information Systems Services

#### <u>Exhibit B</u>

Scope of Work

#### <u>Exhibit C</u>

Firm's Response to RFQ#21-18 Geographic Information Systems Services

Which the City received on or about the  $28^{th}$  day of September 2021.

#### **Project Kick-off**

SAM will provide an on-site kick-off meeting and geodatabase design workshop with the City of Smithville to start the project. The kick-off meeting is essential to developing open communication with the client and will help establish the guidelines and procedures of SAM for coordinating the project. The following important topics will be discussed and determined at the kick-off meeting:

#### **COLLECT EXISTING DATA**

SAM will acquire copies of existing and available mapping records, such as relevant GIS data, AutoCAD drawings, hard-copy utility maps, as-built information and historical utility drawings for use as reference during the project. All hard-copy maps will be scanned and returned to the city in a timely manner.

#### SAFETY AND PROCEDURES

SAM will review safety and field procedures during the kick-off meeting to ensure the safety of field staff, city staff and the citizens of Smithville throughout the data collection phase of the project. SAM follows a strict safety and procedures manual and requires all SAM employees to attend internal quarterly safety meetings to review procedures and concerns.

At all times, field staff will be wearing the required Class II traffic safety vests and all field vehicles will be clearly marked with company information and have the required safety lights for operation while in public right-of-way. GPS field personnel have acquired OSHA training and certification for "Traffic Control for Field Engineering & Surveyors" and "Confined Spaces". Proper traffic control signage will be utilized when necessary while operating in public right-of-way. If required, due to traffic concerns, SAM will operate during non-peak hours to obtain field locates and inspections. If SAM staff has concerns about their safety, the appropriate city staff or local law enforcement will be contacted.



#### **PROJECT TIMELINE AND MILESTONES**

SAM will review and discuss the anticipated project timeline and milestones with the City of Smithville during the kickoff meeting. Any level of responsibility required of the city (i.e. providing existing data, pre-locating utilities, etc.) will be discussed and taken into consideration when finalizing the overall project timeline. Internal and external cost controls, along with any modifications to the proposed project schedule at the request of the city will be discussed during the kick-off meeting.

#### WORK SECTOR DEFINITION

SAM will work with city staff to define a grid and identify work sectors for the entire project area. The creation of these work sectors serves two very distinct and important roles during the project. First, the project sectors will be utilized by SAM field staff as a quality control measure. Field staff will work within each sector and complete all locates and inspections required prior to moving on to the next sector. This allows for an efficient method of data collection and translates into cost savings and overall project quality. Another benefit of working within project sectors is to provide city staff with an effective method to track progress and know exactly what part of the city SAM field staff is working in. The work sectors also facilitate preplanning during morning meetings for traffic control, city staff assistance and project reports to Smithville.

#### PUBLIC NOTIFICATION

SAM will work with city staff to ensure proper citizen notification. It has been our experience on similar projects that informing citizens about the field work will help to alleviate any concerns local residents may have. Notifications at City Hall, utility billing offices and the local newspaper or public access channel (if available) is highly recommended. SAM field staff will carry an informational letter on letterhead from the City of Smithville describing the project and the proper contact information in the event there are concerns from the public. It is also recommended that local law enforcement be notified about the project and that SAM field staff will be working in the area.



#### **GEODATABASE DESIGN WORKSHOP**

The most critical aspect of developing a functional GIS program is the development of the geodatabase. A geodatabase is a logical single-file format for organizing spatial data and corresponding datasets.

When creating the overall design of the geodatabase for Smithville, SAM will take into consideration the best model and structure to meet the needs of the city. The geodatabase will also be based on previous models from SAM, the published Esri utility model and future GIS needs, as identified by Smithville. Developing an accurate and functional geodatabase will enable users to:

- Store all GIS-related data in a centralized location
- Apply rules and relationships to the data
- Create a consistent and accurate spatial database
- Define relationship classes
- Define topological enforcement rules
- Ensure multi-user access and editing capabilities

Custom domains (pre-defined menus) will be built for each layer during the geodatabase design. These domains will be added to the custom field inspection application from SAM to ensure that field staff will collect clean and consistent data throughout the utility project. These domains will also be utilized by city staff for future management of the geodatabase to help simplify the editing and data management processes.

The upfront design process by SAM enables field personnel to collect data in a rule-based environment. This minimizes field coding errors by predefining attribute tables used in the field and maintains consistency in the data collection process.

