Albuquerque Bernalillo County
Water Utility Authority

Agenda Item No. 9d

Meeting Date: February 8, 2023
Staff Contact: David Laughlin, Chief Engineer

TITLE: C-23-1 – Approval of Contract with Insituform Technologies, LLC for Construction Services at I40 Western Trail Pipeline Rehab

ACTION: Recommend Approval

Summary:
Requesting approval to enter into an Agreement with Insituform Technologies, LLC to provide Sewer Interceptor Rehabilitation construction services for the I40-Western Trail Westside Interceptor Rehab project, pursuant to the BuyBoard Cooperative Contract #635-21. This project will rehab 2.3 miles of the 50-year-old Westside Interceptor, which recently experienced a collapsed segment that required emergency response and cleanup. This project is a critical rehabilitation priority for the Water Authority.

The Water Authority intends to procure these construction services pursuant to the authority contained in section 19(a), Existing Government Contracts and Cooperative Procurement, of the Rules Governing Procurement for the Albuquerque/Bernalillo County Water Utility Authority. Resolution R-18-14 requires board approval for any purchase in an amount exceeding $500,000.

This approval is intended to delegate signature authority to the Executive Director to enter into an Agreement with the selected contractor, approve any change orders or amendments to the Agreement as necessary to complete the project.

FISCAL IMPACT:
$16,075,965.86 including NM GRT

AGREEMENT
BETWEEN THE
ALBUQUERQUE BERNALILLO COUNTY WATER UTILITY AUTHORITY
AND
INSITUFORM TECHNOLOGIES, LLC

I-40 WESTERN TRAIL PIPELINE REHAB
PROJECT NO: 02913.00

THIS AGREEMENT is made and entered into on the date last entered below, by and between the Albuquerque Bernalillo County Water Utility Authority, hereinafter called OWNER, and Insituform Technologies, LLC, hereinafter called CONTRACTOR.

That Owner and Contractor for the consideration stated herein mutually agree as follows:

1. **SCOPE OF SERVICES:** CONTRACTOR shall provide the work described in Exhibit A, Specifications, attached hereto (hereafter the "Work") in a satisfactory and proper manner, as determined by the Owner. Contractor shall furnish all supervision, technical personnel, labor, materials, machinery, tools, equipment and services, including utility and transportation services, and perform and complete the Work for the construction of the above-referenced Project and any authorized supplemental work, all in strict accordance with the Contract Documents.

2. **CONTRACT TIME:** The Contract Time will commence on the day indicated in the Notice to Proceed, as specified in the General Terms and Conditions, and continue for a period of **314 consecutive calendar days** for final completion. Changes to the Contract Time are allowed only as provided in the General Terms and Conditions.

   Time for Substantial Completion. The Contractor will commence Work under this Contract in accordance with the Notice to Proceed from the Water Authority, if applicable, and achieve Substantial Completion of the Project as provided in the Contract Documents within 284 consecutive calendar days after the date Contract Time begins as provided in the Contract.

   Time to Complete Punch List. The Contractor shall complete or correct all punch list items attached to the Certificate of Substantial Completion as described in the Contract Documents within 30 consecutive calendar days following the date of Substantial Completion.

   Liquidated damages, in the amount per day of Five Hundred Dollars and 00/cents ($500.00) will be assessed against the Contractor for each calendar day, or portion thereof, the Work has not achieved Substantial Completion after expiration of that portion of the Contract Time allotted for construction, including any approved extension of time granted. Further, liquidated damages, in the amount per day of Five Hundred Dollars and 00/100 ($500.00) will be assessed against the Contractor for each calendar day, or portion thereof, the punch list items listed as incomplete and attached to the Certificate of Substantial Completion are not completed or corrected after expiration of the time allotted for completion and correction, including any approved extension of time granted. These liquidated damages are cumulative. See the General Terms and Conditions, referenced in Part IV of this RFB, for additional information

terms relating to liquidated damages.

3. **CONTRACT PRICE:** OWNER will pay CONTRACTOR for the performance of the Contract in current funds, as provided in the Contract Documents, the amount of Sixteen Million Seventy-Five Thousand Nine Hundred Sixty-Five Dollars and 86/100 ($16,075,965.86), which amount includes any applicable New Mexico Gross Receipts Taxes, pursuant to Exhibit B, Buy-Board Proposal Project: I-40, Western Trail and Fee pursuant to the BuyBoard Cooperative Contract #635-21.

4. **LIST OF SUBCONTRACTORS AND SUPPLIERS:** The Contractor will complete and submit to the Water Authority, at the time requested, a list of subcontractors and suppliers.

5. **NON-APPROPRIATION OF FUNDS:** Notwithstanding any provision in this Contract to the contrary, payments hereunder are contingent upon the Water Authority Board making the necessary appropriations. If sufficient appropriations are not made, this Contract may be terminated at the end of the Water Authority's then current fiscal year upon written notice given by OWNER to CONTRACTOR. Such event shall not constitute an event of default and all payment obligations of OWNER and all of its interest in this Contract will cease upon the date of termination. OWNER'S determination regarding appropriations shall be accepted by CONTRACTOR and shall be final.

6. **COMPLIANCE WITH LAWS:** In providing the Work outlined herein, Contractor shall comply with all applicable laws, ordinances, and codes of the federal, State, and local governments, including, but not limited to the New Mexico Human Rights Act, Title VII of the federal Civil Rights Act of 1964, the Americans with Disabilities Act of 1990, and all federal, State and local statutes, regulations and executive orders relating to civil rights.

7. **CONTRACT DOCUMENTS:** The Contract Documents consist of the following, which are as fully a part of the Contract as if attached to this Agreement or repeated herein, and have precedence in the following order:

- Modifications to the Contract Documents
- the Agreement, (including Exhibit A, Exhibit B, the Wage Decision, insurance certificates and surety bonds) the Drawings (dated____) (incorporated by reference as Appendix A)
- the General Terms and Conditions for Construction Contracts (rev. 12/19/2018)
- the City of Albuquerque Standard Specifications for Public Works Construction, 1986 Edition, as currently updated and amended by the Water Authority General Terms and Conditions of Construction Contracts.

6.1 Construction detail drawings shall govern over scaled dimensions and over other drawings. Dimensions given on plans or which can be calculated will govern over scaled dimensions.

6.3 All definitions and terms set forth in the General Terms and Conditions for Construction Contracts and the Procurement Ordinance are applicable to the Contract Documents.

IN WITNESS WHEREOF, OWNER and CONTRACTOR have executed this Agreement the day and year last entered below.

ALBUQUERQUE BERNALILLO COUNTY WATER UTILITY AUTHORITY

Approved By:

_____
Mark S. Sanchez, Executive Director

Date: _____

_____
Elizabeth Anderson, Chief Planning Officer

Date: _____

Reviewed by:

_____
Charles Kolberg, General Counsel

Date: _____

CONTRACTOR:

INSITUFORM TECHNOLOGIES, INC.

By:_____

Title:_____

Date: _____

WAGE DECISION

LABOR RELATIONS DIVISION **WWW.DWS.STATE.NM.US**

401 Broadway NE
Albuquerque, NM 87102
Phone: 505-841-4400
Fax: 505-841-4424

226 South Alameda Blvd
Las Cruces, NM 88005
Phone: 575-524-6195
Fax: 575-524-6194

1596 Pacheco St, Suite 103
Santa Fe, NM 87505
Phone: 505-827-6817
Fax: 505-827-9676

Wage Decision Approval Summary

1) Project Title: Westside Interceptor Rehab I-40 to Western Trail
Requested Date: 01/06/2023
Approved Date: 01/06/2023
Approved Wage Decision Number: BE-23-0041-A

Wage Decision Expiration Date for Bids: 05/06/2023

2) Physical Location of Jobsite for Project:
Job Site Address: I40/64th to Atrisco/Western Trail
Job Site City: Albuquerque
Job Site County: Bernalillo

3) Contracting Agency Name (Department or Bureau): Albuquerque Bernalillo County Water Utility Authority
Contracting Agency Contact's Name: Tom Matthews
Contracting Agency Contact's Phone: (505) 289-3029 Ext.

4) Estimated Contract Award Date: 02/09/2023

5) Estimated total project cost: $16,000,000.00
a. Are any federal funds involved?: No
b. Does this project involve a building?: No
c. Is this part of a larger plan for construction on or appurtenant to the property that is subject to this project?: No
d. Are there any other Public Works Wage Decisions related to this project?: No
e. What is the ultimate purpose or functional use of the construction once it is completed?: This project will rehabilitate approximately 12,500 linear feet of 48" diameter concrete sewer pipe that is currently in a severely corroded condition. This project will also rehabilitate the associated concrete manholes that are also severly corroded.

6) Classifications of Construction:

Classification Type and Cost Total	Description
Highway/Utilities (A) **Cost:** $16,000,000.00	The project will start on the north end near Western Trail. A short portion will be slip lined requiring the excavation of an insertion pit, associated traffic control, slip lining about 200 feet of 48" sewer pipe, backfilling, compacting, restoration of the existing road and surface conditions. Bypass pumping will be set up at the north end with two 18" HDPE pipes extending to the discharge on Ladera Golf Course. Under bypass the 48" sewer pipe will be cleaned, and a fully structural liner CIPP will be installed. Manholes will be cleaned, and corroded concrete and rebar will be replaced. A corrosion resistant liner will be installed in the manholes. The same process will be repeated for the south end of the project from Ladera Golf Course to I40.

TYPE "A" – STREET, HIGHWAY, UTILITY & LIGHT ENGINEERING

Effective January 1, 2023

Trade Classification	Base Rate	Fringe Rate
Bricklayer/Block layer/Stonemason	24.46	8.81
Carpenter/Lather	27.73	12.14
Carpenter- Los Alamos County	33.18	13.58
Cement Mason	18.24	7.61
Drywall Finisher/Taper	25.82	8.40
Glazier		
Glazier/Fabricator	21.25	6.70
Delivery Driver	12.00	6.70
Ironworker	28.05	18.30
Painter- Commercial	18.25	8.50
Paper Hanger	18.25	8.50
Plumber/Pipefitter	38.63	14.55
Electricians- Outside Classifications: Zone 1		
Ground man	25.43	11.76
Equipment Operator	36.48	16.09
Lineman	46.09	18.52
Journeyman technician	42.92	17.73
Cable Splicer	47.22	18.81
Electricians-Outside Classifications: Zone 2		
Ground man	25.43	11.76
Equipment Operator	36.48	16.09
Lineman	46.09	18.52
Journeyman technician	42.92	17.73
Cable Splicer	47.22	18.81
Electricians-Outside Classifications: Los Alamos county		
Ground man	26.15	11.78
Equipment Operator	37.54	16.13

Lineman	47.29	18.82
Journeyman technician	44.15	18.04
Cable Splicer	51.93	19.98
Laborers		
Group I – unskilled	15.99	7.11
Group II – semiskilled	15.99	7.11
Group III – skilled	17.49	7.11
Group IV – specialty	17.99	7.11
Operators		
Group I	21.35	6.74
Group II	22.38	6.74
Group III	22.49	6.74
Group IV	22.62	6.74
Group V	22.73	6.74
Group VI	22.94	6.74
Group VII	23.12	6.74
Group VIII	23.45	6.74
Group IX	31.96	6.74
Group X	35.65	6.74
Soft Floor Layers	21.00	8.45
Truck Drivers		
Group I-IX	19.00	9.10

NOTE: All contractors are required to pay SUBSISTENCE, ZONE AND INCENTIVE PAY according to the particular trade. Details are located in a PDF attachment at WWW.DWS.STATE.NM.US. Search Labor Relations/Labor Information/Public Works/Prevailing Wage Rates.

For more information about the Subsistence, Zone, and Incentive Pay rates, or to file a wage claim, contact the Labor Relations Division at (505) 841-4400 or visit us online at www.dws.state.nm.us.

SUPPLEMENTAL TECHNICAL SPECIFICATIONS

The following revisions and/or additions to the Technical Specifications of the Standard Specifications are hereby made a part of the Contract Documents.

SUPPLEMENTAL TECHNICAL SPECIFICATION
SECTION 01 21 00
ALLOWANCES

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Administrative and procedural requirements governing the handling and processing of allowances.

1.2 RELATED SECTIONS

A. General and Supplemental General Conditions of the Contract and Division 1.

1.3 ALLOWANCES

A. Allowance- An amount designated by the OWNER for purchase of services, equipment, or goods by the CONTRACTOR for the project. Reimbursement will be based on the suppliers, manufacturers, or service providers invoices.

B. See the Bid Schedule for costs allotted for each allowance.

C. All allowances shall be coordinated with the OWNER and ENGINEER prior to any expenditure of allowance funds.

1.4 CONTRACTOR COSTS INCLUDED IN ALLOWANCE

A. Cost of product or service to Contractor or Subcontractor

B. The Contractor shall make no claim, nor receive any compensation, for anticipated profits, loss of profit, damages, or any extra payment due to any unexpended portion of the allowances.

C. The Contractor is to include time for allowance work in the construction schedule. No adjustment of Contract Time shall be allowed for any work performed under allowance items.

D. Allowance items shall be included in the Schedule of Values.

E. Unless otherwise indicated in the specific measurement and payment provisions under allowance items, the measurable and allowable costs for work performed under an Allowance item shall be limited to the actual, demonstrable, and direct costs associated with that Allowance item. Shipping and sales taxes are allowable costs.

F. Differences in cost will be adjusted by Change Order.

1.5 CONTRACTOR COSTS INCLUDED IN CONTRACT PRICE BUT NOT INCLUDED IN ALLOWANCES

A. See General Terms and Conditions of the Contract.

B. Costs of incidental labor and facilities required to assist a testing firm.

C. Costs of testing laboratory services used by CONTRACTOR separate from Contract Document requirements.

D. Costs of retesting upon failure of previous tests.

E. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

F. Protection of products from elements and from damage.

PART 2– PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION 01 21 00

SUPPLEMENTAL TECHNICAL SPECIFICATION
SECTION 01 31 00
PROJECT MANAGEMENT COORDINATION

PART 1– GENERAL

1.1 SECTION INCLUDES

A. Section includes procedures for preparing and conducting the project construction meetings:

1. Preconstruction meeting
2. Progress meetings
3. Pre-installation meetings
4. Pre-bypass pumping meetings
5. Closeout meeting

1.2 RELATED SECTIONS

A. General and Supplemental General Conditions, and Special Conditions of the Contract.

1.3 DEFINITIONS, ABBREVIATIONS AND ACRONYMS

A. ENGINEER—also referred to as CONSULTANT in the General terms and conditions. An agent or licensed professional with whom OWNER has entered into an agreement, who is responsible for the engineering, surveying, architectural, and/or landscape architectural design or construction contract administration and inspection or both, acting directly or through duly authorized representatives. If OWNER has not contracted with a CONSULTANT, OWNER'S employee(s) will perform the services of the CONSULTANT.

B. Progress Schedule—A schedule, prepared and maintained by CONTRACTOR, describing the sequence and duration of the activities comprising the CONTRACTOR'S plan to accomplish the Work within the Contract Times.

C. Resident Project Representative—The authorized representative of ENGINEER assigned to assist ENGINEER at the Site. As used herein, the term Resident Project Representative or "RPR" includes any assistants or field staff of Resident Project Representative.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Meeting Participants: Representatives of entities participating in meetings shall be qualified and authorized to act on behalf of the entity each represents.

1.5 PRECONSTRUCTION MEETING

A. OWNER or OWNER representative (ENGINEER) will schedule and preside over meeting after issuance of the Notice of Award.

B. Attendance Required: ENGINEER, OWNER, RPR, major Subcontractors, applicable utility representative, funding agency representatives, and CONTRACTOR.

C. Minimum Agenda:

1. OWNER-CONTRACTOR Agreement
    a. Execution.
    b. Submission of executed bonds and insurance certificates.
    c. Distribution.
2. Submission Progress Schedule.
3. Submission of Schedule of Submittals.
4. Designation of Contract Authority and channels of communication.
5. Procedures and processing of:
    a. Field orders
    b. Submittals
    c. Change Orders
    d. Request for Information/Interpretations
    e. Applications for Payment
    f. Record Documents
    g. Contract closeout procedures
6. Scheduling
7. Critical Work sequencing
8. Use of project site:
    a. Office and storage areas
    b. Security
    c. Housekeeping
    d. OWNER'S requirements
9. Major equipment deliveries and priorities
10. Permits required for construction
11. Utilities required for construction
12. Outline responsibilities for RPR
13. Selection of Materials Testing firm and Special Inspection firm
14. Procedures for testing

15. Use of premises by OWNER and CONTRACTOR
16. OWNER'S requirements and partial occupancy
17. Identify coordination items with Owner
18. Set progress meeting location, interval, day of week, and time.
19. Construction facilities and controls
20. Temporary utilities provided by OWNER
21. Survey and site layout
22. Procedures for maintaining record documents
23. Requirements for startup of equipment
24. Inspection and acceptance of equipment put into service during construction period

D. ENGINEER: Record minutes and distribute copies to participants after meeting

1.6 PROGRESS MEETING

A. Attend meetings throughout progress of the Work at periodic intervals.

1. ENGINEER will:
   a. Schedule and administer meetings throughout progress of the Work
   b. Make arrangements for meetings, prepare agenda with copies for participants, and preside over meetings
2. Attendance as appropriate to agenda topics for each meeting:
   a. Job superintendent
   b. Major Sub-Contractors
   c. CONTRACTOR
   d. ENGINEER
   e. OWNER
   f. Additional invitees: OWNER of utility companies when the Work affects their interests, and others necessary to attend.

B. Minimum Agenda:

1. Review minutes of previous meetings
2. Review of submittal schedule and status of submittals
3. Request for information (RFIs) status
4. Change order management status
5. Review of Schedule
6. Planned progress during succeeding work period
7. Field observations, problems, and decisions

8. Maintenance of quality and work standards

9. Action items

10. Next meeting

C. ENGINEER: Record minutes and distribute to participants and those affected by decisions made within two business days after meeting.

1.7 PREINSTALLATION MEETINGS

A. When required in individual Specification Sections, convene pre-installation meetings at Project Site before starting Work of specific Section.

B. Require attendance of parties directly affecting, or affected by, Work of specific Section.

C. Notify ENGINEER 7 calendar days in advance of meeting date as specified in the specific Section

D. CONTRACTOR: Prepare agenda and preside over meeting:

1. Review conditions of installation, preparation, and installation procedures

2. Review coordination with related Work

E. CONTRACTOR: Record minutes and distribute to participants within two business days after meeting and those affected by decisions made

1.8 ODOR CONTROL COORDINATION MEETING

A. Require attendance of parties directly associated with the odor control operation, including ENGINEER, specific CONTRACTOR'S work crews, OWNER'S construction, operations, and maintenance staff.

B. OWNER and CONTRACTOR shall coordinate an onsite meeting after the odor control trailer has been delivered and setup onsite. notify ENGINEER 3 calendar days in advance of meeting date but prior to operation of the odor control trailer.

C. CONTRACTOR shall prepare agenda and preside at meeting:

1. OWNER'S representative will review setup, operation, and maintenance of the Odor Control Trailer.

2. Review timelines, sequences, and phases.

3. Review responsibilities.

4. Review site security measures.

5. Review coordination with related work.

D. CONTRACTOR will record minutes and distribute copies within 3 calendar days after meeting and prior to scheduled shutdown to participants, with copies to ENGINEER, OWNER, and those affected by decisions made.

1.9 PRE-BYPASS PUMPING MEETINGS

A. Require attendance of parties directly affecting, or affected by bypass pumping operation, including ENGINEER, specific work crews, OWNER'S construction, operations, and maintenance staff.

B. CONTRACTOR shall notify ENGINEER 7 calendar days in advance of meeting date. Meeting date shall take place a minimum of 3 days before the start of bypass pumping and all bypass pumping submittals shall be submitted and reviewed by the ENGINEER.

C. CONTRACTOR shall prepare agenda and preside at meeting:

1. Review accepted Bypass Pumping Submittals including conditions of bypass pumping setup.
2. Review timelines and sequences.
3. Review responsibilities.
4. Review dry run plan and schedule, as necessary.
5. Review coordination with related work.

D. CONTRACTOR will record minutes and distribute copies within 3 calendar days after meeting and prior to scheduled shutdown to participants, with copies to ENGINEER, OWNER, and those affected by decisions made.

1.10 FINAL WALK-THROUGH INSPECTION

A. ENGINEER will schedule on-site walkthrough

B. Attendance required: OWNER, ENGINEER, CONTRACTOR (Project Manager and Superintendent)

C. Agenda:

1. Compile punch list of all deficient work or uncompleted work per the contract documents
2. Determine if project is substantially complete

D. Punch List will be maintained by the ENGINEER

1.11 CLOSE-OUT MEETING

A. ENGINEER will schedule close-out meeting

B. ENGINEER will make arrangements for meeting, prepare agenda with copies for participants, and preside at meeting

C. Attendance required: OWNER, ENGINEER, CONTRACTOR (Project Manager and Superintendent)

D. Agenda:

1. Review punch list completion
2. Transfer of record documents
3. Finalize payment

E. ENGINEER will record minutes and distribute copies to participants

1.12 POST CONSTRUCTION MEETING

A. Meet with and inspect the Work 11 months after date of Substantial Completion with OWNER and ENGINEER.

B. Arrange meeting at least 7 days before meeting

C. Meet in OWNER's office or other mutually agreed upon place

D. Inspect the Work and draft list of items to be completed or corrected

E. Review service and maintenance contracts and take appropriate corrective action when necessary

F. Complete or correct defective work and extend correction period accordingly

G. Require attendance of CONTRACTOR, Project Manager, or Superintendent, appropriate manufacturers and installers of major units of constructions, and affected subcontractor

PART 2– PRODUCTS (NOT USED)

PART 3– EXECUTION (NOT USED)

END OF SECTION 01 31 00

SUPPLEMENTAL TECHNICAL SPECIFICATION
SECTION 01 32 00
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1– GENERAL

1.1 SECTION INCLUDES

A. Section includes general information and execution for construction progress documentation.

1.2 GENERAL REQUIREMENTS

A. CONTRACTOR shall prepare and submit a detailed progress schedule, to the ENGINEER for approval in accordance with the General Conditions.

