PROFESSIONAL, SPECIALIZED OR TECHNICAL SERVICES CONTRACT

PROJECT NO. 60810049 – CITY-WIDE SEWER LINE CLEANING, CLOSED CIRCUIT TELEVISION (CCTV) INSPECTION, AND MANHOLE LOCATING AND OPENING FOR OVERFLOW CONTROL PROGRAM PROJECTS RENEWAL NO. 3

WATER SERVICES DEPARTMENT

THIS CONTRACT is between KANSAS CITY, MISSOURI, a constitutionally chartered municipal corporation ("City"), and Ace Pipe Cleaning, Inc. ("Contractor"). City and Contractor agree as follows:

PART I

SPECIAL TERMS AND CONDITIONS

Sec. 1. Compensation.

A. The amount the City will pay Contractor under this contract will not exceed $3,000,000.00.

B. Contractor will bill the City, as described in Task 104 of Attachment A-Scope of Services on a unit price basis and hourly rate basis as listed in Attachment B-Unit Prices, in a form acceptable to the City.

C. It shall be a condition precedent to payment of any invoice from Contractor that Contractor is in compliance with, and not in breach or default of, all terms, covenants and conditions of this Contract. If damages are sustained by City as a result of breach or default by Contractor, City may withhold payment(s) to Contractor for the purpose of set off until such time as the exact amount of damages due City from Contractor may be determined.

D. No request for payment will be processed unless the request is in proper form, correctly computed, and is approved as payable under the terms of this Contract.

E. No request for payment will be processed unless it is accompanied by a copy of the most recent 00485.01 M/WBE Monthly Utilization Report submitted to the City's CREO KC Department.

F. City is not liable for any obligation incurred by Contractor except as approved under the provisions of this Contract.

Sec. 2. Responsibilities of Contractor. Contractor shall perform the following Scope of Services: **See Attachment A – Scope of Services**.

Sec. 3. Notices. All notices required by this Agreement shall be in writing to the following:

City:

Office of the Director
Address: 4800 East 63rd Street
Kansas City, MO 64130
Phone: (816) 513-0304
E-mail address: Andy.Shively@kcmo.org

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Contractor:

Ace Pipe Cleaning, Inc.
Mark Calvert
6601 Universal Avenue
Kansas City, Missouri 64120
Phone: (816) 241-2891
E-mail address: mcalvert@acepipe.com

All notices are effective a) when delivered in person, b) upon confirmation of receipt when transmitted by facsimile transmission or by electronic mail, c) upon receipt after dispatch by registered or certified mail, postage prepaid, d) on the next business day if transmitted by overnight courier (with confirmation of delivery), or e) three business days after the date of mailing, whichever is earlier.

Sec. 4. Merger. This Contract consists of Part I, Special Terms and Conditions and any Attachments and any documents incorporated by reference; and Part II, Standard Terms and Conditions. This Contract, including any Attachments and incorporated documents, constitutes the entire agreement between City and Contractor with respect to this subject matter.

Sec. 5. Conflict Between Contract Parts. In the event of any conflict or ambiguity between the Special Terms and Conditions of Part I and the Standard Terms and Conditions of Part II of this Contract, Part I will be controlling.

Sec. 6. Term of Contract. The work to be performed under this contract shall begin on the date specified in the written Notice to Proceed issued by the Office of Director for Water Services. The work shall be completed within the schedule provided in Part II of **Attachment A-Scope of Services.** The Director is authorized to enter in to an amendment to extend the term of this Contract and time of performance for this Contract.

The period of performance under the contract is provided in the Scope of Services at fixed and firm prices with a unilateral contractual right on the part of the City to extend this price agreement for an additional one (1) one-year period. The continuation of the incumbent Contractor in the option year is a prerogative of the City and is not a contractual right of the Contractor. The City's decision in regard to exercising the option(s) is not subject to appeal. The option year prices will be determined by the City by negotiation with the Contractor. NOTE: YEARLY INCREASES ARE NOT AUTOMATIC. THE CONTRACTOR MUST PROVIDE WRITTEN PROOF THAT THE REQUESTED INCREASE IS WARRANTED.

Sec. 7. Attachments to Part I. The following documents are Attachments to Part I of this Contract and are attached hereto and incorporated herein by this reference:

Attachment A – Scope of Services
Attachment B – Unit Prices
Attachment C – CREO KC Documents
CREO KC Renewal Approval
CREO KC 11: Request for Modification or Substitution
01290.14: Contractor Affidavit for Final Payment
01290.15: Subcontractor Affidavit for Final Payment
Attachment D – 00616 Performance Bond
Attachment E – 00515.01 Employee Eligibility Verification Affidavit

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Attachment F – Non-Construction Subcontractor List
Attachment G – Sewer Pipe Inspection Protocol
Attachment H – 02686 Cleaning and Assessment of Gravity Lines
Attachment I – 02180 Clearing and Grubbing Specification

Sec. 8. Responsibilities of City. See **Attachment A-Scope of Services**.

Sec. 9. Subcontracting. Contractor agrees that it will only subcontract with the subcontractor(s) it has listed on **Attachment F- Non-Construction Subcontractor List**.

Sec. 10. Contract Information Management System. Contractor shall comply with City's Contract Information Management System requirements. Contractor shall use City's Internet web-based Contract Information Management System/Project Management Communications Tool provided by City and protocols included in that software during the term of this Contract. Contractor shall maintain user applications to City's provided system for all personnel, subcontractors or suppliers as applicable.

Sec. 11. Minority and Women's Business Enterprises. City is committed to ensuring that minority and women's business enterprises (M/WBE) participate to the maximum extent possible in the performance of City contracts. If M/WBE participation goals have been set for this Contract, Contractor agrees to comply with all requirements of City's Minority and Women's Business Enterprise Program as enacted in City's Code Sections 3-421 through 3-469 and as hereinafter amended. Contractor shall make its good faith efforts in carrying out this policy by implementing its contractor utilization plan, which is attached as an document in **Attachment C**. If Contractor fails to achieve the M/WBE goals stated in its contractor utilization plan, as amended, the City will sustain damages, the exact extent of which would be difficult or impossible to ascertain or estimate at the time of execution of this contract. Therefore, in order to liquidate those damages, the monetary difference between the amount of the M/WBE goals set forth in this contractor utilization plan, as amended, and the amount actually paid to qualified MBEs and WBEs for performing a commercially useful function will be deducted from the Contractor's payments as liquidated damages. In determining the amount actually paid to qualified MBEs and WBEs, no credit will be given for the portion of participation that was not approved by the Director of City's Human Relations Division, unless the Director determines that the Contractor acted in good faith. No deduction for liquidated damages will be made when, for reasons beyond the control of the Contractor, the M/WBE participation stated in the Contractor Utilization Plan, as amended and approved by the Director, is not met.

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Sec. 12. Performance Bond. Contractor shall furnish a Performance Bond to City on City furnished forms executed by a Surety, in the amount of $3,000,000.00 guaranteeing Contractor's faithful performance of each and every term of this Contract and all authorized changes.

All bonds required to be purchased and maintained by Contractor shall be obtained from surety or insurance companies that are duly licensed in the State of Missouri and in the jurisdiction in which the Project is located, if not in Missouri, to issue bonds for the limits and coverages so required. All surety and insurance companies shall hold an A.M. Best rating of B+, V, or better. A certified copy of the agent's authority to act must accompany all bonds signed by an agent.

If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state where any part of the Project

is located, Contractor shall within twenty (20) days thereafter substitute another bond and surety, both of which must be acceptable to City.

Sec. 13. Intellectual Property Rights. Contractor agrees, on its behalf and on behalf of its employees and agents, that it will promptly communicate and disclose to City all computer programs, documentation, software and other copyrightable works ("copyrightable works") conceived, reduced to practice or made by Contractor or its agents, whether solely or jointly with others, during the term of this Contract resulting from or related to any work Contractor or its agents may do on behalf of City or at its request. All inventions and copyrightable works that Contractor is obligated to disclose shall be and remain entirely the property of City. It is agreed that all inventions and copyrightable works are works made for hire and shall be the exclusive property of City. Contractor hereby assigns to City any rights it may have in such copyrightable works. Contractor shall cooperate with City in obtaining any copyrights or patents.

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Sec. 14. Effectiveness; Date. This contract will become effective when the City's Director of Finance has signed it. The date this contract is signed by the City's Director of Finance will be deemed the date of this contract.

Each party is signing this contract on the date stated opposite the party's signature.

THIS CONTRACT CONTAINS INDEMNIFICATION PROVISIONS

CONTRACTOR

I hereby certify that I have authority to execute this document on behalf of Contractor

Date:_ _____ By: _____

Name:_____

Title: _____

KANSAS CITY, MISSOURI

Date: _____ By:_____

Name: Andy Shively, P.E.

Title: Water Services Deputy Director

Approved as to form:

_____

Assistant City Attorney

I hereby certify that there is a balance, otherwise unencumbered, to the credit of the appropriation to which the foregoing expenditure is to be charged, and a cash balance, otherwise unencumbered, in the treasury, to the credit of the fund from which payment is to be made, each sufficient to meet the obligation hereby incurred.

_____

Director of Finance Date

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PART II

STANDARD TERMS AND CONDITIONS

Sec. 1. Indemnification: Definitions

A. For purposes of this Section 1 only, the following terms shall have the meanings listed:

a. **Claims** means all claims, damages, liability, losses, costs and expenses, court costs and reasonable attorneys' fees, including attorneys' fees incurred by the City in the enforcement of this indemnity obligation.

b. **Contractor's Agents** means Contractor's officers, employees, subconsultants, subcontractors, successors, assigns, invitees, and other agents.

c. **City** means City and its agents, officials, officers and employees.

B. Contractor's obligations under this Paragraph with respect to indemnification for acts or omissions, including negligence, of City, shall be limited to the coverage and limits of insurance that Contractor is required to procure and maintain under this Contract. Contractor affirms that it has had the opportunity to recover the costs of the liability insurance required in this Contract in its contract price.

C. Contractor shall defend, indemnify and hold harmless City from and against all claims arising out of or resulting from all acts or omissions in connection with this Contract caused in whole or in part by Contractor or Contractor's Agents, regardless of whether or not caused in part by any act or omission, including negligence, of City. Contractor is not obligated under this Section to indemnify City for the sole negligence of City.

D. Nothing in this section shall apply to indemnification for professional negligence which is specified in a separate provision of this Contract.

E. In no event shall the language in this Section constitute or be construed as a waiver or limitation of the City's rights or defenses with regard to sovereign immunity, governmental immunity, or other official immunities and protections as provided by the federal and state constitutions or by law.

Sec. 2. Indemnification for Professional Negligence.

If this contract is for professional services, Contractor shall indemnify, and hold harmless City and any of its agencies, officials, officers, or employees from and against all claims, damages, liability, losses, costs, and expenses, including reasonable attorneys' fees, arising out of any negligent acts or omissions in connection with this Contract, caused by Contractor, its employees, agents, subcontractors, or caused by others for whom Contractor is liable, in the performance of professional services under this Contract. Contractor is not obligated under this section to indemnify City for the negligent acts of City or any of its agencies, officials, officers, or employees.

Sec. 3. Independent Contractor.

Contractor is an independent contractor and is not City's agent. Contractor has no authority to take any action or execute any documents on behalf of City.

Sec. 4. Insurance.

A. Contractor shall procure and maintain in effect throughout the duration of this Contract insurance coverage not less than the types and amounts specified in this section. In the event that additional insurance, not specified herein, is required during the term of this Contract, Contractor shall supply such insurance at City's cost. Policies containing a Self-Insured Retention are unacceptable to City unless City approves in writing the Contractor's Self-Insured Retention.

1. Commercial General Liability Insurance: with limits of $1,000,000 per occurrence and $2,000,000 aggregate, written on an "occurrence" basis. The policy shall be written or endorsed to include the following provisions:

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a. Severability of Interests Coverage applying to Additional Insureds
b. Per Project Aggregate Liability Limit or, where not available, the aggregate limit shall be $2,000,000.
c. No Contractual Liability Limitation Endorsement.
d. Additional Insured Endorsement, ISO form CG20 10, or its equivalent.

2. If applicable, Workers' Compensation Insurance, as required by statute, including Employers Liability with limits of:

Workers' Compensation Statutory
Employers Liability

$1,000,000 accident with limits of:
$1,000,000 disease-policy limit
$1,000,000 disease-each employee

3. Commercial Automobile Liability Insurance: with a limit of $1,000,000 written on an "occurrence" basis, covering owned, hired, and non-owned automobiles. If the Contractor owns vehicles, coverage shall be provided on an "any auto" basis. If the Contractor does not own any vehicles, coverage shall be provided on a "hired autos" and "nonowned autos" basis. The insurance will be written on a Commercial Business Auto form, or an acceptable equivalent, and will protect against claims arising out of the operation of motor vehicles, as to acts done in connection with the Agreement, by Contractor.

4. If applicable, Professional Liability Insurance with limits per claim and annual aggregate of $1,000,000.

5. If applicable, Cyber Liability Insurance, with limits not less than $2,000,000 per occurrence or claim, $2,000,000 aggregate. Coverage shall be sufficiently broad to respond to the duties and obligations as is undertaken by Contractor in this agreement and shall include, but not be limited to, claims involving security breach, system failure, data recovery, business interruption, cyber extortion, social engineering, infringement of intellectual property, including but not limited to infringement of copyright, trademark, trade dress, invasion of privacy violations, information theft, damage to or destruction of electronic information, release of private information, and alteration of electronic information. The policy shall provide coverage for breach response costs, regulatory fines and penalties as well as credit monitoring expenses.

6. If applicable, Technology Professional Liability Errors and Omissions Insurance appropriate to the Consultant's profession and work hereunder, with limits not less than $2,000,000 per occurrence. Coverage shall be sufficiently broad to respond to the duties and obligations as is undertaken by the Contractor in this agreement and shall include, but not be limited to, claims involving security breach, system failure, data recovery, business interruption, cyber extortion, social engineering, infringement of intellectual property, including but not limited to infringement of copyright, trademark, trade dress, invasion of privacy violations, information theft, damage to or destruction of electronic information, release of private information, and alteration of electronic information. The policy shall provide coverage for breach response costs, regulatory fines and penalties as well as credit monitoring expenses.

The Policy shall include, or be endorsed to include, property damage liability coverage for damage to, alteration of, loss of, or destruction of electronic data and/or information "property" of the Agency in the care, custody, or control of the Contractor. If not covered under the Contractor's liability policy, such "property" coverage of the Agency may be endorsed onto the Contractor's Cyber Liability Policy as covered property.

If the Contractor maintains broader coverage and/or higher limits than the minimums shown above, the Entity requires and shall be entitled to the broader coverage and/or the higher limits maintained by the Contractor. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the Entity

B. The Commercial General Liability Insurance specified above shall provide that City and its agencies, officials, officers, and employees, while acting within the scope of their authority, will be named as additional insureds for the services performed under this Contract. Contractor shall provide to City at

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execution of this Contract a certificate of insurance showing all required endorsements and additional insureds. The certificates of insurance will contain a provision stating that should any of the policies described in the certificate be cancelled before the expiration date thereof, notice will be delivered in accordance with the policy provisions.

C. All insurance coverage must be written by companies that have an A.M. Best's rating of "A-V" or better, and are licensed or approved by the State of Missouri to do business in Missouri.

D. Contractor's failure to maintain the required insurance coverage will not relieve Contractor of its contractual obligation to indemnify the City pursuant to Sections 1 and 2. If the coverage afforded is cancelled or changed or its renewal is refused, Contractor shall give at least thirty (30) days prior written notice to City. In the event of Contractor's failure to maintain the required insurance in effect, City may order Contractor to immediately stop work, and upon ten (10) days notice and an opportunity to cure, may pursue its remedies for breach of this Contract as provided for herein and by law.

E. In no event shall the language in this Section constitute or be construed as a waiver or limitation of the City's rights or defenses with regard to sovereign immunity, governmental immunity, or other official immunities and protections as provided by the federal and state constitutions or by law.

Sec. 5. Governing Law.

This Contract shall be construed and governed in accordance with the laws of the State of Missouri without giving effect to Missouri's choice of law provisions. The City and Contractor: (1) submit to the jurisdiction of the state and federal courts located in Jackson County, Missouri; (2) waive any and all objections to jurisdiction and venue; and (3) will not raise forum *non conveniens* as an objection to the location of any litigation.

Sec. 6. Compliance with Laws.

Contractor shall comply with all federal, state and local laws, ordinances and regulations applicable to the work and this Agreement. Contractor shall maintain in effect all the licenses, permissions, authorizations, consents and permits that it needs to carry out its obligations under this Agreement..

Sec. 7. Termination for Convenience.

A. City may, at any time upon ten (10) days notice to Contractor specifying the effective date of termination, terminate this Contract, in whole or in part. If this Contract is terminated by City, City shall be liable only for payment for services rendered before the effective date of termination. Contractor shall prepare an accounting of the services performed and money spent by Contractor up to the effective date of termination and shall return to City any remaining sums within thirty (30) days of such date.

B. If this Contract is terminated prior to Contractor's completion of services, all work or materials prepared or obtained by Contractor pursuant to this contract shall become City's property.

C. If this Contract is terminated prior to Contractor's completion of the services to be performed hereunder, Contractor shall return to City any sums paid in advance by City for services that would otherwise have had to be rendered between the effective date of termination and the original ending date of the Contract. Contractor shall prepare an accounting of the services performed and money spent by Contractor up to the effective date of termination and shall return to City any remaining sums within thirty (30) days of such date.

Sec. 8. Default and Remedies.

If Contractor shall be in default or breach of any provision of this Contract, City may terminate this contract, suspend City's performance, withhold payment or invoke any other legal or equitable remedy after giving Contractor notice and opportunity to correct such default or breach.

Sec. 9. Waiver.

Waiver by City of any term, covenant, or condition hereof shall not operate as a waiver of any subsequent breach of the same or of any other term, covenant or condition. No term, covenant, or condition of this Contract can be waived except by written consent of City, and forbearance or indulgence by City in

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any regard whatsoever shall not constitute a waiver of same to be performed by Contractor to which the same may apply and, until complete performance by Contractor of the term, covenant or condition, City shall be entitled to invoke any remedy available to it under this Contract or by law despite any such forbearance or indulgence.

Sec. 10. Modification.

Unless stated otherwise in this Contract, no provision of this Contract may be waived, modified or amended except in writing signed by City.

Sec. 11. Headings; Construction of Contract.

The headings of each section of this Contract are for reference only. Unless the context of this Contract clearly requires otherwise, all terms and words used herein, regardless of the number and gender in which used, shall be construed to include any other number, singular or plural, or any other gender, masculine, feminine or neuter, the same as if such words had been fully and properly written in that number or gender.

Sec. 12. Severability of Provisions.

Except as specifically provided in this Contract, all of the provisions of this Contract shall be severable. In the event that any provision of this Contract is found by a court of competent jurisdiction to be unconstitutional or unlawful, the remaining provisions of this Contract shall be valid unless the court finds that the valid provisions of this Contract are so essentially and inseparably connected with and so dependent upon the invalid provision(s) that it cannot be presumed that the parties to this Contract could have included the valid provisions without the invalid provision(s); or unless the court finds that the valid provisions, standing alone, are incapable of being performed in accordance with the intentions of the parties.

Sec. 13. Records.

A. For purposes of this section:

1. "City" shall mean the City Auditor, the City's Internal Auditor, the city's Director of Human Relations, the city Manager, the City department administering this Contract and their delegates and agents.

2. "Record" shall mean any document, book, paper, photograph, map, sound recordings or other material, regardless of physical form or characteristics, made or received in connection with this Contract and all Contract amendments and renewals.

B. Contractor shall maintain and retain all Records for a term of five (5) years that shall begin after the expiration or termination of this Contract and all Contract amendments. City shall have a right to examine or audit all Records and Contractor shall provide access to City of all Records upon ten (10) days written notice from the City.

C. The books, documents and records of Contractor in connection with this Contract shall be made available to the City Auditor, the City's Internal Auditor, the City's Director of Human Relations and the City department administering this Contract within ten (10) days after the written request is made.

Sec. 14. Affirmative Action.

If this Contract exceeds $300,000.00 and Contractor employs fifty (50) or more people, Contractor shall comply with City's Affirmative Action requirements in accordance with the provisions of Chapter 38 of City's Code, the rules and regulations relating to those sections, and any additions or amendments thereto; in executing any Contract subject to said provisions, Contractor warrants that it has an affirmative action program in place and will maintain the affirmative action program in place for the duration of the Contract. Contractor shall not discriminate against any employee or applicant for employment because of race, color, sex, religion, national origin or ancestry, disability, sexual orientation, gender identity or age in a manner prohibited by Chapter 38 of City's Code. CONTRACTOR shall:

a. Execute and submit the City of Kansas City, Missouri CREO Affirmative Action Program Affidavit warranting that the Contractor has an affirmative action program in place and will maintain the affirmative action program in place for the duration of the Contract.

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b. Submit, in print or electronic format, a copy of Contractor's current certificate of compliance to the City's Civil Rights and Equal Opportunity Department (CREO) prior to receiving the first payment under the Contract, unless a copy has already been submitted to CREO at any point within the previous two (2) calendar years. If, and only if, Contractor does not possess a current certification of compliance, Contractor shall submit, in print or electronic format, a copy of its affirmative action program to CREO prior to receiving the first payment under the Contract, unless a copy has already been submitted to CREO at any point within the previous two (2) calendar years.

c. Require any Subcontractor awarded a subcontract exceeding $300,000.00 to affirm that Subcontractor has an affirmative action program in place and will maintain the affirmative action program in place for the duration of the subcontract.

d. Obtain from any Subcontractor awarded a subcontract exceeding $300,000.00 a copy of the Subcontractor's current certificate of compliance and tender a copy of the same, in print or electronic format, to CREO within thirty (30) days from the date the subcontract is executed. If, and only if, Subcontractor does not possess a current certificate of compliance, Contractor shall obtain a copy of the Subcontractor's affirmative action program and tender a copy of the same, in print or electronic format, to CREO within thirty (30) days from the date the subcontract is executed.

Sec. 15. Tax Compliance.

Contractor shall provide proof of compliance with the City's tax ordinances administered by the City's Commissioner of Revenue as a precondition to the City making the first payment under this contract or any contract renewal when the total contract amount exceeds $160,000.00. If contractor performs work on a contract that is for a term longer than one (1) year, the contractor also shall submit to the City proof of compliance with the City's tax ordinances administered by the City's Commissioner of Revenue as a condition precedent to the City making final payment under the contract.

Sec. 16. Assignability and Subcontracting

(a) Assignability. Contractor shall not assign or transfer any part or all of Contractor's obligation or interest in this Contract without prior written approval of City. If Contractor shall assign or transfer any of its obligations or interests under this Contract without the City's prior written approval, it shall constitute a material breach of this Contract. This provision shall not prohibit contractor from subcontracting as otherwise provided for herein.

(b) Subcontracting. Contractor shall not subcontract any part or all of Contractor's obligations or interests in this Contract unless the subcontractor has been identified in a format required by City. If Contractor shall subcontract any part of Contractor's obligations or interests under this Contract without having identified the subcontractor, it shall constitute a material breach of this Contract. The utilization of subcontractors shall not relieve Contractor of any of its responsibilities under the Contract, and Contractor shall remain responsible to City for the negligent acts, errors, omissions or neglect of any subcontractor and of such subcontractor's officers, agents and employees. City shall have the right to reject, at any point during the term of this Contract, any subcontractor identified by Contractor, and to require that any subcontractor cease working under this Contract**.** City's right shall be exercisable in its sole and subjective discretion. City shall not be obligated to pay or be liable for payment of any monies which may be due to any subcontractor. Contractor shall include in any subcontract a requirement that the subcontractor comply with all requirements of this Contract in performing Contractor's services hereunder.

Sec. 17. Conflicts of Interest.

Contractor certifies that no officer or employee of City has, or will have, a direct or indirect financial or personal interest in this Contract, and that no officer or employee of

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City, or member of such officer's or employee's immediate family, either has negotiated, or has or will have an arrangement, concerning employment to perform services on behalf of Contractor in this Contract.

Sec. 18. Buy American Preference.

It is the policy of the City that any manufactured goods or commodities used or supplied in the performance of any City contract or any subcontract thereto shall be manufactured or produced in the United States whenever possible.

Sec. 19. Professional Services – Conflict of Interest Certification.

If this Contract is for professional services other than for medical doctors or appraisers, Contractor certifies that Contractor is not an expert witness for any party in litigation against the City at the time of the issuance of this Contract.

Sec. 20. Attorney Services – Conflict of Interest Certification.

If this Contract is for professional attorney services, Contractor certifies that Contractor and any of its individual attorneys, do not represent any party in litigation against the City at the time of the issuance of this Contract. Contractor's certification shall not apply to: representation in municipal court; attorneys employed by a not-for-profit legal services corporation; litigation where the City is named as a nominal party; litigation that has been filed with the agreement of the City and the party represented by the attorney; or where the City Council has otherwise waived this requirement. Nothing set forth in this section shall be deemed to supersede the Rules of Professional Conduct for Attorneys.

Sec. 21. Employee Eligibility Verification

If this Contract exceeds five thousand dollars($5,000.00), Contractor shall execute and submit an affidavit, in a form prescribed by City, affirming that Contractor does not knowingly employ any person in connection with the contracted services who does not have the legal right or authorization under federal law to work in the United States as defined in 8 U. S. C. § 1324a(h)(3). Contractor shall attach to the affidavit documentation sufficient to establish Contractor's enrollment and participation in an electronic verification of work program operated by the United States Department of Homeland Security (E-Verify) or an equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, under the Immigration Reform and Control Act of 1986. Contractor may obtain additional information about E-Verify and enroll at www.dhs.gov/xprevprot/programs/gc_1185221678150.shtm. For those Contractors enrolled in E-Verify, the first and last pages of the E-Verify Memorandum of Understanding that Contractor will obtain upon successfully enrolling in the program shall constitute sufficient documentation for purposes of complying with this Section. Contractor shall submit the affidavit and attachments to the City prior to execution of the Contract, or at any point during the term of the Contract if requested by City.

Sec. 22 Quality Assurance Act.

If this Contract exceeds $160,000.00, CONTRACTOR certifies CONTRACTOR will pay all employees who will work on this Contract in the city limits of Kansas City, Missouri at least $15.00 per hour in compliance with the CITY's Quality Services Assurance Act, Section 3-66, Code of Ordinances or CITY has granted CONTRACTOR an exemption.

Sec. 23 Anti-Discrimination Against Israel.

If this Contract exceeds $100,000.00 and Contractor employs at least ten employees, pursuant to Section 34.600, RSMo., by executing this Contract, Contractor certifies it is not currently engaged in and shall not, for the duration of this contract, engage in a boycott of goods or services from the State of Israel; companies doing business in or with Israel or authorized by, licensed by, or organized under the laws of the State of Israel; or persons or entities doing business in the State of Israel.

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Sec. 24 Title VI of the Civil Rights Act of 1964

Title VI of the Civil Rights Act of 1964 requires that no person in the United States shall, on the grounds of race, color, or national or origin (including limited English proficient individuals), be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance. The City of Kansas City, Missouri requires compliance with the requirements of Title VI in all of its programs and activities regardless of the funding source.

Contractor shall not discriminate on the grounds of race, color, or national or origin (including limited English proficient individuals).

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ATTACHMENT A

SCOPE OF SERVICES

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ATTACHMENT A

SCOPE OF SERVICES

Contractor: Ace Pipe Cleaning, Inc.

Owner: City of Kansas City, Missouri

Project: City-Wide Sewer Line Cleaning, Closed Circuit Television (CCTV) Inspection, and Manhole Locating and Opening for Overflow Control Program Projects Renewal No. 3

Contract No: 1277-3

Project No: 60810049

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I. GENERAL

The following paragraphs provide a general description of the Work required of this Scope of Services. Subsequent paragraphs describe in detail the services to be provided by CONTRACTOR for completion of sewer line cleaning, CCTV inspection, manhole locating, manhole cover opening, and easement clearing in Kansas City, Missouri.

A. The Project. The City of Kansas City (CITY), Missouri intends to perform sewer line cleaning and CCTV inspection of the sewers in support of various projects located in multiple drainage basins and the Annual Sewer Rehabilitation (ASR) program. As such, the CITY is contracting with CONTRACTOR to provide the necessary services.

B. Background Information. The CITY is undertaking this Project to evaluate sewers in support of reducing sewer overflows in the sanitary and combined sewer system by implementing city-wide rehabilitation recommendations to be performed by others. Sewer line cleaning and CCTV inspection will be performed to obtain detailed sewer condition assessment data for evaluation by others and for projects under the CITY's Smart Sewer Program (SSP). Data/video processing and quality control and quality assurance shall be conducted by the CONTRACTOR. Specific sewer lines to be cleaned and CCTV inspected by CONTRACTOR will be provided by the CITY. A majority of the sewer cleaning and CCTV inspection will occur in pipe with diameters of less than 48 inches; however, there will be some sewer cleaning and CCTV inspection of sewer lines up to 118-inches in diameter. In addition:

1. CONTRACTOR shall open manhole lids identified by CITY's SSP Team as "could not open" (CNO).
2. CONTRACTOR shall locate, expose and verify buried or sunken manholes that could not be located (CNL) by CITY's SSP Team or that are identified by CONTRACTOR's field or CCTV inspection crews.
3. CONTRACTOR shall perform clearing and grubbing in easements as necessary to obtain access to manholes for cleaning and CCTV inspections.

C. Follow-On Phases. At the discretion of the CITY, the CONTRACTOR may be requested to provide additional services.

D. General Description of Activities. The Basic Scope of Services to be performed by CONTRACTOR consists of furnishing all labor, equipment and materials (as necessary) for sewer line cleaning and CCTV inspection, locating and opening manholes, opening covers on manholes previously located by CITY's SSP Team, and clearing and grubbing as necessary to obtain access to manholes for cleaning and CCTV inspection and manhole locating.