# Geodatabase Design 📰 Datasets **Build the** Geodatabase **GPS** Data Collection **Final Data**

#### **GPS Data Collection**

SAM routinely utilizes Real-Time Kinematic (RTK) survey-grade and mapping-grade GPS technologies to locate utility infrastructure. RTK survey-grade technology is utilized for locating utility assets associated with sanitary sewer, storm water, gas and water features, resulting in centimeter-level accuracy (+/- 2 centimeters) and accurate elevations for sanitary sewer and storm water. Mapping-grade GPS equipment is utilized for locating electric and fiber utility infrastructure and provides decimeter-level accuracy (+/- 4 inches).



For this project, SAM will utilize RTK survey-grade GPS methods to locate the city's storm water, sanitary sewer, and water utility networks contained in the defined project limits. GPS surveys will be referenced to the Missouri State Plane Coordinate System to allow for direct insertion into the GIS program developed for Smithville. Horizontal (x,y) coordinates will be obtained in the field for all utility features. Vertical (z) elevations will be obtained for sanitary sewer and storm water utility features. Captured features through GPS surveys will include all features designated by Smithville during the planning phase of the project.

After thorough investigation by SAM field staff, a report containing all utility features to be located that were not found, or determined to be inaccessible, will be submitted to the City of Smithville. SAM will work with city staff to locate utility features during the clean-up phase of the project. This will allow SAM to collect features in a quicker and more efficient manner, translating into cost savings for Smithville and minimizing the impact on city staff.

#### DATA CONSISTENCY

SAM will employ our customized data collection field application that has been successfully used on other similar projects. All field data will be predefined for field staff to ensure accurate and consistent attribute collection. Field staff will run the custom application on the GPS controller unit to allow for quick and easy identification and navigation of the utility features.

#### DATA SECURITY & BACK UP

SAM will download and process the GPS field data for insertion into the project geodatabase. All data will be downloaded, transferred and backed up nightly via the internet to the SAM GIS office in Maryville, MO.

Every safeguard has been implemented to ensure that hardware or software failure does not interfere or risk our accurate data collection efforts in the field.



#### **GPS REDUNDANCY CHECK**

SAM will GPS locate five (5) percent of the features previously shot during the project. This process is part of the SAM standard field protocol and will be employed during the Smithville project. SAM will compile and process the results against the original dataset and verify the required accuracy tolerance is being met.



#### Storm Water Network GPS Data Collection

Horizontal (x,y) coordinates and vertical (z) elevations will be obtained in the field for the storm water facilities. Aboveground utility features will be collected at sub-centimeter horizontal and vertical accuracies.

#### STORM WATER STRUCTURES TO BE LOCATED:

Manholes

Boxes

• Inlets

Junctions

• Outfalls

Inlets that are inaccessible by GPS due to tree cover or satellite visibility will be noted and shot utilizing traditional survey methods. All data will be coded in reference to method of collection.

#### STORM WATER FIELD ATTRIBUTE COLLECTION

SAM will collect the storm water attribute data during this phase of the project. Any storm water structures that require further assistance in opening or gathering attribute data will be noted and SAM will work with city staff to gain access to the identified storm water structures.

The storm water features to be collected will be defined in preliminary meetings with the city. Storm water features will be

opened, inspected and attribute data will be collected. Attribute features to be collected will correlate with the required attribute fields to allow for seamless integration with the Esri ArcGIS software.

#### STORM WATER ATTRIBUTES TO BE COLLECTED INCLUDE:

 Date Inspector Cover type • Structure number • Locality Grate / inlet size Inspected (Y/N) Reason not inspected Structure size Location • Type Shape Inlet Elevation Depth Depth To F/L Condition





#### Sanitary Sewer Network GPS Field Data Collection

SAM will GPS locate the features associated with the city's sanitary sewer system. Typical features that are collected during this phase of the project include:

- Manholes
- Lift stations
- Force main valves
- Lamp holes (if present)
- Pre-located force main locations

In the event that Smithville is unable to identify the approximate location of the force main, as-built drawings will be utilized to retrace the location of the force main line. If the city's staff is unable to locate portions of the gravity main system during the cleanup phase, SAM will COGO as-built drawings into the GIS. This data will be loaded into the GPS controller and will be used to navigate to the approximate locations of the lost or buried manholes.