PART 2– PRODUCTS [NOT USED]

PART 3– EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Schedule:

1. The CONTRACTOR shall prepare a fully developed, Critical Path Method (CPM) chart or spreadsheet type bar graph of CONTRACTOR'S construction schedule.
2. The scheduling of construction is the responsibility of the CONTRACTOR and CONTRACTOR management personnel shall actively participate in development of the schedule so that intended sequences and procedures are clearly understood. An orderly progression of work is demonstrated by:
    a. Provide a separate task for each significant construction activity. Use the same breakdown of units of the Work as indicated in the "Schedule of Values".
    b. Coordinate the CONTRACTOR'S construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests and other schedules.
    c. The diagram shall show a continuous activity flow from left to right. The activity or event numbers, description, duration, and value shall be shown on the diagram.
    d. Dates shall be shown on the diagram for start of the project, any milestones required by the contract, and contract completion.
    e. The critical path shall be clearly identified.

f. Submittal, review, procurement, fabrication, delivery, installation, start- up, and testing of special or long lead-time materials and equipment shall be included in the schedule.

g. Other agency activities shall be shown. These include but are not limited to notice to proceed, approvals, inspections, and utility tie in for phasing requirements.

B. Work Stages:

1. Indicate important stages of construction for each major portion of the Work, including testing and installation.

C. Schedule Updates:

1. Update the schedule prior to weekly progress meeting.

a. Identify overall progress of each Major Item of Work in the Summary Schedule.

b. If there are significant changes to the schedule, submit a written report at the weekly progress meeting.

END OF SECTION 01 32 00

SUPPLEMENTAL TECHNICAL SPECIFICATION
SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1- GENERAL

1.1 SUMMARY

A. Section includes procedures for preparing and transmitting submittals required by specification sections for a product, material, or construction method:

1. Quality Assurance.
2. Shop drawings.
3. Product data.
4. Design Data and Calculations
5. Manufacturer's instructions.
6. Manufacturer's field service reports.
7. Samples.
8. Miscellaneous.

B. Section also includes requirements and procedures for a substitution requests.

C. It is the responsibility of the CONTRACTOR to convey the requirements of this Section to their SUB-CONTRACTORS and their suppliers and vendors.

1.2 RELATED SECTIONS

A. General and Supplemental General Conditions of the Contract and Division 1

B. STD Specification 1502

1.3 REFERENCES

A. City of Albuquerque Standard Specifications for Public Works Construction, as updated.

1.4 GENERAL SUBMITTAL REQUIREMENTS

A. Wherever Submittals are required hereunder, all such documents shall be furnished to the ENGINEER.

B. The CONTRACTOR shall provide a log of submittals provided, the date submitted to the ENGINEER and the date received from the ENGINEER, and other pertinent information. The log shall be updated by the CONTRACTOR for construction meetings. See attachment B.

C. Schedule submittals with such promptness as to cause no delay in Work. Unless otherwise indicated in this Section, submittals shall be provided in accordance to the accepted submittal schedule.

D. Preparation:

1. Provide separate submittal for each specification section requiring submittals. Where multiple sections relate to the same system or element and are being provided from the same source, a single joint submittal is acceptable.
2. Coordinate submission of related items. Group submittals of related products in a single transmission.
3. Include all submittal material requested for that Section.
4. Identify variations from requirements of Contract Documents. State product and system limitations which may adversely affect Work.
5. Mark or show dimensions and values in same units as specified.
6. CONTRACTOR to include a Cover Transmittal form (Attachment A) with each separate submittal. CONTRACTOR to fill form in its entirety.
7. It is the CONTRACTORS responsibility to note any deviations to the original contract documents and the reason the deviation is requested in the submittal cover transmittal form.

E. CONTRACTOR responsibilities:

1. The CONTRACTOR shall be responsible for the accuracy, completeness, and coordination of all Submittals, including but not limited to, Submittals of or from an item, product, service, person or firm which is specified in the Contract Documents; such specified Submittals shall not be presumed to be acceptable to the OWNER and shall be subject to the same approval process as all other Submittals. The CONTRACTOR shall not delegate this responsibility in whole or in part to any Subcontractor. Submittals may be prepared by the CONTRACTOR, SUBCONTRACTOR, or SUPPLIER, but the CONTRACTOR shall ascertain that each Submittal meets the requirements of the contract and the project. The CONTRACTOR shall ensure that there is no conflict with other Submittals and shall notify the ENGINEER in each case where its Submittals may affect the work of another Contractor or the OWNER. The CONTRACTOR shall ensure coordination of Submittal of related crafts and Subcontractors.
2. Review submittals prior to transmittal. Verify compatibility with field conditions and dimensions, product selections and designations, quantities, and conformance of submittal with requirements of Contract Documents. Return non-conforming submittals to prepare for revision rather than submitting for review.
3. Coordinate submittals to avoid conflicts between items of work.
4. Submittal transmittal form:
    a. Include with each submittal a transmittal form. Sample copy of an acceptable form is attached to this section as Attachment A.
    b. Identify Project, CONTRACTOR, subcontractor, supplier, manufacturer, pertinent drawing sheet and detail numbers, and associated Specification Section numbers.

c. Each Submittal shall be assigned a unique number. Submittals shall be numbered sequentially. The Submittal numbers shall be clearly noted on the transmittal. Original Submittals shall be assigned a numeric Submittal number. Resubmittals shall bear an alpha-numeric system which consists of the number assigned to the original Submittal for that item followed by a letter of the alphabet to represent that it is a subsequent Submittal of the original. For example, if Submittal 25 requires a resubmittal, the first resubmittal will bear the designation “25-A” and the second resubmittal will bear the designation “25-B” and so on.

5. Failure to make timely submittals in accordance with the requirements of the specifications shall constitute grounds for the OWNER to withhold compensation for the equipment to which the submittal is related, or, in the case of information lists, record drawings, investigation findings, safety plans, quality plans, and similar items, the Owner may withhold the value of the information in the submittal.

6. Incomplete, improperly packaged, and submittals from sources other than CONTRACTOR will not be accepted.

F. Transmittal: Where possible, transmit all submittals electronically. Where electronic submittal is not possible, submit three (3) paper copies for ENGINEER retention plus as many copies as CONTRACTOR desires returned after review. Exception: Retained quantities for samples, color charts, and manufacturer’s equipment manuals shall be as specified elsewhere herein.

G. Review: ENGINEER will review and return submittals with comments.

H. Do not fabricate products or begin work which requires submittals until return of reviewed submittal with ENGINEER acceptance.

I. On return, promptly distribute reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

J. Resubmission:

1. Revise and resubmit submittals as required within 15 days of return from initial review.

2. Make re-submittals under procedures specified for initial submittals.

3. Identify all changes made since previous submittal.

1.5 GENERAL SUBMITTAL TYPES

A. QUALITY ASSURANCE:

1. Qualification data: Written information demonstrating capabilities and experience of firm or person. Include lists of complete projects with names and contact information for references.

2. Manufacturer's certificates: Submit reference data, affidavits, and certifications on manufacturer's letterhead certifying that products conform to or exceed specified requirements. Certificates may be based on recent or previous test results supplied by manufacturer and accepted by ENGINEER.

3. Installer approval: Certification on manufacturer's letterhead that installer complies with requirements and is approved for installing manufacturer's products.

4. Welding certificates: Written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specifications (WPS) and Procedure Qualification Record (PQR) on American Welding Society (AWS) forms. Include names of firms and personnel certified.

5. Field test reports: Written reports from qualified testing agency indicating and interpreting results of field tests performed either during or after installation for compliance with specified requirements. The CONTRACTOR shall perform field testing as required by specifications.

B. SHOP DRAWINGS

1. Furnish to the ENGINEER for review, three copies of each Shop Drawing Submittal wherever called for in the Contract Documents. The term “Shop Drawings” as used herein shall be understood to include detail design calculations, shop drawings, fabrication, and installation drawings, erection drawings, lists, graphs, catalog sheets, data sheets, and related items. Whenever the CONTRACTOR is required to submit design calculations as part of a Submittal, such calculations shall bear the signature and seal of a professional engineer registered in New Mexico unless otherwise directed.

2. All Shop Drawing Submittals shall be accompanied by a Submittal transmittal form, attachment A. Any Shop Drawing Submittal not accompanied by such a form, or where all applicable items on the form are not completed, will be returned for resubmittal.

3. Organization:

   a. A single Shop Drawing Submittal transmittal form shall be used for each technical specification section or item or class of material or equipment for which a Submittal is required. A single Submittal covering multiple sections will not be acceptable, unless the primary specification references other sections for components. Example: If a pump section references other sections for the motor, protective coating, anchor bolts, local control panel, and variable frequency drive, a single Submittal would be accepted; a single Submittal covering vertical turbine pumps and horizontal split case pumps would not be acceptable.

   b. On the transmittal form, index the components of the Submittal and insert tabs in the Submittal to match components. Relate the Submittal components to specification paragraph and subparagraph, drawing number, detail number, schedule title, or room number or building name, as applicable.

   c. Unless otherwise approved by OWNER, terminology and equipment names and numbers used in Submittal shall match the Contract Documents.

   d. Present in a clear and thorough manner. Title each drawing with Project name. Identify each element of drawing with reference number.

e. Indicate field verified dimensions. Show relationship of products to adjacent work. Note coordination requirements.

f. Schematics and diagrams shall be logically arranged and presented in a clear understandable manner with all items labeled.

g. Internal wiring diagrams: Provide internal wiring and elementary ladder diagrams for factory pre-wired equipment.

h. Control diagrams: Show relative positions of each component as a system diagram.

4. Format

a. Minimum sheet size shall be 8.5 inches by 11 inches. Maximum sheet size shall be 24 inches by 34 inches. Every page in a Submittal shall be numbered in sequence. Each copy of a Submittal shall be collated and stapled or bound, as appropriate. The Owner's Construction Manager will not collate copies.

b. Where product data from a manufacturer is submitted, clearly mark which model is proposed, with all pertinent data, capacities, dimensions, clearances, diagrams, controls, connections, anchorage, and supports. Sufficient level of detail shall be presented for assessment of compliance with the Contract Documents.

c. Plans, elevations, sections, and detail shop drawings shall be to scale with scale indicated.

5. When construction is complete, prepare and submit red-lined copies of the Contract Drawings showing clearly how construction deviated from the design, along with the authority for the deviation or change. Refer to STS 01 78 39 – Project Record Documents for additional information.

C. PRODUCT DATA

1. Provide product data such as manufacturer's brochures, catalog pages, illustrations, diagrams, tables, performance charts, and other material which describe appearance, size, attributes, code and standard compliance, ratings, and other product characteristics.

2. Form:

a. Provide all critical information such as reference standards, performance characteristics, capacities, power requirements, wiring and piping diagrams, controls, component parts, finishes, dimensions, and required clearances.

b. Submit only data which is pertinent. Mark each copy of manufacturer's standard printed data to identify products, models, options, and other data pertinent to project.

c. Modify manufacturer's standard schematic drawings and diagrams and supplement standard data to provide specific information applicable to project. Delete information not applicable.

d. Colors and patterns: Unless color and patterns are specified for product, submit accurate color and pattern charts or samples illustrating manufacturer's full range for selection by OWNER. Submit two (2) hard copies only.

3. Provide all passwords and instructions for control panels and PLCs with initial submittal.

D. DESIGN DATA AND CALCULATIONS

1. Where required by specification sections, provide basic calculations, analyses, and data to support design decisions, and demonstrate compliance with specified requirements. State assumptions and define parameters. Give general formulas and references. Provide sketches as required to illustrate design method and application.

2. Arrange calculations and data in a logical manner with suitable text to explain procedures and order.

3. Indicate name, title, and telephone number of individuals performing design and include professional seal of designer where applicable or required.

E. MANUFACTURER'S INSTRUCTIONS

1. Where required by specification sections, provide manufacturer's instructions for activities such as delivery, storage, assembly, installation, wiring, start-up, adjusting, and finishing.

2. Indicate pertinent portions and identify conflicts between manufacturer's instructions and Contract Documents.

3. Where appropriate, include preparation procedures, service connection requirements, critical ambient conditions, foundation requirements, special precautions, adjustment requirements, alignment procedures, leveling, purging, charging, lubrication, and cleaning prior to operation and/or OWNER’S acceptance.

4. Installation (e.g., assembly, mounting, or wiring) and start-up instructions shall be submitted and available for review in the field prior to scheduled material or equipment installation.

F. MANUFACTURER'S FIELD SERVICE REPORTS

1. When an individual specification section requires services of manufacturer's field representative, submit report of observations, site decisions, and instructions given to installers.

2. Form:

a. Present complete information in clear concise manner.

b. Bind with titled cover in folder or binder.

3. Report shall include:

a. Time, location, conditions, and duration of activity.

b. Names of persons performing and witnessing activity.

c. Equipment used.

d. Description of activity, data recorded, and results.

e. Deficiencies found, corrective measures, and results of retesting.

f. Other pertinent data.

4. Submit report within 30 days of construction site service visit.

G. SAMPLES

1. Whenever in the Specifications samples are required, submit not less than three samples of each item or material to the ENGINEER for acceptance at no additional cost to the OWNER.

2. Samples, as required herein, shall be submitted for acceptance a minimum of 21 days prior to ordering such material for delivery to the jobsite, and shall be submitted in an orderly sequence so that dependent materials or equipment can be assembled and reviewed without causing delays in the Work.

3. All samples shall be individually and indelibly labeled or tagged, indicating thereon all specified physical characteristics and Manufacturer's name for identification. Upon receiving acceptance of the ENGINEER, one set of the samples will be stamped and dated and returned to the CONTRACTOR, and one set of samples will be retained, and one set of samples shall remain at the job site until completion of the Work.

4. Unless indicated otherwise, all color and textures of specified items presented in sample Submittals shall be from the manufacturer's standard colors and standard materials, products, or equipment lines. If the samples represent non-standard colors, materials, products, or equipment lines and their selection will require an increase in contract time or price, clearly indicate same on the transmittal page of the Submittal.

H. MISCELLANEOUS

1. As-built Data: Refer to STS 01 78 39 – Project Record Documents

2. Utility Investigations: The CONTRACTOR shall submit the findings of all utility investigations performed.

1.6 SUBMITTAL REVIEW

A. Intent of Submittal Review: ENGINEER will review submittals for the sole purpose of verifying general conformance with design intent and general compliance with Contract Documents. Approval of submittal by ENGINEER does not relieve CONTRACTOR of responsibility for correcting errors which may exist in submittal or from meeting requirements of Contract Documents.

B. Except as may otherwise be indicated herein, the ENGINEER will return each Submittal to the CONTRACTOR, with its comments noted thereon, within 14 calendar days following their receipt by the ENGINEER. For resubmittal of Submittals, the ENGINEER will be allowed the same review period as for the original Submittal. It is considered reasonable that the CONTRACTOR shall make a complete and acceptable Submittal to the ENGINEER by the second submission of a Submittal item. Should the ENGINEER, if applicable, be required to review third and subsequent submittals, OWNER will withhold from CONTRACTOR'S next payment request an amount based on ENGINEER'S current fee schedule, including applicable miscellaneous expenses, so that OWNER may reimburse ENGINEER for such reviews.

C. If three copies of a Submittal are returned to the CONTRACTOR marked "COMPLIANCE ACKNOWLEDGE", formal revision and resubmission of said Submittal will not be required.

D. If three copies of a Submittal are returned to the CONTRACTOR marked "COMPLIANCE ACKNOWLEDGE AS NOTED", formal revision and resubmission of said Submittal will not be required.

E. If a Submittal is returned to the CONTRACTOR marked "COMPLIANCE ACKNOWLEDGE AS NOTED – REVISE AND RESUBMIT FOR RECORDS", the CONTRACTOR shall revise said Submittal and resubmit the required number of copies for ENGINEER'S records. The CONTRACTOR shall submit a full executed submittal addressing all comments for records only.

F. If a Submittal is returned to the CONTRACTOR marked "REJECTED – REVISE AND RESUBMIT FOR REVIEW," the CONTRACTOR shall revise said Submittal and resubmit the required number of copies. Resubmittal of portions of multi-page or multi- drawing Submittals will not be allowed. For example, if a Shop Drawing Submittal that consists of ten drawings contains only (one) drawing that is rejected and needs to be resubmitted, the Submittal as a whole is deemed as "REJECTED – REVISE AND RESUBMIT FOR REVIEW," and all ten drawings of the Submittal are required to be resubmitted.

G. Any changes made on a resubmittal, other than those made or requested by the ENGINEER, shall be identified and flagged on the resubmittal.

H. Fabrication of an item shall commence only after the Engineer has reviewed the pertinent Submittals and has returned copies to the CONTRACTOR marked either "COMPLIANCE ACKNOWLEDGE", "COMPLIANCE ACKNOWLEDGE AS NOTED", or "COMPLIANCE ACKNOWLEDGE AS NOTED – REVISE AND RESUBMIT FOR RECORDS". Corrections indicated on Submittals shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as the basis for changes to the Contract requirements.

I. All CONTRACTOR Submittals shall be carefully reviewed by an authorized representative of the CONTRACTOR prior to submission. Each Submittal shall be dated and signed with the following: "I have verified that the equipment or material in this Submittal meets all the requirements specified or shown in the Contract Documents without exceptions." In the case of Shop Drawings, each sheet shall be so dated, signed, and certified. No consideration for review of any submittals will be made for any items which have not been so certified. All non-certified submittals will be returned without action taken, and any delays caused thereby shall be the total responsibility of the CONTRACTOR.

J. The ENGINEER'S review of Submittals shall not relieve the CONTRACTOR of the entire responsibility for the correctness of details and dimensions and for compliance with the Contract Documents. The CONTRACTOR shall assume all responsibility and risk for any problem due to any errors in Submittals. The CONTRACTOR shall be responsible for the dimensions and the design of adequate connections and details.

K. No changes in the Contract times will be considered for schedule delays resulting from non-complaint Submittals.

L. Within 30 Days of the Notice to Proceed, the CONTRACTOR shall submit a complete list of anticipated Submittals which includes Specification and Drawing references. The list shall be updated with "early start" Submittal date within 15 Days of Submittal of the CONTRACTOR'S construction schedule. The Submittal dates shall be updated whenever the schedule is updated.

M. Any additional Submittals identified after the initial Submittal shall be included in the updates.

N. If the CONTRACTOR submits an incomplete Submittal, the Submittal may be returned without review. A complete Submittal shall contain sufficient data to demonstrate that the items contained therein comply with the Contract Documents, meet the minimum requirements for Submittals as described in the Contract Documents, and include all corrections as required from previous Submittals.

1.7 SUBSTITUTIONS

A. See Standard General Conditions of the Contract.

B. A request for a substitution constitutes a representation that the CONTRACTOR:

1. Has investigated the proposed product and determined that it is equal to or superior in all respects to that specified.

2. Will provide the same warranties or bonds for the substitution as for the product specified.

3. Will coordinate the installation of an accepted substitution into the Work and make such other changes as may be required to make the Work complete in all respects.

4. Waives all claims for additional costs, under his responsibility, which may subsequently become apparent.

C. CONTRACTOR shall make written application to ENGINEER for review of a proposed substitute item of material or equipment that CONTRACTOR seeks to furnish or use.

D. The application:

1. will certify that the proposed substitute item will:

a. performs adequately the functions and achieve the results called for by the general design,

b. be similar in substance to that specified, and

c. be suited to the same use as that specified;

2. will state:

a. the extent, if any, to which the use of the proposed substitute item will prejudice CONTRACTOR'S achievement of Substantial Completion on time;

b. whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and

c. whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

3. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change,

E. Substitute Construction Methods or Procedures:

1. If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by ENGINEER.

2. CONTRACTOR shall submit sufficient information to allow ENGINEER, in ENGINEER'S sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents.

F. ENGINEER'S Evaluation:

1. The ENGINEER will determine whether the material or article submitted is equal to the named material or article. The ENGINEER'S decision regarding evaluation of substitutions shall be final and binding. Request for time extensions and additional costs based on rejection of substitutions will not be allowed.

2. ENGINEER will be allowed a reasonable time within which to evaluate each proposal or submittal. ENGINEER may require CONTRACTOR to furnish additional data about the proposed substitute item. ENGINEER will be the sole judge of acceptability.

3. No "or equal" or substitute will be ordered, installed, or utilized until ENGINEER'S review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or equal." ENGINEER will advise CONTRACTOR in writing of any negative determination.

1.8 MEASUREMENT AND PAYMENT

A. All costs associated with the preparation of submittals is considered incidental to the cost of construction. No additional compensation will be rendered for preparation, submission and re-submission of submittals."

PART 2– PRODUCTS – NOT USED

PART 3– EXECUTION – NOT USED

END OF SECTION 01 33 00

ATTACHMENT A
Sample Submittal Transmittal Form

Project Title:	Submittal No.:	
	Date:	
	Sub Nos. & Dates of Previous Subs:	
Contractor Name:	Sub No.:	Date(s):
Contractor Street Address:	Sub No.:	Date (s):
Contractor City, State, ZIP:	Sub No.:	Date(s):
Supplier:	Manufacturer:	
Specification No(s).:	Bid Item No.:	
List Deviations to Contract Documents:		

CONTRACTOR COMMENTS

☐ NO EXCEPTIONS TAKEN ☐ COMMENTS ABOVE ☐ NOTE MARKING

- Submittal has been reviewed and it is complete and conforms with requirements of Contract Documents except as noted.
- Required dimensions have been field verified and are acceptable for installation of proposed products and construction of proposed work.
- Required quantities for products and materials covered by this submittal have been verified as correct.
- Fabrication processes and construction methods proposed in this submittal are acceptable for this Project and will result in a complete, functional installation.
- Submittal has been coordinated with other submittals and work and proposed products and construction will properly interface with other construction.

BY: _____ DATE: _____

(Contractor)

ENGINEER REVIEW

This submittal has been reviewed for compliance with general requirements of design and arrangement only and is not a contract document. Acknowledgement of compliance does not relieve Contractor of responsibility for performance of the work in compliance with all provisions and requirements of the contract documents. Job measurements and coordination of all dimensions for proper fit of all parts of the work and performance of all equipment supplied to meet specification requirements are and remain specific responsibilities of the Contractor.