E. Task Series Listing. The Basic Scope of Services is organized under the following Task Series:

1. Task Series 100 - Project Management and Administration
2. Task Series 200 - Sewer Line Cleaning
3. Task Series 300 - CCTV Inspection
4. Task Series 400 - Manhole Locating and Opening
5. Task Series 500 - Clearing and Grubbing In Easements

F. Explicit Responsibilities. The Basic Scope of Services explicitly sets forth what CONTRACTOR shall perform and does not implicitly put any additional responsibilities or duties upon the CONTRACTOR. The CONTRACTOR agrees to provide the specific Basic Services as identified herein. CONTRACTOR shall provide unit prices, hourly rates, and a proposed not-to-exceed price for the services and quantities described in **Attachment B**.

G. Out of Scope Services. The CONTRACTOR agrees to provide the specific Basic Services as identified herein; work not specifically discussed herein will not be performed without an amendment or written authorization from the CITY.

H. Detailed Task Descriptions. The CONTRACTOR will provide the following Basic Services for each Task Series as written below. All activities described herein shall be performed in accordance with the *Kansas City, Missouri Water Services Department Sewer Pipe Inspection Protocol* (PROTOCOL) dated August 2024, Section 02686 - Cleaning and Assessment of Gravity Lines and Section 02180 - Clearing Grubbing. The PROTOCOL, specifications 02686 and 02180 are incorporated into this Contract as **Attachments G, H,** and **I,** respectively.

II. PROJECT SCHEDULE MILESTONES

A. CONTRACTOR shall complete all Work and all deliverables shall be accepted by CITY for Task Series 100 through 500 for the Fiscal Year (FY) 25 Small Diameter Annual Sewer Rehabilitation (ASR), no later than 360 calendar days after Notice to Proceed (NTP), with exception of sewer lines that could not be accessed by CONTRACTOR for reasons beyond CONTRACTOR's control as determined by CITY.

B. CITY will perform quality control reviews within three (3) weeks upon receipt of deliverable and will provide CONTRACTOR with consolidated written review comments in a quality review form (QRF).

C. The CITY anticipates providing subsequent packages throughout the contract duration until all contract funds are expended.

III. BASIC SCOPE OF SERVICES

A. The CONTRACTOR will provide the following services for each Task Series as written below.

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TASK SERIES 100 - PROJECT MANAGEMENT AND ADMINISTRATION

The purpose of Project Management and Administration will be to manage, direct and oversee each element of Basic Services identified herein and subcontractors employed by the CONTRACTOR in completion of the Work. The following management activities will be provided by CONTRACTOR.

Task 101 Project Management Services

CONTRACTOR will provide project management services necessary for the administration of the Project, including efforts required for proper resource allocation, schedule development and monitoring, budget review and control, client coordination, internal quality assurance/quality control (QA/QC) activities and other standard and customary activities required for timely completion of the Work. CONTRACTOR will prepare and submit invoices in a form that is acceptable to the CITY. CONTRACTOR shall deliver daily notification via e-mail to CITY project manager identifying number of crews and approximate working location of each crew for the day.

Task 102 Schedule Development and Monitoring

CONTRACTOR shall submit a proposed project schedule for the CITY's acceptance within ten (10) calendar days after a written Notice to Proceed is issued by the CITY. The proposed project schedule shall include a detailed and comprehensive schedule utilizing a critical path method diagram network that shows start and finish Milestone dates for each deliverable including field work and all other activities necessary to meet the contract completion dates stated in Section II, Paragraph A. After final acceptance of the proposed project schedule by the CITY, it shall be considered the project baseline schedule and shall be used by the CONTRACTOR for planning, scheduling, managing, and executing the Work. The project baseline schedule shall not be changed without the written consent of CITY. CONTRACTOR shall provide, at least once every thirty (30) calendar days, updated information on the project schedule. The updated information on the project schedule shall not modify any Milestone dates in the project schedule that the CITY has previously approved.

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Task 103 Monthly Project Progress Status Reports

CONTRACTOR shall prepare and submit to CITY monthly project progress status reports that identify the Work that has been performed in the period, work activities anticipated in the next month, action items required of the CITY for an efficient and effective delivery of CONTRACTOR's services, potential project scope variances with corrective actions suggested by CONTRACTOR, a general assessment of CONTRACTOR's ability to meet project CREO KC goals and schedule milestones, including identification of any delays beyond its control, and an estimate of the work percent completion for each task series in the Scope of Services based on the value of the work completed.

The monthly project status report shall also include a 'Project Summary Report', 'Cannot Access List with Map of Proposed Clearing Requests (if applicable)', and 'Cable Footage Calibration Logs', all in accordance with the CCTV PROTOCOL. In addition, the CONTRACTOR shall provide a monthly project schedule update and a summary table showing; the total length of sewer within each package, the length of sewer that has been cleaned and/or CCTV inspected, the length of sewer that needs to be cleaned and/or CCTV inspected, total number of CNL and CNO manholes within each

package, number of CNL/CNO manholes completed, number of CNL/CNO manholes to be completed, and percent complete for all quantified work elements.

A short narrative shall be provided describing the work activities performed for each task within a given task series. CITY will provide directions to CONTRACTOR in a timely manner with respect to each potential variance discussed in each monthly project progress status report.

Task 104 Invoicing

CONTRACTOR shall submit invoices for Task Series 200, 300 and 400 at each deliverable completion. CONTRACTOR will not be paid until the data has been accepted by CITY in accordance with the CITY's quality control and quality assurance process as described in the PROTOCOL. CONTRACTOR shall be paid the unit prices and hourly rates listed in **Attachment B**. To be paid the hourly rates CONTRACTOR shall meet or exceed the "Minimum Requirements for Hourly Rates" as detailed in **Attachment B**.

Each invoice submittal will consist of 1) an invoice showing unit rates and quantities for each Task Series with backup as required, 2) a M/WBE utilization report required by the CITY's CREO KC Department.

Task 105 Monthly Project Coordination Meetings

Participate in up to twelve (12) monthly coordination meetings to discuss submittals, project progress, budget and schedule status, current issues, and potential variances in the scope of work. Anticipated future activities and CITY action items will also be discussed. Prepare and submit an agenda to CITY prior to each meeting and prepare/distribute meeting minutes.

Task 106 Subcontractor Management

CONTRACTOR will manage the efforts of its subcontractors. CONTRACTOR will develop scopes of work for each subcontractor, monitor their progress, review and approve their invoices, oversee adherence to the approved QA/QC plan, monitor adherence to document preparation standards of CONTRACTOR and CITY, and generally oversee each subcontractor's project performance. CITY has established MBE and WBE goals of 5 percent and 20 percent, respectively, for the project. CONTRACTOR will prepare monthly M/WBE subcontractor utilization reports and submit in the required format to the CITY's Civil Rights and Equal Opportunity (CREO) Department.

Task 107 Work Order Management

The CITY shall enter the assets to be cleaned and/or inspected for each package into the CITY's web-based work order management application for work order creation prior to the start of work. On a monthly basis, CONTRACTOR shall submit completed work orders for closure approval. If required, CONTRACTOR shall modify work orders and/or enter additional assets within the CITY's web-based work order management application based on assets cleaned and/or inspected. CONTRACTOR shall follow the work tracking application user protocol provided by the CITY.

Payment Considerations:

Separate payment shall not be made for project management and administration but shall be included in the unit price for CCTV inspection as detailed in **Attachment B**.

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TASK SERIES 200 - SEWER LINE CLEANING

The purpose of the Sewer Line Cleaning is to clean the sewers of debris and any flow obstructions to allow the CCTV camera to pass through the sewer for inspection and documentation of defects.

Task 201 Sewer Cleaning

Conduct light and heavy sewer cleaning as required to allow for CCTV camera passage. The CITY will provide a listing of the lines to be cleaned and CCTV inspected and a geodatabase of the sewer system prior to commencing Work. The CONTRACTOR shall conduct sewer cleaning in conformance with the requirements of the CCTV PROTOCOL and Section 02686 – Sewer Line Cleaning specification incorporated into this Contract as **Attachment G** and **Attachment H**, respectively.

The CONTRACTOR shall start work within ten (10) calendar days after a written Notice to Proceed is issued by the CITY. All sewer cleaning work must be completed by the end of the contract time regardless of the size, type or condition of the sewer. It is the responsibility of the CONTRACTOR to provide sufficient equipment and workforce to complete the work within the established Contract time as defined in Section II of this Scope of Services.

The cleaning equipment shall be a type generally recognized by the trade for the purpose being used and that has proved satisfactory. The equipment shall be capable of removing roots, dirt, grease, rocks, bricks, sand, and other materials and minor obstructions from the sewer pipes and manhole channels. Light sewer cleaning shall be completed with a high velocity jet-cleaning machine and/or a root cutter and shall be defined as up to three (3) slow passes with a high velocity jet-cleaner and one (1) pass with a root cutter, if roots are present. All sewer cleaning work shall be performed in an upstream to downstream system-wide approach.

Precautions shall be taken to minimize risk of the cleaning operation (equipment) causing damage to pipes being cleaned or damage or flooding to public and/or private property being served by the sewer being cleaned. It shall be the CONTRACTOR's sole responsibility to clean and or repair private and public property damaged or flooded during the cleaning process to its original condition or better at the CONTRACTOR's own expense. If cleaning equipment gets trapped inside the sewer, CONTRACTOR shall notify CITY. It shall be the CONTRACTOR's sole responsibility to remove the equipment from the sewer in a timely manner and make necessary repairs to pipe, manholes and restoration of the area to its original condition or better at the CONTRACTOR's own expense.

If the cleaning equipment fails to traverse the entire pipeline section or CONTRACTOR believes that the amount of debris present in a pipe segment cannot be removed by light cleaning, CONTRACTOR shall use CCTV to record the blockage or document the debris amount and submit documentation for the proposed cleaning method and an estimate of time to clear the debris to CITY's representative. CITY will respond to heavy and mechanical cleaning requests within three (3) hours of receipt Monday through Friday 8am to 5pm, excluding holidays. Upon receipt of Notice to Proceed approval from the CITY, CONTRACTOR shall attempt to remove the blockage or debris through the use of heavy cleaning and/or mechanical cleaning. If the blockage cannot be removed, CITY shall be notified. CITY shall be notified if the time to remove the debris exceeds 25% of the original estimate at the time of discovery.

The CITY will provide a location at the Buckeye Pump Station for debris disposal at no charge to the CONTRACTOR. CONTRACTOR shall be responsible for transport of debris to the Buckeye

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Pump Station (5201 NE Birmingham Road). CONTRACTOR shall dump debris into the open dump drying bed site. CONTRACTOR shall dewater their trucks prior to dumping debris into the CITY's drying bed. If CONTRACTOR fails to comply with the above requirements CONTRACTOR will be required to dispose of debris at another non-CITY facility at the CONTRACTOR's cost.

CONTRACTOR shall be able to utilize water from the CITY's potable water system for cleaning operation but shall be responsible for obtaining a water meter from CITY and shall assume responsibility for required deposit and for payment of the water used. A backflow preventer will be required unless the CONTRACTOR's equipment meets the requirements for Air Gap usage set by the Rules of Department of Natural Resources Division 60 Public Drinking Water Program, Chapter 11- Backflow Prevention 10 CSR 60-11.010:

> "(4) Department-Approved Backflow Prevention Assemblies (B). The discharge pipe of an approved air-gap shall terminate a minimum of two (2) pipe diameters of the discharge pipe above the flood level rim of the receiving vessel: in no case shall the distance be less than one inch (1)".

If a backflow preventer is required, Missouri Department of Natural Resources (MDNR) requires that an inspection of the backflow preventer is required every time it is moved and relocated with the water meter. The CITY's Water Meter Group will complete the backflow preventer inspections, but it may take up to 72 hours after notification for each inspection to occur, so the CONTRACTOR shall plan accordingly in staging their work and obtaining water for cleaning operations. All costs associated with water meter deposit, backflow preventer inspections and staging of work is ancillary to the cleaning and CCTV work and no separate payment will be made.

Payment Considerations for Cleaning in Easements or Rights-of-Way:

Rights-of-Way and Easement Cleaning Definition: Work within Rights-of-Way is defined as any manhole (required for access) that is located within fifty (50) feet from a street or access roadway edge. Work within an Easement is defined as any manhole (required for access) that is located further than fifty (50) feet from a street or access roadway edge and meets the "Minimum Requirements for Hourly Work" as detailed in **Attachment B**.

1. Light Cleaning in Rights-of-Way: Separate payment for light cleaning will not be made, but shall be included in unit price for cleaning and CCTV inspection in Rights-of-Way as listed in **Attachment B**.
2. Light Cleaning in Easements: Separate payment for light cleaning will not be made, but shall be included in unit price for cleaning and CCTV inspection in easements listed in **Attachment B**.
3. Heavy Cleaning in Rights-of-Way: The CONTRACTOR shall be paid the heavy cleaning hourly rates listed in **Attachment B**. Heavy Cleaning hours shall be tracked and invoiced on a **per pipe segment** basis. If actual heavy cleaning hours differ from those listed in **Attachment B**, the contract price shall be adjusted through the use of the hourly unit price in **Attachment B**.
4. Heavy Cleaning in Easements: The CONTRACTOR shall be paid the heavy cleaning hourly rates listed in **Attachment B**. Heavy Cleaning hours shall be tracked and invoiced on a per pipe segment basis. If actual heavy cleaning hours differ from those listed in **Attachment B**, the contract price shall be adjusted through the use of the hourly unit price in **Attachment B**.

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5. Mechanical Cleaning in Rights-of-Way: The CONTRACTOR shall be paid the mechanical cleaning hourly rates listed in **Attachment B**. Mechanical Cleaning hours shall be tracked and invoiced on a per pipe segment basis. If actual mechanical cleaning hours exceed those listed in **Attachment B**, the contract price shall be adjusted through the use of the hourly unit price in **Attachment B**.

6. Mechanical Cleaning in Easements: The CONTRACTOR shall be paid the mechanical cleaning hourly rates listed in **Attachment B**. Mechanical Cleaning hours shall be tracked and invoiced on a **per pipe segment** basis. If actual mechanical cleaning hours differ from those listed in **Attachment B**, the contract price shall be adjusted through the use of the hourly unit price in **Attachment B**.

Deliverables:

See Deliverables under Task 301.

TASK SERIES 300 - CCTV INSPECTION

The purpose of the CCTV inspection is to identify and document the defects and provide condition assessment of the sewer. All CCTV inspection, defect identification, video/data documentation and storage shall be completed in conformance with the requirements of the PROTOCOL. Updates to the PROTOCOL due to Pioneer/SewerAI considerations shall be agreed to by CITY and CONTRACTOR.

Task 301 CCTV Inspection

The CONTRACTOR shall be responsible for completing closed circuit television (CCTV) inspection reports/video for sewers as identified by the CITY's SSP Team. A detailed Inspection List will be provided by the CITY prior to commencing work. If CCTV camera or ancillary equipment gets trapped inside the sewer, CONTRACTOR shall notify CITY. It shall be the CONTRACTOR's responsibility to notify CITY and remove the equipment from the sewer and make necessary repairs to pipe, manholes and restoration of the area to its original condition or better at CONTRACTOR's own expense. If a full-length CCTV inspection cannot be completed due to a blockage, CONTRACTOR shall notify CITY and perform a reverse setup and obtain data for as much of the remaining pipe segment as possible.

The CONTRACTOR shall start work within ten (10) calendar days after a written Notice to Proceed is issued by the CITY. All CCTV inspection work must be completed by the end of the Contract time as specified in Section II of this Scope of Services regardless of the size, type or condition of the sewer. It is the responsibility of the CONTRACTOR to provide sufficient equipment and workforce to complete the work within the established Contract times as defined in Section II of this Scope of Services.

Payment Considerations:

1. Full Length CCTV Inspection in Rights-of-Way: Unit prices shall be paid for light cleaning and CCTV inspection on a per foot basis for both services as listed in **Attachment B**. Work within Rights-of-Way work is defined as any manhole (required for access) that is located within 50 feet from a street or access roadway edge. The definition of whether a sewer line is considered easement or Right-of-Way will be predetermined by the CITY based on GIS mapping. Any disputes on the definition, based on actual field

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conditions or incorrect mapping, shall be sent to the CITY's attention for consideration and final determination. The basis for payment will be the total pipe length between manholes along the existing sewer centerline from manhole wall to manhole wall as determined by CCTV inspection. If the actual lineal footage of light cleaning and CCTV inspection differs from the quantities listed in **Attachment B**, the contract price shall be adjusted through the use of the per foot unit prices in **Attachment B**.

2. Full Length CCTV Inspection in Easements: Unit prices shall be paid for light cleaning and CCTV inspection in easements on a per foot basis for both services as listed in **Attachment B**. Easement work is defined as any manholes (required for access) that is located further than fifty (50) feet from a street or access roadway edge and may require the use of one additional laborer or an easement machine. The definition of whether a sewer line is considered easement or Right-of-Way will be predetermined by the CITY based on GIS mapping. Any disputes on the definition, based on actual field conditions or incorrect mapping, shall be sent to the CITY's attention for consideration and final determination. The basis for payment will be the total pipe length between manholes along the existing sewer centerline from manhole wall to manhole wall as determined by CCTV inspection. If the actual lineal footage of light cleaning and CCTV inspection differs, the quantities listed in **Attachment B**, the contract price shall be adjusted through the use of the per foot unit prices in **Attachment B**.

3. Partial CCTV Inspection: If a full-length CCTV inspection cannot be made after heavy/mechanical cleaning to remove blockages, CONTRACTOR shall perform CCTV inspection of the accessible length (including initial and reverse set up) and shall be paid for the CCTV footage completed based on the unit prices listed in **Attachment B** for full length CCTV inspection. A reverse set up must be complete or justification given why it couldn't be completed in order to receive payment for the initial partial CCTV inspections. No payment will be made for partial inspections when blockages have been removed and a full length inspection was or could have been completed.

4. Full Length CCTV Inspection Only: If light cleaning cannot be performed due to cleaning equipment inaccessibility of sewer lines located in deep easement areas; full length CCTV inspection only may be performed and shall be paid for based on the unit prices listed in **Attachment B** for full length CCTV inspection only. CCTV inspection only shall be conducted in a manner that provides an unobstructed view of the pipe above the flowline and the pipe shall be free of debris and obstructions that significantly impede visibility. If these requirements are unable to be met while performing CCTV inspection only, CONTRACTOR shall immediately inform CITY of the conditions and the CITY will provide guidance for proceeding. Pre-approval by CITY is required for the use of full-length CCTV inspection only as described in **Attachment B**. CONTRACTOR shall not charge hourly rates unless the "Minimum Requirements for Hourly Work" is met as described in **Attachment B**.

5. Additional Field Investigation: The CONTRACTOR shall be paid additional field investigation hourly rates listed in **Attachment B** for CCTV exploration to identify or confirm abandoned sewer line segments. Pre-approval by CITY is required for the use of additional field investigation services as described in **Attachment B**. CONTRACTOR shall not charge hourly rates unless the "Minimum Requirements for Hourly Work" is met as described in **Attachment B**.

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6. Additional Field Services: The CONTRACTOR shall be paid additional field services hourly rates listed in **Attachment B** for location services to obtain GPS coordinates of sub-meter or better accuracy. Pre-approval by CITY is required for the use of additional field services as described in **Attachment B**. CONTRACTOR shall not charge hourly rates unless the "Minimum Requirements for Hourly Work" is met as described in **Attachment B.**

7. CCTV Inspection Re-Setup: The CONTRACTOR shall be paid a CCTV inspection re-setup fee per each as listed in Attachment B for equipment setup due to additional root cutting. Pre-approval by CITY is required for the use of CCTV inspection re-setup fee as described in **Attachment B**. CONTRACTOR shall not charge hourly rates unless the "Minimum Requirements for Hourly Work" is met as described in **Attachment B**.

Deliverables:

Deliverables shall be made by submittal packages on a monthly basis, as specified in Section II of this Scope of Services. Contractor shall submit deliverables in accordance to the CCTV PROTOCOL and in accordance with Task 102 of this Contract. CONTRACTOR shall deliver a monthly 'Project Summary Report', 'Cannot Access List with Map of Proposed Clearing Requests (if applicable)', and 'Cable Footage Calibration Logs', all in accordance with the CCTV PROTOCOL. The monthly deliverable of the 'Project Summary Report' does not excuse the CONTRACTOR from delivering a 'Project Summary Report' with the each submittal package.

TASK SERIES 400 - MANHOLE LOCATING AND OPENING

During the course of the performance of manhole inspections by CITY's SSP Team, there will be manholes that cannot be opened or could not be located. CONTRACTOR shall locate and open manholes as they are identified by CITY's SSP Team. "Can Not Locate (CNL)" and a "Can Not Open (CNO)" lists will be developed and provided to the CONTRACTOR at the same time as the Cleaning/CCTV Inspection Lists. The CONTRACTOR shall locate and open the listed manholes within the established Contract times as defined in Section II of this Scope of Services. The CONTRACTOR will need to allocate the resources (equipment and manpower) to locate and/or open the identified manholes within the designated time frame as defined in Section II of this Scope of Services. In the course of the sewer cleaning and CCTV inspection work, the CONTRACTOR may find existing manholes below grade that are not on the original list to be located or opened. If this occurs, the CONTRACTOR shall locate the manhole as described in Task 401.

Task 401 MANHOLE LOCATING

The CONTRACTOR shall attempt to locate buried manholes a minimum of thirty (30) minutes per manhole by using metal detectors, GPS equipment with sub-meter accuracy or better, probing rods, locating sondes, CCTV camera, measuring wheels, or other technology as approved by the CITY. Metal detectors shall be capable of locating intermediate sized metal objects at a minimum of three (3) feet depth.

1. Manholes buried below pavement. CONTRACTOR shall locate sewer manholes using metal detectors and CCTV camera with locating sonde and surface measurement verification or other means to be determined by CONTRACTOR and approved by CITY. CONTRACTOR shall verify the manhole location using at least two (2) methods. For example, use of a locating sonde and CCTV length verification from the upstream and/or

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downstream manhole/s. After locating the manhole, CONTRACTOR shall mark the location on the pavement surface and the adjacent curb with footage offset written on the curb, drive a 2-inch or longer mag nail into the pavement at the manhole location, and then obtain GPS coordinates of sub-meter or better accuracy. CONTRACTOR shall also obtain at least two (2) area photographs from differing vantage points (i.e. facing north and south) documenting the manhole location and the surrounding area. The manhole number and camera direction shall be written on a white board or sign and be legible in the photographs. The photograph shall be taken at a vantage point that allows the marking paint to be visible and at least one identifiable fixed land mark visible in the background or side ground. All photos shall be named with the manhole number, date, and photo number utilizing the following schema: S100-500_20160325_01.

2. Manholes buried less than or equal to 12-inches: CONTRACTOR shall locate manholes buried in unpaved areas using metal detectors, probing rods, shovels, or CCTV camera with locating sonde. After locating the manhole and determining that it is buried less than 12 inches deep, CONTRACTOR shall unearth the manhole, open it, verify that it is the correct manhole (i.e. not a storm manhole), drive a wood lathe with the manhole number written on it and a 6-inch or longer mag stake on the manhole, and then obtain GPS coordinates with sub-meter or better accuracy. CONTRACTOR shall also obtain at least two (2) area photographs from differing vantage points (i.e. facing north and south) documenting the manhole location and the surrounding area. The manhole number and camera direction shall be written on a white board or sign and be legible in the photographs. The photograph shall be taken at a vantage point that allows the marking paint to be visible and at least one identifiable fixed land mark visible in the background or side ground. All photos shall be named with the manhole number, date, and photo number utilizing the following schema: S100-500_20160325_01. All manholes unearthed in residential areas shall be reburied and surface restored using existing turf salvaged during unearthing.

3. Manholes buried more than 12-inches: CONTRACTOR shall locate manholes buried in unpaved areas using metal detectors, probing rods, shovels, and CCTV camera with locating sonde and surface measurement verification or other means as determined by the CONTRACTOR and approved by CITY. CONTRACTOR shall verify the manhole location using at least two (2) methods. For example, use of a locating sonde and CCTV length verification from the upstream and/or downstream manhole/s. After locating the manhole and determining that it is buried more than 12-inches deep, CONTRACTOR shall verify that it is the correct manhole (i.e. not a storm manhole) using CCTV and locating sonde, drive a wood lathe with the manhole number written on it and a 6-inch or longer mag stake on the manhole, and then obtain GPS coordinates with sub-meter or better accuracy. CONTRACTOR shall also obtain at least two (2) area photographs from differing vantage points (i.e. facing north and south) documenting the manhole location and the surrounding area. The manhole number and camera direction shall be written on a white board or sign and be legible in the photographs. The photograph shall be taken at a vantage point that allows the marking paint to be visible and at least one (1) identifiable fixed land mark visible in the background or side ground. All photos shall be named with the manhole number, date, and photo number utilizing the following schema: S100-500_20160325_01.

Payment Considerations:

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1. Manholes buried below pavement: Locating and verify manholes buried below pavement shall be paid for on a unit price basis as listed in **Attachment B**. If the quantities differ from the quantities listed in **Attachment B**, the contract price shall be adjusted through the use of the unit prices in **Attachment B**.

2. Manholes buried less than 12-inches: Locating and opening manholes buried less than 12-inches deep shall be paid for on a unit price basis for manholes in easements and manholes in Rights-of-Way as listed in **Attachment B**. Easement work is defined as any manholes that is located further than fifty (50) feet from a street or access roadway (public or private). If the quantities differ from the quantities listed in **Attachment B**, the contract price shall be adjusted through the use of the unit prices in **Attachment B**.

3. Manholes buried more than 12-inches: Locating and verify manholes buried more than 12-inches deep shall be paid for on a unit price basis for manholes in easements and manholes in rights-of-way as listed in **Attachment B**. Easement work is defined as any MH that is located further than fifty (50) feet from a street or access roadway (public or private) center. If the quantities differ from the quantities listed in **Attachment B**, the contract price shall be adjusted through the use of the unit prices in **Attachment B**.

4. Does not exist manhole: If CONTRACTOR determines through CCTV that a manhole does not exist or is abandoned, the CONTRACTOR shall be paid $150 for the partial manhole location effort as listed in **Attachment B**. If the CONTRACTOR is unable to determine through CCTV that a manhole does not exist or is abandoned, the CONTRACTOR will not be paid unless pre-approved by the CITY to perform additional field investigation services to confirm abandoned sewer systems and be paid in accordance with Task 301.

5. Discovered manholes: If CONTRACTOR through the course of CCTV discovers an existing manhole not identified on the CITY's GIS, the CONTRACTOR shall locate the manhole on the ground surface in accordance with Task 401. CONTRACTOR will be paid in accordance with Task 401 for locating the manhole.

Deliverables:

Deliverables shall be made **by package** to correspond with the same assets included in CCTV deliverables in Task Series 300 and, as specified in Section II of this Scope of Services. CONTRACTOR shall submit an excel spreadsheet of the located manholes, containing the XY coordinates based on Missouri State Coordinate System of 1983, West Zone and NAVD88, photo references, buried depth, location (Right-of-Way or-easement), paved or unpaved, and any significant issues that will affect the City's ability to access and/or raise the manhole (i.e. under fence, under shed, 3 feet tall retaining wall in conflict, under pile of debris in a junk yard, wood fence post in conflict, etc.). CONTRACTOR shall also submit photographs in compliance with this Scope of Services.

Task 402 MANHOLE OPENING

CONTRACTOR shall employ reasonable efforts to open all manholes including use of sledgehammers, pry bars, bond breaking agents, and other equipment.

If a manhole cover is cracked or broken during the opening process, the CONTRACTOR shall attempt to replace the broken cover with a cover provided by the CITY and carried on CONTRACTOR's equipment. Note, it is not guaranteed that the CITY will have manhole covers

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in stock or that the manhole cover will fit the existing frame. If the cover cannot be replaced, CONTRACTOR shall contact the CITY and the CITY will replace the cover. CONTRACTOR shall be responsible for securing the manhole site in unpaved areas and remaining at the manhole location in paved areas until CITY crews arrive or alternatively the CONTRACTOR can secure the site with street closures or street plates in compliance with City of Kansas City Public Works traffic control regulations.

If the bolts are cut, broken or damaged on a bolt down manhole cover during the opening process, the CONTRACTOR shall replace the lid and contact the CITY who will be responsible for replacing and resetting the bolts and replacing any damaged portion of the manhole frame and cover.

Payment Considerations:

CONTRACTOR shall be paid on a unit price basis for each manhole that is opened as listed in **Attachment B**. No payment shall be made for manholes that are not opened. If the actual quantity for manhole opening differ from those listed in **Attachment B**, the contract price shall be adjusted through the use of the unit price in **Attachment B**.

Deliverables:

CONTRACTOR shall submit to CITY a listing of manholes that were opened or could not be opened at for each package, as specified in Section II of this Scope of Services.

TASK SERIES 500 - CLEARING AND GRUBBING IN EASEMENTS

Task 501 Clearing and Grubbing

CONTRACTOR shall clear easements in wooded areas as necessary to obtain access to manholes for CONTRACTOR's cleaning and CCTV equipment. CONTRACTOR shall be responsible for erosion control, work required for removal and disposal of vegetation, trees, and debris, and restoration. All work shall be performed in accordance with Specification 02180 - Clearing and Grubbing in **Attachment I**. CONTRACTOR shall coordinate with CITY and property owner's to determine the best route to access manholes and define the clearing limits before any clearing work begins. CONTRACTOR shall be responsible for locating the manholes within the proposed clearing limits. When possible, line of sight from manhole to manhole shall be used to determine the bearing direction. If line of sight is not possible, CONTRACTOR shall notify CITY and provide a fee estimate for surveying services to stake the clearing limits. CONTRACTOR shall not proceed with surveying services until CITY issues a Notice to Proceed. CONTRACTOR will be responsible for contacting landowners and obtaining permission to perform clearing work. CONTRACTOR shall submit clearing requests as specified in the CCTV PROTOCOL. CONTRACTOR shall submit anticipated cost associated with the proposed clearing requests.