#### DATA COLLECTION SPECIFICATIONS:

- For consistency purposes, the north rim of the manhole will be located during the project.
- SAM will mark each manhole with survey marking paint after each manhole has been identified.
- Manholes that are inaccessible by GPS due to tree cover or satellite visibility will be noted and shot utilizing traditional survey methods (total station or level rod). All data will be coded as to the method of collection utilized.

#### How important is accurate GIS data for sanitary sewer?

The US received a **D+** overall for Sanitary Sewer Infrastructure according to the **American Society of Civil Engineers (ASCE)** Report Card for US in 2021.

56 million more people are expected to be added to a public sanitary sewer system by 2032 in the US – an increase of 23%. There are over **800,000 miles** of public sewer lines in the US whose aging makes them more susceptible to structural failure, blockages and overflows.

#### The ASCE recommends an asset management system for all utility networks.



#### SANITARY SEWER FIELD ATTRIBUTE COLLECTION

SAM will perform top-side manhole field inspections to collect manhole attribute data during this phase of the project. Manholes will be opened, inspected and attribute data collected. Any manholes that require further assistance in opening or gathering attribute data will be noted and SAM will work with city staff to gain access to the identified manholes.

Utilizing traditional survey measurement methods, SAM will obtain invert elevations for all incoming and outgoing mainlines, manhole depth and pipe size. This information will be collected by measuring down from the north rim location where the GPS elevation was acquired. Flow direction will be noted during the field inspection process. If during the inspection process SAM discovers any manholes that need immediate attention (back-ups, cave-ins, major obstructions or overflows), the appropriate staff will be immediately contacted.

All field data will be predefined during the kickoff meeting to ensure accurate and consistent attribute collection. Field staff will run the custom application on the GPS data collector to allow for quick and easy identification and navigation of the manholes.

Northing, Easting and Rim Elevation Access Type Buried (Y/N) / **Depth Buried** Grade **Condition Rating** Manhole Material Evidence of Infiltration Location Pipe Size / Type Invert Elevation of all pipes **Pipe Material** Lined (Y/N) Drop Type Depth

The Environmental Protection Agency estimates that up to **75,000 sanitary** *sewer overflow* events occur in the US each year.



## Technical Work Plan | Smithville, Missouri

#### **Hydrant attributes**

- Barrel color
- Steamer (Y/N)
- Bonnet Color
- Storz Connection (Y/N)
- Manufacturer
- Manufactured year
- X, Y, Z coordinates



- Waterline attributes
  - Pipe diameter
  - Pipe material

Valve attributes

- Type
- X, Y, Z coordinates

#### Water Network GPS Data Collection

SAM will GPS field locate the following utility features for the water network within the project limits:

- Hydrants
- Hydrant valves
- Valves

Through RTK survey-grade GPS methods, SAM will locate the water network contained within the defined project limits. Captured features through GPS surveys will include all features designated by the city during the planning phase of the project. *This proposal does not include the data collection of curb stops or water meters.* 

After thorough investigation by SAM field staff, a report containing all waterline network features that were not found or that were found to be inaccessible will be submitted to the city. SAM will work with city staff to locate utility features during the cleanup phase of the project. This will allow SAM to collect features in a quicker and more efficient manner, translating into cost savings for the city and minimizing the impact on city staff.

GPS surveys will be referenced to the state's plane coordinate system to allow for direct insertion into the city's GIS. Horizontal (x,y) coordinates will be obtained in the field for the water facilities. Features will be collected with centimeter-accurate GPS methods.

All data collected will be downloaded nightly and transferred via the internet to the SAM GIS office in Maryville, MO where it will be backed up nightly. The US received a **C- grade overall** for Drinking Water Infrastructure according to *American Society of Civil Engineers Report Card for US in 2021*. Asset management programs for water networks are encouraged by ASCE to support the improvement efforts of utilities.

> As many as **300,000** water main breaks have

occurred each year since 2012

## \$1 Trillion

in investment is needed to maintain and expand service to meet demands over the next 25 years

There are **2.2 million miles** of drinking water infrastructure

across the US

**47%** 

of all water distribution maintenance work by utilities is reactive and done as systems fail

Everyday nearly 6 billion gallons of treated water is lost due to leaking pipes



#### **Pavement Condition Index Data Integration**

SAM will set up a unique road centerline data layer within the city's existing geodatabase to set up a Pavement Condition Index data layer. The road centerline will be a combination of Clay County's existing road centerline data. The road centerlines will be broken intersection to intersection to allow the city to enter specific pavement information for each road segment in the GIS mapping system.