☐ Compliance acknowledged subject to the foregoing: Distribute	☐ Compliance acknowledged as noted and subject to the foregoing: Distribute
☐ Compliance acknowledged as noted and subject to the foregoing: Revise and Resubmit for record: Distribute	☐ Rejected – Revise and resubmit for review

Reviewed By: Date:

COMMENTS:

ATTACHMENT B:
Submittal Checklist

SUBMITTALS FOR:

#	Item Description	Manufacturers Data	Shop Drawings	Samples	Certification	Guarantees	Lab Test Reports	Operation Manuals	Special Tools	Lubrication & Grease Specs	Spare Parts (Recommended)	Factory Representative	Field Test Reports

SUPPLEMENTAL TECHNICAL SPECIFICATION
SECTION 01 58 13
TEMPORARY PROJECT SIGNAGE

PART 1- GENERAL

1.1 SECTION INCLUDES

A. The CONTRACTOR shall provide, erect, and maintain for the duration of the construction project, two identification signs at the construction site. The CONTRACTOR shall also provide, erect and maintain the sign as necessary for SWPPP and labor notification.

1.2 RELATED SECTIONS

A. General and Supplemental General Conditions of the Contract.

B. STS 01 33 00: Submittal Procedures

1.3 REFERENCES

A. City of Albuquerque Standard Specifications for Public Works Construction, as updated.

B. Where all or part of a Federal, ASTM, ANSI, AWWA, standard specification, etc. is incorporated by reference in these specifications, the reference standard shall be the latest edition and revision.

1.4 PERFORMANCE REQUIREMENTS

A. Labor Sign (incidental to construction)

1. A sign shall also include all notification and sign requirements from the following so that they are weather tight.

    a. Equal employment opportunity poster

    b. Federal and State wage rate information

    c. Safety posters

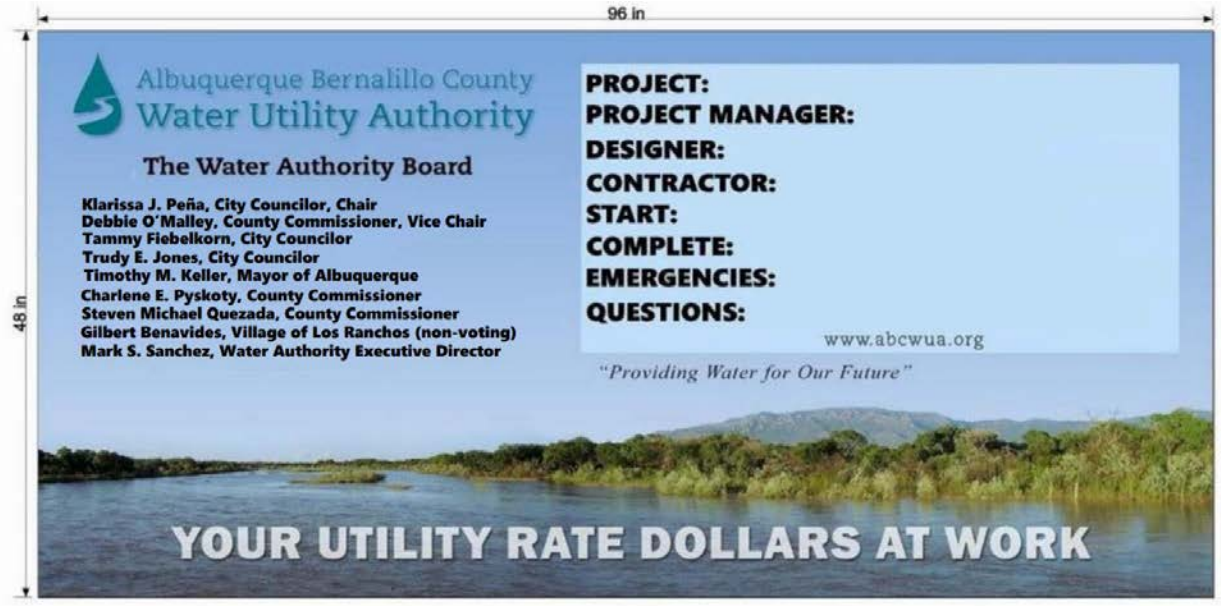
    d. Official announcements and notices

B. Project Sign

1. SIGN DIMENSIONS: 1200 mm x 2400 mm x 13 mm (approx. 4’ x 8’ x 1/2”) UV laminated Signgrade Medium Density Overlay (MDO) Plywood Panel

2. All Water Authority Board Members, Directors, and Officers shall be verified before printing.

3. Final information regarding CONTRACTOR will be supplied after the project has been awarded.



1.5 SUBMITTALS

A. General: Project Sign and Labor notification shall be submitted in accordance with conditions of the Contract and STS 01 33 00.

1.6 QUALITY ASSURANCE

A. Sign Paint (Primer, Paint and Finishes): The paint used for the sign shall be specifically designated for exterior use. It shall resist weathering and fading for the indicated construction schedule.

1.7 DELIVERY, STORAGE AND HANDLING

A. The CONTRACTOR is responsible for the safe storage of the equipment until it is incorporated in the completed project.

B. The material and equipment shall be stored and handled per the manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 PRE-APPROVED SUPPLIER

A. "The Sign Store", 3600 Osuna Rd NE Ste 101, Albuquerque, NM 87109. Phone: 505-830-2530.

PART 3 - EXECUTION

3.1 CONTRACTOR'S RESPONSIBILITY

A. The CONTRACTOR is responsible for furnishing and installing the PRODUCT including all site preparation, and other items necessary for the proper installation and operation of the PRODUCT.

3.2 EXAMINATION

A. Examine all products for compliance with this section.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Immediately correct all deficiencies and conditions which would cause improper execution of Work specified in this Section and subsequent Work.

C. Verify that the PRODUCT dimensions are correct and project conditions are suitable for installation. Do not proceed with installation until conditions deficiencies have been corrected.

D. Proceeding with Work specified in this Section shall be interpreted to mean that all conditions were determined to be acceptable prior to start of Work.

3.3 SEMI-PERMANENT INSTALLATION

A. Semi-permanent installation shall be used when the project location is in one area (All construction is within a ¼ mile of each other)

B. The sign shall be mounted on two 4" x 4" posts, with the bottom of the sign at least four feet above grade. The sign shall be mounted level and at the location designated by the Architect/ENGINEER or the OWNER'S Project Manager.

C. Keep sign and supports clean. Repair deterioration and damage.

D. Remove sign, framing, supports, and foundations to a depth of 2 feet upon completion of the project. Restore the area to a condition equal to or better than before construction.

3.4 TEMPORARY INSTALLATION

A. Temporary installation shall be used when the project location is in multiple areas.

B. The sign shall be mounted on two mobile spring-loaded sign stands. The sign shall be mounted level and at the location designated by the Architect/ENGINEER or the OWNER'S Project Manager.

C. Keep sign and supports clean. Repair deterioration and damage.

END OF SECTION 01 58 13

SUPPLEMENTAL TECHNICAL SPECIFICATION
SECTION 01 78 39
PROJECT AS-BUILT DOCUMENTS

PART 1– GENERAL

1.1 SECTION INCLUDES

A. This Section includes administrative and procedural requirements for Project As-Built Data, including the following:

1. As-Built Documents (Drawings, Specifications, Shop Drawings, Field Orders, Change Orders)
2. As-Built Survey

1.2 REFERENCES

A. City of Albuquerque Standard Specifications for Public Works Construction, as updated.

B. General and Supplemental General Conditions of the Contract and Division 1.

1.3 SUBMITTALS

A. Submit Final As-Built data set to ENGINEER for review at least five (5) working days prior to inspection for Certification of Substantial Completion. Submittal shall include:

1. One (1) hard copy set of As-Built documents including all Specifications, Full Size Drawings, Addenda, Modifications, and Shop Drawings. The set shall clearly mark any deviations from the construction drawings per section 3.3.
2. One (1) digital point file of final as-built survey. Point file shall be comma delineated PNEZD text format (*.txt). Point descriptions shall clearly describe the point.
3. The full-size hard copy of the as-built plans shall cross-reference the final as-built survey. Each point from the final as-built survey shall be marked with the point number on the full-size hard copy of the as-built plans pointing to the item surveyed. The following survey information shall be listed on the as-built plans:
    a. Name, address, and phone number of responsible land surveyor.
    b. Date of completion of Survey
    c. Equipment used to conduct the survey
    d. Horizontal and vertical control marks used to tie the survey to the vertical and horizontal datum referenced in Section 3.1. Ground to grid combination scale factor used.

B. Miscellaneous As-Built Submittals

1. Operation and Maintenance Manuals: Organize the operational and maintenance manual information into suitable sets of manageable size and bind

into individual binders properly identified and indexed. Include pocket folders for folded sheet information.

2. Assemble Certifications, Lab Test Reports, and Field Test Reports required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

1.4 QUALIFICATIONS

A. The As-Built Survey shall be performed by a Licensed Professional Surveyor experienced in the State of New Mexico.

PART 2– PRODUCTS – NOT USED

PART 3– EXECUTION

3.1 AS-BUILT DOCUMENTS

A. As-Built Prints: Maintain one set of all Specifications, Drawings, Addenda, Modifications, and Shop Drawings on site and in good order for marking as-built information.

1. This set shall be annotated/updated at least once a week and will be reviewed for verification of updates by the construction observer on a regular basis, including before each pay application.

2. Submit marked-up set to ENGINEER for review at least five (5) working days prior to inspection for Certification of Substantial Completion.

B. Preparation: Mark prints with as-built information to show the actual installation and removals where installation and removals vary from that shown originally. Actual surveyed points shall be marked, with the point numbers, on the as-built set pointing to item surveyed. Record individual or entity who obtained as-built data, whether individual or entity is Installer, Subcontractor, or similar entity, that marked-up As-Built set.

1. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.

2. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

3. The As-Built drawings shall clearly and neatly show all changes.

a. Additions marked in red.

b. Deletions marked in green.

c. Comments marked in blue.

d. Installed systems in yellow.

C. Mark As-Built set with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.

1. Mark each pipe segment rehabilitation and manhole rehabilitation material type used.

2. Identify all new Trap Manhole Locations.

3. Identify all rehabilitated or new Manholes with a drop inlet and type of drop inlet.

D. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely, clearly, and accurately. If Shop Drawings are marked, show cross-references on the Contract Drawings.

E. Mark As-built set with erasable, red-colored pencil/pen. Use other colors to distinguish between changes for distinct categories of the Work at same location.

F. Note Construction Change Directive numbers (field orders or Request for Information changes), alternate numbers, Change Order numbers, and similar identification, where applicable.

G. Verification of as-built status will be included in the monthly payment approval process that will be noted in the field reports.

3.2 FINAL AS-BUILT SURVEY

A. CONTRACTOR shall survey the final installed product using a professional surveyor licensed in the State of New Mexico. Final as-built survey shall obtain coordinates (Northing, Easting, Elevation, and Description) of all new features including but not limited to:

1. new/rehabilitated manhole (north side at rim)
2. all inverts inside of new/rehabilitated manhole
3. sanitary sewer cleanout
4. valve rim
5. valve operating nut
6. pipe at centerline of valve (elevation at FG)
7. all fittings (elevation at FG)
8. new to existing waterline connection location (elevation at FG)
9. trace wire test station
10. fire hydrant flange

B. The standard horizontal datum and standard projection shall match those referenced in the construction drawings. If no horizontal datum or projection is referenced, the horizontal datum shall be North American Datum 1983 (NAD 83) and the projection shall be New Mexico State Plane Coordinate System (NMSPCS 83). The standard vertical datum shall match the vertical datum referenced in the construction drawings. If no vertical datum is referenced, the vertical datum shall be the North American Vertical Datum 1988 (NAVD 88). The control marks shall match those referenced in the construction drawings. If no control mark is referenced, the location information shall be tied to a legal control mark. A copy of the construction drawings base file is available for reference upon request to the ENGINEER.

END OF SECTION 01 78 39

SUPPLEMENTAL TECHNICAL SPECIFICATION
SECTION 03 64 23
INJECTION GROUTING

PART 1– GENERAL

1.1 SECTION INCLUDES

A. Requirements for the continuous annular space grouting of slip lining systems and, if shown on the plans, of spiral wound pipe lining systems. The annular space (void between the host and liner pipes) shall be completely grouted to support the liner and provide long-term stability. The Contractor shall provide testing of the materials and methods for compliance with the requirements which follow.

B. Requirements for taking existing pipelines out of service by filling with grout. Pipes to be taken out of service shall be completely grouted to support bearing loads and provide long term stability.

C. The Contractor shall provide testing of the materials and methods for compliance with the requirements which follow.

1.2 RELATED SECTIONS

A. STD Specification 207: Lean Fill Construction.

1.3 REFERENCES

A. City of Albuquerque Standard Specifications for Public Works Construction, as updated.

B. Where all or part of a Federal, ASTM, ANSI, AWWA, standard specification, etc. is incorporated by reference in these specifications, the reference standard shall be the latest edition and revision.

1.4 SUBMITTALS

A. The CONTRACTOR shall submit the following to the OWNER at least fifteen (15) days prior to the start of the grouting operation. These requirements shall be submitted as a complete package. The CONTRACTOR shall notify the OWNER of any changes to be made in grouting procedures or materials.

1. Pre-construction CCTV and CCTV log indicating location and size of existing services
2. The proposed grouting mix and all performance data including flow characteristics, viscosity, set time, bleed segregation, shrinkage
3. The proposed densities
4. The proposed grouting method
5. Twenty-four (24) hour and twenty-eight (28) day compressive strengths
6. Proposed/calculated grout stage volumes

7. Bulkhead design(s) and locations
8. Vent design(s) and locations
9. Buoyant force calculations and a detailed plan that will hold the liner pipe on the invert for a period of time long enough to allow the grout to set where buoyant uplift is a factor
10. Flow control including projected slurry injection rate, grout pressure, method of controlling grout pressure
11. Pressure gauge certification
12. MSDS sheets on materials
13. Location of injection points and vents
14. Schedule and sequence of work

PART 2– PRODUCTS

2.1 MATERIALS

A. The grout materials shall be Elastizell EF Class IV, or approved equal.

1. Compressive Strength. The grout shall have a minimum compressive strength of 30 psi in 24 hours and 120 psi in 28 days per ASTM C869 when tested in accordance to ASTM C796. The bearing capacity shall be a minimum of 8.6 Tons/sf. Maximum cast density shall be a 42 pcf.
2. Performance Requirements. The Contractor shall submit the proposed grout mixes, methods, construction drawings, and criteria of the grouting operations. The grouting system shall have sufficient gauges, monitoring devices, and test to determine the effectiveness of the grouting operation and to ensure compliance with the liner pipe specifications and design parameters.
3. Density. The Contractor shall design a grout mix with a density to meet the equipment requirements (section 2.2) and to prevent floating of the liner pipe. The apparent viscosity shall not exceed 35 seconds in accordance with ASTM C939.

2.2 EQUIPMENT

A. The materials shall be mixed in equipment of sufficient size and capacity to provide the desired amount of grout material for each stage in a single operation. The equipment shall be capable of mixing the grout at densities required for the approved procedure and shall also be capable of changing density as dictated by field conditions anytime during the grouting operation.

B. The CONTRACTOR shall supply oil filled gauges with appropriate accuracy to monitor the grout pressure during grouting. Uncalibrated or inaccurate gauges shall be either recalibrated or replaced. The gauges to monitor grout pressure shall be attached immediately adjacent to each injection port.

C. Pumping equipment shall be of a size sufficient enough to inject grout at velocity and pressure relative to the size, length and diameter of existing pipeline or structure.

D. The gauge shall conform to an accuracy of no more than one-half percent error over the full range of the gauge. The range of the gauge shall not be more than 100 percent greater than the design grout pressure. Pressure gauges shall be instrument oil filled and attached to a saddle-type diaphragm seal (gauge saver) to prevent clogging with grout. All gauges shall be certified and calibrated in accordance with ANSI B40, Grade 2A

PART 3– EXECUTION

3.1 EXAMINATION

A. The grouting system shall have sufficient gauges, monitoring devices and tests to determine the effectiveness of the grouting operation and to ensure complete fill (100%) and that no voids exist within the annular space, pipeline or structure.

3.2 GROUTING ANNULAR SPACE

A. Upon completion of sliplining but prior to grouting, bulkheads and appropriate vent ports shall be installed.

B. The gauged pumping pressure shall not exceed the liner pipe manufacturer's approved recommendations. Pumping equipment shall be of a size sufficient to inject grout at a velocity and pressure relative to the size of the annular space. Gauges to monitor grout pressure shall be attached immediately adjacent to each injection port.

3.3 GROUTING ABANDONED GRAVITY SEWER LINES

A. Pre-construction CCTV investigation shall be conducted on all pipes to be taken out of service to verify the locations of all services prior to construction, locate obstructions, and assess condition of the pipe.

B. Prior to grouting, bulkheads and appropriate vent ports shall be installed.

C. Clean installation surfaces of pipelines of debris that may hinder fill placement. Remove excessive amounts of tuberculation and other substances that may degrade performance of fill. Debris left in the existing pipe shall not be more than 2 percent of placement volume.

D. Remove all water prior to starting fill placement. Grouting shall not commence if standing water is left in the pipe.

3.4 GROUTING ABANDONED WATER LINES

A. Pre-construction CCTV investigation shall be conducted on all pipes to be taken out of service to verify the locations of all services prior to construction, locate obstructions, and assess condition of the pipe.

B. Prior to grouting, bulkheads and appropriate vent ports shall be installed.

C. Clean installation surfaces of pipelines of debris that may hinder fill placement. Remove excessive amounts of tuberculation and other substances that may degrade performance of fill. Debris left in the existing pipe shall not be more than 2 percent of placement volume.

D. Remove all water prior to starting fill placement. Grouting shall not commence if standing water is left in the pipe.

E. Remove and salvage and return to OWNER existing fire hydrants connected to the pipeline to be taken out of service prior to grouting. Any hydrant taken out of service shall be bagged until it is physically removed.

F. Demolish, remove, and dispose of existing precast concrete adjustment rings, concrete vault covers, or other pipeline structures, to a minimum depth of 2 feet below finished grade.

G. Remove and dispose of existing water service surface identifications and appurtenances such as valves and valve boxes, meters, and backflow devices.

H. All voids shall be backfilled and compacted to finished grade. Existing pavement shall be removed, disposed of, and replaced.

I. The CONTRACTOR shall be responsible for cutting, capping, and/or plugging water mains as part of the grouting process. The CONTRACTOR may use either mechanical fittings (plugs or caps) or concrete plugs. The CONTRACTOR shall note all such actions on the plans and whether a mechanical fitting (cap or plug) or concrete plug was used. Mechanical joint caps require concrete thrust blocking restraint.

J. Pipe shall not be taken out of service until replacement water main is constructed and tested, with all service connections installed, and replacement main is approved for use.

K. If other sources feeding water main to be taken out of service are found, notify Owner immediately. Cut and cap water main to be taken out of service as directed by the Owner.

L. Service lines shall be cut and capped at the corporation/curb stop.

M. CONTRACTOR will be responsible for all temporary cuts, caps and plugs necessary to accommodate the construction of a new water main. As part of temporary installations, the CONTRACTOR will be responsible for maintaining service to customers during the construction. These are considered to be incidental to the installation of the new pipe and no additional payment will be made.

3.5 FIELD TESTING

A. Density shall be verified by ASTM C138 or by other methods as approved by the Engineer.

B. Viscosities shall be checked with a flowcone provided by the Contractor and tested per ASTM C939.

C. Four compressive strength test specimens shall be taken at point of placement and tested in accordance with ASTM C495 except the test specimens shall not be oven dried prior to the compressive testing. The specimens shall be 3” by 6” cylinders. Results shall be provided at 24-hours, 3-day, and 28-day.

END OF SECTION 03 64 23

SUPPLEMENTAL TECHNICAL SPECIFICATION
SECTION 33 01 30.02
TEMPORARY ODOR CONTROL

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Requirements for the CONTRACTOR to mitigate the generation and discharge of objectionable sanitary sewer odors to the surface environment at all times as a result of the work.

1.2 RELATED SECTIONS

A. General and Supplemental General Conditions of the Contract and Division 1.

B. STS 33 01 30.70: Pipe Slip-Lining

C. STS 33 01 30.23: Pipe Bursting

D. STS 33 01 30.41: Sewer Line Cleaning (Removal of Protruding Service Connection)

E. STS 33 01 30.51: Sewer Flow Control and Bypass Pumping

1.3 SUBMITTALS

A. Odor Control Plan consisting of:

1. Material type used to cover or tent open excavation areas that has exposed sewage.

2. Type of anchoring used to secure a cover or tent over open excavation areas that has exposed sewage.

3. Proposed duct work used to connect ABCWUA's Odor Control Trailer inlet to a manhole and method of sealing the connection between the duct work and the manhole.

1.4 PERFORMANCE REQUIREMENTS

A. Contractor shall cover or tent any open excavation area that has exposed sewage except during active construction at that open excavation. Manholes shall be closed when no active construction is taking place in the manhole.

B. If included in the Bid Proposal, the Contractor shall mobilize, setup, operate, maintain, and demobilize ABCWUA's odor control trailer. Contractor is responsible for all duct work from the odor control inlet to the manhole. Duct work at manhole shall be completely sealed.

PART 2– PRODUCTS – NOT USED

PART 3 – EXECUTION

3.1 MOBILIZATION, SETUP, AND DEMOBILIZATION OF ODOR CONTROL TRAILER

A. CONTRACTOR shall adhere to ABCWUAs Mobilization/Demobilization Standard Operating Procedure (SOP) for the 1,000 cfm odor control trailer (VBS-5). Available under a separate file.

B. CONTRACTOR shall adhere to ABCWUAs Mobilization/Demobilization Standard Operating Procedure (SOP) for the 5,000 cfm odor control trailer (VBS-608). Available under a separate file.

3.2 OPERATION AND MAINTENANCE OF ODOR CONTROL TRAILER

A. CONTRACTOR shall adhere to ABCWUAs Operation and Maintenance Standard Operating Procedure (SOP) for the 1,000 cfm odor control trailer (VBS-5). Available under a separate file.

B. CONTRACTOR shall adhere to ABCWUAs Operation and Maintenance Standard Operating Procedure (SOP) for the 5,000 cfm odor control trailer (VBS-608). Available under a separate file.

END OF SECTION 33 01 30.02

SUPPLEMENTAL TECHNICAL SPECIFICATION
SECTION 33 01 30.11
TELEVISION INSPECTION OF SEWERS

PART 1– GENERAL

1.1 SECTION INCLUDES

A. Requirements for closed circuit television (CCTV) inspection of gravity pipelines including the identification of all active service laterals. CCTV inspection shall be performed by personnel trained and certified in the use of National Association of Sewer Service Companies (NASSCO's) Pipeline Assessment and Condition Program (PACP©).