Payment Considerations:

CONTRACTOR shall be paid hourly rates for clearing and grubbing, disposal, restoration and surveying as listed in **Attachment B**. If the actual quantities for clearing and grubbing and restoration differ from those listed in **Attachment B**, the contract price shall be adjusted through the use of the unit or hourly rates in **Attachment B**. Pre-approval by CITY is required for the use of the field supervisor services, additional laborer, and survey services as described in **Attachment B**. CONTRACTOR shall not charge hourly rates unless the "Minimum Requirements for Hourly Work" is met as described in **Attachment B**.

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Deliverables:

CONTRACTOR shall submit a red-lined map of actual easements or access cleared, digital photographs documenting restoration work, and hours expended for clearing and grubbing, disposal and restoration, and surveying as approved by the CITY's representative to the CITY.

IV. SPECIALIZED SERVICES

Specialized services are for direct expenses and labor for miscellaneous services not included in the basic scope of services. Work may include but not limited to traffic control beyond the basic scope of services. Contractor shall submit a maximum not to exceed fee, appropriate supporting documentation, and associated scope of services to accomplish the proposed work. The City reserves the right to request additional bids for subcontracted services. Contractor shall not proceed with the work until receiving written approval from the City.

V. CITY'S RESPONSIBILITIES

CITY will furnish, as required by Basic Services and not at the expense of the CONTRACTOR, the following items:

A. Provide assistance by placing at CONTRACTOR's disposal available information pertinent to the assignment, including GIS data, information for lines to be cleaned and inspected using CCTV, located, or opened and any other data relative thereto.

B. CITY's Project Manager will coordinate meetings between City staff and the CONTRACTOR.

C. Provide location at the Buckeye Pump Station for debris disposal at no cost to CONTRACTOR.

D. Provide "Can Not Locate (CNL)" and "Can Not Open (CNO)" manhole lists developed by CITY's SSP to CONTRACTOR.

E. Conduct backflow prevention inspection within 72 hours of being notified by CONTRACTOR of water meter location used for sewer cleaning.

F. Repair sewer blockages that cannot be removed by CONTRACTOR using cleaning.

G. Replacement of broken manhole covers if CONTRACTOR cannot replace.

H. Replacement and resetting the bolts on bolt down manhole covers.

I. Assist with contacting landowners and obtaining permission to perform clearing work.

(End of Scope of Services)

Draft

ATTACHMENT B

UNIT PRICES

Draft

Proposer: _____

CITY OF FOUNTAINS
HEART OF THE NATION
KANSAS CITY
MISSOURI

ATTACHMENT B - UNIT PRICES

Project No. 60810049, Contract No. 1277-3

Project Title: City-Wide Sewer Line Cleaning, Closed Circuit Television (CCTV) Inspection, and Manhole Locating and Opening for OCP Projects

			Contract 1277-3	
Item No.	**Item Description:**	**Units**	**Rate**	**Minimum Requirements for Unit Rates**
Task Series 100	**Project Management**	Months		NA - Included with CCTV Inspection
Task Series 200	**Sewer Cleaning**			
201	Heavy Cleaning (Rights-of-Way)	Hours	$ 208.80	One cleaning truck and one operator
202	Heavy Cleaning (Easements)	Hours	$ 293.48	One cleaning truck, one operator, and one laborer
203	Mechanical Cleaning (Rights-of-Way)	Hours	$ 417.60	One cleaning truck, two bucket machines, and three operators
204	Mechanical Cleaning (Easements)	Hours	$ 556.80	One cleaning truck, two bucket machines, three operators, and one laborer
Task Series 300	**CCTV Inspection (Includes Project Management & Light Cleaning under Task Series 100 & 200)**			
	Full Length CCTV Inspection in Rights-of-Way			
301	Sewer Sizes 6-in to 118-in	Linear Feet	$ 2.09	Cleaning and CCTV equipment, one operator per equipment, and one laborer (FY25 Small Diameter ASR work only unless approved by the City)
	Full Length CCTV Inspection in Easements			
302	Sewer Sizes 6-in to 118-in	Linear Feet	$ 2.78	Cleaning and CCTV equipment, one operator per equipment, and one laborer (FY25 Small Diameter ASR work only unless approved by the City)
303	Full Length CCTV Inspection Only	Hours	$ 278.40	Two man field crew to perform CCTV only in deep easements inaccessible by cleaning equipment **(City approval required)**
304	Additional Field Investigation	Hours	$ 278.40	Two man field crew to perform additional field investigation to confirm abandoned sewer systems **(City approval required)**
305	Additional Field Services	Hours	$ 127.00	One man field crew to perform additional field services for GPS locating **(City approval required)**
306	CCTV Inspection Re-Setup	Each	$ 145.00	Two man field crew to re-setup CCTV inspection if required due to additional root cutting/heavy cleaning **(City approval required)**
Task Series 400	**Manhole Opening and Locating**			
401	Manhole Locate Buried Below Pavement	Each	$ 464.00	NA
402	Manhole Locate Buried Less Than or Equal to 12" (Rights-of-Way)	Each	$ 522.00	NA
403	Manhole Locate Buried Less Than or Equal to 12" (Easement)	Each	$ 580.00	NA
404	Manhole Locate Buried Greater Than 12" (Rights-of-Way)	Each	$ 522.00	NA
405	Manhole Locate Buried Greater Than 12" (Easement)	Each	$ 638.00	NA
406	Unsuccessful Manhole Location (Does Not Exist)	Each	$ 174.00	NA
407	Manhole Opening	Each	$ 290.00	NA
Task Series 500	**Clearing and Grubbing in Easements as Necessary to Obtain Access to Manholes CCTV Inspection**			
501	Clearing and Grubbing and Disposal (Labor and Equipment)	Hours	$ 394.40	Two chainsaws, one haul truck with a minimum GVWR of 15,000 lbs, 2 laborers
502	Clearing and Grubbing and Disposal (Labor and Equipment)	Hours	$ 382.80	One excavator or track loader, one operator
503	Restoration (Labor and Equipment)	Hours	$ 220.40	One skid loader, one operator
504	Soil (Material Only)	Cubic Yards	$ 92.80	In accordance with specification section 02180 Clearing and Grubbing
505	2-inch to 3-inch Rock (Material Only)	Tons	$ 34.80	In accordance with specification section 02180 Clearing and Grubbing
506	Seed and Mulch Placed	SF	$ 0.19	In accordance with specification section 02180 Clearing and Grubbing
507	Survey Field Services (Labor and Equipment)	Hours	$ 179.80	All requred equipment and personal to complete easement limits staking (**City approval required**)
508	Survey Office Services	Hours	$ 150.80	All required personal to research easements and develop easement clearing limits coordinates (**City approval required**)
509	Additional Laborer	Hours	$ 84.68	One laborer to asist with clearing, grubbing, disposal, or restoration **(City approval required)**
510	Field Supervisor Services	Hours	$ 145.00	One field supervisor: to obtain permission from property owners to perform clearing work; or to inspect areas requiring clearing to identify the required access (to be used only if clearing work is not performed). **(City approval required)**
	Specialized Services	Each	TBD	Maximum not to exceed fee for direct expenses and labor associated with miscellaneous services. **(City approval required)**
	TOTAL			

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ATTACHMENT C

CREO KC DOCUMENTS

Draft

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Interdepartmental Communication

DATE: May 27, 2025

TO: Jaime Guillen, Director, Civil Rights and Equal Opportunity

FROM: Jamie Driskell, SSP Contract Administration

SUBJECT: Contract /Project No. 1277-3 /60810049 – City-Wide Sewer Line Cleaning, Closed Circuit Television (CCTV) Inspection, and Manhole Locating and Opening for Overflow Control Program Projects Renewal No. 3

Renewal No. 3 (Year Four) for the subject contract does require City Council approval, according to Ordinance No. 230228; Ace Pipe Cleaning, Inc. is recommended for a 3rd renewal year. The contractor has made every effort to prioritize subcontractor participation, including WBE participation substantially over goals, but has been limited in MBE participation by the work capacity and pace of the subcontractors. Ace Pipe Cleaning added a new MBE subcontractor May 16th, 2025, in an effort to, increase MBE participation at a quicker pace. Ace Pipe Cleaning also submitted a Request for Modification dated May 22, 2025, to adjust goals based on subcontractor production capabilities. We recommend the City move forward to renew this contract with Ace Pipe Cleaning, Inc. for Renewal No. 3 with a contract amount of $3,000,000.00.

- This is not a prevailing wage contract.
- Performance Bond is required.
- The goals are set at 15% MBE and 10% WBE.
- The goals for the renewal are requested at 5% MBE and 20% WBE in alignment with pending RFM for WSD1277-2.
- Currently, Ace Pipe Cleaning, Inc. goals are MBE 2.4% and WBE 21.7%
- The Annual Amount for this is $3,000.000.00

The contract renewal information is available upon request.

Approved: DocuSigned by: Rebeca Ameszcua-Hogan 1C5032A12EB3471...
(CREO Dept. - Director)

cc: Jacob Groh, Project Manager

Draft

MEMORANDUM

Date: June 4, 2025

To: CREO KC Department Director Jaime Guillen

From: Rebeca Amezcua-Hogan, Civil Rights Specialist

Subject: RFM Approval Request from: Water Services / Ace Pipe Cleaning Inc

Project: City-Wide Cleaning, CCTV Inspection and Manhole Locating and Opening for OCP Project

Project #: 1277-2/60810049

Contract Amount: $ 1,500,000.00

Background:
Goals for the project were approved at 15% MBE and 10% WBE on 11/23/2015. CREO KC approved a CUP from Ace Pipe Cleaning Inc on 4/19/2026 with participation of 15% MBE and 10% WBE. This is the second renewal, which was approved on 2/1/2023. Current participation is as follows:

MBE:

Elite Root Control, LLC (Pipeline Inspection / Sewer Cleaning and Rodding Services) – $195,000.00 or 13%

H & S & Sons L.L.C (Pipeline Inspection / Sewer Cleaning and Rodding Services) – $15,000.00 or 1%

SE3, LLC (Pipeline Inspection) – $30,000.00 or 2%

Total MBE participation of $240,000.00 out of $1,500,000.00 for 16% MBE.

WBE:

She Digs It, LLC (Utility Line Construction / Sewer Cleaning and Rodding Services) - $150,000.00

Total WBE participation of $150,000.00 out of $1,500,000.00 for 10% WBE.

Request for Modification:

The prime contractor is requesting a modification of the amount of MBE/WBE participation currently listed on the approved CUP from 15% MBE and 10% WBE to 5% MBE and 20% WBE. The prime states that the MBE subs have not been responsive and have not completed the amount of work assigned to them.

Draft

Elite Root Control (MBE)

-Assigned 100K of small diameter CL & CCTV on 11/24/2024. As of 5/21/2025 they have only completed 32K.

SE3 (MBE)

-Assigned 100K of small diameter CL & CCTV on 11/24/2024. As of 5/21/2025 they have only completed 6K.

For perspective purposes, APC also assigned SDI (WBE) 100K of small diameter CL & CCTV on 11/24/2024. They had completed 91K of CL & TV as of 3/10/2025. During this early March period, APC and SDI halted production on the contract to allow for the MBE's to have plenty of remaining contract funds to meet the participation requirements. This lack of production is beginning to create concerns for contract deadlines.

As a Good Faith Effort, the prime contractor has increased the amount of work performed by She Digs It, LLC. She Digs It, LLC's participation on the CUP was for $150,000.00 at 10% WBE. To date, this subcontractor has performed $280,588.56 – doubling their participation to 22%.

Additionally, SE3 LLC is being replaced with SE3 Group LLC. SE3 LLC did not perform any work on this contract and CREO has received a letter from SE3 LLC stating that they are aware of their removal and are in agree with the prime regarding this action. CREO has also received an LOI for SE3 Group, LLC.

H & S & Sons L.L.C's participation has also increased from 1% to 2%. An updated LOI has been provided.

If approved, participation on the CUP will be changed as follows:

MBE:

Elite Root Control, LLC (Pipeline Inspection / Sewer Cleaning and Rodding Services) – *current participation at 2.3%*

H & S & Sons L.L.C (Pipeline Inspection / Sewer Cleaning and Rodding Services) – 2%

SE3 Group, LLC (Pipeline Inspection) – 1%

Total MBE participation 5% MBE.

WBE:

She Digs It, LLC (Utility Line Construction / Sewer Cleaning and Rodding Services) – *current participation at 22%*

Draft

Total WBE participation of 20% WBE

Recommendations:

CREO KC recommends that the prime contractor's Request for Modification to change the participation listed on the approved CUP from 15% MBE and 10% WBE to 5% MBE and 20% WBE be approved. The prime contractor does appear to have made Good Faith Efforts by doubling their WBE participation. Additionally, there isn't much availability as there are only a few certified firms that can perform CCTV inspections. All available MBE's are currently on the contract and have been unresponsive.

The figures in B2G are not the most up to date figures but the prime has been paid $1,291,591.18. The prime reports the following MBE/WBE payments:

MBE: $30,621.00 @ 2% and WBE: $$280,588.56 @ 22% MBE.

Notes:
Original Contract Amount: $1,500,000.00
Current Contract Amount: $1,500,000.00

According to B2G, the prime contractor is currently achieving the following participation on the contract:

Dollars paid to prime contractor by City to date: $1,291,591.18
Dollars paid to MBEs by prime contractor to date: $30,621.00 for 2% MBE.
Dollars paid to WBE by the prime contractor to date: $280,588.56 for 22% WBE.

Draft

REQUEST FOR MODIFICATION OR SUBSTITUTION

*(This Form **must** be submitted to CREO KC to request substitutions for an MBE/WBE listed in the Contractor Utilization Plan or for modification of the amount of MBE/WBE participation listed in the Contractor Utilization Plan. This Form shall be an amendment to the Contractor Utilization Plan.)*

BIDDER/PROPOSER/CONTRACTOR: _____
ADDRESS: _____
PROJECT NUMBER OR TITLE: _____
AMENDMENT/CHANGE ORDER NO: (if applicable) _____

Project Goals:	_____% MBE	_____% WBE
Contractor Utilization Plan:	_____% MBE	_____% WBE

1. I am the duly authorized representative of the above Bidder/Contractor/Proposer and am authorized to request this substitution or modification on behalf of the Bidder/Contractor/Proposer.

2. I hereby request that the Director of CREO KC recommend or approve: (check appropriate space(s))

   a. ☐ A substitution of the certified MBE/WBE firm _____,
   (Name of new firm)
   to perform _____,
   (Scope of work to be performed by new firm)
   for the MBE/WBE firm _____ which is currently
   (Name of old firm)
   listed on the Bidder's/Contractor's/Proposer's Contractor Utilization Plan to
   perform the following scope of work: _____.
   (Scope of work of old firm)

   b. ☐ A modification of the amount of MBE/WBE participation currently listed on the Bidder's/Contractor's/Proposer's Contractor Utilization Plan from

   _____ % MBE_____% WBE *(Fill in % of MBE/WBE Participation currently listed on Contractor Utilization Plan)*

   TO

   _____% MBE _____% WBE *(Fill in New % of MBE/WBE Participation requested for Contractor Utilization Plan)*

   c. Attach 00450.01 Letter of Intent to Subcontract letter for each new MBE/WBE to be added.
   d. Attach a copy of the most recent 00485.01 or on-line M/WBE Monthly Utilization Report

3. Bidder/Contractor/Proposer states that a substitution or modification is necessary because: (check applicable reason(s))

Draft

☐ The MBE/WBE listed on the Contractor Utilization Plan is non-responsive or cannot perform.

☐ The MBE/WBE listed on the Contractor Utilization Plan has increased its previously quoted price without a corresponding change in the scope of work.

☐ The MBE/WBE listed on the Contractor Utilization Plan has committed a material default or breach of its contract.

☐ Requirements of the scope of work of the contract have changed and make subcontracting not feasible or not feasible at the levels required by the goals established for the contract.

☐ The MBE/WBE listed on the Contractor Utilization Plan is unacceptable to the City contracting department.

☐ Bidder/Contractor/Proposer has not attempted intentionally to evade the requirements of the Act and it is in the best interests of the City to allow a modification or substitution.

4. The following is a narrative summary of the Bidder's/Contractor's/Proposer's good faith efforts exhausted in attempts to substitute the MBE/WBE firm named above which is currently listed on the Contractor Utilization Plan with other qualified, certified MBE/WBE firms for the listed scope of work or any other scope of work in the project:

Draft

5. Bidder/Proposer/Contractor will present documentation when requested by the City to evidence its good faith efforts.

Dated:_____ _____
(Bidder/Proposer/Contractor)

_____
By: (Authorized Representative)

CITY OF FOUNTAINS
HEART OF THE NATION

KANSAS CITY
MISSOURI

CONTRACTOR AFFIDAVIT FOR FINAL PAYMENT

Project Number _____

Project Title _____

STATE OF _____)
)SS
COUNTY OF _____)

The Undersigned, _____ of lawful
(Name)
age, being first duly sworn, states under oath as follows:

1. I am the _____ of _____who is the general
(Title) (CONTRACTOR)
CONTRACTOR for the CITY on Project No. _____ and Project Title _____.

2. All payrolls, material bills, use of equipment and other indebtedness connected with the Work for this Project have been paid and all Claims of whatever nature have been satisfied, as required by the Contract.

3 (✓) ☐ Prevailing wage does not apply; or

(✓) ☐ All provisions and requirements set forth in Chapter 290, Section 290.210 through and including 290.340, Missouri Revised Statutes, pertaining to the payment of wages to workmen employed on public works projects have been fully satisfied and there has been no exception to the full and complete compliance with these provisions and requirements and the Annual Wage Order contained in the Contract in carrying out the Contract and Work. CONTRACTOR has fully complied with the requirements of the prevailing wage law as required in the Contract and has attached affidavits from all Subcontractors on this Project, regardless of tier, affirming compliance with the prevailing wage law as stipulated in the Contract.

4. I hereby certify that (a) at project completion and pursuant to contractor's final request for payment, contractor achieved (_____%) Minority Business Enterprise (MBE) participation and (_____%) Women Business Enterprise (WBE) participation on this contract, and (b) listed herein are the names of all certified M/WBE subcontractors, regardless of tier, with whom I, or my subcontractors contracted.

1. Name of MBE/WBE Firm _____
Address _____
_____
Telephone Number (_____) _____
IRS Number _____
Area/Scope*of Work _____
Subcontract Final Amount _____

2. Name of MBE/WBE Firm _____
Address _____
_____
Telephone Number (_____) _____
IRS Number _____
Area/Scope*of Work_____
Subcontract Final Amount _____

Draft

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List additional subcontractors, if any, on a similar form and attach to the bid.

Supplier** Final Amount: _____

*Reference to specification sections or bid item number.

(✓) ☐ Met or exceeded the Contract utilization goals; or
(✓) ☐ Failed to meet the Contract utilization goals (attach waiver, substitution or modification); or
(✓) ☐ No goals applied to this Project.

5. CONTRACTOR certifies that each Subcontractor has received full payment for its respective work in connection with the Contract.

6. If applicable, I hereby certify that (1) at project completion and pursuant to contractor's final request for payment, contractor achieved, company-wide, at least ten percent (10%) minority workforce participation and two percent (2%) women workforce participation and (2) a true and accurate copy of my final project workforce monthly report is attached. **NOTE: This paragraph is only applicable if you completed a construction contract that was estimated by the City, prior to solicitation, as requiring more than 800 construction labor hours and costing in excess of $300,000.00. If applicable you MUST attach copies of your final monthly workforce reports.**

7. This affidavit is made in behalf of the CONTRACTOR for the purpose of securing from Kansas City, Missouri, the certification of completion of the Project and receiving payment therefore.

8. If the Contract amount exceeded $150,000, CONTRACTOR has submitted proof of compliance with the City tax ordinances administered by the City's Commissioner of Revenue and has on file proof of tax compliance from all Subcontractors. If the Contract term exceeded one (1) year, CONTRACTOR has provided proof of compliance with the City tax ordinances administered by the City's Commissioner of Revenue prior to receiving final payment and has on file proof of tax compliance from all Subcontractors prior to the Subcontractor receiving final payment from CONTRACTOR.

Draft

CONTRACTOR_____

By _____
(Authorized Signature)

Title _____

On this _____ day of _____, _____, before me

appeared _____, to me personally known to be the

_____of the_____,

and who executed the foregoing instrument and acknowledged that (s)he executed the same on behalf of

_____ as its free act and deed.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal on the day and year first above written.

My commission expires:

_____ _____
Notary Public

CITY OF FOUNTAINS
HEART OF THE NATION
KANSAS CITY
MISSOURI

SUBCONTRACTOR AFFIDAVIT FOR FINAL PAYMENT

Project Number _____

Project Title _____

STATE OF MISSOURI)

) ss:

COUNTY OF _____)

After being duly sworn the person whose name and signature appears below hereby states under penalty of perjury that:

1. I am the duly authorized officer of the business indicated below (hereinafter Subcontractor) and I make this affidavit on behalf of Subcontractor in accordance with the requirements set forth in Section 290.290, RSMo. Subcontractor has completed all of the Work required under the terms and conditions of a subcontract as follows:

Subcontract with: _____, Contractor

Work Performed: _____

Total Dollar Amount of Subcontract and all Change Orders: $_____

City Certified ☐MBE ☐ WBE ☐ DBE ☐ NA
List certifications: _____

2. Subcontractor fully complied with the provisions and requirements of the Missouri Prevailing Wage Law set forth in Sections 290.210, RSMo through 290.340, RSMo.

Business Entity Type:
(___) Missouri Corporation
(___) Foreign Corporation
(___) Fictitious Name Corporation
(___) Sole Proprietor
(___) Limited Liability Company
(___) Partnership
(___) Joint Venture
(___) Other (Specify)

Subcontractor's Legal Name and Address

_____

_____

Phone No. _____

Fax: _____

E:mail:_____

Federal ID No._____

I hereby certify that I have the authority to execute this affidavit on behalf of Subcontractor.

By: _____ _____
(Signature) (Print Name)

_____ _____
(Title) (Date)

NOTARY

Subscribed and sworn to before me this _____ day of _____, 20_____.

My Commission Expires:_____ By_____

_____ _____
Print Name Title

Draft

ATTACHMENT D

00616 Performance Bond

Draft

CITY OF FOUNTAINS
HEART OF THE NATION

KANSAS CITY
MISSOURI

PERFORMANCE BOND

Project Number _____

Project Title _____

KNOW ALL MEN BY THESE PRESENTS: That _____, as PRINCIPAL (CONTRACTOR), and _____, (SURETY), licensed to do business as such in the State of Missouri, hereby bind themselves and their respective heirs, executors, administrators, successors, and assigns unto Kansas City, Missouri, a constitutionally chartered municipal corporation, (OWNER), as obligee, in the penal sum of _____ Dollars ($ _____) for the payment whereof CONTRACTOR and SURETY bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

CONTRACTOR has entered into a Contract with OWNER for _____ which Contract, including any present or future amendment thereto, is incorporated herein by reference and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if CONTRACTOR shall promptly and faithfully perform said Contract including all duly authorized changes thereto, according to all the terms thereof, including those under which CONTRACTOR agrees to pay legally required wage rates including the prevailing hourly rate of wages in the locality, as determined by the Department of Labor and Industrial Relations or by final judicial determination, for each craft or type of workman required to execute the Contract and, further, shall defend, indemnify, and hold harmless OWNER from all damages, including but not limited to liquidated damages, loss and expense occasioned by any failure whatsoever of said CONTRACTOR and SURETY to fully comply with and carry out each and every requirement of the Contract, then this obligation shall be void; otherwise, it shall remain in full force and effect.

Draft

WAIVER. That SURETY, for value received, hereby expressly agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the Work to be performed thereunder, shall in any way affect the obligations of this Bond; and it does hereby waive notice of any such change, extension of time, or alteration or addition to the terms of the Contract or the Work to be performed thereunder.

IN WITNESS WHEREOF, the above parties have executed this instrument the ____ day of _____, 20_____.

CONTRACTOR
Name, address and facsimile number of Contractor

_____
_____
_____
_____

I hereby certify that I have authority to execute this document on behalf of Contractor.

By: _____
Title: _____

(Attach corporate seal if applicable)

SURETY
Name, address and facsimile number of Surety:

_____
_____
_____
_____

I hereby certify that (1) I have authority to execute this document on behalf of Surety; (2) Surety has an A.M. Best rating of A- or better; (3) Surety is named in the current list of "Companies Holding Certificates of Authority as Acceptable Reinsuring Companies: as published in Circular 570 (most current revision) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury; and (4) Surety is duly licensed to issue bonds in the State of Missouri and in the jurisdiction in which the Project is located.

By:_____
Title:_____
Date:_____

(Attach seal and Power of Attorney)

Draft

ATTACHMENT E

00515.01 Employee Eligibility Verification Affidavit

Draft

EMPLOYEE ELIGIBILITY VERIFICATION AFFIDAVIT

(Required for any contract with the City of Kansas City, Missouri in excess of $5,000.00)

STATE OF _____)
) ss
COUNTY OF _____)

On this _____ day of _____, 20___, before me appeared _____, personally known by me or otherwise proven to be the person whose name is subscribed on this affidavit and who, being duly sworn, stated as follows:

I am of sound mind, capable of making this affidavit, and personally swear or affirm that the statements made herein are truthful to the best of my knowledge. I am the _____ (title) of _____ (business entity) and I am duly authorized, directed or empowered to act with full authority on behalf of the business entity in making this affidavit.

I hereby swear or affirm that the business entity does not knowingly employ any person in connection with the contracted services who does not have the legal right or authorization under federal law to work in the United States as defined in 8 U.S.C. § 1324a(h)(3).

I hereby additionally swear or affirm that the business entity is enrolled in an electronic verification of work program operated by the United States Department of Homeland Security (E-Verify) or an equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, under the Immigration Reform and Control Act of 1986, and that the business entity will participate in said program with respect to any person hired by the business entity to perform any work in connection with the contracted services. I have attached hereto documentation sufficient to establish the business entity's enrollment and participation in the required electronic verification of work program.

I am aware and recognize that unless certain contractual requirements are satisfied and affidavits obtained as provided in Section 285.530, RSMo, the business entity may face liability for violations committed by its subcontractors, notwithstanding the fact that the business entity may itself be compliant.

Draft

I acknowledge that I am signing this affidavit as the free act and deed of the business entity and that I am not doing so under duress.

_____
Affiant's signature

Subscribed and sworn to before me this _____ day of _____, 20____.

_____
Notary Public

My Commission expires:

Draft

ATTACHMENT F

Non-Construction Subcontractors Listing

Draft

ATTACHMENT F

Non-Construction Subcontractors Listing

Contractor shall submit Subcontractor information on this form prior to Subcontractor beginning Work. Contractor shall update this listing and keep it current for the life of the Contract.

	Company Name Contact Name and Email	Address Phone No. and Fax No.
1.	Name:_____ Email:	Address:_____ _____ Phone:_____ Fax:_____
2.	Name:_____ Email:	Address:_____ _____ Phone:_____ Fax:_____
3.	Name:_____ Email:	Address:_____ _____ Phone:_____ Fax:_____
4.	Name:_____ Email:	Address:_____ _____ Phone:_____ Fax:_____
5.	Name:_____ Email:	Address:_____ _____ Phone:_____ Fax:_____
6.	Name:_____ Email:	Address:_____ _____ Phone:_____ Fax:_____
7.	Name:_____ Email:	Address:_____ _____ Phone:_____ Fax:_____
8.	Name:_____ Email:	Address:_____ _____ Phone:_____ Fax:_____
9.	Name:_____ Email:	Address:_____ _____ Phone:_____ Fax:_____
10.	Name:_____ Email:	Address:_____ _____ Phone:_____ Fax:_____

Contractor – Company Name: _____
Submitted By: _____
Title: _____
Telephone No.: _____
Fax No.: _____
E-mail: _____
Date: _____

Draft

ATTACHMENT G

Sewer Pipe Inspection Protocol

Draft

Sewer Pipe Inspection Protocol

Draft

City of Kansas City, Missouri
Water Services Department

Smart Sewer Program

August 2024

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1.0 INTRODUCTION

All underground utilities will deteriorate over time. The City of Kansas City, Missouri (CITY) Water Services Department (KC Water) conducts periodic asset inspections to better understand rehabilitation and replacement needs of their sewer assets. These asset inspections identify problems in the sewer systems that may require repairs or replacement and help prevent catastrophic conditions. Inspections of sewer pipes:

- Determine the condition of the pipe;
- Identify inflow/infiltration (I/I) sources; and
- Locate buried access points.

KC Water standardizes sewer pipe inspection procedures, defect coding, and condition grading based upon the National Association of Sewer Services Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) system. Therefore, all sewer pipe inspections will include the use of closed-circuit television (CCTV) to identify and classify defect observations based on NASSCO PACP.