The GIS road centerline layer will contain the following attribute fields for pavement management:

- Surface Type
  - Concrete
  - Asphalt
  - Chipseal
  - Gravel
- Condition
  - Excellent
  - · Good
  - Fair
  - · Poor
  - · Very Poor
- Function
  - $\cdot$  Primary
  - Secondary
  - $\cdot$  Residential
  - · MoDOT
- PASER Rating · 1-10
  - · T-T
- Age
- Comments
- Treatment Date

SAM will provide one (1) hour of remote training on how to edit the pavement management data layer within the city's existing GIS website.



An essential step in the process of implementing a utility GIS program is integrating field data into a GIS mapping program and properly drawing the utility system to show network connectivity and a high-level overview of the city's infrastructure. SAM specializes in this "field to finish" approach for utility network development.

#### BASE MAP AND THIRD-PARTY DATA LAYERS

SAM will integrate the most current and available digital aerial photography of the project area, provided by the City of Smithville, into the GIS program. The raster datasets created will be viewed as a continuous, seamless image across the entire project area and adjusted for color and contrast to meet the specifications of the city.

SAM will incorporate all available cadastral map data layers from Clay County, Missouri into the GIS program upon request. The City of Smithville is responsible for any cost associated with acquiring the GIS data from Clay County. Incorporating these data layers will establish a base map for the city's GIS program.

#### MAP AND DATA DEVELOPMENT

Sanitary sewer and storm water line segments will be created utilizing custom, in-house editing tools developed by the SAM development team. These tools will incorporate inspection data collected by field staff and will autogenerate sanitary sewer and storm water line segments illustrating flow direction, slope and exact length measurements. Quality assurance warnings have been built into these tools to verify positive slopes and



to check for inconsistencies with pipe material and diameter.

Water distribution mains will be developed by combining exact GPS locations of above ground features with as-built/ AutoCAD drawings to determine the best representation of those networks. Individual water main segments will have diameter and material attributes associated with them. All lines will be checked in a quality assurance process to ensure a clean network.

The completion of all data collected and mapped by SAM personnel will not be final until approved by the City of Smithville. The QA/QC process listed in the Statement of Qualifications will provide appropriate communication and collaboration between the city and SAM to achieve accurate finalized data that the city can rely on.

#### **ArcGIS Enterprise and Portal Implementation Services**

SAM's GIS team has designed and implemented hundreds of Esri enterprise GIS systems. We have the ability to provide on-site enterprise implementation services as well as hosted portal services. Clients who desire a more comprehensive GIS system can benefit from our full implementation and update services, as well as training that can be performed on-site or remotely. Hosted enterprise solutions can benefit organizations who do not want the ArcGIS enterprise investment or internal administration of the full enterprise suite.

SAM's expert GIS implementers will design your system in accordance with organizational goals and security needs by first installing and configuring the ArcGIS Enterprise Suite including:

- Portal
- ArcGIS Server
- Web Adaptor
- ArcGIS Data Store

Once set-up is complete, SAM will implement the following to operate the GIS system as desired by the client:

- Grant permission to data directories
- Create GIS SQL database and set permissions
- Enable GIS database to create SDE geodatabase
- Author and publish map services from data sources
- Author web maps
- Build necessary web applications using Web AppBuilder for ArcGIS
- Create Collector application for devices that are collection and editing

An Operational Dashboard will be developed to organize the viewing, accessibility and management of the client's data.

#### **ARCGIS ONLINE DEVELOPMENT SERVICES**

SAM can provide design and development services to deploy and integrate with Esri's ArcOnline viewer tools. This option benefits organizations who do not want the ArcGIS enterprise investment or internal administration of the full enterprise suite. SAM's GIS staff can configure your ArcOnline viewer and set-up designated user permissions and licensing through Esri.



Utilizing ArcOnline, SAM can provide integration and training for clients using our integrity webbased GIS program or third-party Esri application in order to work with their GPS equipment. This configuration and set-up allows our clients to streamline the GPS update process for field personnel and push new data directly into their application.



#### Integrity<sup>™</sup> Web-based GIS and Asset Management

Built by SAM on Esri technology, Integrity is a web-based and mobile GIS software solution to edit, maintain and analyze GIS data. With built-in workflows for daily operations and utility asset management for municipal government, users can quickly access their mapping data on any computer or mobile device, increasing efficiencies in communication throughout various departments and to constituents. SAM developed Integrity to provide our clients with a user-friendly and cost-effective tool to access and update their GIS data in a multi-user environment.