1.2 RELATED SECTIONS

A. Special Condition: Immediate Notification of Sanitary Sewer Overflows

B. STS 33 01 30.02 Temporary Odor Control

C. STS 33 01 30.41: Sewer Line Cleaning

1.3 REFERENCES

A. City of Albuquerque Standard Specifications for Public Works Construction, as updated.

B. Where all or part of a Federal, ASTM, ANSI, AWWA, standard specification, etc. is incorporated by reference in these specifications, the reference standard shall be the latest edition and revision.

C. National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP©)

1.4 SUBMITTALS

A. Copy of the personnel's certification for NASSCO's PACP.

B. Specifications of the CCTV inspection system to be used for the inspections.

C. Each digital CCTV inspection submittal shall include the following (digital folder naming convention: upstream manhole ID "to" downstream manhole ID "-pre-rehab" or "-post-rehab")

1. PDF of the inspectIT report
2. JPEG photos (snapshots) of each observation identified during the inspection.
3. Digital video (*.wmv) of the inspection using inspectIT software
4. Transmittal of digital CCTV Inspection data to the ENGINEER/OWNER for review shall be one of the following:
    a. CD or DVD delivered to ENGINEER/OWNER

b. USB flash drive delivered to ENGINEER/OWNER (flash drive will be given back to CONTRACTOR after data is downloaded)

c. Download from Cloud Storage accessible to ENGINEER/OWNER

D. CONTRACTOR shall upload the Final Post-rehab CCTV data at the South Side Reclamation Plant within 14 days of approval from ENGINEER and OWNER.

1.5 QUALITY ASSURANCE

A. The camera operator performing the CCTV video inspection shall be certified in the use of National Association of Sewer Service Companies (NASSCO's) Pipeline Assessment and Condition Program (PACP©).

B. The camera operator performing the CCTV video inspection shall have passed a test administered by Infrastructure Technologies on the use of ITpipes software. If not, the camera operator performing the CCTV video inspection shall attend training from Infrastructure Technologies on the use of ITpipes software. Each CCTV Operator shall be trained and pass a test prior to commencing any inspections. The Contractor shall assume a minimum of one eight-hour day of on-line training and a half day of testing at the Infrastructure Technologies Albuquerque office. All costs associated with this training shall be the responsibility of the Contractor and incidental to the Work

PART 2– PRODUCTS

2.1 CCTV VIDEO FORMAT

A. The CONTRACTOR is alerted that the OWNER uses MAXIMO as its Computerized Maintenance Management System (CMMS) and inspectIT software by Infrastructure Technologies as the CCTV software.

B. Videos shall be prepared and submitted in H.264 formatted .mp4 with a resolution of 640 X 480. Data shall be encoded onto video as enabled within ITpipes software. All fields within the custom inspectIT template shall be populated during the pipeline inspection.

C. Post-rehab CCTV must be performed under/utilizing a MAXIMO Work Order.

1. One work order (number) per sewer line segment (manhole to manhole) is required.

2. CONTRACTOR shall coordinate with the ABCWUA's Collection Section Research Analyst (505-289-3426) to obtain the OWNER'S inspectIT template and to setup/obtain MAXIMO work orders for each Post-rehab CCTV inspection.

3. CONTRACTOR will populate the work order and upload the resulting data to the Maximo CMMS and the ITpipes repository

D. Audio Requirements: The recording shall include an audio portion describing the condition of the sewer with the video image. The audio portion shall be in English and be sufficiently free of background noise to produce an oral report that is clear and easily discernible. At the beginning of each inspection run, the audio shall identify the Contractor name, date, time, street location, quarter section, pipe size, pipe type/material, direction of inspection (upstream or downstream), and the manhole numbers at the beginning and end of each run. The audio shall note the location and

condition of the pipe defects, including all cracks, breaks, cracked or misaligned joints, root intrusion, infiltration, missing pieces of pipe, corrosion, deposits, obstructions, dips in the pipe which cause the camera to go underwater, and any other items which reflect the condition of the sewer line. The audio shall also note the location of the connections to the nearest foot, clock positions of the connections, condition of connections, and whether the connection is in service.

2.2 DIGITAL RECORDING

A. Continuous digital recordings of the inspection view as it appears on the monitor shall be stored. Unless directed otherwise by the Project Manager, the recording shall be H.264 formatted .mp4. H.264 video compression is the standard format for streaming video over web browsers. It provides high quality video with reduced file sizes. The inspection image files (pictures) shall have the ability to be exported to Industry Standard Formats, including JPEG, BMP, and TIFF formats, and shall be transferable to an external personal computer, however, the need to transfer is not anticipated. The operator shall pause the digital recording at any time there is a delay in the inspection. The pause shall in no way affect, freeze or interrupt the replay of the video and shall not close the video file during the inspection. The data shall be time coded using the elapsed time from the video file. The naming of the associated picture or video files shall be automated and shall match the Water Authority's inspectIT template settings for video/media file naming.

2.3 CCTV INSPECTION EQUIPMENT

A. CCTV system equipment shall include television cameras, a television monitor, cables, power sources, and other equipment.

1. The camera lens shall not have less than a 65-degree viewing angle and shall have either automatic or remote focus and iris controls.

2. The remote-reading footage counter shall be accurate to less than 1 percent error over the length of the section of pipeline being inspected. This distance shall be measured from the centerline of the manhole to the centerline of the next manhole.

3. The camera and television monitor shall produce a minimum of 400 vertical lines of resolution and 460 horizontal lines of resolution.

4. Telephones, radios, or other suitable means of communication shall be set up to ensure that adequate communication exists between members of the crew.

B. The CCTV inspection camera utilized shall be specifically designed and constructed for sewer inspection.

1. The CCTV inspection camera shall be operative in 100 percent humidity conditions.

2. Lighting for the camera shall minimize reflective glare and be sufficient and bright enough to make clear assessment of the condition of the pipe.

3. Lighting and picture quality shall be suitable to provide a clear, in-focus picture of the entire periphery of the pipeline for all conditions encountered during the work.

4. The camera itself shall have a minimum of 3-lux illumination sensitivity.

5. The CCTV camera(s) shall be mounted on a skid, floatable raft system, or transporter/crawler, based upon the conditions of the pipe to be televised. The camera and mounting system shall be capable of televising 6-inch through 72-inch sanitary sewer pipe in 100 percent humidity conditions.

PART 3– EXECUTION

3.1 GENERAL

A. The CCTV camera(s) shall be a pan/tilt and rotating head camera capable of providing a full view of the inside of all connections and any pipe defects. Recording shall be in color and shall have the best quality possible. The image shall be in focus at all times. The recording shall be done with adequate lighting to provide a clear view of the entire periphery of the sewer including any defects while keeping glare to a minimum. The image shall not be obscured by "fog" in the sewer. If any submitted recording has unacceptable focus, lighting, sound, data, imaging, or interferences the sewer shall be re-inspected at the Contractor's expense.

B. The CCTV camera(s) shall pause for a sufficient length of time to adequately document and provide accurate distance measurements of all the defects in the pipe and the connections observed in the sewer. The camera shall rotate and look directly at each defect, and look into each connection to thoroughly document the conditions and determine if the connection is in service. In the same manner, the Contractor shall identify all sewer connections at each manhole including the manholes at the beginning and end of setup and all intermediate manholes. The Contractor shall capture photos of all observations noted on the inspection report.

C. The CCTV camera(s) shall be moved through the sewer, from upstream to downstream, at a uniform rate of not more than 35 feet per minute, achieving no less than 450 feet per hour. Distance of sewer between adjacent manholes shall be measured and recorded. The distance measurements shall be made from the centerline of the manhole that the camera is traveling from and shall be accurate to within 2 feet for every 1,000 feet inspected. If more than one manhole reach is inspected in a single run, the footage counter shall be reset to zero at the center of all the intermediate manholes.

D. If, during CCTV inspection, the television camera will not pass through the entire sewer main section, the Contractor shall set up his equipment at the downstream manhole and attempt to inspect the section of the pipe from the opposite direction. If the camera fails to pass through the entire section, it shall be assumed that an obstruction exists. Efforts to televise the section of pipeline shall be temporarily suspended and the Contractor shall notify the Water Authority. If the Water Authority agrees the inspection cannot be completed, the Contractor shall submit the completed inspection and payment shall be made for the inspected footage.

E. The equipment and skill of the operators shall be capable of providing a continuous clear recorded and viewed picture of the entire length of the sewer main under all normally expected pipe atmospheric conditions and flow conditions. The Contractor shall have adequate cabling and wiring equipment to perform CCTV inspection of sewer interceptor mains up to a length of 1,600 feet without causing degradation of recorded and viewed picture quality.

F. Televising shall provide a clear, definitive recorded and viewed TV picture. The recording shall not contain intervals of more than 20 seconds when the camera is stationary. When the tape is stopped due to obstructions or equipment malfunction and then restarted, the TV operator shall state the length of time or delay and the reason for the delay. The importance of accurate distance measurement is emphasized. The remote reading footage counter shall be accurate to +/- 0.2 percent over the length of the section being inspected. Each pipe segment shall be defined as one manhole to manhole run, and pipe lengths shall be defined as the intervening distance between the centers of manholes along a line parallel to the pipe invert. Accuracy of the distance meter shall be checked by use of a walking meter, roll-a-tape, or other suitable device and the accuracy shall be satisfactory to the Water Authority.

G. The OWNER desires to inspect the entire corroded upper pipe surface along with a portion of the non-corroded sidewall for comparison purposes and to verify that the entire corroded surface has been examined. If the water level is too high to successfully examine the corroded upper surface or for all the CCTV equipment to move within a segment, the Contractor shall move on to the next segment and immediately inform the Water Authority.

H. All equipment and all Contractor operations shall be conducted at a low noise level suitable for night time CCTV inspection in residential areas.

I. The Contractor may inspect through existing manholes.

3.2 PRE/POST REHABILITATION

A. PRE-REHABILITATION: CCTV inspection shall be completed immediately after cleaning to confirm cleaning, location of all service lateral connections, and to identify any additional point repairs or obstruction removals which may impact(s) the rehabilitation of the pipeline. If the CCTV inspection camera will not pass through the entire pipeline section, the CONTRACTOR shall reset the equipment at the downstream manhole and attempt to inspect the section of pipe from the opposite direction. Refer to STS 33 01 30.41 Sewer Line Cleaning, if CCTV inspection cannot be completed due to an obstruction. CONTRACTOR shall complete pre-rehabilitation CCTV inspection of the entire segment prior to rehabilitation after obstruction removal has been completed.

B. POST-REHABILITATION: CCTV inspection is required and shall be completed after rehabilitation of the pipeline to confirm compliance with the plans and specifications. If a new manhole (not currently recorded in the OWNER'S asset database) has been installed within this project, then the Post-Rehabilitation CCTV inspection shall note the new manhole as an observation and the inspection shall begin and end at existing manholes currently in the OWNER'S asset database.

END OF SECTION 33 01 30.11

SUPPLEMENTAL TECHNICAL SPECIFICATION
SECTION 33 01 30.41
SEWER LINE CLEANING

PART 1– GENERAL

1.1 SECTION INCLUDES

A. Requirements for pipeline cleaning including pre-rehabilitation point repairs and/or removal of protruding service connections to be performed prior to closed circuit television (CCTV) inspection and pipeline rehabilitation/replacement.

B. Requirements for the removal and disposal of debris from the pipeline.

1.2 RELATED SECTIONS

A. Special Condition: Immediate Notification of Sanitary Sewer Overflows

B. STS 33 01 30.02 Temporary Odor Control

C. STS 33 01 30.11 Television Inspection of Sewers

D. STS 33 01 30.81 Manhole Rehabilitation

1.3 REFERENCES

A. City of Albuquerque Standard Specifications for Public Works Construction, as updated.

B. Where all or part of a Federal, ASTM, ANSI, AWWA, standard specification, etc. is incorporated by reference in these specifications, the reference standard shall be the latest edition and revision.

1.4 SUBMITTALS

A. Contractor shall submit a written Debris Control Plan. The plan shall contain:

1. Sewer line and manhole cleaning plan describing methodology to be used from manhole to manhole.
2. Describe what measures will be implemented to remove the debris generated during the sewer line cleaning operation from continuing downstream in the active sewer.
3. Describe what measures will be implemented during the manhole interior cleaning process to prevent debris from entering the sanitary sewer flow and flowing downstream. Examples are temporary planks spanning the manhole benches or installation of a sturdy net.
4. Describe what measures will be implemented to prevent debris from entering the open manhole. Examples are a steel plate covering the open manhole or installation of a sturdy net.
5. Communication plan. Identify who is responsible for enforcing the Plan to all parties, including sub-contractors, working at the project site.

6. The Debris Control Plan from STS 33 01 30.81:Manhole Rehabilitation and this STS may be the same plan.

B. Noise mitigation plan during cleaning operations.

C. Pre-rehabilitation host pipe condition analysis report pre section 1.5.

1.5 PRE-REHABILITATION HOST PIPE CONDITION ANALYSIS

A. The CONTRACTOR shall review all the post-cleaning digital videos and identify any additional host pipe deficiencies which impact the rehabilitation of the pipeline. CONTRACTOR shall submit a pre-rehabilitation host pipe condition analysis in writing to the ENGINEER and OWNER. The analysis shall describe the following:

1. Any anticipated defects in the trenchless pipeline rehabilitation system due to the current host pipe condition for each pipe segment (List specific locations along the pipe segment);

2. Specific locations along the pipe segment where additional point repairs/obstruction removals are requested;

3. Any modifications to the installation procedures due to the current host pipe condition for each pipe segment;

4. Any concerns pertaining to a specific pipe segment due to host pipe condition.

5. No point repair or obstruction removal shall be performed without written approval from the ENGINEER and OWNER.

B. If ENGINEER and OWNER rejects a request to perform a point repair or obstruction removal, the CONTRACTOR shall perform the pipeline rehabilitation with the host pipe deficiency. The OWNER will reimburse the CONTRACTOR for a post-rehabilitation point repair/trenchless liner patch (method to be determined) if the liner pipe is found to be unacceptable.

PART 2– PRODUCTS

2.1 CLEANING METHODS/EQUIPMENT:

A. HIGH VELOCITY JET-CLEANING: Cleaning equipment that uses a high velocity water jet for moving debris shall be capable of producing a minimum volume of 50-gpm with a pressure of 1500 psi at the pump. Any variations to this pumping must be approved in advance, by the ENGINEER. A working pressure gauge shall be used on the discharge of all high-pressure water pumps. A minimum of 2 or more high-velocity nozzles capable of producing a scouring action from 15 to 45 degrees. The CONTRACTOR shall operate the equipment so that the pressurized nozzle continues to move at all times. The pressure nozzle shall be turned off or reduced anytime the hose is held or delayed preventing damage to the line. Equipment shall also include a high-velocity gun for washing and scouring manhole walls and floor. 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.

B. MECHANICAL CLEANING: Mechanical cleaning, in addition to normal cleaning when required by the ENGINEER, shall be performed with approved equipment and accessories driven by power winching devices. The CONTRACTOR shall submit the equipment manufacturer's operational manual and guidelines to the ENGINEER, which shall be followed strictly, unless

modified by the ENGINEER. Experienced operators shall operate all equipment and devices so that they do not damage the pipe in the process of cleaning. Cleaning devices and other debris removing equipment/accessories shall be used as appropriate and necessary in the field, in conjunction with the approved power machine(s). Bucket machines shall operate 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. The use of cleaning devices such as rods, metal pigs, porcupines, root cutters, snakes, scooters, sewer balls, kite and other approved equipment, in conjunction with hand winching device, and/or, gas, electric rod propelled devices, shall be considered normal cleaning equipment.

PART 3– EXECUTION

3.1 WATER USAGE

A. The CONTRACTOR shall be responsible for obtaining a water meter(s) from OWNER'S Customer Service, that shall be installed at the fire hydrant(s). The CONTRACTOR is responsible for installing the water meter and an approved reduced pressure backflow preventer on any and all fire hydrant connections along with obtaining all required permits. All related charges for the set-up and the water bill shall be considered incidental to the cleaning of the existing sewer lines. No fire hydrant shall be obstructed or used when there is a fire in the area. The CONTRACTOR shall remove the water meter(s)/piping etc., from all fire hydrants at the end of each working day. Water shall not be wasted on streets.

3.2 CLEANING

A. All cleaning activities shall be performed by experienced personnel. All cleaning shall be done from the downstream manhole unless otherwise authorized by the OWNER.

B. The CONTRACTOR shall close or cover all open sanitary manholes or access openings in the lines when operations have been suspended for a period of two hours or more to minimize the dispersal of sewer odors. No cleaning shall be done prior to checking both upstream and downstream manholes for flow monitors or other mechanical devices. When utilizing high-velocity hydraulic cleaning equipment independently or in combination with other cleaning methods, a minimum of 2 passes with the hydraulic nozzle shall be done unless otherwise approved by the ENGINEER. If cleaning cannot be completed from one manhole, the equipment shall be moved and set up on the other manhole and cleaning shall be re-attempted. If successful cleaning still cannot be performed or the equipment fails to traverse the entire pipeline section, it shall be assumed that a blockage exists. Efforts to clean the lines shall be temporarily suspended and the CONTRACTOR shall notify the ENGINEER. Upon removal of the obstruction, the CONTRACTOR shall complete the cleaning operation.

C. The CONTRACTOR shall remove all foreign materials from the interior of pipelines and manholes including but not limited to debris, roots, solids, sand, grease, and grit thus improving pipe flow as well as facilitating television inspection. Manhole cleaning shall include all surfaces between the pipe invert and a point 12 inches above the pipe crown and all manhole benches. Experienced personnel shall operate all cleaning equipment and devices. Satisfactory precautions shall be taken to protect the sanitary sewer mains and manholes from damage that might be inflicted by the improper use of the cleaning process or equipment. Any manhole and/or frame and cover that is dismantled or damaged during

the cleaning process (excluding those manholes for which new rings and covers are to be installed where shown on the Drawings), shall be repaired at no additional cost and shall be incidental to cleaning. Any damage done to a sewer by the CONTRACTOR shall be repaired by the CONTRACTOR at no additional cost to the OWNER and to the satisfaction of the ENGINEER and OWNER. Cleaning shall also include the manhole wall washing by high pressure water jet. The CONTRACTOR shall ensure manholes are not damaged due to the forces generated by equipment, water pressure, and air pressure.

D. The CONTRACTOR, when instructed by the ENGINEER, shall demonstrate the performance capabilities of the cleaning equipment proposed for use on the project. If the results obtained by the proposed sanitary sewer cleaning equipment are not satisfactory, the CONTRACTOR shall use different equipment and/or attachments, as required to meet specifications. More than one type of equipment/attachments may be required at a location. When hydraulic or high velocity cleaning equipment is used, a suitable sand trap, weir, dam, or suction shall be constructed in the downstream manhole in such a manner that all the solids and debris are trapped for removal.

E. When hydraulic or high-velocity cleaning equipment is used, it is required that the vacuum chute be in the downstream manhole to remove all debris loosened in the pipe cleaning operation. Additionally, the Contractor may install a suitable sand trap, weir, dam or suction device in the downstream manhole so that debris is trapped for removal.

F. The Contractor shall take precautions to protect sanitary sewer manholes and pipelines from damage that might occur by improper selection and use of cleaning equipment. When using hydraulically-propelled devices, take precautions to ensure that the water pressure created does not cause damage to or flooding of public or private property. Do not surcharge any sanitary sewer to an elevation that could cause overflow of sewage including backup into laterals.

G. Where possible, use the flow of wastewater present in the sanitary sewer pipeline to provide the fluid for hydraulic cleaning.

H. The Contractor shall operate high-velocity cleaning equipment so that the pressurized nozzle moves continuously. Turn-off or reduce the flow to the nozzle to prevent damage to the pipeline any time the nozzle becomes stationary.

3.3 REMOVAL AND DISPOSAL OF DEBRIS

A. All sludge, dirt, sand, rocks, grease, and other solid or semi-solid material resulting from the cleaning operation shall be removed at the downstream manhole of the section being cleaned. Passing of debris from upstream manhole section to downstream manhole section will not be allowed. All debris from the manholes shall be loaded into an enclosed container that is approved by the New Mexico Environment Department for liquid waste hauling.

B. The CONTRACTOR is not allowed to accumulate debris, and/or liquid waste, sludge, etc. on the site except in enclosed containers approved by the New Mexico Environment Department. All waste shall be disposed of at a legally permitted disposal site.

C. Debris may be disposed at the OWNER'S Soils Amendment Facility (SAF) located near Double Eagle Airport if it passes a paint filter test and the OWNER determines that the debris is suitable for disposal at the SAF. CONTRACTOR shall be responsible for all debris loading, unloading, intermediate handling, reloading, and transportation to the point of disposal. There will be no charges by the OWNER for disposal of accepted debris at the SAF.

The OWNER will be responsible for spreading dried debris disposed at the SAF after it is dumped. The CONTRACTOR is notified that the SAF may have limited hours in which material may be hauled to the site. Should the material not pass the paint filter test, or is unsuitable for disposal at the SAF, the CONTRACTOR shall find a disposal location that is acceptable to the ENGINEER and OWNER.

3.4 PRE-REHABILITATION POINT REPAIR/OBSTRUCTION REMOVAL

A. This subsection specifies the point repair/replacement of host pipelines and/or obstruction removal from host pipelines due to host pipe deficiencies which impact the rehabilitation of the pipeline. The CONTRACTOR shall repair the pipeline where point repairs or obstruction removals are shown on the Plans and/or are approved by the OWNER (as identified in section 1.5) prior to any rehabilitation.

B. PRE-REHABILITATION POINT REPAIR: A Point Repair shall include up to 12 linear feet of pipeline replacement by excavation. Remove only that amount of sanitary sewer pipe or sewer service connection which will impact the pipeline rehabilitation. New sewer pipe shall be per STS 33 31 11 Public Sanitary Sewerage Gravity Piping. Transitions shall be flexible couplings with stainless-steel bands. The new sewer pipe and flexible couplings shall be backfilled with lean fill or concrete to a thickness of at least 12 inches from the pipe exterior, from the pipe spring line and down.

C. PRE-REHABILITATION OBSTRUCTION REMOVAL: An Obstruction Removal shall be performed with a remote device (robot) which can remove the obstruction by entering the pipeline from a manhole. An obstruction shall be defined as a) a protruding service more than 1-inch into the main.; b) a miscellaneous obstruction that cannot be removed by one of the cleaning methods or equipment identified in this Section, as demonstrated by the CONTRACTOR.