However, pipe inspections may also include other technologies that provide different information regarding the condition of the asset. The data collected using these technologies may be continuous or periodic, giving snapshots of the pipe condition. Pipe inspections covered under this protocol may include one or a combination of the following technologies:

- Closed-Circuit Television (CCTV) – Continuous video recording to identify pipe defects visually
- Sound Navigation and Ranging (SONAR) – Continuous identification of obstructions and loss of pipe material below the water level
- Light Amplification by Stimulated Emission of Radiation (LASER) or Light Detection and Ranging (LIDAR) – Continuous identification of pipe loss and corrosion (usually due to hydrogen sulfide gas in sanitary sewers) above the water level
- Sewer Walk – Manual investigation of asset, where a person enters the sewer and walks the alignment
- Rebound Hammer Test – Periodic measurement of the elastic properties or strength of concrete, mainly surface hardness and penetration resistance
- Pipe Penetrating Radar (PPR) – Periodic application of electromagnetic waves to identify voids behind the pipe wall

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During inspections, characteristics of the sewer system may be observed that were not viewable from the surface. It is important to update the City's Geographic Information System (GIS), the system of record for access point and pipe asset data, to reflect these observations. These GIS mapping updates of assets are integral to facilitating system maintenance, providing information for design projects, and accounting for recent infrastructure improvements.

This document provides the protocols related to sewer pipe inspections as part of the KC Water's Smart Sewer Program (SSP).

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2.0 GENERAL

2.1 Inspection Conditions

To the extent practical, pipe inspections should be conducted during:

A. Low flow conditions, to observe pipe condition; and
B. High groundwater conditions, to identify sources of infiltration.

2.2 Inspectors

2.2.1 Definition

The term "*Inspector*" shall be used to describe the person completing the sewer inspection (regardless of the technology utilized) and/or operating the inspection equipment, as well as any person making edits to PACP database field values.

2.2.2 Certification

Any person making edits to PACP database field values, either collecting the field data or making changes to the data in-office, shall be NASSCO PACP-certified with a valid NASSCO PACP certification.

2.3 Prompt Attention Notification

Inspector shall immediately notify via email the SSP Project Manager and KC Water Utility Superintendent (contact information provided by SSP) regarding field observations requiring prompt attention, including but not limited to:

A. Asset failure that may pose an immediate danger to the general public (e.g. missing/broken lids, collapsed connecting pipes, sink holes)
B. Asset failure allowing significant I/I into the sanitary sewer system (e.g. such as an asset failure adjacent to a stream, allowing stream flow to enter the sewer system)
C. Information regarding backups and overflows, such as a backup or overflow occurring at the time of system characterization or inspection
D. Assets containing a flush valve (direct connection to potable water supply)

2.4 Public Notification

Most pipe inspections can be performed within the public right-of-way. However, some pipe inspections may require access to private property or easements outside of the public right-of-way. Therefore,

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notification of occupants and/or property owners is required only for those pipe inspections that require access to private property and/or easements.

2.4.1 Public Notification Procedure

A. *Inspector* shall notify the occupant and/or property owner in-person when possible, such as a door knock and face-to-face conversation. *Inspector* shall answer any questions about the work.

B. If occupant and/or property owner assistance is needed for access to complete the pipe inspection, the *Inspector* shall leave a "Manhole Access Required Door Hanger" at the residence or business.

2.4.2 Public Notification Materials

A. *Inspector* shall utilize the following Notification Materials provided on the Smart Sewer Printing Portal to facilitate Public Notification:

   i. Manhole Access Required Door Hanger

B. *Inspector* shall access Notification Materials from the Smart Sewer Printing Portal using the following instructions:

   i. Go to: kcmo.gov/printingportal

   ii. Click "Log In" at the bottom of the Welcome page.

   iii. Select "Register Now" and fill in your information.

   iv. Once the system administrator has processed your request, you will be notified via email. This may take up to two (2) business days.

   v. Once approved, you will receive an email notification and can return to kcmo.gov/printingportal to log in. You will be redirected to the printing portal, or you can click the "Smart Sewer Collateral" hyperlink.

2.4.3 Public Notification Log

A. The *Inspector* shall maintain a Public Notification Log with a list of all occupants and property owners notified during the work.

B. The Public Notification Log shall include, at a minimum:

   i. Occupant or property owner's name and address;

   ii. Date notified;

   iii. Type of notification materials provided or left; and

   iv. Denied access or concerns raised by the occupant or property owner.

C. If an occupant or property owner denies access, the *Inspector* shall immediately report the situation to the SSP Project Manager via email.

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D. The Public Notification Log shall be a running log documenting subsequent conversations and/or Notification Materials left at the residence or property.
E. The Public Notification Log shall be updated daily and may be requested and reviewed by City at any time.
F. The Public Notification Log shall be included in the final data submittal.

2.5 Safety Plan

All field personnel must follow proper safety procedures including, but not limited to, the following guidelines:

A. A comprehensive safety plan must be in place before work begins, including a designated safety coordinator with a description of their job duties.
B. All National Institute for Occupational Safety and Health (NIOSH) - Occupational safety and Health Administration (OSHA) safety standards are applicable, and compliance is mandatory.
C. Traffic control – When working in street or highway rights-of-way, the traffic-controlled area shall direct vehicular traffic away from the work site following local and state traffic control requirements and the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD).
D. The work area shall be properly barricaded to direct pedestrians safely around the work area.
E. Work on major streets should be scheduled to avoid *rush hour* traffic when possible. (*Rush hour* is assumed to be from 7:00 AM – 9:00 AM and from 4:00 PM – 6:00 PM.)
F. All workers shall wear safety apparel, including but not limited to, reflective safety vests/shirts, over the ankle foot protection, toe-reinforced protection, long pants, and other necessary personal protective equipment while working within the road right-of-way.
G. Entrance into any asset shall be considered Confined Space Entry and shall require proper permitting following 29 CFR 1910.146. *Inspector* is advised that active sewer and manhole environment may be oxygen deficient, may contain toxic and/or explosive gas vapors and liquids, or may be a source of additional health hazards associated with contact with raw wastewater. No manhole shall be entered without trained personnel, proper safety equipment, testing the atmosphere, continuous monitoring of the atmosphere, and documentation for the confined space permit for the carbon dioxide (CO_2), hydrogen sulfide (H_2S) and oxygen (O_2) gas levels. Ventilation may be required to eliminate the hazard. Failure of any parameter shall preclude entry.
H. Work Stop Authority – Failure to meet safety standards will result in immediate shutdown of the field crew. If there is an unsafe situation, the field personnel can stop the task to evaluate the situation, call for help, or reschedule the task.

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3.0 PIPE INSPECTION REQUIREMENTS

3.1 General

These requirements are written to promote data collection and reporting consistency and are not intended as step-by-step instructions. *Inspectors* shall use personal experience and best professional judgement during all phases of sewer pipe inspection.

3.2 Technology Platforms and Industry Standards

3.2.1 Technology Platforms

Inspector shall provide the SSP Project Manager access to an online geospatial web application that clearly displays and labels:

A. Pipes with Segment IDs
B. Access Points with UNITIDs
C. Inspection Completion Status
D. Recommended Inspection Type
E. Inspection Type Used

3.2.2 Industry Standards

Pipe inspections shall comply with the latest version of NASSCO PACP.

3.3 Planning

Appropriate planning measures shall be taken prior to the start of work. Planning items include, but are not limited to, the following:

3.3.1 PACP Certification Credentials

Inspector names, NASSCO PACP certification numbers, and NASSCO PACP certificate expiration dates shall be provided to the SSP Project Manager at least five (5) calendar days prior to the start of work. Names provided should be those making edits to PACP database field values, either collecting the field data or making changes to the data in-office.

3.3.2 Online Geospatial Web Application Login Information

Inspector shall provide the SSP Project Manager login information for the Technology Platform at least five (5) calendar days prior to the start of work.

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3.3.3 City GIS

City will provide GIS files that indicate pipe segments to be inspected and/or access points to be located, including unique identifiers for upstream and downstream access points (e.g., manholes, inlets).

3.3.4 CNO, CNL, and CNA Lists

SSP will provide lists of access points that could not be opened (CNO), could not be located (CNL), and/or could not be accessed (CNA) during system characterization and/or access point inspections to *Inspector*, if applicable.

3.3.5 Supplemental Information

SSP may provide supplemental information to *Inspector*. *Inspector* shall use supplemental information (if provided) to aid system characterization and/or access point inspections. Supplemental information may include:

A. Map(s) in portable digital format (PDF) of pipe segments to be inspected, based on the City GIS files provided
B. Sewer Record Books
C. Other documents, as applicable.

3.3.6 Flow Control/Bypass Pumping

Inspector should schedule inspections during periods of low flow to maximize the viewing area and the extent of the inspection; flow levels during inspections should be no greater than 15% of the pipe diameter (or height if non-circular pipe shape).

A. If assistance is required to aid in the control of flow within a pipe, then *Inspector* shall notify the SSP Project Manager at least seventy-two (72) hours in advance of the scheduled inspection.
B. If flow levels cannot be adequately lowered, the *Inspector* shall coordinate through the SSP Project Manager the use of other methods of flow control such as plugging or bypass pumping.
C. *Inspector* may request permission for nighttime work where flows cannot be adequately controlled. *Inspector* shall submit requests for nighttime work to the SSP Project Manager at least seventy-two (72) hours in advance of the scheduled inspection.shema

3.4 Equipment

Equipment used when performing pipe inspections and access point location services shall meet the following specifications:

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3.4.1 Two-Way Communication

All *Inspectors* and crew members shall carry a cellular phone or other form of two-way communication.

3.4.2 Manned-Entry

A. If confined space entry is necessary, the *Inspector* shall provide all equipment necessary for a safe working condition and entry in conformance with Section 2.5 Safety Plan.
B. Entry into access points (i.e. manholes, inlets) shall not rely on use of existing steps within the access point.

3.4.3 Sonde Equipment

A. In-line sewer inspections provide information about the sewer system that may not be visible from surface and/or access point inspections such as bends and buried access points. Therefore, all sewer inspections shall be performed with accompanying sonde equipment for locating these alignment changes and/or buried access points.
B. Sonde equipment shall have the capability of being located to a depth of at least 20 feet.

3.4.4 GPS Equipment

A. Equipment used must be capable of providing global positioning system (GPS) coordinates for horizontal location (X & Y coordinates) and elevation (Z coordinate).
B. All GPS equipment shall be in calibration/adjustment and verified against a known baseline or existing control with similar relative accuracy prior to the start of work.
C. Equipment utilized for surveying shall be of the same make and model per project for consistency of data collection and accuracy.
D. MACP "Survey Level" GPS equipment should be used when possible.
E. If GPS coordinates with "Survey Level" accuracy cannot be obtained, MACP "Sub-Meter" accuracy equipment may be used.
F. If GPS coordinates with "Sub-Meter" accuracy cannot be obtained, then GPS equipment with MACP "Nearest Meter" accuracy may be used.
G. GPS coordinates of an access point may be obtained by location offset from the access point using traditional survey techniques via triangulation or distance/bearing references. The GPS Type shall be classified based on the GPS accuracy (Survey Level, Sub-Meter, Nearest Meter) of the reference location and the techniques used to calculate the horizontal location and elevation of the asset.
H. If no GPS coordinates can be obtained, including via offset, due to site specific constraints, then the access point location may be updated based on aerial photography.

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3.4.5 CCTV Equipment

The CCTV equipment shall have the following minimum features and capabilities:

A. The equipment shall be a pushing cable, tractor, or float unit.
   (Exception: CCTV equipment may be mounted to *Inspector* for Sewer Walks ONLY).
B. The camera shall be designed specifically for pipe inspections.
C. The equipment shall be fog-resistant, capable of operating in 90% humidity.
D. The equipment shall include a cable footage counter so that the location of defects and service laterals relative to the starting access point location can be reported.
   i. The cable footage counter shall be able to reach a minimum of 1,000 feet.
   ii. The footage counter shall be accurate to 0.5 feet per 100 feet (0.5%) and shall be calibrated daily.
   iii. Calibration may be performed by checking the cable footage counter against a pre-measured length of 50 to 300 feet.
E. The equipment shall have either manual or digital pan, tilt, and/or zoom capabilities to facilitate defect viewing.
F. The equipment shall have a minimum of 640 lines of resolution, with a minimum of 1280 lines of resolution for High-Definition CCTV (HDCCTV).
G. The equipment shall record full color video.
H. The equipment shall have automatic and/or remote focus and iris control.
I. The equipment shall be capable of producing MP4 video recordings of each segment inspected.
J. The equipment shall include a lamp capable of lighting the entire periphery of the pipe.
K. If sewer service laterals are to be inspected, the equipment shall include a “side-shot” camera tool provided specifically for lateral inspections.
L. The equipment shall be able to fit through a minimum opening width of 20.625 inches.
M. The equipment shall be capable of recording defects in accordance with the NASSCO PACP defect coding system.
N. The equipment shall produce deliverables of quality acceptable to the City.
   i. Equipment that does not produce deliverables of quality acceptable to the City shall be replaced, at no additional cost to the City.
   ii. For deliverables that are not accepted by the City, the inspection shall be re-conducted at no additional cost to the City.

3.4.6 SONAR Equipment

The SONAR equipment shall have the following minimum features and capabilities:

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A. The equipment shall be specifically designed for pipe inspections.
B. The equipment shall be capable of being mounted on a float or tractor.
C. The equipment shall have integrated pitch and roll sensing.
D. The equipment shall be capable of recording data to be related to pipe circumferential position and relative location as measured from the access point.
E. The equipment shall be capable collecting and recording data for up to 3 hours.
F. The equipment shall be capable of producing a summary of cross-sectional imagery showing pipe restrictions, voids/defects and estimated quantity of debris.
G. The equipment shall be capable of transmitting continuous, digital data for topside viewing.
H. The equipment shall have a frequency greater than or equal to 2 MHz.
I. The equipment shall have an acoustic beam width less than or equal to 1.8-degrees conical.
J. The equipment shall be able to fit through a minimum opening width of 20.625 inches.
K. The equipment shall be capable of recording defects in accordance with the NASSCO PACP defect coding system.
L. The equipment shall produce deliverables of quality acceptable to the City.
    i. Equipment that does not produce deliverables of quality acceptable to the City shall be replaced, at no additional cost to the City.
    ii. For deliverables that are not accepted by the City, the inspection shall be re-conducted at no additional cost to the City.

3.4.7 LASER Equipment

The LASER equipment shall have the following minimum features and capabilities:

A. The equipment shall be specifically designed for pipe inspections.
B. The equipment shall be capable of being mounted on a float or tractor.
C. The equipment shall be fog-resistant, capable of operating in 90% humidity.
D. The equipment shall be capable collecting and recording data for up to 3 hours.
E. The equipment shall be capable of transmitting continuous, digital data for topside viewing.
F. The equipment shall have a minimum frame rate of 10 frames per second.
G. The equipment shall have an angular resolution of 0.25-degrees or better.
H. The equipment accuracy shall be a minimum of 0.3% at 30 feet.
I. The equipment shall be able to fit through a minimum opening with of 20.625 inches.
J. The equipment shall be capable of recording defects in accordance with the NASSCO PACP defect coding system.
K. The equipment shall produce deliverables of quality acceptable to the City.

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i. Equipment that does not produce deliverables of quality acceptable to the City shall be replaced, at no additional cost to the City.
ii. For deliverables that are not accepted by the City, the inspection shall be re-conducted at no additional cost to the City.

3.4.8 LIDAR Equipment

The LIDAR equipment shall have the following minimum features and capabilities:

A. The equipment shall be specifically designed for pipe inspections.
B. The equipment shall be capable of being mounted on a float or tractor.
C. The equipment shall be fog-resistant, capable of operating in 90% humidity.
D. The equipment shall be capable collecting and recording data for up to 3 hours.
E. The equipment shall be capable of transmitting continuous, digital data for topside viewing.
F. The equipment shall have an angular resolution of 0.25-degrees or better.
G. The equipment accuracy shall be a minimum of 0.3% at 30 feet.
H. The equipment shall be able to fit through a minimum opening with of 20.625 inches.
I. The equipment shall be capable of recording defects in accordance with the NASSCO PACP defect coding system.
J. The equipment shall produce deliverables of quality acceptable to the City.
   i. Equipment that does not produce deliverables of quality acceptable to the City shall be replaced, at no additional cost to the City.
   ii. For deliverables that are not accepted by the City, the inspection shall be re-conducted at no additional cost to the City.

3.4.9 Sewer Walk Equipment

A. Sewer walks shall be conducted using all equipment necessary for a safe working condition (see Section 2.5 Safety Plan).
B. All sewer walks shall be performed with CCTV equipment (see Section 3.4.5 CCTV Equipment) and additional testing equipment (see Section 3.4.10 PPR Equipment and/or Section 3.4.11 Rebound Hammer Test Equipment) as applicable.
C. The equipment shall produce deliverables of quality acceptable to the City.
   i. Equipment that does not produce deliverables of quality acceptable to the City shall be replaced, at no additional cost to the City.
   ii. For deliverables that are not accepted by the City, the inspection shall be re-conducted at no additional cost to the City.

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3.4.10 PPR Equipment

The PPR equipment shall have the following minimum features and capabilities:

A. PPR shall have a penetration depth of five (5) feet in cohesive soils.
B. The equipment shall be able to fit through the frame of a circular manhole with a diameter of 20.625-inches.
C. The equipment shall produce deliverables of quality acceptable to the City.
    i. Equipment that does not produce deliverables of quality acceptable to the City shall be replaced, at no additional cost to the City.
    ii. For deliverables that are not accepted by the City, the inspection shall be re-conducted at no additional cost to the City.

3.4.11 Rebound Hammer Test Equipment

The Rebound Hammer Test (also referred to as the Swiss/Schmidt Hammer Test) measures the relative compressive strength of rigid pipe materials, most often concrete. The equipment shall have the following minimum features and capabilities:

A. The Rebound Hammer shall be calibrated per manufacturer requirements.
B. The Rebound Hammer shall be designed for use on the pipe material being tested and shall not be operated in such a way that damages the assets being tested.
C. The equipment shall produce deliverables of quality acceptable to the City.
    i. Equipment that does not produce deliverables of quality acceptable to the City shall be replaced, at no additional cost to the City.
    ii. For deliverables that are not accepted by the City, the inspection shall be re-conducted at no additional cost to the City.

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3.5 Access Point Location

3.5.1 Assets Designated Could Not Open (CNO) during System Characterization

A. If applicable, City will provide *Inspector* with a list of assets that were designated as Could Not Open (CNO) during system characterization and/or access point inspections, the CNO List.
B. The *Inspector* shall attempt to open the assets on the CNO List.
C. *Inspector* shall update status designations in the CNO List (Attachment 1) per Section 3.6 Status Designations.
D. *Inspector* shall update relevant fields in the CNO List.

E. *Inspector* shall provide an Area Photo for each access point on the CNO List.
F. If the access point cover is broken or damaged during attempt to open the structure, *Inspector* shall notify the City and SSP Project Manager immediately and remain on-site until the City arrives with a replacement cover.

3.5.2 Assets Designated Could Not Locate (CNL) during System Characterization

A. If applicable, City will provide *Inspector* with a list of assets that were designated as Could Not Locate (CNL) during system characterization and/or access point inspections, the CNL List.
B. The *Inspector* shall attempt to locate and open the assets on the CNL List.
C. *Inspector* shall update status designations in the CNL List (**Error! Reference source not found.**) per Section 3.6 Status Designations.
D. *Inspector* shall update relevant fields in the CNL List.
E. *Inspector* shall provide an Area Photo for each access point on the CNL List.
F. If the access point cover is broken or damaged during attempt to open the structure, *Inspector* shall notify the City and SSP Project Manager immediately and remain on-site until the City arrives with a replacement cover.

3.5.3 Assets Designated Could Not Access (CNA) during System Characterization

A. If applicable, City will provide *Inspector* with a list of assets that were designated as Could Not Access (CNA) during system characterization and/or access point inspections, the CNA List.
B. The *Inspector* shall attempt to access, locate, and open the assets on the CNA List.
C. *Inspector* shall update status designations in the CNA List (**Error! Reference source not found.**) per Section 3.6 Status Designations.
D. *Inspector* shall update relevant fields in the CNA List.
E. *Inspector* shall provide an Area Photo for each access point on the CNA List.
F. If the access point cover is broken or damaged during attempt to open the structure, *Inspector* shall notify the City and SSP Project Manager immediately and remain on-site until the City arrives with a replacement cover.

3.6 Status Designations

A. **Opened** – *Inspector* was able to open the access point.
B. **Located & Opened** – *Inspector* was able to locate and open the access point.
    i. *Inspector* shall update the COORD_X and COORD_Y of the access point in the CNL or CNA List (if applicable).

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C. **Could Not Open (CNO) - Seized** – *Inspector* was unable to open the access point because the frame and/or cover was corroded, damaged.
   i. If the access point cannot be opened due because the frame and/or cover was corroded, damaged, *Inspector* shall update the CNO, CNL, or CNA List (if applicable), describing what attempts were made to open the access point.
   ii. For assets not in the CNO, CNL, or CNA List (if applicable), *Inspector* shall:
      a. Update the Project Summary Report (see Section 5.9 Project Summary Report), including in the significant issue description field the status designation and what attempts were made to open the access point.
      b. Include the issue in the Project Status Report (see Section 5.3 Project Status Reports).

D. **Could Not Open (CNO) - Buried** – *Inspector* was able to locate the access point and obtain or attempt to obtain GPS coordinates, but was not able to open the access point because it was buried under pavement or under debris/earthen materials 6 inches or greater.
   i. If the access point is buried under debris/earthen materials less than 6 inches, then *Inspector* shall remove the soil, grass, or rocks. Access points that are uncovered shall not be assigned the status designation "Could Not Open (CNO) - Buried".
   ii. If the access point cannot be opened due to burial, *Inspector* shall update the CNO, CNL, or CNA List (if applicable), describing what the access point is Buried Under and the Buried Depth for access points buried under debris/earthen materials (e.g., under pavement, under debris/earthen materials, 6 inches).
   iii. For assets not in the CNO, CNL, or CNA List (if applicable), *Inspector* shall:
      a. Update the Project Summary Report (see Section 5.9 Project Summary Report), including in the significant issue description field the status designation and what the access point is Buried Under and the Buried Depth for access points buried under debris/earthen materials (e.g., under pavement, under debris/earthen materials, 6 inches).
      b. Include the issue in the Project Status Report (see Section 5.3 Project Status Reports).

E. **Could Not Access (CNA) - Temporary** – *Inspector* was unable to access the access point with reasonable effort due to a temporary access issue (e.g., resident was not home to obtain permission for entry onto private property, car parked over asset, dog in backyard, asset was inside a locked gate, locked public facility, etc.).
   i. *Inspector* shall update the CNO, CNL, or CNA List (if applicable), describing in the comments field why the asset could not be accessed (e.g., parked car, locked gate, dog in yard, etc.).
   ii. For assets not in the CNO, CNL, or CNA List (if applicable), *Inspector* shall:

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a. Update the Project Summary Report (see Section 5.9 Project Summary Report), including in the significant issue description field the status designation and why the asset could not be accessed (e.g., parked car, locked gate, dog in yard, etc.).
b. Include the issue in the Project Status Report (see Section 5.3 Project Status Reports).

F. **Could Not Access (CNA) - Permanent** – *Inspector* was unable to access the access point due to a permanent access issue (e.g. permanent structure built on top of the asset, such as a deck, fence, building, playground equipment, access point raised 8 feet in the air,).
   i. *Inspector* shall update the CNO, CNL, or CNA List (if applicable), describing in the comments field why the asset could not be accessed (e.g. deck, raised 8 feet in the air, etc.).
   ii. For assets not in the CNO, CNL, or CNA List (if applicable), *Inspector* shall:
      a. Update the Project Summary Report (see Section 5.9 Project Summary Report), including in the significant issue description field the status designation and why the asset could not be accessed (e.g., deck, raised 8 feet in the air, etc.).
      b. Include the issue in the Project Status Report (see Section 5.3 Project Status Reports).

G. **Could Not Locate (CNL)** – *Inspector* was unable to locate the access point from surface investigations (see Section 3.6.4 Surface Investigations) but was able to confirm that the access point exists during inspection of sewer pipe (see Section 3.6.3 Subsurface Investigations).
   i. *Inspector* shall update the CNO or CNA List (if applicable), describing in the comments field what efforts were made to locate the access point (e.g., field search, metal detector, sonde, etc.).
   ii. For assets not in the CNO or CNA List (if applicable), *Inspector* shall:
      a. Update the Project Summary Report (see Section 5.9 Project Summary Report), including in the significant issue description field the status designation and what efforts were made to locate the access point (e.g., field search, metal detector, sonde, etc.).
      b. Include the issue in the Project Status Report (see Section 5.3 Project Status Reports).

H. **Does Not Exist (DNE)** – *Inspector* was unable to locate the access point during inspection of the sewer pipe (see Section 3.6.3 Subsurface Investigations) or surface investigations (see Section 3.6.4 Surface Investigations).
   i. *Inspector* shall update the CNO, CNL, or CNA List (if applicable), describing in the comments field what efforts were made to locate the access point (e.g., field search, metal detector, sonde, etc.).
   ii. *Inspector* shall add DNE access points that are displayed in the City GIS, to the Map Change Form "DNE" (see Section 5.14 Map Change Forms).

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a. *Inspector* shall provide the UNITID of the access point that Does Not Exist (DNE) and any relevant comments such as field what efforts were made to locate the access point (e.g., field search, metal detector, sonde, etc.).
b. *Inspector* shall maintain a running log of all DNE access points using the Map Change Form "DNE" (see Section 5.14 Map Change Forms).

3.6.2 Field Investigations

3.6.3 Subsurface Investigations

Inspector shall attempt to locate the missing access point from the subsurface (while conducting sewer inspection) utilizing specialty equipment such as a CCTV camera sonde transmitter.

3.6.4 Surface Investigations

A. *Inspector* shall attempt to locate the missing access points from the surface.
B. These surface investigations shall be performed for approximately 20 minutes and shall include:
   i. *Inspector* shall make all reasonable effort to conduct a field search to locate the access point. Access points may be in difficult areas such as overgrown easements or in congested areas (e.g., intersections), where several access points may be present and some buried or paved over.
   ii. *Inspector* shall conduct a comparison of field conditions against the City GIS, aerial imagery, and supplemental information (if provided by City) to locate the access point.
   iii. *Inspector* shall utilize specialty equipment such as metal detectors to attempt to locate the access point.

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3.7 Area Photo

A. In addition to Area Photos required for Section 3.5 Access Point Location, *Inspector* shall provide an Area Photo of each access point that the *Inspector* Could Not Open (CNO) and Could Not Locate (CNL) that were not included on the CNO, CNL, and CNA Lists (see Section 3.5 Access Point Location).
B. The Area Photo shall document the manhole location and surrounding area.
C. The photograph shall be taken at a vantage point that allows the marking paint to be visible and at least one identifiable fixed landmark visible in the background or side ground.
D. The photograph shall include a plaque bearing the asset unique identifier and the camera cardinal direction; or should have the asset unique identifier and the camera cardinal direction digitally overlain on the photograph such that it will not interfere with the image of the asset opening.

E. See Figure 3.1 for an example.

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Figure 3.1: Example Area Photo

3.8 Asset Identification

3.8.1 Unique Identifier Naming Convention for Point Feature Assets

Point feature assets are assigned a unique identifiers in the City GIS UNITID attribute field by the following four-part naming convention:

A. Part 1 – South "S" or North "N" designator based on location relative to the Missouri River
B. Part 2 – Three-digit sewer atlas number
C. Part 3 – Operator or alphabetical character:
    i. Manhole to Inspect (wwManhole): Hyphen "-"
    ii. Inlet to Inspection (swInletPoint): "I"
    iii. Fitting (wwFitting): "F"
D. Part 4 – Three-digit or four-digit asset number within the sewer atlas, determined by asset type:
    i. Manhole (wwManhole): Three-digit
    ii. Inlet (swInletPoint): Four-digit
    iii. Fitting (wwFitting): Four-digit
E. Examples:
    i. Manhole (wwManhole)

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a. Description: Manhole asset number 200 on sewer atlas 24, south of the Missouri River
b. UNITID: S024-200.

ii. Inlet (swInletPoint)
a. Description: Inlet asset number 200 on sewer atlas 24, south of the Missouri River
b. UNITID: S024I0200.

iii. Fitting (wwFitting)
a. Description: Fitting asset number 200 on sewer atlas 24, south of the Missouri River
b. UNITID: S024F0200

3.8.2 Identifying and Naming New Structures

A. Access points and fittings are sometimes not yet identified in the City's GIS or are newly constructed.

B. *Inspector* shall temporarily name the newly discovered structure by assigning the UNITID of the nearest upstream access point and sequentially adding the suffix "a", "b", "c", etc. See example in Figure 3.2.

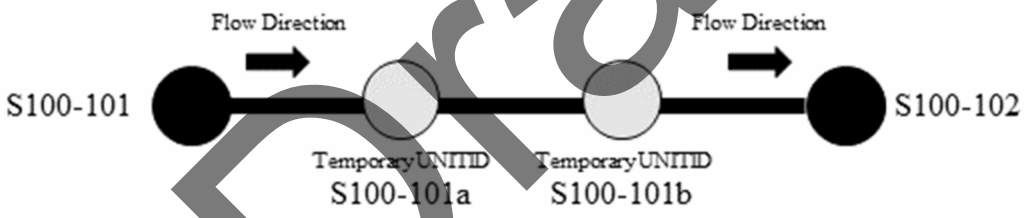

Figure 3.2: Temporary UNITID for Newly Identified Manholes

C. *Inspector* shall add access points discovered in the field, which are not displayed in the City GIS, to the Map Change Form "New Structure" (see Section 5.14 Map Change Forms).

i. *Inspector* shall periodically request permanent UNITIDs from the SSP Project Manager and replace all temporary UNITIDs in the deliverables prior to deliverable submittal.

ii. *Inspector* shall provide the structure type (e.g., manhole, inlet, or other), X-coordinate, and Y-coordinate (coordinates in State Plane Coordinate System Missouri West 2403, feet), original pipe segment reference, and revised upstream and downstream pipe segment references for the assets that need a UNITID.

iii. *Inspector* shall maintain a running log of all permanent UNITIDs requested from the SSP Project Manager using the Map Change Form "New Structure" (see Section 5.14 Map Change Forms).