<b>∛Integrity</b> ™												
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#### WEB DESIGN AND DEVELOPMENT

If not already in place, SAM will assist with Esri Organizational account set up for the Client. Organizational user accounts from Esri are required in order to utilize the GIS program. The client is responsible for all costs incurred through Esri user accounts. SAM will ensure data is secured and services that are published are organized and accessible in order to implement the Integrity web viewer. SAM will setup a customized SAM Integrity viewer. Developed on the HTML5 platform, the GIS website will allow the accessibility of GIS data via any tablet or mobile iOS, Apple, Android or Windows device. SAM will setup and incorporate the following Esri GIS datasets for the GIS website:

- All GIS data designed and created by SAM under the scope of this project
- Any Esri "GIS ready" shapefile data and aerial photography provided by the client

SAM will register a domain name through GoDaddy.com and configure Transport Layer Security (TLS). This standard security protocol will establish encoded links between the web server and browser in order to protect the privacy and exchange of data. The suggested web domain will be:

#### https://smithville.integritygis.com

SAM will route the Domain Name Service (DNS) numbers to our dedicated web servers. SAM will test the domain name once transferred to our web server for quality control purposes.

#### WEB MAINTENANCE

SAM will publish the GIS data to the client's Esri ArcGIS Online Organizational Account and then consume the web services into the Integrity Interface. Maintenance services for the Integrity GIS program include:

- Functional Interface with workflows from Geocortex
- 24/7 unlimited site access via the internet
- TLS secure protocol to protect your online data
- Administration control of users
- Multiple-user environment
- Back-end system administration to ensure the GIS program is functioning and accessible
- Esri Organizational Account Management

#### **PROGRAM TRAINING**

SAM provides comprehensive training and support for every level of service provided, including on-site and remote training for the Integrity program. As part of this project, four (4) hours of on-site GIS website training will be provided to the client's staff.



## Advantages of Integrity web-based GIS

- Unlimited users
- Cross platform functionality
- HTML5 mobile
- Full editing rights
- Asset management
- Work order modules
- Password protected
- Integrated with County data
- Print high-resolution maps
- Advanced search and report tools
- Email and share maps
- Utility maintenance tables

After the staff at the City of Smithville has reviewed and approved all GPS located and attributed data, SAM will present a full set of deliverables to the city. All collected and mapped storm water, sanitary sewer and water data will be uploaded into the city's geodatabase and also integrated into the city's Integrity GIS website or ArcGIS Online viewer. Pavement management data will also be incorporated into the geodatabase and into the city's Integrity GIS website or ArcGIS Online viewer. The following deliverables will be provided:

- Esri ArcGIS Geodatabase containing datasets for storm water, sanitary sewer and water utility features.
- Esri map documents (.mxd)
  - 11x17 truck book map documents (for each utility)
  - ° 36x36 100-scale map documents (for each utility)
- Two (2) sets of bound 11x17 truck books (for each utility)
- One (1) full system wall map (for each utility)
- Integration of Pavement Condition Index data layer
- Integrity GIS website development and implementation
- ArcGIS Online viewer tool
- Four (4) hours on-site GIS training for staff
- Annual GIS website maintenance

#### **GPS DATA COLLECTION & GIS DEVELOPMENT**

*Fees are based on the number of estimated utility features as provided to SAM by the City of Smithville.* 

Sanitary Sewer Utility Network	\$72,830.00
Water Utility Network	\$49,450.00
Storm Water Utility Network	\$65.00 / Structure*
Pavement Condition Index Integration	\$4,200.00

\*Based on the information provided, SAM recommends a budget of \$78,000.00 for the Storm Water Utility Network

## OPTION 1 - INTEGRITY GIS WEBSITE & MOBILE

Integrity GIS Website Development Annual GIS Website Maintenance	\$4,000.00 \$3,600.00/Year		
OPTION 2 - ARCGIS ONLINE			
ArcGIS Online Setup	\$4,000.00		
ArcGIS Online Maintenance	\$3,000.00		
Single Required Creator License	\$500/year*		

\*Additional licenses will be required for additional users

Ownership of data created under this proposal or added by city staff shall belong to the City of Smithville. SAM claims no copyright of any nature relative to any data developed under this proposal or corresponding agreement.