END OF SECTION 33 01 30.41

SUPPLEMENTAL TECHNICAL SPECIFICATION
SECTION 33 01 30.51
SEWAGE FLOW CONTROL

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. The work specified in this section of the specifications provides the requirements for sanitary sewer flow control during sewer line rehabilitation/replacement including bypass pumping and/or temporary flow control.

B. The purpose of sanitary sewer flow control is to maintain reliable sewer service to the users during rehabilitation/replacement, and to prevent backup to services and/or overflow outside of the designated pipes and manholes during cleaning, television inspection, and/or rehabilitation/replacement of the sewer line.

1.2 REFERENCES

A. City of Albuquerque Standard Specifications for Public Works Construction, as updated.

B. Where all or part of a Federal, ASTM, ANSI, AWWA, standard specification, etc. is incorporated by reference in these specifications, the reference standard shall be the latest edition and revision.

1.3 PERFORMANCE REQUIREMENTS

A. CONTRACTOR shall maintain on site, sufficient equipment, materials, and personnel to ensure continuous and successful operation of the bypass pumping system.

B. CONTRACTOR shall provide all necessary means to safely convey the existing flows past the work area. Flow data, if available, for sizing the bypass pumping systems required for this project is provided in the plans. The CONTRACTOR is responsible for the design, construction, and operation of adequate and properly functioning bypass systems even if flow data is unavailable. The collection of any additional flow monitoring data that CONTRACTOR believes is necessary to design bypass pumping facilities shall be performed at CONTRACTOR's expense and is considered incidental to the work. CONTRACTOR is further advised that during major rain events, the flows may increase by 35 percent or more, beyond the provided flow data or measured flow data collected by the CONTACTOR; CONTRACTOR's design, construction and operation of the bypass system shall account for this contingency.

C. Temporary bypass pumps:

1. Primary pump(s) shall be a complete unit sized to handle the peak flow of the section of sewer line to be bypassed and pumped.

2. Standby pump(s) shall be a complete unit able to provide 100 percent redundancy and be fully operational at all times including all equipment and piping being in-place. Standby pumps shall have a valve and manifolded for fast changeover during emergency situations.

3. All pumps shall be non-clog pumps designed for wastewater service in the presence of sewage solids.

4. The CONTRACTOR shall maintain on site a sufficient number of valves, tees, elbows, connections, tools, sewer plugs, piping, and other parts or system hardware to ensure immediate repair or modification of any part of the system as necessary.

5. Pumping operations shall be enclosed by an approved sound suppression system.

D. Temporary piping:

1. Discharge piping: Designed to withstand at least twice the maximum system pressure or a maximum of 50 psi, whichever is greater. Pipe shall be sized to limit velocities to less than 8 feet per second during peak flow. Discharge piping that extends into a manhole shall be rigid hose or hard pipe. Lay-flat hose is not allowed to extend into manholes. All discharge piping must be anchored at the discharge point.

2. Suction piping: Designed according to pump size, flow calculations, and suction depth. Suction piping that extends into a manhole shall be rigid hose or hard pipe.

E. Temporary Pipeline Plugs and Test Balls:

1. Specifically designed for host pipe diameter and application.

2. Maximum pressure rating shall be 17 psi up to 12” diameter line. Plug or test-ball for pipe sizes larger than 12” require approval from Engineer prior to use.

1.4 SUBMITTALS

A. General: Submit listed submittals in accordance with conditions specified in the Contract and STS 01 33 00 – Submittal Procedure.

B. Planned sequence of construction with specific dates and times of Temporary Flow Control (without bypass pumping) and Bypass Pumping.

C. Bypass Pumping Plan: The plan shall indicate the locations and capacities of all pumps, sumps, plugs, suction, discharge lines, frequency of maintenance, hourly inspections with inspection log showing personnel and observations.

D. Temporary Flow Control Plan (without bypass pumping): The plan shall indicate the locations and durations of all test-balls and plugs, plus a monitoring plan of upstream storage.

E. Noise Control Plan per the applicable ordinance.

F. Spill Prevention and Emergency Response Plan: The plan shall address implementation of measures to prevent sewage spills, procedures for spill control and containment, emergency response, cleanup, and spill and damage reporting. The plan shall account for all storm drain systems and water courses within the vicinity of the work which could be affected by a sewage spill. Catch basins that could receive spilled sewage shall be identified. Notification shall be per the Special Conditions of the contract.

PART 2– PRODUCTS – NOT USED

PART 3 – EXECUTION

3.1 SETUP

A. The bypass pumping system or the installation of the bypass pumping system shall not impede or prevent access to private residences, public facilities, or businesses, except by prior agreement with impacted owners and renters.

B. Temporary piping shall not completely impede a traveled roadway in either direction or completely block access to any resident or business. Temporary piping may need to be constructed in trenches with adequate cover and otherwise protected from damage due to traffic.

C. The discharge location (manhole and downstream pipeline) shall be protected against any scour, erosion, or damage due to the bypass pumping operations.

D. CONTRACTOR shall host a Pre-Bypass Pumping Meeting a minimum of 3 days before the start of bypass pumping. Refer to STS 01 31 00 PROJECT MANAGEMENT COORDINATION for additional information.

3.2 EXAMINATION

A. Contractor shall inspect the bypass pumping operation.

1. In areas where flows are bypassed, all bypass flows shall be discharged as approved by the Engineer.

2. The Contractor shall inspect the entire bypass pumping and piping system for leaks or spills on an hourly basis.

3. The Contractor shall also create an inspection log and shall enter the time of the inspections, the condition of the piping, the fuel level for the power source (if applicable), and the name of the inspector into the log for review by the Engineer.

4. No bypassing to the ground surface, receiving waters, storm drains, or bypassing which results in soil or groundwater contamination or any potential health hazards shall be permitted.

5. In the event of any sewage spill the Contractor will be responsible for the prompt cleanup and disinfecting of the spill as called for in his spillage cleanup plan.

6. The Contractor shall compensate the Owner for the cost of any fines levied as the result of a spill or unauthorized discharge.

B. The CONTRACTOR shall maintain a test-ball insertion/removal log to track the date and time the test-ball is inserted and the date and time the test-ball is removed. The log shall be available for review by the owner, engineer, or inspector.

3.3 CLEANING

A. When bypass pumping operations are complete all piping shall be drained into the sanitary sewer prior to disassembly.

END OF SECTION 33 01 30.51

SUPPLEMENTAL TECHNICAL SPECIFICATION
SECTION 33 01 30.70
PIPE SLIP LINING

PART 1– GENERAL

1.1 SECTION INCLUDES

A. Requirements for the rehabilitation of gravity sanitary sewer lines by pipe slip lining methodology including reinstatement of service lateral connections.

1.2 RELATED SECTIONS

A. Special Condition: Immediate Notification of Sanitary Sewer Overflows

B. STS 03 64 23: Injection Grouting

C. STS 33 01 30.41: Sewer Line Cleaning

D. STS 33 01 30.11: Television Inspection of Sewers

E. STS 33 01 30.51: Sewer Flow Control and Bypass Pumping

1.3 REFERENCES

A. City of Albuquerque Standard Specifications for Public Works Construction, as updated.

B. The Greenbook Standard Specifications for Public Works Construction, Latest Edition.

C. Where all or part of a Federal, ASTM, ANSI, AWWA, standard specification, etc. is incorporated by reference in these specifications, the reference standard shall be the latest edition and revision.

1.4 SUBMITTALS

A. Pipe Installation Plan: The CONTRACTOR shall prepare and submit a plan with installation procedures and the locations of insertion/access pits for review and approval at a minimum of 30 working days prior to commencing work. This plan may include a dewatering plan if groundwater is identified to be present.

B. Project specific engineering pipe design calculations for each SAS segment the liner system will be applied. Pipe design shall be calculated and stamped by a professional ENGINEER licensed in the USA and verified by the pipe manufacturer in accordance with ANSI, ASTM, and AWWA standards. Calculations shall include, but not be limited to; soil loads, live loads, hydrostatic loads, pipe stiffness, Standard Dimension Ratio, pipe wall crushing strength, initial and long term (50 years) values of pipe deflection including grout load deflection, pipe bonding strain, hydrostatic collapse resistance, constrained buckling strength, and allowable jacking force and length.

C. Certifications from the manufacturer demonstrating the pipe meets or exceeds the requirement of this specification. Certifications of the materials shall include the cell classification, grades, type of resins, glass fibers, and all other materials used in the manufacturing of the pipe. Certifications shall include drawings showing the cross-sectional profile of the pipe wall and pipe joint details.

D. Details from the pipe manufacturer of the pushing or pulling heads to be used.

E. Manufacturers' shipping, storage, and handling recommendations for all components of the pipe system.

F. Shop drawings of the Closure Couplings.

G. Material data sheets and bulkhead design for sealing the liner at manholes.

H. Identification/notification of any host pipe defects which will impact the pipe slip lining operation and a proposed pre-rehabilitation repair method for each defect. Refer to STS 33 01 30.41.

1.5 QUALITY ASSURANCE

A. Pipe and Fittings Manufacturer Qualifications: demonstrate a ten-year minimum history of successful installations in the United States for direct-bury and slip line rehabilitation of sanitary sewers.

1.6 PIPE DESIGN CRITERIA

A. Pipe design shall be based on the following Design Conditions (Gravity Service):

Height of Water Above Top of Pipe, ft	=	1.0
Fluid Temperature, degrees F	=	80
Soil Density, pcf	=	130
Live Load, psi	=	HS-20 Highway
Dead Load, psi	=	Dead Load/Depth of cover: As indicated on the Drawings. Vertical deflection not to exceed 3-percent in short term (30 days) and 5 percent thereafter
Modulus of Soil Reaction, psi	=	800

PART 2– PRODUCTS

2.1 MANUFACTURERS

A. Refer to the OWNER’s Approved Product List.

2.2 MATERIAL

A. Fiberglass Reinforced Polymer Mortar Pipe (FRPMP)

1. All FRPMP shall be per ASTM D3262, Type 1, Liner 1 or 2, Grade 1 or 3. The pipe shall also meet the strain corrosion resistance requirements of ASTM D 3681 and joint requirements of ASTM D 4161.

2. The interior surface of the FRPMP shall be a resin rich finish, 40 mils thick minimum, of epoxy, polyester or vinylester resin with no fillers and shall be free of cracks and crazing when placed under the design loading.

3. The interior and exterior layers of the FRPMP shall be composed of resin impregnated glass fibers and silica sand fillers in layers.

4. The FRPM pipe produced shall have a minimum pipe stiffness of 46 psi at 5% deflection as set forth in ASTM D 2412.

5. Resin Systems: The manufacturer shall use a thermosetting polyester resin system with a minimum tensile elongation of 2 percent.

6. Glass Reinforcements: The reinforcing glass fibers used to manufacture the components shall be commercial grade of E-type glass filaments with binder and sizing compatible with impregnating resins.

7. Fillers: Sand shall be in accordance with ASTM C 33 and shall be a minimum 98% silica, kiln-dried and graded, with a maximum moisture content of 0.2%.

8. Additives: Resin additives, such as curing agents, pigments, dyes, fillers, thixotropic agents, etc., when used, shall not detrimentally impact the performance of the product.

9. Chemical resistance: The FRPMP shall meet or exceed the requirement for the 50-year strain value as outlined in ASTM D 3262-Table 4 when tested in accordance with ASTM D 3681.

10. FRPMP Joining System:

    a. The FRPMP shall be field connected with flush bell-spigot joints meeting the performance requirements of ASTM D4161.

    b. An elastomeric gasket meeting the requirements of ASTM F477 shall be used to provide a positive leak proof sealing system at each pipe joint.

    c. Maximum allowable joint angular deflection shall be 1.0 degrees.

11. Closure Couplings for FRPMP

    a. Casing and fasteners shall be constructed of 316 Stainless Steel.

    b. Sealing Sleeve shall be constructed of EPDM rubber.

B. Materials for Sealing Pipe at Manholes

1. The annular space between host pipe and liner pipe at each manhole may be sealed with Oakum saturated with Avanti 202 covered with a quick setting grout, an approved non-shrink grout or an approved quick setting epoxy.

2. The annular space between host pipe and liner pipe at each manhole may also be sealed with a water stop gasket by Fernco Company or approved equal and finished with a quick setting grout.

3. The quick setting grout, non-shrink grout or a quick setting epoxy shall be used for sewer applications that is chemical resistant.

PART 3– EXECUTION

3.1 EXAMINATION

A. Proceeding with Work specified in this Section shall be interpreted to mean that all conditions, including site conditions, were determined to be acceptable prior to start of Work.

B. Pipes shall be inspected by the OWNER or ENGINEER for damage prior to installation.

C. If pipe is found to be superficially damaged by cracks, holes, de-laminations, foreign inclusions, blisters, or other defects that would, due to their nature, degree, or extent, have a deleterious effect on the pipe performance as determined by the ENGINEER; the ENGINEER may reject the pipe or may allow the pipe to be repaired. Rejected pipe shall be replaced with a new section of pipe at no additional cost to the OWNER.

3.2 PREPARATION

A. Complete all pre-approved obstruction removals, pipe cleaning, and point repairs per STS 33 01 30.41. Complete the pre-rehab CCTV inspection including submittal and approval by ENGINEER and OWNER per STS 33 01 30.11. All sewer service connections shall be identified and located prior to slip-lining. All sanitary sewer flow control shall be approved by ENGINEER and OWNER and in-place and operational prior to slip lining.

B. CONTRACTOR is responsible for determining the internal diameter, ovality, and any obstructions within the existing pipe that may impede the slip-lining process.

1. Mandrel/Proof Pipe Test: A mandrel/proof pipe test may be required on segments of line as indicated on the plans. A mandrel/proof pipe of at least the outside diameter and length of individual pipe section of the slip liner pipe shall be pulled through the specified lines prior to any insertion attempts. A guide cable shall be attached to each end of the mandrel/proof pipe so that it may be removed from either end of the pipe section being tested

C. Protection: Before any excavation is done for any purposes, the CONTRACTOR shall contact the appropriate One Call agency for determining field locations of existing utilities near the work area. Temporary construction easement and/or right-of-way areas, if required, will be arranged by the CONTRACTOR at no cost to the OWNER.

3.3 INSTALLATION

A. Rehabilitation of sewer pipe by slip-line shall be full compensation for all subsurface investigations, materials, labor, equipment, cost of insertion pits, removing and replacing gravel base course, pavement, curb and sidewalk, and incidentals required to complete the slip-line process. Connection to the manholes is incidental to the pipe slip-line process.

B. CONTRACTOR is responsible for any point repairs or point insertion pits required to advance the slip-lining process due to the liner pipe becoming immovable before reaching the end of the pre-determined segment.

C. Pipe Insertion Pits

1. Insertion pits shall be excavated and backfilled in accordance with the appropriate specifications. Remove and replace existing asphalt in accordance with the applicable standard details and specifications.

2. All excavations shall be properly sheeted and shored in accordance with relevant specifications for trench safety systems. Any damage resulting from improperly shored excavations shall be corrected to the satisfaction of the OWNER or ENGINEER with no additional compensation due to the CONTRACTOR.

3. All open excavations shall be kept secure at all times by the use of barricades with appropriate lights and signs, construction tape, covering the steel plates, etc., or as directed by the ENGINEER.

4. Insertion pits shall be of sufficient length to allow the pushing mechanism and new liner pipe to enter the host pipe and maintain the grade of the existing sanitary sewer.

5. CONTRACTOR to install insertion pits to eliminate the use of closure couplings. Refer to section D if closure couplings are required.

6. The pits shall be located such that their total number shall be minimized, and the footage of liner pipe installed in a single push shall be maximized.

7. As directed by the OWNER, insertion pits shall be located where obstructions or damaged pipe are planned to be removed.

D. Pipe Insertion/Slip lining

1. The existing sewer shall remain in operation during the relining process.

2. Any Obstruction that would prevent passage or damage to the liner sections shall be removed or repaired prior to installing the liner. Slip-line work shall begin within 12 hours of the pipe being cleaned.

3. After completing the insertion pit excavation, the top of the existing sanitary sewer pipe shall be removed, where required, down to the spring line. Bumpers shall be provided in the insertion pit in order to prevent the edges of the existing pipe from damaging the outside of the liner as it is inserted into the existing sewer.

4. The liner shall be inserted into the existing sewer spigot end first with the bell end trailing. The pushing force shall be applied to the pipe wall end inside of the bell in accordance with the manufacturer's instructions. A jacking or pulling ring shall be used to distribute the push/pull forces uniformly against the bell end perimeter of the liner pipe. Once the slip-line work has begun for a segment of existing sewer line, work shall be completed without interruption to next manhole or insertion pit. No jacking load shall be applied to the end of the bell.

5. The installation heads or mechanism shall incorporate a gauging system which shall provide a continuous monitor of the force being applied during liner insertion operations.

    a. If the gauging system does not provide a direct reading of the force being applied to the pipe in pounds, the system shall be calibrated and such calibrated data shall be tabulated in written form to allow the ENGINEER to readily determine the force in pounds being applied to the pipe during the insertion operation.

b. The insertion force used by the CONTRACTOR shall not exceed the liner pipe manufacturer's recommended maximum allowable pulling or pushing force that can be exerted on the pipe without damaging integrity of the liner pipe or pipe joints.

6. For manholes where no point of intersection occurs in the manhole, the pipe liner shall be inserted through the manholes with no pipe joints in the manhole and the pipe liner shall be terminated with an end seal.

E. CLOSURE COUPLING

1. CONTRACTOR shall follow the following installation requirements along with the manufactures installation procedures to create a watertight connection. The ends of the liner to be joined shall be cut smooth and square to the axis of the liner.

a. Use the distance between the marks on each pipe to establish any pipe gaps, but not beyond the sealing capability of the coupling. Center the coupling about the marks. The recommended maximum gaps shall be per manufactures recommendations.

b. To aid fitting, the screws may be loosened but not disconnected form the nut or bar.

c. Make sure that the two pipes are straight and not misaligned. Adjust if necessary. Check that any ovality in the pipes is in the same direction. The maximum step between the pipe outside diameters at any point around the pipe circumference should not be greater than 0.1" (size up to 24" ND) or 0.2" (size over 24" ND). Adjust or jack out if necessary.

d. The sealing of the rubber sleeve will be improved by tapping all-round the casting with a soft nosed mallet during the tightening procedure for all diameters over 24" ND and/or on rough or out of round pipes.

e. Any gap between the pipe surface and the rubber sleeve suggests poor compression. Check the pipe surface for deformation and pipe alignment and carefully refit the couplings.

f. The amount of movement which a coupling can accommodate shall be per manufactures recommendations.

g. The maximum amount of angular deflection which the couplings can accommodate shall be per manufactures recommendations.

3.4 REINSTATE SERVICE LATERAL CONNECTION BY OPEN CUT

A. The CONTRACTOR shall notify the occupants of the buildings with service connections when the service will be interrupted. The CONTRACTOR shall give the OWNER of the service the opportunity to remove and replace the service line within private property at the property OWNER'S expense. The CONTRACTOR shall maintain sewer service throughout the construction period, without any spills or discharges to unapproved systems

B. All live services shall be immediately reinstated after the pipe slip lining (pipeline rehabilitation) is complete. Inactive service lines to a vacant lot, vacant building, or to an occupied residence with more than one service line serving the property, shall be defined as a “live” service, and shall be reinstated. It is the CONTRACTOR’S responsibility to locate all live services prior to rehabilitation activities.

C. Service lateral reinstatement by open cut includes locating all interfering utilities, existing surface removal, excavation, dewatering, reinstatement of service lateral connection, backfilling, surface restoration, temporary flow bypassing, and sewer dewatering. Reinstatement of service lateral connection by open cut includes the removal and replacement of the first five (5) feet of service lateral, cutting of liner for the service opening, and installing a pre-fabricated fitting (Inserta-Tee® or equivalent) with the manufacturer’s specifications so that a complete water-tight seal is achieved. The new service line shall be connected to the existing service line with a flexible coupling and stainless-steel bands, as approved by OWNER. The service lateral connection at the pipeline shall be encased in lean fill, a minimum of six inches (6") below and twelve inches (12") above and on the sides of the pipe. The lean fill construction shall be inspected and approved by the OWNER prior to completing the trench backfilling.

3.5 END SEALS

A. The finished linear shall be cut smooth and parallel with the manhole wall. The interface between the host pipe and the pipe liner shall be sealed 360 degrees. End seals shall be completed prior to the start of annular space grouting. When the pipe liner extends through a manhole it shall be sealed at all seams between liner and manhole. End seals shall be completed prior to the start of the annular space grouting.

3.6 ANNULAR SPACE GROUTING

A. The annular space (void between the host and liner pipes) shall be completely filled with grout to support the liner and provide long-term stability. Refer to STS 03 64 23 (injection grouting).

3.7 ACCEPTANCE OF WORK:

A. After completion of the pipe slip lining, reconnection of sewer service lateral, and rehabilitation of the manholes, the CONTRACTOR shall perform a CCTV inspection in accordance with STS 33 01 30.11.

END OF SECTION 33 01 30.70

SUPPLEMENTAL TECHNICAL SPECIFICATION
SECTION 33 01 30.72
CURED-IN PLACE PIPE LINING

PART 1– GENERAL

1.1 SECTION INCLUDES

A. Requirements for the rehabilitation of gravity sanitary sewer lines by installation of a Cured - In-Place Pipe Lining system including reinstatement of service lateral connections. The liner system shall be entirely trenchless excluding pre-approved point repairs. The liner system shall be continuous from manhole to manhole.

1.2 RELATED SECTIONS

A. Special Condition: Immediate Notification of Sanitary Sewer Overflows

B. STS 33 01 30.41: Sewer Line Cleaning

C. STS 33 01 30.11: Television Inspection of Sewers

D. STS 33 01 30.51: Sewer Flow Control and Bypass Pumping

1.3 REFERENCES

A. City of Albuquerque Standard Specifications for Public Works Construction, as updated.

B. The Greenbook Standard Specifications for Public Works Construction, Latest Edition.

C. Where all or part of a Federal, ASTM, ANSI, AWWA, standard specification, etc. is incorporated by reference in these specifications, the reference standard shall be the latest edition and revision.