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3.8.3 Changing Structure Types

A. If an access point or fitting asset is on the incorrect feature layer, *Inspector* shall add a the structure to the Map Change Form "Structure Type" (see Section 5.14 Map Change Forms).
   i. Examples:
      a. Access point is incorrectly identified as an "Inlet" when it should be a "Manhole"
      b. Access point is incorrectly identified as a "Manhole" when it should be an "Inlet"
      c. Asset is incorrectly identified as a "Fitting" when it should be a "Manhole"
      d. Asset is incorrectly identified as a "Fitting" when it should be an "Inlet"
      e. Asset is incorrectly identified as a "Manhole" when it should be a "Fitting"
      f. Asset is incorrectly identified as a "Inlet" when it should be an "Fitting"

B. *Inspector* shall periodically request permanent UNITIDs from the SSP Project Manager for those assets which need a change in structure type and replace all original UNITIDs of the wrong structure type in the deliverables prior to deliverable submittal.

C. *Inspector* shall provide the original UNITID, original structure type (e.g., manhole, inlet, or other), and revised structure type for the assets that need a new UNITID.

D. *Inspector* shall maintain a running log of all permanent UNITIDs requested from the SSP Project Manager using the Map Change Form "Structure Type" (see Section 5.14 Map Change Forms).

3.9 Inspection and Data Collection

3.9.1 General

A. The overall effectiveness of sewer inspections is directly related to the completeness and accuracy of the data collected.

B. At a minimum, all sewer inspections shall include CCTV.

C. The recommended inspection type will be provided by the City. Recommended inspection type includes but is not limited to the following:
   i. CCTV
   ii. CCTV + SONAR + LASER/LIDAR
   iii. CCTV Sewer Walk

D. The Inspector shall use best judgement when performing inspections based on these recommendations or determining if SONAR and/or LASER/LIDAR data should be processed.

E. *Inspector* shall perform sewer pipe inspections from access point to access point unless a pipe converges into another pipe alignment at a fitting; then the inspection shall be performed from access point to fitting. See Figure 3.3.

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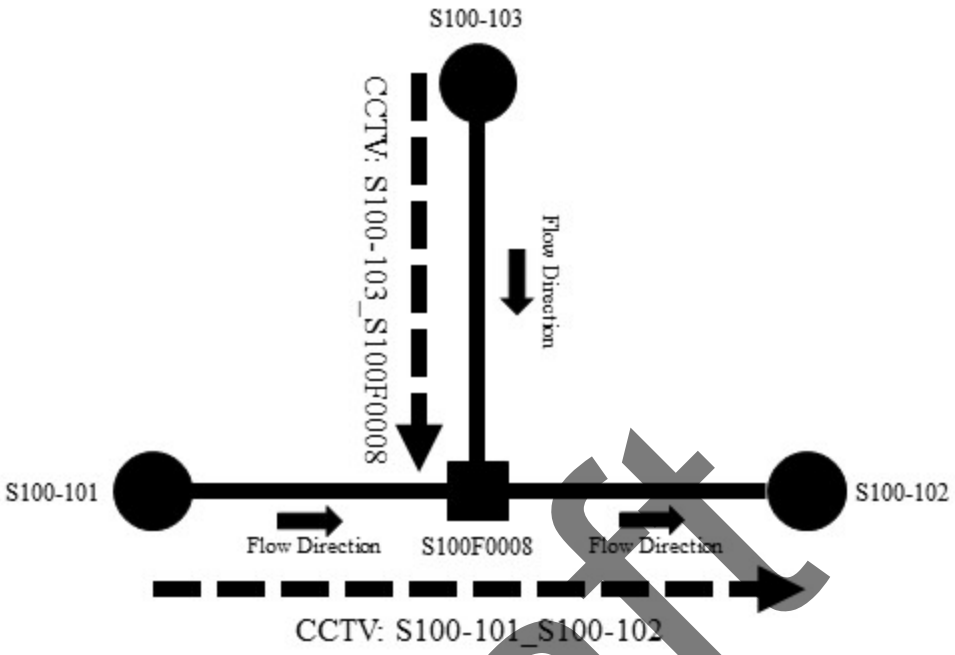

Figure 3.3: Performing Sewer Pipe Inspections

3.9.2 Alternative Inspection Technology Notification

A. The *Inspector* shall notify the SSP Project Manager, via email, within 24 hours for sewer inspections where the recommended inspection type is:
   i. Insufficient to obtain a wholistic condition assessment of the sewer asset based on field observations; or
   ii. Unsafe to perform (as determined by the *Inspector*) due to encountered field conditions.

B. The *Inspector* shall recommend an alternate inspection technology based on the field conditions and limitations of the equipment. The *Inspecto*r may proceed with alternate technology upon receipt of written approval by the SSP Project Manager.

3.9.3 Sewer Line Cleaning

A. *Inspector* shall perform sewer line cleaning work in an upstream to downstream approach.

B. The use of various sewer line cleaning methods (Light Cleaning, Heavy Cleaning, and Mechanical Cleaning) shall be as required per the Contract Documents.

C. If light cleaning equipment fails to traverse the entire pipe section or *Inspector* believes that the amount of debris present in a pipe segment cannot be removed by light cleaning, *Inspector* shall notify the SSP Project Manager via email including photographic documentation of the debris,

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the proposed cleaning method (Heavy Cleaning or Mechanical Cleaning), and an estimate of the time to remove the debris. If the debris cannot be removed or if the time to remove the debris exceeds 25% of the original estimate for time to remove the debris, *Inspector* shall notify the SSP Project Manager via email within 24 hours.

i. Light Cleaning shall be defined as up to three (3) slow passes with high-velocity jet-cleaning equipment (per Specification 02676 Sewer Line Cleaning) and/or up to one (1) pass with root-cutting equipment if roots are present.
ii. Heavy Cleaning shall be defined as more than three (3) passes with high-velocity jet-cleaning equipment (per Specification 02676 Sewer Line Cleaning) and/or more than one (1) pass with root-cutting equipment if roots are present.
iii. Mechanical Cleaning shall be defined as the use of any mechanically-powered equipment (per Specification 02676 Sewer Line Cleaning) that is not included in Light Cleaning or Heavy Cleaning.

D. If sewer line cleaning fails to remove the obstruction, the *Inspector* shall attempt to complete the inspection using a reverse set-up.

3.9.4 CCTV

Inspector shall perform CCTV inspections in accordance with the following guidelines:

A. CCTV equipment shall meet the requirements of Section 3.4.5 CCTV Equipment.
B. High-Definition (HDCCTV) shall be used for all sewer lines greater than or equal to 48-inches in diameter (or when height and/or width of non-circular pipe is greater than or equal to 48 inches).
C. Lighting during the inspection shall adequately, but not excessively, illuminate the periphery of the pipe.
D. To limit distortion the camera should be centered in the middle of the pipe to the extent that is practically possible by use of specialized CCTV equipment designed for large diameter sewers.
E. The camera shall move at a steady pace not to exceed 30 feet per minute.
F. The camera should stop to view defects and provide still photos in JPEG format.
G. The camera should stop to view all construction features (including but not limited to service connections and storm/sanitary main connections) and provide still photos in JPEG format.
H. The camera shall capture the general condition of the access points and other incoming and/or outgoing pipes in the starting access point (launch manhole) and ending access point.
I. If an unidentified access point is encountered during the inspection, the inspection shall stop, and a temporary UNITID shall be assigned to the previously unidentified asset per Section 3.8.2 Identifying and Naming New Structures.

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i. *Inspector* shall submit a Map Change Form (see Section 5.14 Map Change Forms), area photos of the new asset location (see Section 3.7 for photo requirements), and a PDF aerial map displaying the change to the SSP Project Manager to request a permanent UNITID for the newly identified asset prior to deliverable submittal.
ii. The inspection documentation and video display shall be renamed to reflect the permanent UNITID, not the temporary UNITID assigned by the *Inspector*.
iii. This change shall also be submitted on the Project Summary Report (see Section 5.9 Project Summary Report).

J. If an abandoned or removed access point is encountered during the inspection, the inspection documentation and video display shall be renamed to reflect the nomenclature of upstream access point to downstream access point for the inspected pipe segment. This change shall also be submitted via Map Change Form (see Section 5.14 Map Change Forms) and on the Project Summary Report.
K. If the flow direction of the pipe segment is different than displayed in the City GIS, the inspection documentation and video display shall be renamed to reflect the nomenclature of upstream access point to downstream access point for the inspected pipe segment. This change shall also be submitted via Map Change Form (see Section 5.14 Map Change Forms).

3.9.5 SONAR

Sound Navigating and Ranging (SONAR) technology may be used to supplement CCTV inspection of sewer lines. SONAR is primarily used to quantify the amount of debris in the pipe to educate operations and maintenance decisions. SONAR may also be used to identify defects in the sewer line below the flow level. SONAR, when used in conjunction with CCTV, can provide a simultaneous image of the sewer asset both above and below the flow level.

A. *Inspector* shall use SONAR to supplement CCTV inspections when the pipe diameter is greater than or equal to 48 inches (or when height and/or width of non-circular pipe is greater than or equal to 48 inches) and the condition of the bottom of the pipe cannot be determined by CCTV inspection alone due to flow conditions.
B. SONAR equipment shall meet the requirements of Section 3.4.6 SONAR Equipment.
C. *Inspector* shall not process SONAR data unless requested by CITY or if insufficient flow depth was present. Inspector shall store unprocessed SONAR data in a format that can be readily processed upon request by the CITY for a minimum of three (3) years after project closeout.

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D. If SONAR processing is requested, *Inspector* shall spatially align SONAR inspection data to CCTV inspection data and append the information collected by SONAR technology to the PACP database deliverable.
   i. *Inspector* shall code SONAR-observed debris/blockages as Deposit Settled Other (DSZ) and input the percentage per PACP standards.

E. SONAR inspection data shall include graphic simulations illustrating conditions below the flow line and cross-sectional imagery identifying pipe restrictions, corrosion, and debris, if present.

3.9.6 LASER or LIDAR

LASER or LIDAR (LASER/LIDAR) technology may be used to supplement CCTV inspection of sewer assets. LASER/LIDAR technology may be used to measure the interior pipe wall and identify deformations of the pipe above the flow level. This technology is typically used in concrete pipe to identify H2S corrosion and pipe loss. LASER/LIDAR inspections can be conducted to document pipe construction, observe flow conditions, and determine depth of debris and structural integrity above the flow line. Graphs of corrosion and buildup can be used to quantify loss or gain of pipe wall along the asset alignment. High-resolution scans showing the pipe cross sections can be used to determine the inside pipe diameter, ovality, and eccentricity of the asset.

A. *Inspector* shall use LASER/ LIDAR to supplement CCTV inspections (and SONAR inspections, when applicable) when the pipe diameter is greater than or equal to 48 inches (or when height and/or width of a non-circular pipe is greater than or equal to 48 inches) and LASER/ LIDAR was the recommended inspection type provided by the City.

B. LASER and/or LIDAR equipment shall meet the requirements of Section 3.4.7 LASER Equipment or Section 3.4.8 LIDAR Equipment, respectively, as applicable.

C. *Inspector* shall not process LASER or LIDAR data unless requested by CITY. *Inspector* shall store unprocessed LASER and LIDAR data in a format that can be readily processed upon request by the CITY for a minimum of three (3) years after project closeout.

D. If LASER or LIDAR processing is requested, *Inspector* shall spatially align LASER/LIDAR inspection data to CCTV inspection data (and SONAR inspection data, when applicable) and append the information collected by LASER/LIDAR technology to the PACP database deliverable.
   i. *Inspector* shall code LASER/LIDAR-observed pipe ovality greater than or equal to 5% based on the pipe material (rigid, flexible, or brick) and input the percentage per PACP standards. Most commonly used PACP defect codes for pipe ovality include Deformed Rigid (DR) Deformed Flexible Bulging Round (DFBR), and Deformed Brick Bulging Round (DTBR).

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ii. *Inspector* shall code LASER/LIDAR-observed pipe wall loss due to corrosion based on estimated wall loss expressed as a percentage as follows, assuming an initial wall thickness based on equivalent circular inside pipe diameter per Table 3.1 when as-built records are unavailable:

a. Surface Roughness Increased (SRI): 5% to less than 10% pipe wall lost
b. Surface Aggregate Visible (SRV): 10% to less than 20% pipe wall lost
c. Surface Aggregate Missing (SAM): 20% to less than 40% pipe wall lost
d. Surface Reinforcement Visible (SRV): 40% to less than 50% pipe wall lost
e. Surface Reinforcement Protruding (SRP): 50% to less than 100% pipe wall lost
f. Surface Missing Wall (SMW): 100% of pipe wall lost

Table 3.1: Assumed Pipe Wall Thickness Based on Inside Pipe Diameter

Inside Pipe Diameter (inches)	Wall Thickness (inches)
48	5.00
54	5.50
60	6.00
66	6.50
72	7.00
78	8.25
54	8.75
90	9.25
96	9.75
108	10.75
120	11.75

iii. *Inspector* shall code LASER/LIDAR-observed debris/blockages as Deposit Settled Other (DSZ) and input the percentage per PACP standards.

E. LASER/LIDAR inspection data shall include graphic simulations illustrating conditions below cross-sectional imagery identifying pipe restrictions, corrosion, ovality, and debris, if present.

3.9.7 Sewer Walk

Sewer walks, a manned-entry inspection technique, with the aid of video equipment allows the *inspector*, to assess and document the internal condition of sewer assets. Manned-entry inspections provide flexibility for the *inspector* to use additional tests to assess the assets condition such as PPR and/or Rebound Hammer Test.

A. Sewer Walks shall be conducted in accordance with Section 2.4 Safety Plan.

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B. *Inspector* shall perform Sewer Walks with CCTV inspections (per Section 3.3.3 CCTV) when the pipe diameter is greater than or equal to 72 inches (or when height of a non-circular pipe is greater than or equal to 72 inches), the observed flow depth is less than 12 inches and/or less than 2 feet per second, and the "CCTV Sewer Walk" was the recommended inspection type provided by the City.
C. CCTV equipment shall meet the requirements of Section 3.3.3 CCTV.
D. *Inspector* shall spatially align observed defects identified by visual inspection and additional test(s) to CCTV inspection data (when applicable) and append the ancillary information collected to the PACP database deliverable.

3.9.8 PPR

Pipe Penetrating Radar (PPR) is an electromagnetic technology that can detect voids within or behind brick or concrete sewer assets. The depth PPR can penetrate is dependent on pipe material and the soil conditions. PPR can also use these radar pulses to identify cracks, corrosion, and other deformations. Radar pulses in the pipe wall are reflected and refracted by sharp changes in material; the greater the difference in the material properties, the more energy that is reflected.

A. *Inspector* may use PPR to supplement Sewer Walk inspections (See 3.5.7 Sewer Walk) when the *Inspector* suspects voids behind the pipe wall.
B. *Inspector* shall input defect information collected by PPR technology to the PACP database deliverable.

3.9.9 Rebound Hammer Test

The Rebound Hammer Test may be used to assess material uniformity and determine the compressive strength of the pipe asset.

A. Rebound Hammer Tests shall be performed as follows:
    i. Per ASTM C805 (hardened concrete) or ASTM D5873 (rock) as applicable based on the observed pipe material.
    ii. All rebound hammer tests shall be conducted in-situ. No core samples shall be collected without written authorization by the City.
    iii. Test areas shall be located every 50 linear feet and at the 3-, 9-, and 12 o'clock positions circumferentially within the pipe unless otherwise directed by the City.
B. *Inspector* shall use caution when conducting Rebound Hammer Tests to not cause damage to the asset. Inspector shall not perform test if *Inspector* is concerned that test will damage asset. For

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example, a Rebound Hammer calibrated for hardened concrete shall not be used on mortar in brick joints.

C. *Inspector* shall input information collected to the PACP database deliverable in the notes field as clock position, followed by average test result at each clock position tested.

3.9.10 Inspection Completion Status

A. **Full** – *Inspector* was able to complete the sewer pipe inspection from upstream access point to downstream access point.

B. **Partial** – *Inspector* was unable to complete the sewer pipe inspection from upstream access point to downstream access point due to some issue encountered within the pipe; however, some of the pipe alignment was inspected. A reversal attempt should be made and coded as described in Section 5.4.2.J.

C. **Unable to Complete (UTC)** – The *Inspector* was unable to complete the sewer pipe inspection in any capacity.

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4.0 QUALITY CONTROL

4.1 *Inspector's* Quality Control Procedure

A. *Inspector* shall define the extent, nature, and implementation of their quality control/quality assurance (QA/QC) program prior to the start of work.
B. The *Inspector's* QA/QC plan shall be submitted to the City prior to the start of work.
C. At a minimum collected field data review shall conform to the requirements of the Section 4.2 NASSCO PACP Quality Control Procedure.
D. QA/QC reviews of the videos and completed field entry forms, and database information shall be performed in preparation of final data deliverables.

4.2 NASSCO PACP Quality Control Procedure

Inspector shall follow the NASSCO PACP Quality Control (Attachment 3).

4.3 City's Quality Control Procedure

The following sections outline the City's minimum quality control procedures. The City reserves the right to adjust quality control reviews based on the performance of the *Inspector*.

4.3.1 Pre-Inspection Verification of Deliverables

A. Within fourteen (14) calendar days following the *Inspector*'s Notice to Proceed, the *Inspector* shall submit an example deliverable in conformance with Section 5.0 Deliverables.
B. The City will review and provide comments on the example deliverable's compliance with this protocol.
C. Pending City review of the example deliverable, *Inspector* may be requested to resubmit a revised example deliverable, addressing City review comments.

4.3.2 Audits

The City reserves the right to audit, at will, the *Inspector*'s quality control procedure.

4.3.3 Data Management QA/QC

4.3.3.1 Data Management Quality Review

The City will perform data management quality control reviews of each deliverable. The City's data management quality control review consists of reviews for completeness, accuracy and conformance to this protocol. At a minimum the City will review the following:

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A. The following deliverables were submitted with each package:
    a. CCTV Video (linked to Access Database)
    b. Feature/Defect Photographs (linked to Access Database)
    ii. PACP Pipe Run, Scoring, and Feature/Defect Photograph Reports
    iii. SONAR, LASER, LIDAR, Rebound Hammer Test, and/or PPR Data Files and Reports
    iv. Project Summary Report
    v. Could Not Open/Could Not Locate/Could Not Access (CNO/CNL/CNA) Lists Sheet
    vi. Map Change Forms (tabular summary and schematics, as required)
B. The following deliverables were submitted with each Project Status Report:
    i. Could Not Open (CNO) List
    ii. Could Not Locate (CNL) List
    iii. Could Not Access (CNA) List and Clearing Request Maps
    iv. Cable Footage Calibration Log
    v. Schedule
C. The above deliverables were completed in accordance with this protocol and any modifications or special requirements in the *Inspector*'s Contract with the City.
D. The PACP database will be checked by WinCan's PACP validator tool and any errors will be returned to the *Inspector* for correction.
E. The *Inspector*'s asset UNITIDs match the City's asset UNITIDs and meet nomenclature requirements of this protocol.
F. The *Inspector's* Cable Footage Counter Calibration Log demonstrates that inspections were performed when the Cable Footage Counter was calibrated per the requirements of Section 3.4.5 CCTV Equipment. The City reserves the right to reject any work and pay application if inspection(s) were completed with a Cable Footage Counter that was not calibrated or that had an accuracy outside of compliance of Section 3.4.5 CCTV Equipment requirements.

4.3.3.2 Quality Review Form

A. The City will develop a Quality Review Form (QRF) with comments outlining potential errors and return the QRF to the *Inspector*.
B. The *Inspector* shall respond to all QRF comments explaining why the data is correct and/or resubmit the entire data deliverable within fourteen (14) calendar days of receiving the QRF.
C. Partial resubmittals of the data deliverable will NOT be accepted.

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5.0 DELIVERABLES

5.1 General

A. Specific details regarding additional required deliverables and frequency of submittals for sewer inspections shall be included in the project's Contract Documents.

B. *Inspector* shall maintain copies of all deliverables for the duration of the project and for a minimum of three (3) years after project closeout.

5.2 Draft Deliverable

A. City will provide WinCan Web access to the *Inspector*.

B. *Inspector* shall upload the final standard PACP exchange database file and associated videos/photos to WinCan Web.

C. In addition to the WinCan web upload, *Inspector* shall deliver the following information in electronic format via email:

   i. PACP Access Database

      a. CCTV Video (linked to Access Database)

      b. Feature/Defect Photographs (linked to Access Database)

   ii. PACP Pipe Run, Scoring, and Feature/Defect Photograph Reports

   iii. Data Files and Reports for SONAR, LASER, LIDAR, Rebound Hammer Test, PPR

   iv. Project Summary Report

   v. Could Not Open/Could Not Locate/Could Not Access (CNO/CNL/CNA) Lists Sheet

   vi. Map Change Forms (tabular summary and schematics, as required)

D. Notification to *Inspectors*

   i. BMCD will notify the *Inspector* via email when deliverable materials are downloaded from the SharePoint or Cloud Server link. This will enable the *Inspector* to clear cloud storage space as needed.

5.3 Project Status Reports

A. The frequency for submittal of Project Status Reports shall be defined in the project Contract Documents.

B. At a minimum the following information shall be included in Project Status Reports:

   i. Could Not Open (CNO) List (if applicable)

   ii. Could Not Locate (CNL) List (if applicable)

   iii. Could Not Access (CNA) List (if applicable)

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iv. Clearing Request Map(s)
v. Cable Footage Counter Calibration Log
vi. Rebound Hammer Calibration Log (if applicable)
vii. Schedule

5.4 PACP Access Database

5.4.1 Technical

The PACP Access Database shall be written in Latest Version used by KC. The video and photo reference location/path shall be limited to one single folder named 'Video' and 'Picture', respectively.

5.4.2 Header

All header fields shall be completed using the PACP abbreviations and units as defined in Latest NASSCO PACP Version. The PACP Access Database shall include, at a minimum, all the PACP mandatory header fields, all non-mandatory header fields that are applicable to the asset or work, and the following non-mandatory and/or City-specific changes to the PACP header fields:

A. Field 1 – Name of the *Inspector*'s Company in a format agreed upon with the City. (Note, this is different than the Field 1 requirement in NASSCO)
B. Field 7 – P/O Number. Defined as the *Inspector's* contract number assigned by the City in four ((4)-digit format.
C. Field 8 – Work Order Number. Work order number or inspection number if assigned by the CITY.
D. Field 14 – Weather
E. Field 20 – Inspection Technology Used
F. Field 25 – Pipe Segment Reference (Upstream Access Point UNITID_ Downstream Access Point UNITID)
G. Field 35 – Lining Method, if applicable.
H. Field 38 – Total Length (Anticipated Length from City GIS). Note, this field is only to be completed in the event of an MSA or partial survey.
    i. Per NASSCO Manual: "The distance from the wall of the starting access point to the wall of finishing access point. If the survey is abandoned, enter the actual total length between access point walls on site or scale this distance off of the drawings. This is the expected length, but NOT NECESSARILY the length surveyed. When measuring from the ground surface or

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scaling from plans or maps, take into account that the measurements are taken from the access point walls and not the center of the structures.

I. Field 39 – Length Surveyed
   i. Per NASSCO Manual: "Enter the distance actually surveyed. If the survey is abandoned, enter the actual length surveyed, i.e. the distance displayed on the counter. This may differ from Field 38 if the survey was abandoned."

J. Field 59 – Additional Information, if applicable. Record REVERSAL as necessary. REVERSAL designation shall be used when original PACP survey direction was abandoned and has a completion status of partial. The REVERSAL code shall be used to indicate an inspection was made from the other direction.

5.4.3 Inspection Form

The CCTV inspection form within the PACP access database shall be completed in accordance with NASSCO requirements and include the following additions:

A. The 'VCR Time' or 'Video Time' shall be included at the appropriate time in the CCTV video that represents the defect or feature code if overlay software allows. An acceptable alternative to the VCR Time is to identify the length associated with the defect in the overlay.
B. The remarks column shall be used to identify Drop Connections, Diversion Structures, Lamp Holes, Grit Chambers, etc.

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5.5 PACP Pipe Run, Scoring, and Feature/Defect Photograph Reports

Inspector shall provide a PACP Report for each pipe segment in PDF that contains:

A. Pipe run information pursuant to Sections 5.4.2 Header and 5.4.3 Inspection Form
B. Structural, Operation and Maintenance, and Overall Quick/Pipe/Index ratings and total ratings for each grade.
C. Feature/defect photographs
D. Naming Convention of Pipe Run and Scoring Reports
   i. Pipe Run_S075-626_S075-320_20210510_D
   ii. Pipe Scoring_S075-626_S075-320_20210510_D

5.6 CCTV Video

A. One (1) electronic video, in MP4 file format, shall be submitted for each pipe segment inspected.
B. The opening frame of each video shall display at a minimum the following information:

i. Inspection date
ii. Inspection time
iii. Weather, PACP Field 14 – Weather
iv. Pipe Segment Reference
v. Upstream Access Point UNIT ID
vi. Downstream Access Point UNITID
vii. Direction of inspection
    a. "D" shall indicate "downstream" inspection direction. Downstream direction indicates that inspection was performed from upstream access point structure to downstream access point structure.
    b. "U" shall indicate "upstream" inspection direction. Downstream direction indicates that inspection was performed from downstream access point structure to upstream access point structure.
viii. Pipe Height, PACP Field 31 – Height (Diameter for circular pipes)
ix. Pipe Width, PACP Field 32 – Width (leave blank for circular pipes)
x. Pipe Shape, PACP Field 33 – Shape
xi. Pipe Material, PACP Field 34 – Material

C. The following minimum information shall be continually displayed throughout the entirety of the video recording:
    i. Inspection date
    ii. Inspection time
    iii. Running Footage - current inspection distance relative to the starting position
    iv. Upstream Access Point UNITID
    v. Downstream Access Point UNITID
    vi. Direction of inspection
D. Each video file shall be named using the upstream to downstream unique asset identifiers (UNITID), underscore date stamp, and underscore inspection direction.
    i. UNITID for the upstream and downstream access points shall be per Section 3.8.1 Unique Identifier Naming Convention for Point Feature Assets.
    ii. The date stamp shall be presented as four (4)-digit year, followed by two (2)-digit month, followed by two (2)- digit day: "YYYYMMDD".
    iii. "D" shall indicate "downstream" inspection direction.
    iv. "U" shall indicate "upstream" inspection direction.

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v. For example, the video file for the pipe segment from manhole S023-314 to manhole S023-317 inspected upstream to downstream would be named: "S023-314_S023-317_YYYYMMDD_D"

5.7 Data Files and Reports for SONAR, LASER, LIDAR, Rebound Hammer Test, PPR

A. If applicable, SONAR, LASER, LIDAR, Rebound Hammer Test, and/or PPR data files and reports shall be provided for each pipe segment inspected.

B. Each file shall be named using the upstream to downstream unique asset identifiers, underscore date stamp, and underscore inspection direction.

i. Unique asset identifiers of the upstream and downstream access points shall be Section 3.8.1 Unique Identifier Naming Convention for Point Feature Assets.

ii. The date stamp shall be presented as four (4)-digit year, followed by two (2)-digit month, followed by two (2)- digit day: "YYYYMMDD".

iii. "D" shall indicate "downstream" inspection direction.

iv. "U" shall indicate "upstream" inspection direction.

v. For example, the video file for the pipe segment from manhole S023-314 to manhole S023-317 inspected from upstream to downstream would be named: "S023-314_S023-317_YYYYMMDD_D"

5.8 Feature/Defect Photographs

Digital photographs shall be provided for each structural defect, operation and maintenance defect, I/I source, construction feature, and miscellaneous feature.

A. Photographs shall be in JPEG file format.

i. The following minimum information shall be displayed on each photo:

a. Inspection date

b. Inspection time

c. Running Footage - current inspection distance relative to the starting position

d. Upstream Access Point UNITID

e. Downstream Access Point UNITID

f. Direction of inspection

g. Defect Code

B. Each photograph file shall be named using the associated video file name, associated PACP defect code, and three (3)-digit linear footage at which the defect was observed in the pipe segment inspection.

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i. For example, a photograph taken on March 25, 2015, of a Hole Soil Visible defect, 75 linear feet upstream against the direction of flow (reverse set-up), in a pipe segment located south of the Missouri River on atlas map 24 between manholes 500 (upstream manhole) and 498 (downstream manhole), then the photograph file would be named: "S024-500_S024-498_20150325_U_HSV_075"

5.9 Project Summary Report

The Project Summary Report is a tabular summary of the project.

A. The Project Summary Report shall be submitted in .xlsx or .csv file format.
B. At a minimum the Project Summary Report shall include the following fields, organized by pipe segment inspected:
   i. Inspection date
   ii. Upstream Access Point (UNITID)
   iii. Downstream Access Point (UNITID)
   iv. Work Order Number (if provided by CITY)
   v. Pipe Height, PACP Field 31 – Height (Diameter for circular pipes)
   vi. Pipe Width, PACP Field 32 – Width (leave blank for non-circular)
   vii. Pipe Shape, PACP Field 33 – Shape
   viii. Pipe Material, PACP Field 34 – Material
   ix. Total Length – Length of pipe segment as measured in GIS based on X & Y coordinates
   x. Length Surveyed – Total length inspected as measured by Cable Footage Counter
   xi. Inspection Completion Status – Full, Partial, or Unable to Complete. (Any "Partial" inspections or "Unable to Complete" require a reason documented in the "Significant Issue Description" Field.)
   xii. Structural Quick Rating (QSR)
   xiii. Operations & Maintenance Quick Rating (QMR)
   xiv. Overall Quick Rating (QOR)
   xv. Cleaning performed (i.e. Light Cleaning, Heavy Cleaning, Mechanical Cleaning)
   xvi. Volume of debris removed in cubic yards (Mechanical cleaning only)
   xvii. Time spent on mechanical cleaning in hours (or other units as defined in the Contract Documents)
   xviii. Significant Issue Description (Examples include: Reason for reverse set-up, Miscellaneous Survey Abandoned (MSA) and reason for not completing the pipe inspection,

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notations such as manhole is buried, requires clearing for access, private property could not be accessed, etc.)