1.4 SUBMITTALS

A. Pre-Installation

1. Pipe Installation Plan: The CONTRACTOR shall prepare and submit a plan with trenchless pipeline rehabilitation installation procedures for review and approval at a minimum of 30 working days prior to commencing work. This plan may include a dewatering plan if groundwater is identified to be present.

2. Project specific engineering pipe design calculations (Liner Wall Thickness) for each SAS segment the liner system will be applied. Pipe design shall be calculated and stamped by a professional ENGINEER licensed in the USA and verified by the pipe manufacturer in accordance with ANSI, ASTM, and AWWA standards. Calculations shall include, but not be limited to; soil loads, live loads, hydrostatic loads, pipe stiffness, Standard Dimension Ratio, pipe wall crushing strength, initial and long term (50 years) values of pipe deflection, pipe bonding strain, hydrostatic collapse resistance, constrained buckling strength, and allowable pulling force and length.

3. Shop drawings, catalog data, MSDS sheets, and manufacturer's technical data showing complete information on material composition, physical properties, and dimensions of new pipe and fittings pertinent to this project demonstrating compliance with this specification.

4. Liner repair materials, methods, and manufacturer's recommendations (Repair Specification).

5. Manufacturers' shipping, storage, and handling recommendations for all components of the liner system

6. List of critical equipment needed for the installation of the liner system, List of redundant equipment that will be onsite during each installation.

7. Material data sheets for sealing the liner at manholes.

8. Pressure gauge, recorder, and field equipment certifications (e.g., calibration by an approved certified lab).

9. Identification/notification of any host pipe defects which will impact the cured-in-place pipe installation and a proposed pre-rehabilitation repair method for each defect. Refer to STS 33 01 30.41.

B. Post-Installation

1. An evaluation of all defects witnessed through a review of the post-rehabilitation inspection with repair recommendations for liner pipe found to be unacceptable, per the Section.

1.5 LINER DESIGN CRITERIA

A. The proposed liner or pipe shall be capable of withstanding a minimum fifty-year (50-yr) continuous loading condition.

B. Thickness design of the liner system and pipes shall be for a fully deteriorated host pipe condition. Pipes shall have a minimum wall thickness in accordance with the manufacturer's recommendations. The minimum wall thickness shall be determined using the following design parameters, unless other design parameters are shown on the plans:

Factor of Safety	=	2.0
Long-Term Modulus of Elasticity, psi	=	50% of Flexural Modulus
Height of Water Above Top of Pipe, ft	=	1.0
Fluid Temperature, degrees F	=	80
Soil Density, pcf	=	130
Live Load, psi	=	HS-20 Highway
Ovality Factor, %	=	3.0
Modulus of Soil Reaction, psi	=	800

C. Refer to plans for minimum rehabilitated/replaced internal diameter of each segment.

PART 2– PRODUCTS

2.1 MANUFACTURERS

A. Pre-approved structural liner systems.

1. Cured-in-place pipe (CIPP) liner marketed under the trade name “Insituform.”
2. Cured-in-place pipe (CIPP) liner marketed under the trade name “InLiner Technologies.”
3. Cured-in-place pipe (CIPP) liner marketed under the trade name “Applied Felts.”
4. Cured-in-place pipe (CIPP) liner marketed under the trade name "IPR"
5. Ultra-Violet glass reinforced Cured-in-place pipe (UV CIPP) liner marketed under the trade name “ALPHALINER”

2.2 MATERIALS

A. Water or Steam Cured-In-Place Pipe (CIPP) Liner

1. CIPP Liner shall either be the Type A – inversion process conforming to ASTM F 1216 or the Type B – pull in place process conforming to ASTM F 1743 for installation using heated water cure or steam cure. The CIPP liner shall use an approved epoxy , epoxy polyester resin or epoxy vinyl ester resin-impregnated flexible fabric tube. The tube shall be installed by an inversion method using a hydrostatic head or by pulling it through an existing pipe and inflating by inverting a membrane using a hydrostatic head.
2. The fabric tube shall consist of one or more layers of flexible, needled felt or an equivalent non-woven material and have plastic coating(s). The material shall be compatible with and capable of carrying epoxy, epoxy polyester resin, or epoxy vinyl ester resin, capable of withstanding installation pressures and curing temperatures, and be compatible with the approved resins used. The approved epoxy, epoxy polyester resin or epoxy-vinyl-ester resin shall be compatible with the application and pipeline environment and be able to cure in the presence of water. The initiation temperature for cure shall be as recommended by the resin manufacturer and approved by the ENGINEER. The CIPP liner shall comply with ASTM D 5813 and shall have, as a minimum, the initial structural properties shown in the table below:

Epoxy Resin Properties	ASTM Test Method	Initial Values psi (Mpa)
Flexural Strength	D 790	5,000 (34.5)
Flexural Modulas	D 790	300,000 (2050)
Tensile Strength	D 638	4,000 (27.5)
Tensile Modulas	D 638	250,000 (1710)
Epoxy-Vinyl-Ester Resin Properties	**ASTM Test Method**	**Initial Values psi (Mpa)**
Flexural Strength	D 790	4,500 (31)
Flexural Modulas	D 790	250,000 (1710)
Tensile Strength	D 638	3,000 (20.5)
Tensile Modulas	D 638	250,000 (1710)

The CONTRACTOR shall provide field-cured samples as directed by the ENGINEER. The physical properties of the finished CIPP shall be verified through a field sampling procedure in accordance with ASTM F 1216 or ASTM F 1743 and in accordance with ASTM D 5813.

3. Resin and Tube Acceptance: At the time of resin impregnation, the entire fabric tube shall be inspected for defects. The resin shall not contain fillers, except those required for viscosity control, fire retardance, or extension of pot life. Thixotropic agents that do not interfere with visual inspection may be added for viscosity control. The opacity of the plastic coating shall not interfere with visual inspection. Resins may contain pigments, dyes, or colors that do not interfere with visual inspection of the CIPP liner or its required properties. Additives may be incorporated that enhance the physical and/or chemical resistance.

B. Ultra-Violet Glass Reinforced Cured-In-Place Pipe (UV CIPP) Liner

1. UV CIPP Liner shall be the pull in place process conforming to ASTM F2019 Fiberglass, cured in place using ultraviolet light and corrosion resistant polyester Npg, orthophthalic or vinyl ester resins shall be used. The tube shall be installed by pulling it through the existing pipe.

2. An inner liner and outer liner film must be used for resin control, to prevent resin migration and contamination. The inner film and out film are certified styrene gas barriers. A pull in place slip sheet is used to cut down friction of the UV CIPP liner as it is pulled in place. The inner film must be removed after the curing and removal of light train. The material shall be manufactured in such a manner as to result in a tight fitting, continuous liner after installation. There shall be no measurable annular space. The liner shall have a snug fit at manhole terminations as shall be evidence by flares.

3. The UV CIPP liner shall be manufactured and wet out with a resin bath to allow for the lowest possible amount of air entrapment, in an ISO 9000 certified and quality-controlled manufacturing plant. There will be not on site wet out. The fiberglass tube shall be seamless and spirally wound including an exterior and interior film that protects and contains the resins used in the liner. The exterior film shall provide a UV light blocker. The UV CIPP liner shall be shipped in wooden crates that protect the liner from UV Light.

4. The wall color of the interior of the pipe surface of the UV CIPP after installation shall be a light reflective color so as not to interfere with visual and/or closed-circuit television (CCTV) inspection of the liner or its required properties.

5. Resin: The resin system shall meet the requirements of ASTM F2019. The resin shall be a chemically resistant UV cured isophthalic polyester or vinyl ester thermoset resin. When cured the UV CIPP shall meet the structural and chemical resistance requirements of ASTM F2019.

6. The UV CIPP liner shall have, as a minimum, the initial structural properties shown in the table below:

UV CIPP Resin Properties	ASTM Test Method	Initial Values psi (Mpa)
Flexural Strength	D 790	6,500 (45)
Flexural Modulus	D 790	725,000 (5000)

7. The UV CIPP liner shall have, as a minimum, a long-term flexural modulus of 363,500 psi defined as fifty years as determined by ASTM D2990 Test Method.

C. Materials for Sealing Pipe at Manholes

1. A quick setting grout, non-shrink grout or a quick setting epoxy used for sewer applications that is chemical resistant.

PART 3– EXECUTION

3.1 EXAMINATION

A. Proceeding with Work specified in this Section shall be interpreted to mean that all conditions, including site conditions, were determined to be acceptable prior to start of Work.

3.2 PREPARATION

A. Complete all pre-approved obstruction removals, pipe cleaning, and point repairs per STS 33 01 30.41. Complete the pre-rehab CCTV inspection including submittal and approval by ENGINEER and OWNER per STS 33 01 30.11. All sewer service connections shall be identified and located prior to liner installation. All sanitary sewer flow control shall be approved by ENGINEER and OWNER and in-place and operational prior to liner installation.

3.3 INSTALLATION:

A. All CIPP installations shall be per manufacture's written recommendations. Precautions shall be taken to protect the new liner and the existing pipe and manholes from any damage that might result during the insertion process.

B. Water or Steam Cured-In-Place Pipe (CIPP) Liner

1. The outside diameter of the tube being installed shall be sized to allow for expansion so that the CIPP can fit tightly against the existing pipe. CIPP shall be installed in accordance with ASTM Fl216 or ASTM Fl743 and the CONTRACTOR'S recommendations as approved by the ENGINEER. Immediately prior to installation, the CIPP liner tube shall be saturated with resin (on or off the work site) and stored/transported at a cool temperature as recommended by the resin manufacturer.

2. Curing: After tube placement is completed, the CONTRACTOR shall provide a suitable heat source and distribution equipment to distribute or recirculate hot water or steam throughout the installed CIPP liner tube. Temperature shall be maintained during the curing period as recommended by the resin manufacturer and approved by the ENGINEER. After the tube is cured, a cool-down period shall be used prior to opening the downstream end, reinstate

service lateral connections, and returning normal flow back into the system. Heat curing of the resin shall occur within the manufacturer's approved recommended period (pot life). The water in the CIPP shall be cooled to below 100°F (38°C) before discharge.

C. Ultra-Violet Glass Reinforced Cured-In-Place Pipe (UV CIPP) Liner

1. Liner installation shall be in accordance with ASTM F2019, Section 6.

2. Resin Impregnation: The liner tube shall be impregnated with resin in accordance with ASTM F2019, Section 6.3.1, with the following requirements: The fabric tube shall be totally impregnated with resin (wet out) in the manufacturers plant under quality-controlled conditions. The impregnation equipment shall contain devices to secure the proper distribution of the resin (resin bath). Certification documentation concerning date, type of resin, resin volume, mixing ratio, liner thickness, temperature, type of glass fiber, manufacturing date shall be stamped and/or marked on the finished uncured fiberglass liner by the UV CIPP manufacturer

3. Tube Insertion: A plastic slip-sheet shall be installed in the bottom half of the pipe prior to liner insertion. The slip-sheet is used to protect the outer film from damage during insertion from offset joints, broken pipe, or slightly protruding taps. In addition, it will increase flow characteristics and reduce friction during the pull-in process. Once the slip-sheet is in place, the shipping crate is opened, and the pre-impregnated spiral wound fiberglass liner is prepared for insertion into the host pipe following manufacturer procedures. Care should be taken to protect the ends of the liner from contaminates within the sewer such as moisture. A double capstan, constant tension winch shall be used to pull the spiral wound fiberglass liner into position. The double capstan, constant tension winch must be capable of documenting the amount of tension used to pull the liner into the pipe. Maximum pulling forces established by the manufacturer will not be exceeded. The tube shall be pulled-in through an existing manhole or approved access point and fully extend to the next designated manhole or termination point. During the pull-in process, the liner is manually fed into the pipe by the install technician. Care should be taken during this process not to tear or damage the outer film, thus exposing the liner to contaminates within the pipe. Lubricants used for tube insertion shall be subject to the approval of the OWNER.

4. Curing: Once the liner has been inserted into the host pipe, an end plug or packer is used to cap one end of the liner to prepare for initial pressurizing. The packer should be secured with a strap to prevent it from being expelled due to pressure. The other end of the liner is held closed manually by the technician. The liner is then pressurized using forced air to the initial pressure of one 1 psi. The spiral wound fiberglass liner shall be cured with a UV light source (i.e. light train). The UV light train should be assembled according to the manufacturer's specifications for the liner diameter. Once initial air pressure is achieved, the technician shall insert the light train into the open end of the liner. When inserting the light train, care should be taken not to damage the inner film material or the light train. After the light train is inside the liner, a packer is secure, fill liner inflation may begin. The air pressure will be raised at one 1 psi

increments and held for approximately ten 10 minutes before increasing the pressure to the next level. Typical optimum inner air pressure is between 6 psi and 8 psi. However, the CONTRACTOR shall follow the manufacturer's recommendation for inner liner pressure according to the actual liner design used for the specific installation. Once optimum inner air pressure is achieved, a visual "pre-curing inspection of the liner will be done using CCTV. Once the "pre-cure" inspection is completed and the OWNER'S representative gives approval, the actual curing of the liner can begin. Curing of the spiral wound fiberglass liner is achieved through exposure to UV lights. The lights are energized in sequence according to the manufacturer specifications. The UV light train shall be capable of curing the fiberglass liner at a curing rate of up to 10-lf (linear feet) per minute

5. Record of Curing: For the liner to achieve the required water tightness and specified mechanical properties, the following parameters must be controlled during the entire curing process, giving the OWNER a record of the curing process over every segment of the entire length of the liner. This demonstrates that the entire liner is cured properly and completely. The recording will include:

    a. Curing speed.

    b. Light source working and wattage.

    c. Inner air pressure.

    d. Exothermic (curing) temperatures.

    e. Date and time.

    f. Length of liner.

6. Record of the curing parameters will be accomplished using a computer and database that are tamper proof. During the curing process, infrared sensors will be used to record exothermic curing temperature data. The parameters for curing speed, inner air pressure and wattage are defined in the Quality Tracker UV curing protocol issued by the manufacturer. The optimal curing speed, or travel speed of the energized UV light train, is determined for each length of liner based on liner diameter, liner thickness, and exothermic reaction temperature. A video will be recorded using CCTV during the curing process. The liner is cured once the energized light train has traveled the entire length of the liner.

7. Post Curing: The outer film that has been manufactured to control resin loss, liner thickness, and contamination of the resin by water or other contaminants as well as a styrene barrier, shall remain in-place after UV curing of the liner has been completed. The inner film will be removed no sooner than 30 minutes after the curing of the liner is complete. Ensure the curing method provides uniform temperature application for effective curing throughout the liner

3.4 END SEALS

A. The finished linear shall be cut smooth and parallel with the manhole wall. The interface between the host pipe and the pipe liner shall be sealed 360 degrees.

3.5 REINSTATE SERVICE LATERAL CONNECTION

A. All live services shall be immediately reinstated after the liner installation (pipeline rehabilitation) is complete. Inactive service lines to a vacant lot, vacant building, or to an occupied residence with more than one service line serving the property, shall be defined as a “live” service, and shall be reinstated. It is the CONTRACTOR’S responsibility to locate all live services prior to rehabilitation activities. Each service lateral connection shall be noted by its size, position from a reference manhole, and orientation with respect to the circumference of the pipe. Reinstatement shall be accomplished from the interior of the sewer line by means of a television camera and a remote-controlled cutting device. Holes cut through the rehabilitation liner shall be neat and smooth and shall match the bottom of the reinstated service line. The service opening shall be reinstated to a minimum of 95 percent and a maximum of 100 percent of the service lateral pipe area. Service lateral openings that expand in diameter between the exterior and interior of the pipe wall shall be reinstated by cutting a hole in the liner that is 95 percent to 100 percent of the expanded diameter. The new edge shall be crack free with no loose or abraded material. Reinstated services that do not conform to this section shall be repaired and CCTV video confirmation. The repair method shall be compatible with the lining system per the lining system manufacturer and as approved by OWNER. No extra payment shall be made for the repair and CCTV video confirmation.

B. The CONTRACTOR shall have a fully operational backup device for reinstating service laterals. If for any reason the remote cutting device fails during the reinstatement of a service lateral, the standby device shall be immediately deployed to complete the work. The backup device shall be fully functional without requiring removal of parts from the primary device. The backup equipment shall be onsite throughout the reinstatement process and will be periodically tested upon request of the ENGINEER. If for any reason the CONTRACTOR is unable to remotely reinstate a service lateral connection, the CONTRACTOR shall reinstate the service lateral connection by open cut.

C. Service lateral reinstatement by open cut includes locating all interfering utilities, existing surface removal, excavation, dewatering, reinstatement of service lateral connection, backfilling, surface restoration, temporary flow bypassing, and sewer dewatering. Reinstatement of service lateral connection by open cut includes the removal and replacement of the first five (5) feet of service lateral, cutting of liner for the service opening, and installing a pre-fabricated fitting (Inserta-Tee® or equivalent) with the manufacturer’s specifications so that a complete water-tight seal is achieved. The new service line shall be connected to the existing service line with a flexible coupling and stainless-steel bands, as approved by OWNER. The service lateral connection at the pipeline shall be encased in lean fill, a minimum of six inches (6") below and twelve inches (12") above and on the sides of the pipe. The lean fill construction shall be inspected and approved by the OWNER prior to completing the trench backfilling.

3.6 ACCEPTANCE OF WORK

A. After completion of the lining, reinstatement of service lateral connections, and rehabilitation of the manholes, the CONTRACTOR shall perform a CCTV inspection in accordance with STS 33 01 30.11.

B. The CONTRACTOR shall review each post-rehabilitation CCTV inspection and provide an evaluation of liner defects and repair specifications for unacceptable defects to the ENGINEER. Level 1 Defects may be repaired by the CONTRACTOR or a pay adjustment will be

applied to the unit price for Pipeline Rehabilitation within the pipeline segment (manhole to manhole). All Level 2 Defects are unacceptable and must be repaired by the CONTRACTOR.

C. Evaluation criteria of liner defects:

1. A defect is identified that disrupts or impedes the normal flow characteristics of the pipe consisting of liner wrinkles or lumps/bulges:

   Level 1 Defect = Defect size is <15% of Internal Diameter;

   Level 2 Defect = Defect size is >15% of Internal Diameter

2. A defect is identified that impedes any future inspection or cleaning of the pipe (Level 2 Defect);

3. A defect is identified that compromises the structural integrity of the liner system. (Level 2 Defect)

4. A defect is identified that penetrates through the liner system not including an accepted service re-instatement;

   Level 1 Defect = Penetration is between the 10 and 2 position and the penetration is less than 3 inches in diameter

   Level 2 Defect = Penetration is between the 3 and 9 position OR the penetration is greater than 3 inches in diameter.

5. Service re-instatement does not meet requirements of this specification. (level 1 Defect)

D. A defect that is identified due to a host pipe deficiency including a partially or fully degraded section shall be repaired by the CONTRACTOR but paid for by the OWNER if:

1. The location of the host pipe deficiency was identified in writing to the ENGINEER under STS 33 01 30.41.

2. A CCTV inspection video of the pipe is provided that was performed not more than 12 hours before the pipe liner was installed during no flow or low flow (less than 25% full) conditions showing no existing loose debris.

3. OWNER and ENGINEER recognize that due to the severe degradation of some host pipes, defects caused by host pipe deficiency versus CONTRACTOR error/negligence will be decided on a case by case basis.

3.7 POST-REHABILITATION POINT REPAIR/LINER PATCH

A. This subsection specifies the trenchless liner patch installation or point repair of rehabilitated pipelines to repair a liner defect.

1. TRENCHLESS LINER PATCH: A trenchless liner patch shall be up to 4 linear feet long and be approved by the liner manufacturer. The removal, extraction, and disposal of debris/obstruction in between the host pipe and pipe liner using a remote device shall be completed prior to patch installation. The CONTRACTOR is responsible for installing the patch in the correct location to completely cover the liner defect.

2. POST-REHABILITATION POINT REPAIR: A Point Repair shall include up to 12 linear feet of rehabilitated pipeline replacement by excavation. Remove only that amount of rehabilitated pipeline or sewer service connection that is identified as exhibiting an unacceptable defect. New sewer pipe shall be per 33 31 11 Public Sanitary Sewerage Gravity Piping. Transitions shall be flexible couplings with stainless-steel bands and a trenchless liner patch extending a minimum of 1 foot upstream and downstream of the transition. The flexible coupling shall be backfilled with lean fill to a thickness of at least 12 inches from the pipe exterior in all lateral and vertical directions. The trenchless liner patch shall be approved by the liner manufacturer and compatible with the replacement pipe. Reinstatement of service lateral connection (if patch covered a service lateral) is incidental to the point repair.

END OF SECTION 33 01 30.72

SUPPLEMENTAL TECHNICAL SPECIFICATION
SECTION 33 01 30.81
MANHOLE REHABILITATION

PART 1– GENERAL

1.1 SECTION INCLUDES

A. Sanitary Sewer Manhole Rehabilitation

1. The work specified in this section includes all labor, materials, accessories, equipment, and tools necessary for the repair and rehabilitation of sanitary sewer manholes for the purpose of eliminating infiltration, providing corrosion protection, repair of voids, and restoration of the structural integrity of the manhole. Sanitary sewer manhole rehabilitation shall include the following:

   a. Repair and coating of manholes with specified cementitious materials or the installation of a fiberglass or polymer manhole insert where specified in the construction plans;

   b. Rebuilding of manhole invert and benches to the profile shown on Standard Drawings 2101 and 2102 or to the specific profiles provided on the construction plans;

   c. Installation of an Epoxy Lining System or Polyurethane and Epoxy Protective Lining System where shown on the construction plans

1.2 RELATED SECTIONS

A. STS Section 33 01 30.41: Sewer Line Cleaning.

B. STS Section 33 01 30.51: Sewage Flow Control.

C. STS Section 33 05 76: Fiberglass Manholes.

D. STS Section 33 05 61: Concrete Manholes.

1.3 REFERENCES

A. City of Albuquerque Standard Specifications for Public Works Construction, as updated.

B. Where all or part of a Federal, ASTM, ANSI, AWWA, standard specification, etc. is incorporated by reference in these specifications, the reference standard shall be the latest edition and revision.

1.4 SUBMITTALS

A. Comply with STS 01 33 00 – Submittal Procedures.

B. Before commencing work, the CONTRACTOR shall submit the following for Approval:

1. Submit Technical Data Sheets and Material Safety Data Sheets (MSDS) for all materials used for manhole rehabilitation.

2. Submit the manufacturer's product data, installation instructions, applicable referenced work standards (ASTM, ACI, etc.), approved laboratory test reports that verify strength requirements of this specification, and materials certification for each product used.

3. Installation procedures as recommended by the manufacturer.

4. Product testing results.

5. Design calculations.

6. Application Methods and Equipment: Submit a written description of the material application methods including the equipment that will be used. Applicator qualifications and proof of manufacturer training.

7. Contractor shall submit a written Debris Control Plan. The plan shall contain:

    a. Sewer line and manhole cleaning plan describing methodology to be used from manhole to manhole.

    b. Describe what measures will be implemented to remove the debris generated during the sewer line cleaning operation from continuing downstream in the active sewer.

    c. Describe what measures will be implemented during the manhole interior cleaning process to prevent debris from entering the sanitary sewer flow and flowing downstream. Examples are temporary planks spanning the manhole benches or installation of a sturdy net.

    d. Describe what measures will be implemented to prevent debris from entering the open manhole. Examples are a steel plate covering the open manhole or installation of a sturdy net.

    e. Communication plan. Identify who is responsible for enforcing the Plan to all parties, including sub-contractors, working at the project site.

    f. The Debris Control Plan from STS 33 01 30.41: Sewer Line Cleaning and this STS may be the same plan.

C. Post Manhole Rehabilitation:

1. Field Quality-Control Test reports.

D. CONTRACTOR Qualifications:

1. Submit a copy of manufacturer's licensee certificate. If the CONTRACTOR is not licensed by the manufacturer, then a manufacturer's representative shall be on-site for the duration of the work.

2. Submit qualification of each nozzlemen: Each nozzlemen is required to be ACI certified through the Nozzlemen Certification Program.

3. Submit a list of ten (10) similar regional projects completed within the last three (3) years including information such as number of manholes on project, type of rehabilitation, date of completion, and project cost.

1.5 QUALITY ASSURANCE

A. The manhole rehabilitation CONTRACTOR shall be a firm having a minimum of three (3) years continuous successful experience in the rehabilitation of manholes similar to that required of this Project.

B. The manhole lining CONTRACTOR shall be certified and trained by the lining material manufacturer to install the manhole liner if the material requires a certified applicator. Furnish an on-site manufacturer's representative for a minimum of four (4) working hours for each supplied material.

PART 2– PRODUCTS

2.1 MANUFACTURERS

A. All materials used shall be listed on the Water Authority Approved Product list.

2.2 MATERIALS

A. Rust inhibitors for exposed steel reinforcing shall be Ospho as manufactured by Skybryte or Corroseal Rust Converter as manufactured by Rodda Paint.

B. Patching Mix: a quick setting fiber reinforced, calcium aluminate, corrosion resistant cementitious material shall be used as patching material to fill large voids.

C. Infiltration Control: a rapid setting cementitious product specifically formulated for leak control shall be used to stop minor water infiltration of water into the manhole.

D. Grouting Mix: a cementitious grout shall be used for stopping active infiltration into the manhole and filling voids in the manhole wall. Chemical grouts may be used to stop excessively active infiltration.

E. Cementitious Liner Mix:

1. A Calcium Aluminate Cement shall be used to form a monolithic liner covering all interior manhole surfaces. The Calcium Aluminate Cement shall meet or exceed the following requirements:

    a. Compressive Strength (ASTM C 109) (min): 9,000 psi @ 28 days

    b. Flexural Strength (ASTM C 293) (min): 900 psi @ 28 days

    c. Bond Strength (ASTM C882) (min): 2,000 psi

    d. Sulfide Resistance (ASTM C 267): No Attack

2. Geopolymer Lining System shall consist of a factory blended, one component, micro-fiber reinforced geopolymer mortar and enhanced with monocrystalline quartz aggregate. Geopolymer liner material may be centrifugally cast, manually sprayed or hand troweled applied. Material application thickness when using low pressure spraying or spin cast application shall be applied at 1000 mils (25.4 mm) minimum thickness for deteriorated surfaces in one continuous coat.

    1) The Geopolymer shall meet or exceed the following requirements:

    2) Tensile Strength ASTM C496 (min), 900 psi @28 days

    3) Flexural Strength ASTM C78 (min), 800 psi @28 days

    4) Compressive Strength ASTM C39 & C109 (min), 8,000 psi @28 days

5) Bond Strength ASTM C882 (min), 3,000 psi @ 28 days

6) Sulfide Resistance (ASTM C 267): No Attack

F. Epoxy Lining System or Polyurethane and Epoxy Protective Lining System:

1. Structural Epoxy Lining System: Lining material shall consist of a two component, 100% solids, high build, spray-applied, structural grade epoxy system. Structural Epoxy liner material may be manually sprayed or hand troweled applied. Material application thickness when using spray or troweled application shall be applied at 125 mils (3.175 mm) minimum thickness in one continuous coat.

    1) Structural Epoxy shall meet or exceed the following requirements:

    2) Tensile Strength ASTM D638, Type IV (min): 7,800 psi

    3) Flexural Strength ASTM D790 (min): 7,000 psi

    4) Elongation at Break, % ASTM D2370, Type IV: 3

    5) Compressive Strength ASTM D695 (min), 12,000 psi

    6) Sulfide Resistance (ASTM C 267): No Attack

2. Epoxy Lining System. Lining material shall consist of solvent free, high-build epoxy resin capable of spray application to 125 mils (3 mm) minimum thickness in one continuous coat. The Epoxy Liner shall conform to the following requirements:

    a. Tensile Strength ASTM D638, Type IV (min): 3,000 psi

    b. Elongation at Break, % ASTM D638, Type IV: 0.9

    c. Wear Resistance, mg. wt. Loss Taber abrasion, ASTM D4060 (Abrasive wheel No. CS -17, maximum value): 115

    d. Hardness, Shore D, Durometer ASTM D2240: 80

3. Polyurethane and Epoxy Protective Lining System. Lining material shall consist of 100 percent solid polyurethane and moisture tolerant epoxy. Polyurethane shall be capable of spray application to 125 mils (3 mm) minimum thickness in one continuous coat. Epoxy shall be capable of spray application to 5 mils (125 µm) thickness in one continuous coat.

    a. The Epoxy Primer shall meet or exceed the following requirements:

        1) Tensile Strength ASTM D638, Type IV (min): 6,000 psi

        2) Elongation at Break, % ASTM D638, Type IV: 5

        3) Wear Resistance, mg. wt. Loss Taber abrasion, ASTM D4060 (Abrasive wheel No. CS -17, maximum value): 100

        4) Hardness, Shore D, Durometer ASTM D2240: 75

    b. The Polyurethane shall meet or exceed the following requirements:

        1) Tensile Strength ASTM D638, Type IV (min): 2,000 psi

2) Elongation at Break, % ASTM D638, Type IV: 40

3) Wear Resistance, mg. wt. Loss Taber abrasion, ASTM D4060 (Abrasive wheel No. CS -17, maximum value): 60

4) Hardness, Shore D, Durometer ASTM D2240: 55

5) Tear Resistance, ASTM D624: 150 ppi

PART 3– EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

A. Delivery, Storage, and Handling shall be no less than that of the Manufacturer's written recommendations. Cementitious materials shall be stored in weather tight, original packaging to protect against moisture and contamination.

3.2 PREPARATION

A. Active wastewater flows may need to be plugged or diverted to ensure that the wastewater does not come into contact with surfaces while rehabilitation work is in progress. Use of flow-thru plugs is permitted. All extraneous flows into the manhole or vaults at or above the area coated shall be plugged and/or diverted until the protective coating has adequately set in accordance with manufacturer recommendations.

B. Manhole inverts shall be lined. Flow-thru plugs or bypass pumping shall be utilized, unless otherwise directed by ENGINEER.

C. Establish sewage bypass or flow-through plugs as necessary if the invert of the channel needs to be rehabilitated. Sewer flow control shall be per STS 33 01 30.51: Sewer Flow Control if required.

D. The manhole cover shall remain in place except when necessary, .e.g. replacement or adjustment of the ring and cover, active work rehabilitating the manhole.

E. If reinforced steel is exposed, either before or after removing deteriorated concrete, it shall be thoroughly inspected and accepted by the OWNER. The CONTRACTOR shall place a protective coating/rust inhibitor on the exposed reinforcing steel. The protective coating shall be applied in accordance with the manufacturer's specification.

3.3 SURFACE PREPARATION

A. CONTRACTOR shall inspect all surfaces specified to receive a protective coating/lining prior to surface preparation. CONTRACTOR shall notify OWNER of any noticeable disparity in the surfaces which may interfere with the proper preparation or application of the repair mortar/ resurfacing material and protective coating/ lining.

B. CONTRACTOR shall implement measures as approved in the Debris Control Plan to prevent debris from entering active sewer line. Dispose of captured debris in accordance with local regulations.

C. All contaminants including: corroded material, debris, oils, grease, incompatible existing coatings, waxes, form release, curing compounds, efflorescence, sealers, salts, or other contaminants shall be removed. All contaminants from the surface preparation shall not be allowed to enter the sewer system per the Debris Control Plan.

D. Existing manhole steps or ladders shall be removed by cutting off flush to the manhole wall prior to application of any rehabilitation coatings.

E. All concrete or mortar that is not sound or that has been damaged by chemical exposure shall be removed down to a sound concrete surface or replaced. All microbial contamination shall be removed.

F. Surface preparation method(s) shall be performed in accordance with NACE No. 6/ SSPC SP-13, Surface Preparation of Concrete guidelines.

G. All active infiltration shall be stopped and the substrate surfaces shall have no free water visible prior to rehabilitation product application.

H. All interior manhole surfaces shall be cleaned using high pressure water blasting and abrasive blasting methods to produce a sound surface with adequate profile and porosity to provide a strong bond between the protective coating/lining and the substrate. Generally, this can be achieved with a high-pressure water blasting using equipment capable of 5,000 psi at 4 gpm (minimum) followed by abrasive blasting using copper slag or nickel slag blast media. After abrasive blasting is complete, clean substrate again using high pressure water blasting. Other methods such as high-pressure water jetting (refer to NACE Standard No. 5/SSPC-SP12), grinding, scarifying or acid etching may also be used in conjunction with high pressure water blasting and abrasive blasting. Detergent water cleaning and hot water blasting may be necessary to remove oils, grease or other hydrocarbon residues from the concrete. Whichever method(s) are used, they shall be performed in a manner that provides a uniform, sound clean neutralized surface that is not excessively damaged. Abrasive blasting may be needed.

I. Surfaces shall be prepared to a minimum degree of roughness designated as CSP 4 by the ICRI Guideline No 03732. Overhead surfaces shall be prepared to a minimum designation of CSP 5.

J. After abrasive blast and infiltration repair is performed, all surfaces shall be inspected for remaining laitance, debris, microbial residue, or corroded concrete prior to build-back and/or protective coating/lining material application. Any evidence of remaining contamination or laitance shall be removed by additional abrasive blast or other approved method.

K. All surfaces shall be inspected by the OWNER's representative or the ENGINEER's representative during and after preparation and before the repair/ resurfacing material is applied.

3.4 PATCHING HOLES OR VOIDS

A. Holes or voids around steps, joints or pipes, spalled areas, and cavities caused by missing or broken brick or mortar shall be repaired using patching material conforming to the requirements of this Specification.

B. The patching material shall be mixed and applied in accordance with the manufacturer's requirements.

3.5 STOPPING ACTIVE LEAKS AND INFILTRATION

A. Active leaks shall be stopped using quick setting specially formulated mixes according to the manufacturer's recommendations. Any areas that show evidence of leakage either active or non-active during inspection shall be injected. All mixes shall be compatible with the specified repair/ resurfacing material and is suitable for top coating with the specified build back material and protective coating/lining. All grouting and water stop materials utilized shall be compatible with specified protective coating/lining system

B. At each point of leakage within the manhole structure, a hole shall be carefully drilled through the wall to the exterior of the manhole. Grout ports or sealant injection devices shall be placed in these holes in a way as to provide a watertight seal between the holes and the injection device.

C. Cementitious or hydraulic cement shall be pumped through the hole until material refusal is recorded on a pressure gauge mounted on the pumping unit. Care shall be taken during the pumping operation to ensure that excessive pressures do not develop and cause damage to the manhole structure.

D. Dewater the exterior of the manhole with a well-point system if necessary, to facilitate the repair work. The dewatering shall continue for a minimum of 8 hours following completion of the repair work.

E. Upon completion of the injection, the ports shall be removed, and the remaining holes filled with mortar and troweled flush with the surface of the manhole wall.

F. Manhole joints, pipe connections, holes, or seams shall be sealed with patching material conforming to the requirements of this Specification and smoothed flush with the surface of the manhole wall. In order to prevent the migration of infiltration leaks, comply with the following requirements for points of injection:

    1. For Pre-cast Section Joint Leaks, furnish and install a minimum of four (4) injection points which shall be evenly spaced around the circumference of the manhole joint.

    2. For Pipe Connection Leaks, injection points shall be furnished and installed around pipe connection by CONTRACTOR'S means and methods.

    3. For Pipe Invert Leaks, furnish and install a minimum of two (2) injection points, one on each side of trough.

    4. For Lift Holes and Voids furnish and install a minimum of one (1) injection point below the center of the lift hole or void.

    5. Reform/repair existing bench and invert

G. Invert Repair shall be performed on all inverts with visible damage or infiltration is present.

    1. After Flow-thru plugs or bypass pumping is setup and thoroughly cleaning the invert, the quick setting patch material shall be applied to the invert and bench. The material shall be troweled uniformly onto the damaged invert at a minimum thickness of ½-inch at the invert extending out onto the bench of the manhole sufficiently to tie into the structurally enhanced monolithic liner.

    2. The finished invert and bench shall be troweled to a smooth finish free of any ridges.

3.6 MANHOLE BENCH AND CHANNEL

A. Manhole channels and benches shall be repaired and field formed from concrete.

B. Modify the inverts to provide a smooth flow line through the manhole.

C. Raise the bench to the top of the pipe, forming a "U" channel through the manhole. All benches shall be raised to the pipe crown and shall slope 1-inch per foot from the pipe crown. Refer to Standard Drawings 2101 and 2102 or to the specific profiles provided on the construction plans for bench rehabilitation requirements

3.7 CEMENTITIOUS LINER APPLICATION

A. No application shall be made to frozen surfaces or if freezing is expected to occur inside the manhole within 24 hours after application. If ambient temperatures exceed 90 degrees, precautions shall be taken to keep the mix temperature below 90 degrees.

B. For each bag of product, use the amount of water specified by the manufacturer and mix for 30 seconds to one (1) minute using equipment per manufacturer's recommendation.

C. First Application:

1. The surface prior to spraying shall be damp without noticeable free water, but saturated.

2. Materials shall be applied using low-pressure spray equipment from the bottom of the wall (including the bench but not invert) to the top (terminating at the frame/cone connection), to a minimum uniform thickness to ensure that all cracks, crevices, and voids are filled and a relatively smooth surface remains after light troweling.

3. Light troweling shall be performed to compact the material into voids and to set the bond.

D. Second Application:

1. A second application is applied after the first application has begun to take an initial set (disappearance of surface sheen which could be 15 minutes to one (1) hour depending upon ambient conditions) to assure a minimum total finished thickness of one (1) inch.

2. Application shall be from the bottom up using low-pressure spray equipment.

3. The surface shall then be troweled to a smooth finish being careful not to over trowel to bring additional water to the surface and weaken it.

E. Curing:

1. Caution shall be taken to minimize exposure of applied product to sunlight and air movement.

2. If application of second coat is to be longer than 15 minutes after completion of first coat, the manhole cover shall be set back in place.

3. At no time should the finished product be exposed to sunlight or air movement for longer than 15 minutes before replacing the manhole cover.

4. Ambient manhole conditions are adequate for curing so long as the manhole is covered. It is imperative that the manhole be covered as soon as possible after the application has been completed.

5. Contractor shall protect surfaces from contamination of any type between coats and through curing periods.

6. The final application shall have a minimum of four (4) hours cure time before being subjected to active flow.

7. Traffic shall not be allowed over manholes for 12 hours after application is complete.

3.8 EPOXY LINING SYSTEM OR POLYURETHANE AND EPOXY PROTECTIVE LINING SYSTEM APPLICATION

A. Surface Preparation:

1. Any holes or voids shall be filled in accordance with this Specification. The surface to be repaired shall be clean and free of any loose materials.

2. Active leaks and infiltration shall be stopped in accordance with this Specification.

3. The lining system shall be applied over a back-build of cementitious liner. The lining system shall take place only after the cementitious liner has cured the appropriate length of time as recommended by the manufacturer.

B. Application Extents:

1. Lining material shall be applied to all prepared surfaces from 1 inch (25 mm) above the low-flow water level to the base of the ring and cover unless otherwise specified. All termination points of the lining material to the existing subsurface shall be keyed into the subsurface by mechanically scoring a minimum 1/4 inch x 1/4 inch (6 mm x 6 mm) keyway.

2. Contractor is responsible for mitigating any turbulence and/or splashing through the manhole that may impede the application extents required.

C. Epoxy Lining System Installation:

1. Epoxy shall be applied to a thickness of 125 mils (3 mm). Lining material shall be uniform in color fully cured free of holidays, surface imperfections, blisters and sags and adequately adhered to the subsurface.

D. Polyurethane and Epoxy Protective Lining System Installation:

1. Prior to application of the polyurethane, the subsurface shall be primed with the epoxy primer to a thickness of 3 mils (75 µm) minimum to 5 mils (125 µm) maximum. Polyurethane shall be applied to a thickness of 125 mils (3 mm) immediately prior to the epoxy primer becoming tack-free. Lining material shall be uniform in color, fully cured, free of holidays, surface imperfections, blisters and sags and adequately adhered to the subsurface.

3.9 GEOPOLYMER LINING SYSTEM APPLICATION

A. Surface Preparation:

1. Any holes or voids shall be filled in accordance with this Specification. The surface to be repaired shall be clean and free of any loose materials.

2. Active leaks and infiltration shall be stopped in accordance with this Specification.

B. Application Extents

1. Lining material shall be applied to all prepared surfaces from 1 inch (25 mm) above the low-flow water level to the base of the ring and cover unless otherwise specified. All termination points of the lining material to the existing subsurface shall be keyed into the subsurface by mechanically scoring a minimum 1/4 inch x 1/4 inch (6 mm x 6 mm) keyway.

2. Contractor is responsible for mitigating any turbulence and/or splashing through the manhole that may impede the application extents required.

3. The surface prior to spraying shall be damp without noticeable free water, but saturated.

4. Materials shall be applied using low-pressure spray or spin cast equipment from the bottom of the wall (including the bench but not invert) to the top (terminating at the frame/cone connection) and shall be applied at 1000 mils (25.4 mm) minimum thickness for deteriorated surfaces in one continuous coat.

5. Material applied by trowel shall be performed from the bottom of the wall (including the bench but not invert) to the top (terminating at the frame/cone connection) and shall be applied at 1000 mils (25.4 mm) minimum thickness for deteriorated surfaces in one continuous coat. . Lining material shall be uniform in color, fully cured, free of holidays, surface imperfections, blisters and sags and adequately adhered to the subsurface.

C. Curing

1. Material curing shall be in accordance with manufacture's recommendations.

3.10 STRUCTURAL EPOXY LINING SYSTEM APPLICATION

A. Surface Preperation

1. Any holes or voids shall be filled in accordance with this Specification. The surface to be repaired shall be clean and free of any loose materials.

2. Active leaks and infiltration shall be stopped in accordance with this Specification.

B. Application Extents

1. Lining material shall be applied to all prepared surfaces from 1 inch (25 mm) above the low-flow water level to the base of the ring and cover unless otherwise specified. All termination points of the lining material to the existing subsurface shall be keyed into the subsurface by mechanically scoring a minimum 1/4 inch x 1/4 inch (6 mm x 6 mm) keyway.

2. Contractor is responsible for mitigating any turbulence and/or splashing through the manhole that may impede the application extents required.

3. Lining material shall be applied in accordance to manufacture's specifications.

4. Structural Epoxy liner material may be manually sprayed or hand troweled applied. Material application thickness when using spray or troweled application shall be applied at 125 mils (3.175 mm) minimum thickness in one continuous coat.

3.11 ACCEPTANCE

A. Performance Testing:

1. After the manhole rehabilitation and repair has been completed, the work shall be visually inspected in the presence of the OWNER and/or ENGINEER for compliance with these specifications and the manufacturer's recommendations.

2. If required, a qualified independent testing and inspecting agency shall be contracted by the CONTRACTOR or by the OWNER as designated in the Contract Documents.

3. Spark Testing:

   a. All manholes that received an Epoxy Lining System or Polyurethane and Epoxy Protective Lining System in the project shall be have a High Voltage Spark test performed to ensure that there is a full monolithic lining and to ensure that there are no pinholes in the coating. High voltage spark testing shall be conducted in accordance with NACE SP0188.

   b. If the manhole fails the initial test, necessary repairs shall be made in accordance to this Section. Retesting shall continue until the manhole satisfactorily passes the test.

   c. All tests shall be performed in the presence of the OWNER and/or ENGINEER.

   d. Furnish all personnel, facilities, and equipment necessary to conduct the testing.

   e. The voltage shall be set at a minimum of 15,000 volts. For thicknesses greater than 150 mils (4 mm), the voltage shall be set at 100 volts per 1 mil (25 µm) of thickness of the applied lining material. Identified holidays shall be marked without contaminating the lining surface and repaired.

4. Mil Gauge Test: During installation, a mil gauge shall be used to verify that the minimum thickness of the lining meets and/or exceeds the minimum thickness specified.

5. Adhesion Testing:

   a. Adhesion testing shall be performed on a minimum of 1 structure or 33 percent of all rehabilitated structures that received an Epoxy Lining System or Polyurethane and Epoxy Protective Lining System, whichever is greater unless otherwise shown on the Plans or specified in the Special Conditions.

   b. Adhesion testing shall be conducted after the liner system has cured in accordance with the manufacturer's specifications.

c. Adhesion testing shall be conducted in accordance with ASTM D7234 as modified herein.

d. OWNER or ENGINEER shall select locations within the manhole where adhesion test will be performed. The adhesive used to attach the dollies to the coating/ liner shall be rapid setting with tensile strength in excess of the coating/ liner material and permitted to cure in accordance with manufacturer recommendations (typically 24 hours). The coating/ lining material and dollies shall be adequately prepared to receive the adhesive.

e. Prior to pull test, the CONTRACTOR shall utilize a scoring device to cut through the coating until the substrate is reached, in accordance with ASTM D7234. Extreme care shall be taken while scoring to prevent micro cracking in the coating/lining, or scoring too deep into the substrate since cracks may cause failures at diminished strengths.

f. The pull tests in each area shall meet or exceed 250 psi. and shall include subbase adhered to the back of the dolly or no visual signs of coating material in the test hole. A glue failure exceeding 300 psi may be acceptable at the discretion of the ENGINEER.

g. If any test fails, a minimum of 3 additional locations in the section of the failure shall be tested, as directed by the ENGINEER. If any of the retests fail, all loosely adhered or unadhered liner in the failed area, as determined by the ENGINEER, shall be removed and replaced.

h. If a host structure fails the adhesion test, one additional host structure or 10 percent of the initial number of host structures selected for testing shall be tested as directed by the ENGINEER or as specified in the Special Condition.