5.10 Could Not Open (CNO) List

A. If applicable, City will provide a list of access points that were unable to be opened (CNO List) during system characterization to the *Inspector.*

B. From this CNO List, *Inspector* shall provide an updated tabular summary of access points in xlsx or csv file format, updating the Status Designation of the access point based on the circumstance observed by the *Inspector* at the time of pipe inspection.

C. CNO List shall include the following fields:

i. Access Point UNITID

ii. Status Designation from System Characterization (if applicable)

iii. Opening Issue Description from System Characterization (if applicable)

iv. Status Designation assigned by *Inspector* (during CCTV)

v. Comments (as necessary)

5.11 Could Not Locate (CNL) List

A. If applicable, City will provide a list of access points that were unable to be located (CNL List) during system characterization to the *Inspector.*

B. *Inspector* shall provide an updated tabular summary of access points in xlsx or csv file format, , updating the Status Designation of the access point based on the circumstance observed by the *Inspector* at the time of pipe inspection.

C. CNL shall include the following fields:

i. Access Point UNITID

ii. Status Designation assigned by *Inspector* (during CCTV)

iii. COORD_X (in State Plane Coordinate System Missouri West 2403, feet)

iv. COORD_Y (in State Plane Coordinate System Missouri West 2403, feet)

v. Comments (as necessary)

5.12 Could Not Access (CNA) List

A. If applicable, City will provide a list of access points that were unable to be accessed (CNA List) during system characterization to the *Inspector.*

B. From this CNA List, *Inspector* shall provide an updated tabular summary of access points in xlsx or csv file format, updating the Status Designation of the access point based on the circumstance observed by the *Inspector* at the time of pipe inspection.

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C. The CNA List shall include the following fields:
   i. Access Point UNITID
   ii. Status Designation from System Characterization (if applicable)
   iii. Access Issue Description from System Characterization (if applicable)
   iv. Status Designation assigned by *Inspector* (during CCTV)
   v. Access Issue Description assigned by *Inspector* (during CCTV)
   vi. Clearing Requested (Yes/No)
   vii. Clearing Request Map file name per Section 5.13 Clearing Request Map(s) (Note: If no clearing is requested, file name shall indicate "None")

5.13 Clearing Request Map(s)

A. *Inspector* shall submit a Clearing Request Map for each clearing request identified:
   i. in the CNA List (see Section 5.12 Could Not Access (CNA) List).
   ii. in Project Summary Report significant issue description (see Section 5.9 Project Summary Report)
B. Each Clearing Request Map shall be submitted as an electronic PDF file with a sheet size of 8.5x11 inches.
C. Each Clearing Request Map shall have a file name with UNITID, underscore, "ClearingRequest". (For example, if manhole S024-411 could not be accessed due to clearing issues and clearing is requested, the Clearing Request Map file shall be named: "S024-411_ClearingRequest").
D. At a minimum, each Clearing Request Map shall include the following:
   i. City GIS base file
   ii. Aerial photography base file
   iii. North Arrow
   iv. Scale Bar
   v. Legend
   vi. Access points labeled with UNITID and symbology by access point type (Inlet, Manhole, or Other)
   vii. CNA access point for which clearing is being requested clearly identified from other access points in viewport
   viii. Proposed clearing extents and area in square feet

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5.14 Map Change Forms

Map Change Forms shall be used to identify locations where field observations differ from the City GIS. The following types of map change forms should be utilized depending on the situation.

5.14.1 New Structure

Inspector shall provide area photos of newly found assets (see Section 3.7 for photo directions), a PDF aerial map displaying routing changes, and a tabular summary of access points (see Attachment 2, containing example request documents) not displayed in the City GIS in xlsx or csv file format that includes the following fields:

A. Temporary UNITID assigned by the *Inspector* (during CCTV)
B. COORD_X (in State Plane Coordinate System Missouri West 2403, feet)
C. COORD_Y (in State Plane Coordinate System Missouri West 2403, feet)
D. Structure Type
    i. Manhole
    ii. Inlet
    iii. Other (Please clarify in "Comments" field)
E. Original Pipe Segment Reference
F. Revised Upstream Pipe Segment Reference (format for pipe segment reference is UpstreamUNITID_DownstreamUNITID)
G. Revised Downstream Pipe Segment Reference (format for pipe segment reference is UpstreamUNITID_DownstreamUNITID)
H. Permanent UNITID assigned by KC Water
I. Comments (as necessary)

5.14.2 Change in Structure Type

Inspector shall provide a tabular summary (see Attachment 2) of access points that are displayed as with an incorrect structure type in the City GIS in xlsx or csv file format that includes the following fields:

A. Original UNITID assigned in the City GIS
B. Original Structure Type
    i. Manhole
    ii. Inlet
    iii. Other (Please clarify in "Comments" field, e.g. fitting)
C. Comments (as necessary)

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5.14.3 Flow Direction Change

Inspector shall provide a tabular summary (see Attachment 2) of assets that are displayed with an incorrect flow direction in the City GIS in xlsx or csv file format that includes the following fields:

A. Original Pipe Segment Reference (format for pipe segment reference is UpstreamUNITID_DownstreamUNITID)
B. Revised Pipe Segment Reference (format for pipe segment reference is UpstreamUNITID_DownstreamUNITID)
C. Comments (as necessary)

5.14.4 Does Not Exist (DNE)

Inspector shall provide a tabular summary (see Attachment 2) of assets that do not exist as confirmed by subsurface pipe inspection in xlsx or csv file format that includes the following fields:

A. UNITID as assigned in the City GIS
B. Comments (as necessary)

5.14.5 Miscellaneous

A. *Inspector* shall provide a schematic in PDF with a sheet size of 8.5x11 inches for assets that are affected by field-observed connectivity issues and are applicable for the other four (4) map change forms (Sections 5.14.1 New Structure, 5.14.2 Change in Structure Type, 5.14.3 Flow Direction Change, and 5.14.4 Does Not Exist (DNE).
B. Each Map Change Form schematic shall have a file name of the Revised Pipe Segment Reference.
C. The schematic shall, at a minimum, include the following:
    i. Original Pipe Segment Reference
    ii. Revised Pipe Segment Reference
    iii. Two (2) Viewports
        a. Original GIS features
        b. Revised GIS features
    iv. Aerial photography
    v. North Arrow
    vi. Scale Bar
    vii. Legend
    viii. Pipe Flow Direction Arrows

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D. *Inspector* shall provide a tabular summary (see Attachment 2) of assets that are affected by field-observed connectivity issues and/or are not applicable for the other four (4) map change forms (Sections 5.14.1 New Structure, 5.14.2 Change in Structure Type, 5.14.3 Flow Direction Change, and 5.14.4 Does Not Exist (DNE) in xlsx or csv file format that includes the following fields:
   i. Original Pipe Segment Reference (format for pipe segment reference is UpstreamUNITID_DownstreamUNITID)
   ii. Revised Pipe Segment Reference (format for pipe segment reference is UpstreamUNITID_DownstreamUNITID)
   iii. Map Change Form Schematic File Name
   iv. Comments

E. Map Change Forms Excel Sheet and Additional Attachments
   i. The *Inspector* shall include a photo of the structure change on the tab for the specific structure changes (e.g., change of structure type or new structure). The photo should be included as part of the Excel document and also attached as a JPEG to the email. The email should include a narrative in the body describing what the photo depicts and the type of change occurring.

5.15 Cable Footage Counter Calibration Log

A. Cable footage counter calibrations shall be performed in accordance with Section 3.4.5 CCTV Equipment.

B. *Inspector* shall submit a Cable Footage Counter Calibration Log, which, at a minimum, shall include the following:
   i. Calibration Date
   ii. Pre-Measured Length in feet
   iii. Recorded Cable Footage Length in feet
   iv. Difference between Recorded Cable Footage Length and Pre-Measured Length (Cable Footage Length minus Pre-Measured Length)
   v. Percent Difference between Recorded Cable Footage Length and Pre-Measured Length (Difference between Recorded Cable Footage Length and Pre-Measured Length divided by Pre-Measured Length, expressed as percentage)

5.16 Rebound Hammer Calibration Log

A. Rebound Hammer calibrations shall be performed in accordance with manufacturer requirements.

B. *Inspector* shall submit a Rebound Hammer Calibration Log , which at a minimum shall include the following:

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i. Calibration Date
ii. Manufacturer Calibration Requirements (i.e. specification, brochure, product literature, etc.)
iii. Certification of Calibration (if not performed by *Inspector*)

5.17 Schedule

Inspector shall provide a schedule of work complete and anticipated date of final deliverable in a format desirable to the City.

5.18 Final Deliverable

A. The Final Delivery process happens after the following events have occurred:
   i. The Draft Deliverable has been submitted by the inspector. See Section 5.2.
   ii. The Draft Deliverable's standard PACP exchanged database file has been validated without errors.
      a. If the MS Access Database contains errors, they will be corrected, and the Draft Deliverable has to be resubmitted in accordance with the corrected MS Access Database.
   iii. The Draft Deliverable has completed the QA/QC and QRF processes. Note that on some occasions, the QRF is completed for a Draft Deliverable that has not finished the fieldwork.
   iv. Map Change Form Submission
      a. The Map Change form has been submitted, including:
         + Map Change Form_New Structure
         + Map Change Form_Structure Type
         + Map Change Form_Flow Direction
         + Map Change Form_DNE
         + Map Change Form_Misc
   v. KC GIS Team Review
      a. The Map Change Form has been submitted to the KC GIS Team, and all comments and concerns have been addressed with the KC Water Permanent UNITID assigned.
   vi. Reviewed Map Change Form Sent to Inspector
      a. The Reviewed Map Change Form has been sent to the Inspector to incorporate all of the changes in the following documents:
         + Wincan Web Data (e.g., CCTV video, CCTV Titles, CCTV Photos)
         + Summary Excel
         + Access Database
         + The *Inspector*'s GIS Records

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- + The *Inspector*'s Pipe Run and Scoring Reports
- + The Inspector's CCTV reports
- + The CCTV Overlays in the event of a temporary ID being used
- + The CCTV Videos

vii. Completion of Deliverable for All Assets

a. The entirety of the Deliverable is completed for all assets that were sent to the *Inspector* from the Pipe Inspection list, including all of the inspection types, if applicable.

viii. Notification to BMCD

a. The *Inspectors* have notified BMCD through email, provided the updated documents referenced in section VI, and sent the documents or links to the updated Wincan web link.

b. The document can be sent through a SharePoint or Cloud Server link.

ix. Notification to *Inspectors*

a. BMCD will notify the *Inspector* via email when deliverable materials are downloaded from the SharePoint or Cloud Server link. This will enable the *Inspector* to clear cloud storage space as needed.

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ATTACHMENT 1 - COULD NOT OPEN/COULD NOT LOCATE/COULD NOT ACCESS (CNO/CNL/CNA) LISTS SHEET TEMPLATE

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ATTACHMENT 2 - MAP CHANGE FORM & GIS CHANGE TEMPLATES

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ATTACHMENT 3 - NASSCO PACP QUALITY CONTROL

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ATTACHMENT H

02686 Cleaning and Assessment of Gravity Lines

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SECTION 02686 – CLEANING AND ASSESSMENT OF GRAVITY LINES

PART 1 - GENERAL

1.01 SUMMARY

A. The work covered by this section consists of furnishing all materials, labor, equipment and supplies required to perform cleaning and inspection of gravity lines and associated structures. All pipe and structures indicated on the drawings shall be cleaned as described herein. The cleaning shall remove all accumulated grease, sand, grit, solids, roots and debris from the pipe in accordance with the specifications and to the complete satisfaction of the City/Design Professional. The inspection/assessment may include one or more of the following technologies: acoustic inspection, closed-circuit television (CCTV), laser profiling, sonar technology, focused electrode leak location (FELL) technology, light detection and ranging (LIDAR) or multi-sensor inspection. The work shall also include all data storage, data transmission, data analysis and the full reporting of the results.

B. Inspection is used to determine the physical condition of a gravity system by viewing and evaluating the inside of the piping. Condition assessments may be used for one or more of the following purposes:
   1. Verify cleaning operations.
   2. Identify defects that may result in eventual pipe failure or allowing infiltration to enter the pipe.
   3. Identify current failures of the pipe.
   4. Identify obstructions.
   5. Locate and classify connections to the pipe including sources of inflow.
   6. Percent ovality of the pipe.
   7. Corrosion and wall loss analysis.
   8. Pre-rehabilitation verification for alignment, bend analysis, and mandrel testing.
   9. Acceptance inspection.

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1.02 SPECIFICATION MODIFICATIONS

A. It is understood that throughout this section, these Specifications may be modified by appropriate items in Section 01015 – Specific Project Requirements, or as otherwise indicated on the Contract Drawings. The technologies to be used for the project shall be as listed in Section 01015. If a technology is not specified in Section 01015, then by default, CCTV shall be used for the project.

1.03 RELATED SECTIONS

A. Section 00700 – General Conditions.
B. Section 01015 – Specific Project Requirements.
C. Section 01020 − Record Documents.
D. Section 01300 – Submittals.
E. Section 01566 – Cleanup Operations.
F. Section 01700 – Traffic Control.
G. Section 02580 – Pipe Bursting for Gravity Sewers.
H. Section 03362 – Sanitary Sewer Manhole Rehabilitation.
I. Section 06010 – Cured-in-Place Pipe (CIPP), CIPP Point Repairs and End Seals.

1.04 CODES AND STANDARDS

A. The publications listed form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.
B. National Association of Sewer Service Companies (NASSCO):
   1. CCTV inspection, coding, and grading procedures shall be based upon the latest version of NASSCO Pipeline Assessment and Certification Program (PACP) observation classifications.
   2. Manhole inspection, coding, and grading procedures shall be based upon the latest version of NASSCO Manhole Assessment and Certification Program (MACP) observation classifications.
   3. If lateral launches are specified in Section 01015, lateral inspection, coding and grading procedures shall be based upon the latest version of NASSCO Lateral Assessment and Certification Program (LACP) observation classifications.

1.05 DEFINITIONS

A. Safety Representative: as defined by Section 00700 – General Conditions, Article 6 – Contractor's Responsibilities.
B. Cleaning is defined as the removal of all materials and debris from the gravity line, manholes and all other structures along the gravity line. The cleaning shall restore the gravity line to a minimum of 95 percent of the original carrying capacity. This does not include the removal of hard deposits such as minerals or iron scale.
C. Preconstruction Television Inspection: the requirements for Preconstruction Television Inspections are defined in other Sections of the Contract Documents. Sections that include specific requirements include, but are not limited to, the following:
   1. Section 02580 – Pipe Bursting.
   2. Section 06010 – Cured-in-Place Pipe (CIPP), CIPP Point Repairs and End Seals.
D. Post-Construction Television Inspection: All post construction CCTV inspection and/or post installation CIPP inspections will follow all requirements listed in this section, in addition to any other requirements listed in the Contract Documents. Sections that include specific requirements include, but are not limited to, the following:
   1. Section 02580 – Pipe Bursting.
   2. Section 06010 – Cured-in-Place Pipe (CIPP), CIPP Point Repairs and End Seals.

1.06 INFORMATION PROVIDED BY THE CITY

A. As provided in the Contract Documents.
B. Work order numbers, if assigned by the City.
C. "Comp Key" numbers, if assigned by the City.
D. Manhole numbers to be used when unrecorded or unnamed manholes are encountered.
E. GIS shape file or geodatabase of the project area.
F. As-built drawings as needed to complete the scope of work.

1.07 SUBMITTALS

A. Submit as specified in Section 01300 – Submittals.
B. Complete details and specifications covering cleaning procedures, modifications, and equipment to be used.
C. Shop Drawings:
   1. Not applicable.

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D. Product Data:
   1. Complete details and specifications covering all television inspection equipment. Information shall include, but is not limited to, that required to verify conformance with the following:
      (a) Part 2.03 TELEVISION INSPECTION EQUIPMENT FOR MAINLINE SEWERS.
      (b) Part 2.04 TELEVISION INSPECTION EQUIPMENT FOR CONNECTIONS/LATERALS.
      (c) That the equipment is suitable and can provide video recordings in the resolution and format specified in Part 2.05 VIDEO RECORDINGS.
      (d) That the equipment is suitable and can provide still photographs in the resolution and format specified in Part 2.06 PHOTOGRAPHS.
   2. Inspection procedures:
      (a) Provide example NASSCO PACP Header Form to be used.
      (b) Provide example NASSCO PACP Inspection Form to be used.
      (c) Provide example NASSCO MACP Header Form to be used.
      (d) Provide example NASSCO MACP Inspection Form to be used.
      (e) Provide example NASSCO LACP Header Form to be used (if lateral launches are specified in Section 01015).
      (f) Provide example NASSCO LACP Inspection Form to be used (if lateral launches are specified in Section 01015).

E. Samples:
   1. Not applicable.

F. Other Submittals:
   1. CCTV Operators NASSCO-PACP/MACP/LACP certifications and when utilized, the artificial intelligence software used to identify and assess defects.
   2. Requests for Working Hours Adjustment (as required).
   3. Preconstruction and Post-construction CCTV inspection videos and cable footage meter calibration reports shall be submitted weekly.
   4. Preconstruction and Post-construction inspections shall be submitted monthly, as a condition to payment, and include at a minimum the following:
      (a) Could Not Access (CNA) List: Submit a list of manholes that could not be accessed and why they couldn't be accessed.
      (b) Clearing Request Map: Submit with the CNA List a map showing the requested areas for clearing (as applicable).
      (c) Could Not Locate (CNL) List: Submit a list of manholes that could not be located.
      (d) Could Not Open (CNO) List: Submit a list of manholes that could not be opened.
      (e) Map Change Forms.
      (f) Videos.
      (g) PACP Pipe Run Reports: Reports shall be submitted as individual PDF files for each pipe segment.
      (h) MACP Manhole Reports: Reports shall be submitted as individual PDF files for each manhole (if manhole inspections are specified in Section 01015).
      (i) LACP Lateral Reports: Reports shall be submitted as individual PDF files for each lateral (if lateral launches are specified in Section 01015).
      (j) NASSCO PACP Microsoft Access Database.
      (k) NASSCO MACP Microsoft Access Database.

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(l) NASSCO LACP Microsoft Access Database (if lateral launches are specified in Section 01015).

5. Post-construction inspection and documentation shall be submitted as one final consolidated package at the end of the project, as a condition to final completion, and include at a minimum the following:
   (a) Videos.
   (b) Photographs.
   (c) PACP Microsoft Access Database.
   (d) MACP Microsoft Access Database (if manhole inspections are specified in Section 01015).
   (e) LACP Microsoft Access Database (if lateral launches are specified in Section 01015).
   (f) PACP Pipe Run Reports: Reports shall be submitted as individual PDF files for each pipe segment.
   (g) MACP Manhole Reports: Reports shall be submitted as individual PDF files for each manhole (if manhole inspections are specified in Section 01015).
   (h) LACP Lateral Reports: Reports shall be submitted as individual PDF files for each lateral (if lateral launches are specified in Section 01015).
   (i) A log of all manholes located in the field but not included on City maps.
   (j) A log of all manholes included on City maps but not located in the field.
   (h) A log of pipes, manholes and laterals that were inspected before cleaning.

1.08 ACOUSTICAL INSPECTION

A. When specified in Section 01015, an acoustical inspection shall be done as an initial assessment tool to identify blockages in gravity pipes. The acoustical inspection shall be performed in accordance with the Acoustical Systems manufacturer's recommendations in order to establish ratings of 0-10 for obstructions in the pipeline segments being assessed.

B. If acoustical inspection is specified for the project, it shall only be used on sewers 6-inches through 12-inches in diameter.

1.09 2D LIDAR/LASER PROFILING INSPECTION

A. When specified in Section 01015, the CCTV inspection system with laser ring projection or 2D LIDAR head shall be used for inspection/assessment of the gravity line. The color inspection video, from the camera, shall be recorded in mp4 format. 2D Laser/LIDAR shall be used for measuring internal diameters to determine corrosion, wall loss, and/or ovality.

B. Each Inspection shall contain CCTV Pre-Inspection (including header), Profiler Inspection (including header), calibration (horizontal and vertical) and lens distortion validation.

1.10 SONAR INSPECTION

A. When specified in Section 01015, sonar inspection shall be performed according to the Sonar System manufacturer's recommendation as it pertains to survey rate in inches per second to collect data below the flowline. The Sonar Inspection System shall operate in real time mode with continuous interior scanning over full 360 degrees. Digital data shall be recorded at full resolution.

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1.11 3D LIDAR INSPECTION

A. When specified in Section 01015, 3D LIDAR inspection shall be performed according to the LIDAR manufacturer's specifications for assessment of the gravity line. LIDAR scans shall be used to measure internal diameters to determine corrosion, wall loss, and/or ovality.

B. When specified for pre-rehabilitation, only 3D LIDAR can be used for determining alignment, bend analysis, and virtual mandrel testing for construction purposes.

1.12 MULTI-SENSOR INSPECTION

A. When specified in Section 01015, multiple inspection technologies/sensors shall be used in synchronization to assess the interior of the pipe. This can include, but is not limited to, CCTV, Sonar, 2D Laser or 3D LIDAR, hydrogen sulfide gas sensor and/or temperature sensor. Where applicable, the analysis of data from each technology will be used to verify one another, providing a visual representation of the internal pipe with laser-LIDAR above the flow line and sonar measurement below the flow line. In all scenarios, high-definition CCTV must be used. After processing, all data and reporting deliverables shall be delivered to the City/Design Professional.

1.13 FOCUSED ELECTRODE LEAK LOCATION (FELL) TESTING FOR POST CURED-IN-PLACE PIPE (CIPP) MAINS

A. When specified in Section 01015, acceptance testing and certification of repairs, relining, and renewal, shall be performed using Focused Electrode Leak Locating (FELL) and shall be performed by an independent third-party contractor, in accordance with the ASTM F2550, Standard Practice for Locating Leaks in Sewer Pipes By Measuring the Variation of Electric Current Flow Through the Pipe Wall and the Seventh Edition, Volume 1, MAINTENANCE AND OPERATION OF WASTEWATER COLLECTION SYSTEM manual (December 2015) ISBN 978-1-59371-066-8, where Focused Electrode Leak Locating is referred to as Electro Scanning Inspection.

B. The contractor shall furnish all necessary labor, equipment, materials, services and incidentals required to record inspection by means of Focused Electrode Leak Locating technology on City designated, rehabilitated gravity sewer line sections from manhole to manhole (or from clean out to mainline for laterals), including but not limited to, charts and graphs, and final overall report. The report shall include a graph and chart outlining the location of all defects and the magnitude of each. The report shall include an estimate of the size of the defect and the potential infiltration of each, with a total for all.

C. Post-Rehabilitation FELL Testing shall be performed on the lineal footage specified in Section 01015 of all rehabilitated mainline pipes that receive CIPP lining, selected at random by the City, paid for at the established unit prices in the Contract. The City reserves the right to perform additional post-rehabilitation FELL testing at the established unit prices in the Contract.

D. Qualifications: All FELL inspections shall be done with the use of an approved supplier of the Focused Electrode Leak Locating technology equipment that meets ASTM F2550-13, Standard Practice for Locating Leaks in Sewer Pipes by Measuring the Variation of Electric Current Flow through the Pipe Wall. Only those licensed and pre-approved by the equipment manufacturer shall be allowed to perform the Work. Submit certification of licensing and training in accordance with Section 01300 – Submittals.

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1.14 AUTO DETECTION/AUTO CLASSIFICATION SOFTWARE

A. When specified in Section 01015, the contractor shall use an artificial intelligence (AI) software to analyze the CCTV inspection footage of the gravity line. The software shall automatically detect and classify every defect per established NASSCO PACP standards.

1.15 QUALITY ASSURANCE

A. The Contractor is responsible for the quality assurance and quality control of the Work. Contractor shall employ minimum quality control methods that meet or exceed those required by the latest versions of NASSCO.

B. Contractor shall employ only experienced personnel who are familiar with, and regularly engaged in, the type of work required; shall provide adequate supervision by a qualified supervisor at all times when cleaning is in progress; and shall have access to the equipment of proper size and capacity to perform the work as specified herein.

C. All inspections, post processing, and quality control shall be conducted by NASSCO certified PACP/MACP/LACP operators (Operators).

D. Contractor shall submit a copy of each Operator's NASSCO certification(s) and ID card with Name, Certification Number, and Expiration Date clearly visible. The NASSCO certification(s) shall be current upon Notice to Proceed. If the operator's certification expires during the Work, documentation of recertification shall be provided to the City prior to the expiration.

E. All videos, photographs, and audio recordings are subject to acceptance by the City. Equipment that does not produce a picture or audio quality acceptable to the City shall be replaced. For deliverables that are not accepted by the City, the inspection shall be re-conducted at no additional cost to the City.

F. The data and information provided by the Contractor shall be delivered in strict accordance with the naming conventions for assets described herein. Information included as part of the final deliverables that cannot be associated with the Comp Keys provided, or does not meet the naming conventions specified, will not be accepted.

G. Data cleanliness, handling, labeling, naming conventions, PACP coding standards, organization, and security are of the utmost importance to the City. Any CCTV videos, reports, or database not in compliance with this Section shall not be accepted.

1.16 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Product Delivery for weekly deliverables shall be electronically uploaded to a City-designated site. Weekly submittals shall not represent interim acceptance by the City, with any quality control or quality assurance concerns, corrections, or required modifications, to be included in any and all final deliverables.

B. Product Delivery for final consolidated package shall be delivered on an external, portable hard drive that will become the property of the City. Each external hard drive or digital file in the data set shall be given a unique name/label. The Contractor shall include an electronic photograph index that identifies the photographs by file name located on each external hard drive or digital file folder. The hard drive shall include a README text file that includes the following information:

1. Name of Project.
2. City Project Number.
3. City Contract Number.
4. Date of Submittal.

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5. Contractor Name.
6. Contractor Address.
7. Name of Contractor's Representative.
8. Phone Number of Contractor's Representative.
9. Email of Contractor's Representative.

C. Storage of all source media will be the sole responsibility of the Contractor and must be stored and properly maintained for a period of thirty-six (36) months after Contractor's Substantial Completion date, available to the City or its designated representatives within ten (10) business days of the written request.

D. All work product and deliverables shall be in digital format, or in a format requested by the City. Additionally, three paper copies of the final report shall also be provided.

1.17 SAFETY PLAN

A. The Contractor's responsibilities for safety are defined by Section 00700 – General Conditions, Article 6 – Contractor's Responsibilities.

B. Entrance into any manhole is considered a Permit Required Confined Space.

C. In addition to the safety requirements of Section 00700, the Contractor shall develop and implement a project-specific, comprehensive safety plan to address safety concerns related to the Work.

D. The Safety Plan shall be submitted to the City prior to commencement of pipeline inspections.

E. At a minimum, the safety plan shall conform to the following guidelines:
   1. The work area shall be properly barricaded to direct pedestrian and vehicular traffic away from the work site following local and state traffic control requirements and the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD) and Section 01700 – Traffic Control.
   2. The plan shall describe personal protective equipment (i.e. hard hats, reflective safety vests and other required personal protective equipment) to be worn.
   3. The plan shall describe all personal protective equipment to be worn while handling hazardous material (sewage).
   4. The plan shall describe all confined space entry protocols.
   5. Work shall be scheduled to avoid rush hour traffic when possible.

F. The Safety Plan shall include the name and contact information of the Contractor's Safety Representative with a description of their job duties and level of responsibility with respect to the Work described in this section.

1.18 SCHEDULING THE WORK

A. Generally, the Work is to be conducted during times allowed by Section 00700, Article 6, Contractor's Responsibilities and Section 01000 – General Project Requirements, paragraph TEMPORARY ENVIRONMENTAL PROTECTION which establishes hours of operations.

B. See additional instruction for scheduling the Work in Section 01015 – Specific Project Conditions.

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PART 2 - PRODUCTS

2.01 ACOUSTICAL INSPECTION EQUIPMENT

A. Contractor shall own, lease and/or rent one (1) set (minimum) of acoustical assessment equipment as manufactured by Infosense Incorporated (SL-Rat equipment). The set includes an acoustic transmitter and a signal receiver.

2.02 CLEANING EQUIPMENT

A. The equipment selected for cleaning shall be capable of removing all dirt, grease, rock, brick, wood, sand, mud, roots and other deleterious materials and obstructions from the gravity line. Cleaning shall be performed using hydraulically-propelled, high-velocity and/or mechanically-powered cleaning equipment and vacuum removal equipment.

1. Hydraulically powered equipment: The equipment used shall be of a movable dam type and be constructed in such a way that a portion of the dam may be collapsed at any time during the cleaning operation to protect against flooding of the sewer or bypassing to waterways. The movable dam shall be equal in diameter to the pipe being cleaned and shall provide a flexible scraper around the outer periphery to ensure removal of grease. If sewer cleaning balls or other equipment which cannot be collapsed are used, special precautions shall be taken that are acceptable to the Owner, to prevent flooding of sewers and property.
2. High velocity equipment: All high-velocity cleaning equipment shall be constructed for ease and safety of operation. The equipment shall have a minimum of 700 feet of one inch minimum diameter hose with working pressure ratings to match the rating of the water pressure. The equipment shall have a selection of two or more high-velocity nozzles. The nozzles shall be capable of producing a scouring action from 10 degrees to 45 degrees in all sizes of gravity lines included in this Contract using a minimum volume of 60 gallons of water per minute, at a minimum working pressure of 2,000 pounds per square inch. Special care shall be taken when cleaning CIPP rehabilitated pipelines by using a wide spray nozzle with a maximum spray angle of 30 degrees, a nozzle pipe centralizer and a maximum pressure of 2,000 PSI.
   (a) Equipment shall also include a high-velocity gun for washing and scouring the manholes and diversion structure walls, channels, shelves, floors, and manhole covers and frames from grade level. The gun shall be capable of producing flows from a fine spray to a solid stream. The equipment shall carry its own water tank, auxiliary engines, pumps, and hydraulically-driven hose reel. Filler piping on the tank shall have an air gap to prevent backflow and contamination of the water supply system.
3. Mechanically powered equipment: Bucket machines shall be in pairs with sufficient power to perform the work in an efficient manner. Machines shall be belt operated or have an overload device. Machines with direct drive that could cause damage to the pipe will not be allowed. A power rodding machine shall be either a sectional or continuous rod type. To ensure safe operation, the machine shall be fully enclosed and have an automatic safety clutch or relief valve.

2.03 TELEVISION INSPECTION EQUIPMENT FOR GRAVITY LINES

A. All television inspection equipment shall be specifically designed and manufactured for the inspection purposes intended under this Contract.

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B. Video cameras/recorders not specifically intended for use for internal television inspection of gravity lines will not be allowed.
C. The Contractor shall conduct CCTV inspections using a self-propelled tractor unit. The tractor unit shall have the following minimum features and capabilities:
    1. The camera shall be designed specifically for gravity pipe inspections and the appropriate diameter.
    2. The camera shall be capable of operating in 90% humidity.
    3. For 8 inch through 46 inch pipes, the camera shall have a minimum of 640 lines of resolution.
    4. For 48 inch and larger pipes, the camera shall have a minimum of 1280 lines of resolution.
    5. The camera shall have either automatic or remote: focus and iris control.
    6. The camera shall have zoom, pan and tilt capabilities to facilitate defect viewing and evaluation. Digital zoom is acceptable when utilizing equipment with HDCCTV.
    7. The unit shall be equipped with lights capable of lighting the entire periphery of the pipe. The illumination shall allow an even distribution of the light around the perimeter of the pipe without the loss of contrast or flare out of picture shadowing.
    8. Cable Footage Meter:
        (a) The unit shall be equipped with a cable footage meter so that the location of defects and service laterals relative to the starting manhole location can be reported.
        (b) The cable footage meter shall be able to reach a minimum of 1,000 feet.
        (c) The cable footage meter shall be accurate to 0.5 feet per 100 feet (0.5%).
        (d) The cable footage meter shall be calibrated in accordance with paragraph CABLE FOOTAGE METER CALIBRATION.
    9. Camera must have capability to position camera head in the middle of the pipe (example: camera head will be 4-inches from pipe invert in an 8-inch pipe) by adjusting elevator or by varied wheel sizes. For pipe sizes 48-inch and larger, Contractor shall submit the proposed equipment for City approval.
    10. In no case shall cameras be equipped with carbide-tipped wheels that increase traction and potentially harm post-rehabilitation lining or pipe wall interiors. Any damage caused to post-rehabilitation repairs, relining, or rehabilitation will be the sole responsibility of the Contractor to correct or repair to the City's satisfaction.

2.04 TELEVISION INSPECTION EQUIPMENT FOR CONNECTIONS/LATERALS

A. If laterals or connecting pipes are to be inspected, the Contractor may use one of the following:
    1. Inspections from the mainline: a self-propelled tractor unit that incorporates a lateral launch camera tool.
    2. Inspections from a cleanout: a push camera system provided especially for lateral inspections.
B. The lateral equipment shall have the following minimum features and capabilities:
    1. The camera shall be designed specifically for lateral pipe inspections and the appropriate diameter.
    2. The camera shall be capable of operating in 100% humidity.
    3. The camera shall have a minimum of 640 lines of resolution.
    4. The unit shall be equipped with lights capable of lighting the entire periphery of the pipe. The illumination shall allow an even distribution of the light around the

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perimeter of the pipe without the loss of contrast or flare out of picture shadowing.

C. In the event of a full-length lateral rehabilitation, from the mainline connection to the house, a full-length lateral inspection shall be conducted.

2.05 VIDEO RECORDINGS

A. Contractor shall perform sewer pipe inspections from access point to access point unless a pipe converges into another pipe alignment at a fitting; then the inspection shall be performed from access point to fitting as shown in figure 2.1.

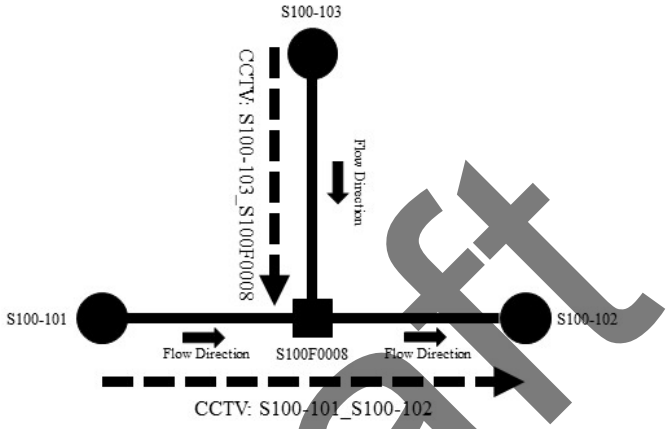

Figure 2.1: Performing Sewer Pipe Inspections

B. Each video television inspection shall be submitted in digital format with associated video, images, report, and all inspection data included in a Microsoft Access Database.

C. All video recordings shall be recorded and provided in digital MPEG-4 Part 14 (MP4) format.

D. All video recordings shall be in color.

E. File Naming Convention – Mainline Sewers:

1. Each line segment video shall be named using the upstream manhole identifier, underscore, downstream manhole identifier, underscore, date stamp, underscore and inspection direction (no exceptions). Use “U” for upstream and “D” for downstream inspection direction.
2. For example, the video for the line segment from manhole S023-314 to manhole S023-317 inspected upstream to downstream would be labeled as follows: S023-314_S023-317_YYYYMMDD_D. Any deviation from the File Naming Convention for Mainlines will not be accepted.

E. File Naming Convention – Service Laterals:

1. Each service lateral video shall be named using the upstream manhole identifier, underscore, downstream manhole identifier, underscore, date stamp, underscore, inspection direction, underscore, Tap Feature Code, underscore, and lateral location in feet from start of inspection. Use “U” for upstream and “D” for downstream inspection direction.
2. For example, the video for a rehabilitated sewer service 50 feet downstream from manhole S023-314 on line segment S023-314_S023-317 would be labeled as

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follows: S023-314_S023-317_YYYYMMDD_D_TRA_50. Any deviation from the File Naming Convention for Laterals will not be accepted.

F. Videos shall not be filtered, clipped, edited, modified, enhanced, or otherwise changed, except for overlay corrections. In no event shall videos have missing frames or sections of video.

2.06 PHOTOGRAPHS

A. All photographs shall be recorded and provided in a digital format.
B. Photographs shall be provided in JPEG file format.
C. All photographs shall be in color.
D. File Naming Convention:
   1. Digital photograph files shall be named using the associated video file name, associated defect code, and linear footage (in 3-digits) assigned to the defect for each line segment survey (**no exceptions**).
   2. For example, if a picture is taken May 25, 2021, at a Hole Soil Visible defect, 75 linear feet upstream against the direction of flow (reverse set up), on a line segment located south of the Missouri River on atlas map 24 between manholes 500 (upstream manhole) and 498 (downstream manhole), then the digital photograph file name would be as follows: S024-500_S024-498_20210525_U_HSV_75

2.07 SOFTWARE

A. The CCTV data shall be delivered utilizing the latest version of NASSCO PACP certified software.
B. The latest version of the Data Viewer shall be provided at the start of the inspection.
C. If specified, the artificial intelligence (AI) software for detecting and classifying defects shall be:
   1. SewerAI.
   2. Molfar.AI.
   3. City approved equal.

2.08 LASER / 2D LIDAR PROFILING INSPECTION EQUIPMENT

A. All laser profile inspection equipment shall be specifically designed and manufactured for the inspection purposes intended under this Contract.
B. Laser Profilers and 2D LIDAR sensors shall be Laser Safety Class II and certified eye-safe as per US – IEC 60825-1 standard.
C. All laser/LIDAR equipment shall be calibrated regularly to ensure accuracy of +/- 5mm in pipes 20-inches or larger.
D. Contractor shall own, lease and/or rent at a minimum one (1) each of the MSI SuperMD Profiler and MSI MD Profiler as manufactured by RedZone Robotics and one (1) CUES SolidFX Profiling system for the duration of the field work associated with the Work.

2.09 SONAR INSPECTION EQUIPMENT

A. The sonar equipment must be specifically designed for use in sanitary sewer systems using high frequency sound waves to locate and map irregularities within the pipe environment creating continuous sonar images recorded in “real time” mode.
B. Sonar equipment must be capable of continuous data collection throughout each applicable pipe segment reach and contain sufficient information to produce a visual

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profile, profile comparison, and dimensions data of significant debris and/or defects. This includes depth, volume and cross-sectional area along the length of pipe.

C. When specified, sonar inspections, either on their own or through multi-sensor inspection, shall be utilized prior to any cleaning in pipes 21" and greater to provide evidence that cleaning is required. Post verification inspections shall be a combination of CCTV and/or Sonar, as flow permits.

2.10 3D LIDAR INSPECTION EQUIPMENT

A. Contractor shall own, lease and/or rent at a minimum one (1) each of the MSI Responder tracked crawler as manufactured by RedZone Robotics for the duration of the field work associated with the Work.

B. 3D LIDAR inspection equipment should be capable of inspections in pipes 36 inches and larger.

C. When pre-rehabilitation inspection that requires alignment, bend analysis, or virtual mandrel testing is specified, a 3D LIDAR must be used for proper accuracy and modelling.

D. LIDAR sensor shall be Class I eye-safe as per US – IEC 60825-1 standard.

E. High-definition CCTV shall be captured when any LIDAR inspection is performed.

2.11 MULTI-SENSOR INSPECTION EQUIPMENT

A. Multi-sensor inspection equipment must be capable of synchronized sensor measurement, collected during a single deployment of the equipment. Where applicable, the analysis of data from each technology will be used to verify one another. All sensors shall be zeroed at the beginning of the pipe segments.

B. Equipment must be operated via a tracked crawler or floating platform specifically designed for inspection in gravity lines.

C. Equipment shall be capable of long-distance deployments and have tether length of 3000 linear feet, and sufficient power (battery or otherwise) to operate at those lengths. It is permissible to inspect through multiple access points, provided that sensor data is zeroed at the beginning of each new pipe segment.

D. When specified, multi-sensor inspection equipment shall be utilized prior to any cleaning in pipes 21" and greater to provide evidence that cleaning is required. Post verification inspections shall be a combination of CCTV and/or Sonar, as flow permits.

2.12 FELL INSPECTION EQUIPMENT

A. The Focused Electrode Leak Locating technology system used for the pipeline assessment shall be specifically designed and constructed for such inspection. This equipment and proposed solution shall be in full compliance with and have capabilities as outlined in ASTM F2550-13 Standard Practice for Locating Leaks in Sewer Pipes by Measuring the Variation of Electric Current Flow through the Pipe Wall.

B. Instrumentation must represent a complete and fully functioning device to scan the pipe and record all pipe defects capable of causing leaks. The proposed solution must include any recommended accessories and spare parts necessary to complete this work.

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PART 3 - EXECUTION

3.01 OBSERVATION OF WORK

A. City reserves the right to be present and continuously observe the work and information being displayed at the recording site.

3.02 TRAFFIC CONTROL

A. Traffic control and signage for the inspection operation shall be the responsibility of the Contractor and shall be acceptable to the City.
B. Traffic Control shall be conducted in accordance with Section 01700 – Traffic Control.

3.03 LOCATING MANHOLES/STRUCTURES

A. For the work required by the contract documents, the Contractor shall locate, make open and accessible all existing manholes, structures and access points.
B. The Contractor will be responsible for conducting a reasonable search to locate missing manholes. The minimum effort to locate missing manholes should include:
   1. Conducting a field search.
   2. A comparison of verified field conditions against available City information.
   3. Utilization of specialty equipment such as metal detectors.
C. If after conducting a reasonable search, a manhole cannot be found in the area specified by the sewer maps, then the Contractor should seek City assistance.

3.04 UNRECORDED/UNNAMED MANHOLES

A. Manholes located in the field, which are not shown on the Drawings shall be documented for submittal.
B. If an unrecorded/unnamed manhole is encountered, television inspection may proceed, but the Contractor shall notify City and request a City assigned manhole number and comp key. Manhole numbers and Comp Keys be obtained from the City and the final deliverable data shall be modified to reflect the assigned manhole number and comp key on any segment connected to an unrecorded/unnamed manhole.
C. Contractor shall submit weekly to the City: a Map Change Form with Unrecorded/Unnamed Manholes showing the revised system connectivity, photographs of the location, and a brief description of the location of each Unrecorded/Unnamed Manhole.

3.05 ACOUSTICAL ASSESSMENT

A. Assessment shall be done one pipe segment at a time between two adjoining structures or manholes. The flow within pipeline is irrelevant to the assessment.
B. The unit set shall be calibrated daily prior to starting the assessment.
C. The following information is required by the City: manhole ID's upstream and downstream for the pipeline segment being assessed, assessment date, pipeline length, notes, etc. Prior to initiating the acoustical assessment, all information shall be entered into the unit for each segment.
D. During the assessment, the software will designate a numerical value to the quality of the sound sent and received (rating of 0-10) giving a nominal assessment of Good, Fair, Poor or Blocked.
E. Each night the data shall be transferred from the field assessment equipment to the SL-Dog software installed on a PC.

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F. The assessment data shall be provided to the City/Design Professional in CSV (Excel), SHP (Arc GIS) or PDF. The data deliverables shall be solely at the discretion of City/Design Professional.
G. The City/Design Professional will be responsible for the review and analysis of the data provided.

3.06 CLEANING

A. It is the responsibility of the Contractor to properly apply for, secure and provide for all water needed to perform the cleaning work described herein.
Precautions shall be taken to protect the sanitary sewer structures from damage that may result from improper use of the cleaning equipment. Contractor is responsible for traffic control, as needed; in addition to Contractor's truck warning lights and traffic cones, as needed or required. Traffic control is subject to review and approval by the Owner. If successful cleaning cannot be performed without risk of damage to the pipe, or if the equipment fails to traverse the entire line segment, cleaning efforts shall be temporarily suspended, and the Owner shall be notified. The line segment shall then be evaluated in order to determine if the segment can be adequately cleaned. Any unusual conditions found during the cleaning operations shall be reported to the Owner as soon as possible.
B. Any modifications to manholes to facilitate cleaning shall be the Contractor's responsibility and shall be subject to approval by Owner.
Contractor shall salvage and reuse all manhole covers and rings that are removed during sewer line and manhole rehabilitation, unless otherwise directed by Engineer.
C. When pumping and bypassing is required, Contractor shall supply the pumps, piping, and other equipment necessary to divert the flow of wastewater around the sewer section being cleaned and back into the interceptor sewer. All existing wastewater flows, plus waters added to the flow due to cleaning, shall be contained within the existing sewer system. The bypass system shall have the necessary capacity to handle all the flow.
The Contractor shall be responsible for furnishing the labor and supervision necessary to set up and operate the pumping and bypass system. For pumping and bypassing operations, a plan must be submitted in accordance with the procedures set forth in the submittals section. In performing the work under this Contract, Contractor shall be thoroughly familiar with federal, state, and local statutes, ordinances, and directives with respect to excessive noise and pollution of air and water due to construction operations. If pumping and bypassing is required, engines shall be equipped in a manner to keep noise to a minimum.
D. During sewer cleaning operations, satisfactory precautions shall be taken in the use of cleaning equipment. When hydraulically propelled cleaning tools, which depend on water pressure to provide their cleaning force, or tools which retard flow in the sewer line are used, precautions shall be taken to ensure that the water pressure created does not damage or cause flooding to public or private property being served by the sewer being cleaned or does not cause bypassing of flow to nearby waterways.
The flow of wastewater in the sewers shall be utilized to provide necessary pressures of hydraulic cleaning devices whenever possible. When additional water is required from other sources to avoid delay in normal work procedures, the water shall be conserved and not used unnecessarily. No fire hydrant shall be obstructed in case of fire in the area served by the hydrant. The Contractor shall be responsible for all damage to public and private property as a result of all cleaning operations. The cost

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of restoring any damaged area to conditions prior to cleaning shall be borne by the Contractor at no additional cost to the Owner.

E. All roots shall be removed. Special attention shall be given during the cleaning operation to assure complete removal of roots from the joints. Procedures may include the use of mechanical equipment such as rodding machines, bucket machines and winches using root cutters and porcupines, and equipment such as high-velocity jet cleaners. Chemical root treatment may be used at the option of the Contractor. When chemicals are used to aid in the removal of roots, the chemical shall be EPA registered and labeled for use in sewer lines and acceptable to all applicable State and City agencies. All material and mixing/application procedures for chemical root treatment shall be consistent with the latest standards, requirements, and recommendations of the manufacturer of the chemical root treatment material used.

F. All sludge, dirt, sand, grit, rocks, bricks, wood, mud, grease, roots and any other solid or semi- solid material resulting from the cleaning operation shall be removed using vacuum removal equipment or other methods to assure debris does not cause downstream obstruction. Vacuum equipment shall be suitable for removal of all debris at each manhole location for each line being cleaned. Vacuum system performance will be at least 4,000 CFM and 16" Hg vacuum pressure to ensure all debris can be efficiently removed from the sewer. A device designed to minimize debris from escaping down the sewer line, the design and use of which is subject to approval by Owner, shall be used in all sewer line cleaning operations. When hydraulic cleaning equipment is used, a suitable sand trap, weir, basket, or dam shall be constructed in the downstream manhole in such a manner that the solids will be trapped while using a rake or sewer shovel to help collect solids. Material or debris removed from the sewer shall be immediately placed in watertight containers. Containers may include valved drains to remove excess water from containers. Drainage, including rainfall, shall be contained and returned to the sewer by means acceptable to the Owner.

G. Multiple passes (one to three passes) with the water jet shall be made, as required, to flush the debris to the manhole in order to remove the debris. Sewers will be cleaned by introducing the water jet into the sewer line facing against the sewer flow and retrieving the water jet under pressure with the sewer flow. The nozzle shall not be stopped in the sewer line when under working pressure, but shall continue to move through the line at all times.

H. All debris removed from the sewer shall be legally disposed of by and at the expense of the Contractor. The disposal facility shall be a permitted landfill. The debris shall be dewatered and suitable for immediate disposal prior to weighing at the landfill. Contractor shall provide the Engineer with scale tickets to verify quantities of debris disposed of in an approved landfill. Transportation of debris or other material by the Contractor shall be done in vehicles or equipment which contain the debris or other material in such a manner to minimize objectionable odor and avoid the possibility of dripping, spilling, scattering, leaking, or blowing. Should mishaps occur for any reason, the Contractor shall be responsible for cleaning up any debris or other material to the satisfaction of the Owner or other authorities having jurisdiction. All vehicles transporting debris or other material shall not exceed the maximum allowable load limits of any road being used.

I. Contractor shall televise the sewers, in accordance with the television inspection section, upon the completion of cleaning. Acceptance of sewer line cleaning shall be based upon the review of the inspection videos by the City or Design Professional.

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If cleaning inspections show the cleaning to be unsatisfactory, the Contractor shall be required to re-clean and re-inspect the sewer line, at no additional cost to the Owner, until cleaning is shown to be satisfactory.

3.07 SEWER FLOW DIVERSION AND CONTROL

A. During CCTV inspection, the pipe should be free of obstructions that impede visibility. The depth of flow at the upstream manhole of the sewer line section being inspected shall not exceed 15 percent of the pipe diameter. As necessary, Contractor shall divert flow to allow for the CCTV inspection to capture as much of the invert of the pipe as possible. In pipes 21 inches or larger, where sonar or multi-sensor inspection is specified, flow diversion is not required.

B. A sewer line plug may be installed upstream of the section being inspected. Sewer plugs are always installed in the upstream (incoming) pipe of a manhole. It is desirable that the plug be equipped with an air hose to permit deflation from above ground. A strong rope should be attached to enable the plug to be quickly pulled out of the manhole. Care must be taken to prevent a plug from being pushed into the outgoing pipe when the backed-up sewage is released.

C. When pumping and diverting flow is required, pumps, conduits, and other equipment shall be used to divert the flow of sewage around the manhole section in which work is to be performed. The diversion system should have sufficient capacity to handle the existing flow plus additional flow that may occur. Bypass pumping plan to be submitted to the City for approval.

D. When the flow in a sewer line is reduced, plugged, or diverted, precautions must be taken to ensure that the operations do not cause flooding or damage to public or private property. Contractor should closely monitor sewer surcharging upstream of the manhole section being inspected and be alert for situations such as residential flooding that would be likely to occur. Contractor is responsible for all backups, spills, or damage that may occur from plugging or diversion efforts.

3.08 CABLE FOOTAGE METER CALIBRATION

A. Calibration of the cable footage meter shall be done by checking the cable counter against a pre-measured length of 50 to 300 feet. At least one out of every five calibrations shall be in excess of 200 feet.

B. At a minimum, calibration of the cable footage meter shall be conducted each day before the first use of the equipment, or as directed by the City.

C. If a cable footage meters fails a calibration test, then all inspections completed since the last successful calibration shall be re-inspected at no additional cost to the City.

D. The results of all calibration testing shall be submitted in accordance with paragraph SUBMITTALS.

E. In no case shall footage readings start at anything more than 0.00.

3.09 PIPE PREPARATION

A. As needed or as indicated in the Contract Documents, the Contractor shall clean the sewer lines in accordance with Section 02676 – Sewer Line Cleaning prior to CCTV work.

B. All fog condensation shall be evacuated from the pipeline and the pipeline kept clear of any fog condensation during the inspection process.

C. When sonar or multi-sensor inspection is specified for pipes 21 inches and larger, inspection shall be performed prior to any cleaning, to provide evidence that cleaning

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is required. Post verification inspections shall be a combination of CCTV and/or Sonar, as flow permits.

3.10 INSPECTION METHODS

A. Camera image shall be down the center axis of pipe when camera is in motion. Provide 360-degree sweep of pipe interior at points of interest to more fully document condition of existing sewer. Points of interest may include, but are not necessarily limited to, the following: defects, obstructions, encrustations, mineral deposits, debris, sediment, lateral connections, and any location determined not to be clean.
B. The direction of the camera should be noted. Per NASSCO standards, inspections in the downstream direction are preferred.
C. The display shall always begin with the numbering from upstream manhole to downstream manhole. If a reverse setup is attempted, the same numbering system will be used, but the direction of camera will be switched.
D. The television camera shall be a self-propelled unit.
E. The rate of camera travel shall be slow enough to allow a thorough inspection of each pipe joint, tee connection, structural deterioration, defect, I/I source, deposits in the sewer line, and to record observations.
F. The camera travel speed shall not exceed a rate of 30 feet per minute.
G. Lighting during the inspection should adequately, but not excessively, illuminate the immediate area.

3.11 RECORDING OF FEATURES AND DEFECTS

A. The CCTV Inspection shall capture the following minimum information:
    1. Starting point in the launch manhole panning up to see the general condition of the manhole and other incoming/outgoing pipes.
    2. Ending point at the downstream manhole (or upstream manhole for reverse setups) panning up to see the general condition of the manhole and other incoming/outgoing pipes.
    3. Defects and Points of Interest: The camera shall be stopped at each defect or other feature. The camera lens shall be rotated, panned and/or tilted to clearly show each defect or feature. The Contractor shall capture defects with still photographs.
    4. Service Connections: The camera shall be stopped at each service connection. The camera lens shall be rotated, panned and/or tilted to clearly show each connection. The Contractor shall capture service connections with still photographs.

3.12 INSPECTION AND DOCUMENTATION

A. PACP Pipe Run Report:
    1. A separate inspection form, otherwise known as a pipe run report, shall be produced for inspections of each complete sewer length between manholes.
    2. The Pipe Run Report shall be completed in accordance with the latest NASSCO PACP requirements.
    3. General information should be documented on CCTV inspection field forms prior to beginning inspection activity for each pipe run section, including:
        (a) Project name.
        (b) Operator's name.
        (c) Operator's NASSCO PACP certificate number.

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(d) Inspection date/time (i.e., the date that the camera initiated or completed its inspection).
(e) Pipe diameter.
(f) Pipe material.
(g) Direction of inspection (upstream/downstream).
(h) Upstream and downstream manhole numbers.
(i) Street location.
(j) Inspection footage.
(k) An alphanumeric tape/media number.
(l) The level of cleaning before, or after, the investigation.
(m) It should be noted if the pipe was cleaned before, or after, CCTV work.

4. The information documented on CCTV inspection field forms for each pipe run section should include, at a minimum, the following:
   (a) A description of each service connection, type of each service connection, and defect observed.
   (b) The location of each service connection and defect reported as the distance from the start of the inspection.
   (c) The location of each service connection and defect reported with respect to the pipe axis.
   (d) A reference to each photograph taken. Each photograph reference should include:
   The location of the photograph from the start of the inspection.
   A description of the defect or connection.
   A reference to the electronic photograph file name.
5. The field form format shall be that produced by a City approved software with PACP coding.

B. Video:
1. Electronic video shall be made for each line segment inspection.
2. All video recordings shall become the property of the City upon inspection completion and acceptance. The video cost shall be included in the unit price. Each video shall be prefaced with the following minimum information:
   (a) Inspection date.
   (b) Inspection time.
   (c) Prevailing weather conditions.
   (d) Upstream/Downstream manholes indicating connectivity.
   (e) Direction of inspection.
   (f) Pipe diameter.
   (g) Pipe material.
3. The videos shall include a report of the current inspection distance relative to the starting position.
4. The audio recording shall state the following minimum information:
   (a) Date of inspection.
   (b) Time of inspection.
   (c) Description of weather during the inspection.
   (d) Operator name.
   (e) Nearest street name.
   (f) Upstream and downstream manhole numbers.
   (g) Direction of the inspection in relation to the direction of flow.
   (h) Pipe diameter and material type.
   (i) Description of each service connection and pipe defect.

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C. Photographs:
   1. Digital photographs shall be taken of each significant structural defect, I/I source, and service connection.
   2. The location of each photograph along with photograph file name shall be recorded.
   3. Photographs shall be supplied as JPEG images or another approved format.
   4. Digital photograph files are to be named as described in paragraph 2.05. D.

D. PACP Microsoft Access Database:
   1. Technical: The PACP Microsoft Access Database shall be written in the latest version. The video and photo reference location/path shall be limited to one single folder named 'Video' and 'Picture', respectively. In no event shall files be password protected or otherwise inaccessible to the City, with any incorrect field or data entries the responsibility of the Contractor.
   2. Header: The PACP Microsoft Access Database shall include, at a minimum, all the PACP mandatory header fields and the following non-mandatory or City-specific changes to the header fields:
      (a) Field 1 – Name of the Contractor in a format agreed upon with the City. (Note, this is different than the Field 1 requirement in NASSCO).
      (b) Field 7 – P/O Number. Defined as the Inspector's contract number assigned by the CITY in four (4)-digit format.
      (c) Field 8 – Work Order Number. Work order number or inspection number if assigned by the CITY.
      (d) Field 14 – Weather.
      (e) Field 20 – Inspection Technology Used.
      (f) Field 25 – Pipe Segment Reference. (Upstream Access Point UNITID_ Downstream Access Point UNITID).
      (g) Field 35 – Lining Method, if applicable.
      (h) Field 38 – Total Length (Anticipated Length from CITY GIS). Note, this field is only to be completed in the event of an MSA or partial survey.
      (i) Field 39 – Length Surveyed.
   3. All header fields shall be completed using the PACP abbreviations and units as defined in NASSCO PACP.
   4. Inspection Form:
      (a) The CCTV inspection form within the PACP access database shall be completed in accordance with NASSCO requirements and include the following additions:
      The "Video Time" shall be included at the appropriate time in the CCTV video that represents the defect or feature code.
      The remarks column shall be used to identify Drop Connections, Diversion Structure, Lamp Holes, Grit Chambers, etc.

E. If specified, the artificial intelligence (AI) software shall be used to analyze the CCTV footage in order to identify and classify each defect. The reporting of results shall be as described herein. The contractor shall rectify all discrepancies between the original pipe run report and the AI software pipe run report. The contractor shall document and track the discrepancies in order to calculate the percent accuracy of the operator and the AI software over time.

F. MACP Manhole Report:
   1. A manhole inspection form shall be produced for each manhole inspected.
   2. The Manhole Report shall be completed in accordance with the latest NASSCO MACP requirements.

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3. General information shall be documented on the manhole inspection form prior to beginning the inspection for each manhole. This information includes:
   (a) Project name.
   (b) Operator's name.
   (c) Operator's NASSCO MACP certificate number.
   (d) Inspection date/time.
   (e) Unique Manhole identifier/UNITID.
   (f) Manhole diameter.
   (g) Manhole material.
   (h) Pipe sizes in/out.
   (i) Flow direction in/out.
   (j) Street/cross street location.
4. Digital photographs shall be taken of each significant structural defect, I/I source, and service connection.
5. Photographs shall be supplied as JPEG images or another approved format.
6. Digital photograph files are to be named as described in paragraph 2.05. D.

G. MACP Microsoft Access Database:
1. Technical: The MACP Microsoft Access Database shall be written in the latest version. The photo reference location/path shall be limited to one single folder named 'Picture'. In no event shall files be password protected or otherwise inaccessible to the City, with any incorrect field or data entries being the sole responsibility of the Contractor.
2. Header: The MACP Microsoft Access Database shall include, at a minimum, all the MACP mandatory header fields and the following non-mandatory or City-specific changes to the header fields:
   (a) Field 1 – Name of the Contractor in a format agreed upon with the City. (Note, this is different than the Field 1 requirement in NASSCO).
   (b) Field 7 – P/O Number. Defined as the Inspector's contract number assigned by the CITY in four (4)-digit format.
   (c) Field 8 – Work Order Number. Work order number or inspection number if assigned by the CITY.
   (d) Field 14 – Weather.
   (e) Field 20 – Inspection Technology Used.
   (f) Field 27 – Inflow Potential from Runoff.
   (g) Field 28 – Locations Details.
   (h) Field 72 – Frame Depth.
   (i) Field 88 – Wall Diameter (Length).
   (j) Field 72 – Frame Depth.
   (k) Field 88 – Wall Diameter (Length).
   (l) Field 118 – Structure ID (Pipe/Lateral Segment Reference).
3. All header fields shall be completed using the MACP abbreviations and units as defined in NASSCO MACP.
4. Inspection Form:
   (a) The Manhole inspection form within the MACP access database shall be completed in accordance with NASSCO requirements and include the following addition:
      (i) Field 106 shall be used to identify Diversion Structures, Lamp Holes and Grit Chambers.
      (ii) Field 119 shall be used to identify Drop Connections.

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H. LACP Lateral Report (if specified in Section 01015):
   1. A separate inspection form, otherwise known as a lateral report, shall be produced for inspections of each lateral.
   2. The Lateral Report shall be completed in accordance with the latest NASSCO LACP requirements.
   3. General information should be documented on the Lateral inspection field forms prior to beginning the inspection of each lateral. This information includes:
      (a) Project name.
      (b) Operator's name.
      (c) Operator's NASSCO LACP certificate number.
      (d) Inspection date/time (i.e., the date that the camera initiated or completed its inspection).
      (e) Lateral diameter.
      (f) Lateral material.
      (g) Location of lateral from upstream and downstream manhole numbers.
      (h) Location of lateral with respect to pipe axis.
      (i) Type of service lateral: residential or commercial.
      (j) Street/cross street location.
      (k) Inspection footage.
      (l) An alphanumeric tape/media number.
   4. The information documented on Lateral inspection field forms for each lateral should also include, at a minimum, the following:
      (a) A description of each lateral service connection, type of each service connection (tap, saddle, etc.) and defects observed.
      (b) The location of each lateral defect reported as the distance from the start of the lateral inspection.
      (c) A reference to each photograph taken. Each photograph reference should include:
         (i) The location of the photograph from the start of the lateral inspection.
         (ii) A description of the defect or connection.
         (iii) A reference to the electronic photograph file name.
   5. The lateral field form format shall be that produced by a City approved software with LACP coding.

I. Lateral Video:
   1. Electronic video shall be made for each lateral inspection.
   2. All video recordings shall become the property of the City upon inspection completion and acceptance. The video cost shall be included in the unit price. Each video shall be prefaced with the following minimum information:
      (a) Inspection date.
      (b) Inspection time.
      (c) Prevailing weather conditions.
      (d) Upstream/Downstream manholes from lateral.
      (e) Lateral diameter.
      (f) Lateral material.
   3. The videos shall include a report of the current inspection distance relative to the starting position.
   4. The audio recording shall state the following minimum information:
      (a) Date of inspection.
      (b) Time of inspection.
      (c) Description of weather during the inspection.

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(d) Operator name.
(e) Nearest street name.
(f) Upstream and downstream manhole numbers.
(g) Lateral diameter and material type.
(h) Description of each lateral service connection and connection defects.

J. Photographs:
1. Digital photographs shall be taken of each significant structural defect, I/I source, and connection.
2. The location of each photograph along with photograph file name shall be recorded.
3. Photographs shall be supplied as JPEG images or another approved format.
4. Digital photograph files are to be named as described in paragraph 2.05. D.

K. LACP Microsoft Access Database:
1. Technical: The LACP Microsoft Access Database shall be written in the latest version. The video and photo reference location/path shall be limited to one single folder named 'Video' and 'Picture', respectively. In no event shall files be password protected or otherwise inaccessible to the City, with any incorrect field or data entries being the sole responsibility of the Contractor.
2. Header: The LACP Microsoft Access Database shall include, at a minimum, all the LACP mandatory header fields and the following non-mandatory or City-specific changes to the header fields:
(a) Field 1 – Name of the Contractor in a format agreed upon with the City. (Note, this is different than the Field 1 requirement in NASSCO).
(b) Field 7 – P/O Number. Defined as the Inspector's contract number assigned by the CITY in four (4)-digit format.
(c) Field 8 – Work Order Number. Work order number or inspection number if assigned by the CITY.
(d) Field 14 – Weather.
(e) Field 20 – Inspection Technology Used.
(f) Field 25 – Pipe Segment Reference. (Upstream Access Point UNITID_ Downstream Access Point UNITID).
(g) Field 35 – Lining Method, if applicable.
(h) Field 39 – Length Surveyed.
3. All header fields shall be completed using the LACP abbreviations and units as defined in NASSCO LACP.
4. Lateral Inspection Form:
(a) The CCTV Lateral inspection form within the LACP access database shall be completed in accordance with NASSCO requirements and include the following additions:
(i) The "Video Time" shall be included at the appropriate time in the CCTV Lateral video that represents the defect or feature code.

3.13 2D LASER/LIDAR PROFILING INSPECTION

A. CCTV Preparation: Per CCTV inspection requirements, which includes relevant header information such as asset name, manholes, type, etc. as required in this Section. This CCTV inspection shall be used in conjunction with the profiling to complete the analysis of the pipeline.

B. Profile Inspection: Header Details shall comply with CCTV inspection requirements by the City. Standard manufacturer's headings will normally suffice, with City approval. Header Field 'Profile Direction' shall also be included. Valid inputs are

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"Upstream" or "Downstream". Flow Depth for Ovality Analysis flow shall not exceed 1/3 full. For Corrosion Analysis of the pipe walls, flow shall not exceed 1/3 full and shall be performed during lowest flow period. The camera head will be configured to a central position in the pipe (+/-15%). Laser ring or 2D LIDAR sensor shall be clear, central and take up between approximately 2/3 and 3/4 of the vertical screen. Lights shall be turned off. Distance counter shall be displayed. Distance counter shall not overlap the laser ring. All other text shall be removed from screen. Camera shall be in Home position (0.0) for the entirety of the profile inspection. Recording shall be from start manhole to end manhole. Profiling shall be performed in either a forward or reverse direction however this shall be clearly displayed in the header details of the profile inspection. The camera and laser system shall be moved through the pipe at a constant speed not to exceed 10 meters or 30 feet per minute. The tractor shall not stop in the pipe during the profile inspection. The camera shall not perform pan or tilt during profile inspection. Pan and tilt shall be performed during the CCTV lights on inspection.

C. Calibration: Calibration shall be performed using the same CCTV camera and video recording medium as used for the inspection. The calibrator shall be assembled as per manufacturer's instructions and shall be performed using the exact CCTV camera and laser configuration used in the profile inspection. The calibrator shall be clearly viewed (focused) and without glare on screen. The calibrator shall be recorded in the horizontal position and in the vertical position. The video image shall be included in the submitted Inspection video.

D. CCTV Camera Lens Correction: To validate camera lens correction, a flat "Lens correction grid" shall be placed perpendicular to camera lens recorded using the same CCTV camera and video recording medium as used for the inspection. All text shall be removed from the screen. The checkers shall be clearly viewed (focused) and without glare on screen. The video image shall be recorded and be included in the submitted Inspection video.

E. Software Analysis: The inspection video shall be loaded into the profiling software. The correct camera option shall be selected based on CCTV camera used in the profile inspection. The selected camera option shall be automatically stamped into the data file so that the settings cannot be changed. The camera setting shall be displayed in the profiling data file.
   1. Horizontal and vertical calibration shall be performed on the calibration segment of the inspection video. The profile pipe selection shall be from start of pipe asset (beside start manhole) to end of pipe asset (beside end manhole), and selected using the start and end markers in the profile software. The profile software shall be tuned to the laser ring so as to provide maximum number of profile points. A water/debris mask shall be positioned to mask the highest water/debris point in the pipe.
   2. The data file shall be recorded at 25 to 30 profile cross-sections per second and linked to the profile inspection segment of the video. The recorded video shall be used to provide quantitative information of pipe diameter, ovality and corrosion.

F. Laser Profile Data: A NASSCO/PACP certified CCTV operator with profiler software training (Ovality analysis only) or a qualified profiler analyst employed by the equipment manufacturer shall be used to analyze and report structural condition of pipeline using all or some of the following sensors: laser, CCTV. Due to the complex nature of corrosion, all Corrosion and/or Wall Loss Reports must be created by a qualified profiler analyst employed by the equipment manufacturer.

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G. Ovality Reports: The Condition Analysis of Plastic Pipe: Ovality (as per ASTM F1216). Reports shall be presented as an Ovality Observation Report - a line graph displaying Ovality of the pipe over the length of the inspected pipe asset. Where water or debris exists, the software shall use a mask for the non-structural segment to calculate Ovality. A 'Match to Reference Shape and Size' observation shall be shown for each pipe highlighting a cross-section where the actual pipe shape and size closest matches (as determined by engineer):

1. The As-Built diameter, or
2. The median calculated diameter over the entire pipe length
3. Cross-sectional observations should be taken where the structural Ovality threshold exceeds 5% (or as directed by the municipality).
4. Project reports are to be shown as One Mile Ovality Flat Reports – made up of a colored flat graph and a line graph that clearly shows ovality over the 5% threshold (or as directed by the municipality).
5. The flat graph is a colored map of the circular dimensions of the pipe over the length of the inspected pipe asset. Measured pipe ID that coincides with expected values must be coded white.
6. Areas where the data is greater than the pipe ID must be colored on a yellow/red color scale. Areas where the data is smaller than the pipe ID must be colored on a blue scale. The line graph will be aligned with the flat graph, clearly showing ovality above the desired threshold.
7. Deflection Reports – Alternative Option for Condition Analysis of Plastic Pipe
    a. X and Y Diameter Reports shall be presented as an XY Deflection Observation Report – a line graph displaying and XY deflection of the pipe over the length of the inspected pipe asset. Where water or debris exists, the software shall use a mask for the non-structural segment to calculate the X and Y diameters. A 'Match to Reference Shape and Size' observation shall be shown for each pipe highlighting a cross-section where the actual pipe shape and size closest matches the median calculated diameter for each cross-section
    b. Cross-sectional observations should be taken where the X and Y deflection threshold exceeds 5% (or as directed by the municipality).

H. Corrosion Reports: The Analysis of Concrete Pipe – Corrosion, Wall Loss and Buildup Reports shall be presented in a Flat Observations Report. A color map of the circular dimensions of the pipe over the length of the inspected pipe asset. Measured pipe ID that coincides with expected values must be coded white. Material loss (corrosion), as measure by increasing pipe ID must be colored on a yellow/red color scale, with red color set to ½ of the expected wall thickness. Material gain (buildup), as measured by decreasing pipe ID, must be on a blue color scale. A "Match to Reference Shape and Size" observation should be shown for each pipe highlighting a cross-section where the actual pipe shape closest matches the reference shape and size. Cross-sectional observations should be taken to highlight areas of worst corrosion. Due to the complex nature of corrosion, all Corrosion Reports must be created by a qualified profiler analyst employed by the equipment manufacturer.

3.14 SONAR INSPECTION

A. The purpose of the Sonar inspection shall be to document conditions as specified in this Section and as a pre-cleaning evaluation. The Contractor shall document sewer line operational and structural conditions and/or cleaning results.

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B. The Contractor shall keep Sonar Inspection Logs providing location records of the sewer mains inspected. The Logs shall be kept and maintained by the Contractor in a digital format. These location records shall clearly show the stationing location from manhole to manhole. Hard copies of the inspection reports shall be bound and submitted to the City with the digital data. The digital information shall contain multiple video inspection records and files that store each line segment as a unique digital record.

C. The Contractor shall use CCTV to assess the condition of the pipe above the flowline and sonar inspection to assess the condition below the flowline. The Contractor shall provide a digital video file of the inspection. The digital video files must include the location of the line segment at the time the inspection is performed. At a minimum, the video file shall also display manhole numbers and footage at all times. The purpose of the digital recording is to provide a visual record of all line segments that are inspected. Slow motion and stop-motion features shall also be provided. The Contractor shall have all digital video and necessary playback equipment readily accessible for review by the City during the project. The digital video file shall be a deliverable and shall be required for completion of the work for each segment inspected. The digital video files (recorded on the approved digital storage media) shall be indexed with the line segment and labeled appropriately on the disc. Video recordings shall be processed by the Contractor and delivered to the City after completion of the Sonar inspection for review. Video and reports shall be submitted via hard copy, CD-ROM, removable hard drive or DVD Data disk.

D. The Contractor shall provide pipeline reports containing visual profile, profile comparison and dimension data of significant defects where flows are greater than 12-inches in depth. The report shall include longitudinal pipeline cross sections showing the debris profile and depth, volume and cross-sectional area along the length of pipe.

3.15 3D LIDAR INSPECTION

A. CCTV Preparation: Per CCTV inspection requirements, which includes relevant header information such as asset name, manholes, type, etc. as required in this Section. This CCTV inspection shall be used in conjunction with the profiling to complete the analysis of the pipeline.

B. LIDAR Inspection: Header Details shall comply with CCTV inspection requirements by the City. Standard manufacturer's headings will normally suffice, with City approval. Header Field 'Profile Direction' shall also be included. Valid inputs are "Upstream" or "Downstream". Flow Depth for Ovality Analysis flow shall not exceed 1/3 full. For Corrosion Analysis flow shall not exceed 1/3 full and shall be performed during lowest flow period. The camera head will be configured to a central position in the pipe (+/-15%). Recording shall be from manhole to manhole. Scanning shall be performed in either a forward or reverse direction. Scans shall be taken when the robotic unit is stopped and stabilized to reduce shift in the point cloud scans. For Ovality, Wall Loss and Corrosion assessment, a scan must be taken every 5-6 linear feet and must be tagged with the tether distance to determine location the scan was taken in the pipe. For Alignment, Bend Radius, and Virtual Mandrel Analysis, a scan must be taken every 2-3 linear feet and must be tagged with the tether distance to determine location the scan was taken in the pipe.

C. LIDAR Data: Due to the complex nature of LIDAR data. All reports must be created by a qualified profiler analyst employed by the equipment manufacturer. This

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includes Ovality, Wall Loss, Corrosion, Alignment, Bend Radius, and Virtual Mandrel Reports.

D. Ovality Reports: The Condition Analysis of Plastic Pipe: Ovality (as per ASTM 1216). Reports shall be presented as an Ovality Observation Report - a line graph displaying Ovality of the pipe over the length of the inspected pipe asset. Where water or debris exists, the software shall use a mask for the non-structural segment to calculate Ovality. A 'Match to Reference Shape and Size' observation shall be shown for each pipe highlighting a cross-section where the actual pipe shape and size closest matches (as determined by engineer):
   1. The As-Built diameter, or
   2. The median calculated diameter over the entire pipe length
   3. Cross-sectional observations should be taken where the structural Ovality threshold exceeds 5% (or as directed by the municipality).
   4. Project reports are to be shown as One Mile Ovality Flat Reports – made up of a colored flat graph and a line graph that clearly shows ovality over the 5% threshold (or as directed by the municipality).
   5. The flat graph is a colored map of the circular dimensions of the pipe over the length of the inspected pipe asset. Measured pipe ID that coincides with expected values must be coded white.
   6. Areas where the data is greater than the pipe ID must be colored on a yellow/red color scale. Areas where the data is smaller than the pipe ID must be colored on a blue scale. The line graph will be aligned with the flat graph, clearly showing ovality above the desired threshold.
   7. Deflection Reports – Alternative Option for Condition Analysis of Plastic Pipe
      a. X and Y Diameter Reports shall be presented as an XY Deflection Observation Report – a line graph displaying and XY deflection of the pipe over the length of the inspected pipe asset. Where water or debris exists, the software shall use a mask for the non-structural segment to calculate the X and Y diameters. A 'Match to Reference Shape and Size' observation shall be shown for each pipe highlighting a cross-section where the actual pipe shape and size closest matches the median calculated diameter for each cross-section
      b. Cross-sectional observations should be taken where the X and Y deflection threshold exceeds 5% (or as directed by the municipality).

E. Corrosion and Wall Loss Reports: The Analysis of Concrete Pipe – Corrosion, Wall Loss and Buildup Reports shall be presented in a Flat Observations Report. A color map of the circular dimensions of the pipe over the length of the inspected pipe asset. Measured pipe ID that coincides with expected values must be coded white. Material loss (corrosion), as measure by increasing pipe ID must be colored on a yellow/red color scale, with red color set to ½ of the expected wall thickness. Material gain (buildup), as measured by decreasing pipe ID, must be on a blue color scale. A "Match to Reference Shape and Size" observation should be shown for each pipe highlighting a cross-section where the actual pipe shape closest matches the reference shape and size. Cross-sectional observations should be taken to highlight areas of worst corrosion. Due to the complex nature of corrosion, all Corrosion Reports must be created by a qualified profiler analyst employed by the equipment manufacturer. Deliverables shall include, but not limited to, electronic files, pdf documents, Microsoft Excel spreadsheets, or other formats requested by the City/Design Professional.

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F. Alignment, Bend Radius, and Virtual Mandrel Reports: The Analysis of a pipe in preparation for rehabilitation through lining, slip-lining, or geopolymers shall be presented via plan drawings and 3D models. All LIDAR scans must be aligned and constrained to survey-grade coordinates of the access points. Any bends, horizontal or vertical deflection, or curvature of the pipe shall be noted by the location in the pipe and the radius or degree of the bend. For Virtual Mandrel Analysis, liner manufacturer specifications such as the internal diameter (ID), outer diameter (OD), joint deflection, and length of the liner segment must be provided in order to process and determine successful rehabilitation.

3.16 MULTI-SENSOR INSPECTION

A. Equipment shall be calibrated and deployed per the manufacturers' specifications. Each inspection record and recording shall be limited to a single (1) sewer segment. Combining multiple sewer segment inspections in one (1) recording shall not be permitted.

B. The Contractor shall keep Multi-Sensor Inspection Logs providing location records of the gravity lines inspected. The Logs shall be kept and maintained by the Contractor in a digital format. These location records shall clearly show the stationing location from manhole to manhole. Hard copies of the inspection reports shall be bound and submitted to the City with the digital data.

C. The multiple inspection technologies shall be used to develop a visual representation of internal pipe conditions above the flow line using Lidar-laser measurement and below the flow line using sonar measurement, combined with high-definition video inspection. The Contractor shall provide a digital video file of the inspection. The digital video files must include the location of the line segment at the time the inspection is performed. At a minimum, the video file shall also display manhole numbers and footage at all times. The purpose of the digital recording is to provide a visual record of all line segments that are inspected. Slow motion and stop-motion features shall also be provided. The Contractor shall have all digital video and necessary playback equipment readily accessible for review by the City during the project. The digital video file shall be a deliverable and shall be required for completion of the work for each segment inspected. The digital video files (recorded on the approved digital storage media) shall be indexed with the line segment and labeled appropriately on the disc. Video recordings shall be processed by the Contractor and delivered to the City after completion of the Sonar inspection for review. Video and reports shall be submitted via hard copy, CD-ROM, removable hard drive or DVD Data disk.

D. Where other sensors are used in conjunction with the CCTV, Contractor shall provide the required reports as specified in 3.13, 3.14, and/or 3.15.

3.17 FELL INSPECTION

A. The inspection shall be performed on one sewer line section (i.e., manhole to manhole or clean out to mainline) at a time. Flow within the section is irrelevant except within the area of the inspection probe, which will be 100 percent flooded to within three (3) feet of the probe in both directions.

B. The probe shall be pulled through the line a uniform rate in compliance with operator discretion. The rate of inspection should not be greater than 60 feet per minute, and the rate should not exceed the capability of encapsulating the probe with water.

C. For each gravity line inspected, executing the FELL testing shall begin with a light flushing of the gravity line and then using a hydraulic jet hose and reel to pull the

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FELL probe through the pipe. The gravity line shall be flushed from the downstream manhole, the nozzle removed at the upstream manhole, a Sliding Funnel Plug shall be attached to the hose, and the FELL probe shall be attached to the Plug. The hydraulically powered jet truck shall then pull the probe through the pipeline while simultaneously providing the water necessary for the probe to electrically examine the pipe walls.

D. All data will be fed back to a PC via a standard coaxial cable. Once the data is collected on the laptop computer, it shall be uploaded to a Cloud-Based portal where it will be instantly processed and available for Owner/engineer/contractor and staff to view. This portal shall be a secure site and only accessible by Owner code and pathway security.

E. The equipment manufacturer's custom and proprietary algorithms shall be used to grade the size and type of each leak, defects, or possible defects, and graphically display the defect grade size, type and frequency for each manhole-to-manhole pipeline section. In addition, the manufacturer's software shall provide an estimated GPM gallons per minute, and GPD gallons per day infiltration rate per defect and for the entire pipeline segment being assessed. All shall be in accordance with ASTM 2550-13.

F. Contractor shall provide the fully analyzed Focused Electrode Leak Locating pipe testing results to the Owner within 72 hours of testing each section of pipe via uploading each scan to the Owner's licensed viewing platform or document management system with the following information:
   1. Owner and State.
   2. Date of Inspection.
   3. Location of Inspection.
   4. Pipeline size, type, and overall length.
   5. Graph showing:
      a. Defect start / end and overall length (ft.).
      b. Potential GPM infiltration estimation based on the hydrogeological approach.
      c. Percentage of potential GPM infiltration per defect.
      d. Defect Threshold (Small, Medium, Large).
      e. Overall chart indicating GPM Summary in Detail.

G. If specified by the City, Premium Reporting shall be provided. CCTV of the installed CIPP shall be obtained and reviewed in conjunction with the processing of FELL results. Defects shall be categorized and assigned to the main line or service connections with their associated GPM and GPD infiltration rates showing the following information:
   1. Minor flow and percentage of Total Flow.
   2. Moderate flow and percentage of Total Flow.
   3. Severe flow and percentage of Total Flow.
   4. Total GPM.
   5. Total GPD.
   6. Total GPD / IDM.

H. Acceptance of all testing shall be at the sole discretion of the City/Design Professional. The City will be responsible for the review and analysis of the post CIPP CCTV and FELL testing.

I. Correction of defects identified shall be at the sole discretion of the City.

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3.18 DELIVERABLES

A. All information developed as part of this section shall be considered a record document. Management and submittal of this information shall conform to this Section, Section 00700 – General Conditions, Article 6, Contractor's Responsibilities and Section 01020 – Record Documents.

3.19 CLEAN UP

A. The Contractor shall keep premises free from accumulation of waste materials, rubbish, and other debris generated by Contractor's operations.
B. Cleanup shall be conducted in accordance with Section 01566 – Cleanup Operations.

3.20 MEASUREMENT AND PAYMENT

A. Unless otherwise specified in the Contract Documents, all work associated with cleaning and the inspection technology or technologies utilized shall be considered ancillary and will not be measured for payment. All labor, material, equipment and deliverables costs shall be included in the Bid.

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END OF SECTION

ATTACHMENT I

02180 Clearing and Grubbing

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SECTION 02180 – CLEARING AND GRUBBING

PART 1 - GENERAL

1.01 SUMMARY

A. Clearing and grubbing, within the Site and as indicated in the Contract Documents, shall consist of the removal and disposal of all trees, stumps, roots, logs, shrubs, grass, weeds, fallen timber, trash (surface and buried), buildings, foundations, fences and all other material designated for removal and disposal.

1.02 SPECIFICATION MODIFICATIONS

A. It is understood that throughout this section these Specifications may be modified by appropriate items in Section 01015 – Specific Project Requirements and as indicated in the Contract Documents.

1.03 RELATED SECTIONS

A. Section 01015 – Specific Project Requirements.
B. Section 02190 – Demolition.
C. Section 02200 – Earthwork.
D. Section 02575 – Restoration.
E. Section 02949 – Tree Protection, Removal and Replacement.

1.04 CODES AND STANDARDS

A. Note used.

1.05 DEFINITIONS

A. Clearing – The removal and disposal of all materials such as trees, brush, fallen timber and other materials found on or above the surface of the site. It shall include, but is not limited to, the removal of the following: buildings (see also Section 02190 – Demolition), fences, lumber, trash and other waste. Salvaging and disposing of the materials shall be as specified in this section and in the Contract Documents.
B. Scalping – The removal and disposal of material such as: sod, grass, weeds, agricultural crops, bushes, brush and all decayed vegetative matter from the surface of the ground without disturbing the earth more than is necessary.
C. Grubbing – The removal and disposal of all material such as stumps, roots, buried debris, foundations and trash encountered below the surface of the ground that has not been included in the description of clearing.
D. Trees – Woody growth having a diameter of 2 inches or greater as measured 4.5 feet above the ground.
E. Brush – Dense vegetation consisting of shrubs, bushes and small trees less than 2 inches in diameter as measured 4.5 feet above the ground.

1.06 INFORMATION PROVIDED BY THE CITY

A. As provided in the Contract Documents.

1.07 SUBMITTALS

A. Submit as specified in Section 01300 – Submittals.
B. Other Submittals:
    1. All permits required for the Work specified in this section.

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2. Landfill Information. The Contractor shall submit for review and approval all proposed landfill sites to be used for the disposal of debris resulting from clearing and grubbing.

1.08 QUALITY ASSURANCE

A. The Contractor is responsible for the quality assurance and quality control of the Work.

1.09 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Salvaged materials shall be handled, stored and delivered as specified in Section 01015 – Specific Project Requirements.

1.10 LIMITS OF WORK

A. The limits of clearing and grubbing shall extend to the construction limits unless otherwise shown on the Drawings. Clearing should only occur in those areas required for construction within a six-month period.
B. Large projects shall be cleared and grubbed as construction progresses. Mass clearing and grubbing shall be avoided.
C. An undisturbed strip of not less than 25 feet in width consisting of existing grass or other vegetation shall be kept in place around the perimeter of the construction site and protected from damage. The Contractor shall scalp only those areas necessary for the construction of the project.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.01 PERIMETER EROSION AND SEDIMENT CONTROLS

A. Perimeter erosion and sediment controls shall be installed prior to the start of clearing and grubbing the Site.
B. When needed for the installation of perimeter controls, limited clearing and grubbing will be allowed to accommodate the Contractor's perimeter installation operation.

3.02 PRESERVATION OF TREES

A. All work associated with trees shall be done in accordance with Section 02949 - Tree Protection, Removal and Replacement. No trees shall be removed outside the excavated area or outside filled areas, unless their removal is indicated on the Drawings or as authorized by the City in accordance with Section 02949.
B. Trees left standing shall be protected from permanent damage by construction operations in accordance with Section 02949 - Tree Protection, Removal and Replacement.

3.03 NOTIFICATIONS

A. The Contractor shall notify property owners at least one (1) week in advance of removing any special plantings (flowers, ornamental trees, bushes, plants, etc…) so that the property owner has a reasonable opportunity to transplant prior to the Contractor's work activities.

3.04 CLEARING

A. Trees located within the permanent easement and temporary construction easement shall be removed as indicated on the Drawings and in accordance with Section 02949.

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B. Clearing shall consist of removing all materials such as trees, brush, downed timber, trash, waste and other objectionable materials found on or above the surface of the site.
C. The Contractor shall tag or identify existing trees, shrubs and landscape materials to be removed; and obtain City approval prior to removal in accordance with Section 02949.

3.05 SCALPING

A. Scalping shall include the removal and disposal of material such as: sod, grass, weeds, agricultural crops, bushes, brush and all decayed vegetative matter from the surface of the ground without disturbing the earth more than is necessary.

3.06 GRUBBING

A. Grubbing shall consist of the removal and disposal of all material such as stumps, roots, buried debris, foundations and trash encountered below the surface of the ground that has not been included in the description of clearing.
B. The vegetative matter shall be removed to the following depths:
   1. A minimum depth of 12 inches below ground line or subgrade, whichever is lower.
   2. A minimum depth of 18 inches below ground line or subgrade, whichever is lower, at water containment areas (berms, dams, levees, lagoons, ponds, dikes etc.).
C. Remove and dispose of all stumps, roots and other vegetative matter larger than 2 inches in diameter.
D. When materials encountered below grade that are detrimental to the proposed improvement, the material shall be removed to a depth necessary to provide adequate space for installation and support for the proposed improvement.

3.07 EMBANKMENT AREAS

A. Unless otherwise noted on the plans, where undisturbed stumps and roots are encountered and the fill depth will exceed 3 feet, the stumps and roots may be left in place provided they do not extend above final grade.

3.08 BORROW AREAS

A. All stumps, roots and other objectionable matter shall be removed from the borrow material used for embankment or fill. The borrow area shall be left in a well-drained and smooth condition and restored in accordance with Section 02575 – Restoration.

3.09 BACKFILL

A. Backfill all holes, pits and depressions resulting from clearing and grubbing.
B. Backfill with suitable material placed and compacted in conformance with Section 02200 – Earthwork and grade the area to drain.

3.10 DISPOSAL OF MATERIAL

A. Dispose of all materials from the clearing and grubbing operations at a City approved location, as arranged for by Contractor, at no additional cost to City.
B. Unless otherwise specified in Section 01015 – Specific Project Requirements or other portions of the Contract Documents, the Contractor may claim and salvage any material which the Contractor may consider of value but shall not delay any work associated with the Contract by the salvaging operations.
C. Open burning of brush or debris on the Site is not allowed unless approved by the City. If approved by the City, the Contractor shall obtain all permits required for open burning.

END OF SECTION

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