B. Liner Repairs:

1. Holidays, uncured lining material, blisters: surface imperfections and damage to the liner resulting from the adhesion test shall be repaired to a point 1 inch (25 mm) minimum beyond the limits of the damaged area. The repair shall be 125 mils (3 mm) thick or the minimum thickness specified in the Special Provisions.

2. All detected holidays shall be marked and repaired by abrading the coating surface with grit disk paper or other hand tooling method. After abrading and cleaning, additional protective coating/lining material can be hand applied to the repair area to a minimum additional thickness of 30 mils (750 µm) unless otherwise specified by the liner manufacturer or approved by the ENGINEER. All touch-up/repair procedures shall follow the protective coating/lining manufacturer's recommendations.

3. Blisters, uncured lining and surface imperfections shall be completely removed and the areas recoated with appropriate lining material to 1 inch (25 mm) minimum beyond the repair areas at a minimum thickness of 100 mils (2540 µm).

4. Additional spark testing shall be performed after repairs are completed.

C. Cementitious Liner Material Testing:

1. Cementitious liner shall be tested for 24-hour and 28-day compressive strength in accordance with ASTM C109.
2. Two samples shall be taken for every 50 bags of material used.
3. Samples shall be sprayed from the nozzle.
4. Cubes shall be labeled with date, project, manhole number, and product batch number.
5. Samples shall be sent to an independent testing agency for laboratory verification, results shall be provided to the OWNER.
6. A written log shall be maintained referencing the specific bags of cement (product batch numbers) used per manhole, for all manholes.

D. Photographs:

1. Provide digital photographs of the finished manhole upon completion of repair and rehabilitation work.
2. The photograph shall be taken looking down into the manhole, oriented so that the effluent pipe is at the bottom of the photograph.
3. Photographs shall be named by the corresponding manhole number. When duplicate numbers occur, the photograph name shall also contain an approximate address or street location. These photographs shall be submitted to the OWNER digitally on a USB flash drive, periodically to accompany pay applications.
4. Final project acceptance is contingent upon receiving all manhole photographs.

3.12 CLEANUP

A. After the work has been completed and accepted by the OWNER, clean-up the entire project area and return the ground cover to its original condition.

B. All excess material and debris not incorporated into the permanent installation shall be legally disposed of off-site.

END OF SECTION 33 01 30.81

SUPPLEMENTAL TECHNICAL SPECIFICATION
SECTION 33 05 61
CONCRETE MANHOLES

PART 1– GENERAL

1.1 SECTION INCLUDES

A. This section contains items which are relative to the installation of sanitary sewer manholes

1.2 RELATED SECTIONS

A. STD Specification 101 PORTLAND CEMENT CONCRETE)

B. STD Specification 102 STEEL REINFORCING

C. STD Specification 105 CONCRETE CURING COMPOUND

D. STD Specification 106 CEMENT MORTAR AND GROUT

E. STD Specification 108 BRICK

F. STD Specification 163 Ductile Iron Castings

G. STD Specification 170 ELECTRONIC MARKER DEVICES

H. STS 33 01 30.81: MANHOLE REHABILITATION

1.3 REFERENCES

A. City of Albuquerque Standard Specifications for Public Works Construction, as updated.

B. Where all or part of a Federal, ASTM, ANSI, AWWA, standard specification, etc. is incorporated by reference in these specifications, the reference standard shall be the latest edition and revision.

C. ASTM C 32 Sewer and Manhole Brick (Made from Clay or Shale)

D. ASTM C 139 Concrete Masonry Units for Construction of Catch Basins and Manholes

E. ASTM C 478 Precast Reinforced Concrete Manhole Sections

F. ASTM C 497 Methods for Concrete Pipe, Manhole Sections, or Tile

G. ASTM D 1557 Laboratory Compaction Characteristics of Soil Using Modified

1.4 SUBMITTALS

A. All Submittals shall comply with STS 01 33 00 - Submittal Procedures.

B. Before commencing work, the CONTRACTOR shall submit the following for Approval:

1. Technical Data Sheets for proposed materials.
2. Certifications that the proposed materials meet or exceed the requirements listed in the Specifications.
3. Installation procedures as recommended by the manufacturer.

4. Product testing results.
5. Design calculations.
6. Applicator qualifications and proof of manufacturer training.

C. Product Data: Submit manufacturer's catalog information for manhole sections, manhole frames and covers, joint sealing compounds component construction, features, configuration, and dimensions. Show dimensions and materials of construction by ASTM reference and grade. Show lettering on manhole covers.

D. Shop Drawings:

1. Indicate structure locations and elevations.
2. Indicate sizes and elevations of piping, penetrations, step locations, cones, grade rings, and casting dimensions.
3. Indicate wall thickness, strength of concrete, type, and steel reinforcement.
4. Provide proposed concrete mix design for manhole sections.
5. Furnish certified test reports for each type.
6. Proposed precast base and concentric cone or top slab.
7. Proposed FORMED-IN-PLACE REINFORCED CONCRETE manholes.
8. Proposed CONCRETE BLOCK manhole.

1.5 PROJECT CONDITIONS

A. Field Measurements:

1. Verify field measurements prior to fabrication.
2. Indicate field measurements on Shop Drawings.

PART 2– PRODUCTS

2.1 PORTLAND CEMENT CONCRETE

A. All cement used for poured foundations, mortar, fillets, grout, and concrete shelf construction shall be Type II or approved equal.

B. All concrete for formed in place foundations or bases, concrete shelves, and pipe supports shall conform to STD Specification 101.

2.2 PRECAST CONCRETE MANHOLES:

A. The vertical sections of the manhole may be of different dimensions in order that manholes of various depths can be readily assembled.

B. Concrete, used for precast bases, vertical sections, and concentric cones, shall conform to STD Section 101.

C. Vertical sections of the manhole shall conform to the requirements of ASTM C478.

D. Circular precast manhole sections shall be provided with mastic gasket to seal joints between sections. Material used shall conform to the OWNER Approved Product List.

E. All lifting holes, except Type “C” manhole covers, and gaps at joints shall be filled with a non-shrink grout.

F. Precast concrete manhole bases may be used when approved by the ENGINEER. If approved, it shall be with the understanding that the CONTRACTOR shall be responsible for placing the bases at the specified elevation, location, and alignment.

2.3 FORMED-IN-PLACE REINFORCED CONCRETE MANHOLE:

A. Concrete used for this type of manhole construction shall conform to STD Section 101.

B. A precast concentric cone or a flat top cover can be used.

2.4 CONCRETE BLOCK MANHOLE:

A. Concrete masonry units for the construction of this type of manhole shall conform to ASTM C 139 and the Standard Detail Drawings. All blocks shall be mortared into place.

B. A precast concentric cone or a flat top cover can be used.

2.5 COATING OF MANHOLES:

A. Exterior of Manholes: The coating shall be a waterproofing type of bitumastic or asphaltic material, as approved by the ENGINEER.

B. Interior of Manholes: The coating shall conform to STS 33 01 30.81 MANHOLE REHABILITATION and be listed on the OWNER’S Approved Product List

C. Plastering of Manholes: The work shall include the coating of the surface of existing block manholes with plaster as required on the construction plans.

2.6 ADJUSTMENT BRICKS:

A. Manhole adjustment bricks shall conform to the requirements for manhole bricks, per ASTM C 32 for Grade MS.

B. Mortar shall be used to lay the bricks, as well as coating the interior and exterior surfaces of the laid brick. Thickness of the mortar coating shall be ½-inch.

2.7 MANHOLE FRAME AND COVER:

A. The manhole frame and cover for the sanitary sewer shall conform to the specifications contained in STD Specification 163 Ductile Iron Castings.

PART 3– EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

A. Inspection: Accept materials on-site in manufacturer's original packaging and inspect for damage.

B. Handling: Comply with precast concrete manufacturer instructions and ASTM C913 for unloading and moving precast manholes and drainage structures.

C. Storage:

1. Store materials according to manufacturer instructions.

2. Store precast concrete manholes and drainage structures to prevent damage to OWNER'S property or other public or private property.

3. Repair property damaged from materials storage.

D. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.

2. Provide additional protection according to manufacturer instructions.

3.2 GENERAL

A. Soil Foundations for manhole base shall be compacted to a density of 95 percent of the maximum density per ASTM D 1557. Compaction limits shall be one foot beyond the perimeter of the concrete base and shall be a minimum of one foot in depth.

B. Manholes shall be constructed in accordance with the Standard Detail Drawings and as shown on the construction plans. Precast reinforced concrete units, concrete blocks or formed in-place, reinforced concrete may be used to construct manhole.

C. Invert elevation of the pipes entering or exiting the manhole and interior inverts shall not vary more than 0.05 feet from the elevation indicated on the construction plans. In order to ensure compliance with the design drawings, the CONTRACTOR shall provide the ENGINEER with coordinates, obtained by a Professional Surveyor licensed in the state of New Mexico. The vertical precision of the coordinates shall be, at a minimum, accurate to within 0.05 feet. Use the NAD 1983 NM STATE PLANE CENTRAL ZONE for x and y coordinates and NAVD 1988 for z coordinate.

D. Depending on the size of the pipe, connections to existing and new manholes shall be made by:

1. Core drilling through the manhole wall, preformed for new precast units.

2. If core drilling is not practical, the CONTRACTOR shall request the ENGINEER to authorize the chipping operation. Upon approval the manhole wall may be removed by carefully chipping the wall segment which will permit entry of the pipe. Exposed manhole reinforcement should be bent and tied to the reinforcement of the pipe tied to the reinforcement of the pipe collar.

3. During either operation, the CONTRACTOR shall take care to avoid unnecessary damage to the manhole surfaces or walls.

E. Electronic marker devices shall be installed at all sanitary sewer manholes, one foot upstream of the manhole over the centerline of the main line.

3.3 COATING OF MANHOLES:

A. Exterior of Manholes:

1. Exterior coating of manholes shall be required in areas where ground water is present.

2. Application shall be in accordance with the manufacturer’s published recommendations.

B. Interior of Manholes:

1. Interior coating of manholes shall be required only when specified on the construction plans.

2. Refer to STS 33 01 30.81 MANHOLE REHABILITATION. Application shall be in accordance with the manufacturer's published recommendations.

C. Plastering of Manholes:

1. The work shall include the coating of the surface of existing block manholes with plaster as required on the construction plans.

3.4 FIELD QUALITY CONTROL

A. Tests: Leakage Testing of Sewer Manholes:

1. All sanitary sewer manholes shall be tested for leakage by either a water exfiltration test or a vacuum test.

a. Whichever leakage test is utilized the test should be performed prior to backfilling around the manhole and prior to placement of the manhole frame and cover.

b. All inlet and outlet lines shall be properly plugged, and the lift holes and barrel joints filled and sealed as specified.

c. The CONTRACTOR shall be responsible for all materials and equipment necessary to perform the test and shall conduct the test in the presence of the ENGINEER or his representative.

d. The CONTRACTOR has the option of performing a manhole test in increments appropriate to the depth of the manhole.

2. Under all circumstances, the CONTRACTOR shall be required to remove all plugs immediately after testing and prior to acceptance of the work.

a. The OWNER assumes no liability for damages caused by plugs inadvertently left in the line by the CONTRACTOR.

b. The CONTRACTOR shall certify in writing to the OWNER the completion of the plug removal task. The certification shall include the locations of removed plugs and corresponding date of removal.

3. The water exfiltration test shall consist of filling the entire manhole with water to the bottom of the frame elevation.

a. A stabilization period of one hour will be allowed for absorption, after which the manhole shall be refilled as necessary before starting the test.

b. The test period shall be two (2) hours, after which the manhole shall be refilled, measuring the necessary quantity of water.

c. The allowable leakage shall be 0.25 gallons per foot diameter per vertical foot per day and is represented by the following formula:

$$V = 0.25\ DHT / 24$$

Where: V = Allowable loss in gallons

D = Manhole diameter in feet

H = Initial depth of water to invert in feet

T = Duration of test in hours

4. The vacuum test shall consist of utilizing an inflatable compression band, vacuum pump, gauges, and appurtenances specifically designed for vacuum testing.

    a. Test procedures shall be in accordance with the manufacturer's printed recommendations.

    b. The ENGINEER shall be the sole judge as to the adequacy of the equipment.

    c. A vacuum of 10" Hg shall be placed in the manhole and the time measured for a drop to 8.5" Hg.

    d. The test shall be considered successful if the measured time exceeds the test period.

    e. Should the test fail, the manhole shall be repaired as necessary and the test rerun.

    f. The test periods are:

        1) Sixty (60) seconds for four (4) foot diameter manholes

        2) Seventy-five (75) seconds for five (5) foot diameter manholes

        3) Ninety (90) seconds for six (6) foot diameter manholes

        4) One hundred and twenty (120) seconds for eight (8) foot diameter manholes

3.5 VERTICAL ADJUSTMENTS

A. Adjust top elevation of existing manholes and structures to finished grades as indicated on Drawings.

B. Vertical Adjustment of Existing Manholes less than 2-inches:

1. Remove frame, cover, and PCC collar (if applicable).

2. Reset to required elevation using metal rings according to requirements specified for installation of castings.

3. As required, the following items are included per appropriate adjustment: pavement removal and replacement, excavation, compacted backfilling, reinforced concrete collar or pad, metal rings, new frame, new cover, and EMD placement..

C. Vertical Adjustment of Existing Manholes greater than 2-inches:

1. Remove frame, cover, and PCC collar (if applicable).

2. Reset to required elevation using leveling bricks according to requirements specified for installation of castings.

3. As required, the following items are included per appropriate adjustment: pavement removal and replacement, excavation, compacted backfilling, reinforced concrete collar or pad, leveling bricks, new frame, new cover, and EMD placement.

D. Vertical Adjustment of Existing Manholes requiring adjustment of concrete or block barrel:

1. Remove frame, cover, and PCC collar (if applicable).

2. Remove precast reinforced concrete cone or precast reinforced concrete top slab.

3. Furnish and install required manhole (precast concrete, concrete block, or poured concrete) barrel to obtain the required adjustment.

4. Reset the existing precast reinforced concrete cone or precast reinforced concrete top slab.

5. As required, the following items are included per appropriate adjustment: pavement removal and replacement, excavation, compacted backfilling, reinforced concrete collar or pad, concrete or block barrels, new frame, new cover, and EMD placement.

3.6 ABANDONMENT OF MANHOLES

A. Abandonment of manhole, which is part of a sewer line being abandoned, shall require the following work and materials:

1. Manhole will not be removed but will be abandoned in place.

2. All manhole inlet and outlet lines shall be plugged with a 12-inch –thick concrete or concrete mortar plug.

3. The concrete collar, ring, and cover shall be removed and disposed of by the CONTRACTOR.

4. Manhole bottom will be pulverized.

5. The manhole shall be filled with cement treated base (CTB) material to the bottom elevation of the asphalt base course of the pavement or to the ground surface level.

6. All labor, materials, and equipment necessary to complete this work shall be furnished by the CONTRACTOR.

7. CONTRACTOR shall provide coordinates accurate to within 0.3 feet, obtained by a Professional Surveyor licensed in the state of New Mexico, on the record drawings. Use the NAD 1983 NM STATE PLANE CENTRAL ZONE for x and y coordinates and NAVD 1988 for z coordinate.

END OF SECTION 33 05 61

SUPPLEMENTAL TECHNICAL SPECIFICATION
SECTION 33 05 76
FIBERGLASS MANHOLES

PART 1– GENERAL

1.1 SECTION INCLUDES

A. This specification shall govern for the furnishing of all work necessary to accomplish and complete the installation of Fiberglass Reinforced Polyester (FRP) manholes (and manhole liners). FRP Manholes shall be a one-piece monolithic designed unit constructed of fiberglass reinforcements, unsaturated commercial grade polyester resin. The resin system shall be suitable for atmospheres containing hydrogen sulfide and dilute sulfuric acid as well as other gases associated with the wastewater collection systems. FRP manholes shall be manufactured in strict accordance with ASTM D-3753.

1.2 RELATED SECTIONS

A. STS Section 33 01 30.41: Sewer Line Cleaning.

B. STS Section 33 01 30.81: Manhole Rehabilitation.

1.3 REFERENCES

A. City of Albuquerque Standard Specifications for Public Works Construction, as updated.

B. Where all or part of a Federal, ASTM, ANSI, AWWA, standard specification, etc. is incorporated by reference in these specifications, the reference standard shall be the latest edition and revision.

C. AASHTO H-20 - Axle Loading.

D. ASTM D3753 - Standard Specification for Glass-Fiber Reinforced Polyester Manholes.

E. ASTM C109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars.

1.4 SUBMITTALS

A. Product Data: Submit

1. Design and fabrication details for fiberglass manhole components.
2. Manufacturer's installation instructions.
3. Provide dimensional drawings specific to this project.
4. Manufacturer's data and details for materials to be used for grout and pipe connections.
5. Manufacturer's certification that FRP manhole comply with the requirements of this Section, including the chemical resistance criterion.

B. QUALITY CONTROL SUBMITTALS

1. Test Reports:

    a. Submit test reports from an independent testing laboratory confirming chemical resistance, and AASHTO H-2O loading.

PART 2– PRODUCTS

2.1 MANUFACTURERS

A. Pre-approved FRP manhole manufacturers are:

1. Containment Solutions, Inc.
2. L.F. Manufacturing, Inc.

2.2 MATERIALS

A. FRP Manholes shall be manufactured in accordance with the following:

1. FRP Manholes shall be single piece barrel and concentric reducer construction OR multiple barrels with top barrel having concentric reducer construction, joints between barrels manufactured to fit snugly together.
2. The minimum wall thickness for all FRP Rehabilitation manholes at all depths shall be 0.50 inch. Wall thickness shall provide for an AASHTO H-20 load rating.
3. Interior and exterior surfaces shall be relatively smooth and be free of sharp projections and protruding glass fibers. No blisters or delamination shall be visible.
4. FRP manhole liners shall be sized to fit inside existing manholes and allow grade rings and frame between the top and finish grade.
5. Manway reducers will be concentric with respect to the larger portion of the manhole liner diameters. Manway reducer opening size shall be per Standard Drawings 2101 and 2102.
6. Cover and Ring Support: The manhole liner shall provide an area for which grade rings or brick can be installed to accept a typical metal ring and cover and have the strength to support a traffic load without damage to the manhole liner.
7. Resin:

    a. The resins used shall be a commercial grade unsaturated polyester resin or other suitable polyester or vinyl ester resin.

    b. Non-pigmented resin is required to allow for light or "sand" color of manhole surface in order to facilitate easy viewing from grade interior inspection.

8. Reinforcing Materials: The reinforcing materials shall be commercial Grade “E” type glass in the form of continuous roving and chop roving, having a coupling agent that will provide a suitable bond between the glass reinforcement and the resin.

9. Filler and Additives: Fillers, when used, shall be inert to the environment and manhole construction. Sand shall not be accepted as an approved filler. Additives, such as thixotropic agents, catalysts, promoters, etc., may be added as required by the specific manufacturing process to be used to meet the requirements of this standard. The resulting reinforced-plastic material must meet the requirements of this specification.

10. Chemical Resistance: The fiberglass manhole and all related components shall be fabricated from corrosion proof material suitable for atmospheres containing hydrogen sulfide and dilute sulfuric acid as well as other gases associated with the wastewater collection systems.

B. Sealants: Sealant between FRP manhole liner and the surfaces of the existing manhole base shall be a quick-setting grout as specified in STS 33 01 30.81 Manhole Rehabilitation.

C. Grout: Grout between the FRP manhole liner and the existing manhole wall shall be as specified in STS 33 01 30.81 Manhole Rehabilitation.

PART 3– EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

A. Do not drop or impact the FRP manhole. Lift the FRP manhole with two slings on spreader bar in horizontal position or by use of an appropriately sized timber or steel beam, 8 inches longer than the cone top opening, inserted crosswise inside the FRP manhole to the underside of the collar with a rope or chain attached to backhoe or other lifting device. FRP MANHOLE may be rolled over the ground provided that it is smooth and free of rocks, debris, etc. Use of chains or cables in contact with FRP manhole surface is prohibited.

B. Onsite Inspection

1. The quality of all materials, the process of manufacture, and the finished sections shall be subject to inspection and approval by the ENGINEER, or other representative of the OWNER. Such inspections shall be made at the place of manufacture, or at site of delivery, and the sections shall be subject to rejection on account of failure to meet any of the specification requirements.

2. At the time of inspection, the material will be examined for compliance with the requirements of this Section and the approved drawings.

C. Corrective Actions:

1. Sections rejected after delivery to the job site shall be marked for identification and shall be removed from the job at once. All sections, which have been damaged after delivery will be rejected, and if already installed, shall be acceptable if repaired or removed and replaced at the CONTRACTOR'S expense

2. Replace or repair Work to eliminate defects, deficiencies, and irregularities.

3.2 PREPARATION

A. Sewer flow control shall be per STS 33 01 30.51: Sewer Flow Control if required. Clean the manhole per STS 33 01 30.41: Sewer Line Cleaning.

3.3 INSTALLATION

A. FRP manhole installation shall be per manufacturers written recommendations.

B. FRP manhole liner installation:

1. Remove pavement if present as specified in Contract Documents.
    a. Excavate around the manhole as necessary to prevent soil and debris from falling into manhole while frame and grade rings are removed.
2. Remove and dispose the upper segment of the existing manhole as determined by the ENGINEER.
3. Rehabilitate the bench BEFORE installation of the FRP manhole liner per STS 33 01 30.81 Manhole Rehabilitation.
4. Cut the FRP manhole liner or prepare the concrete bench so that the FRP manhole liner will be evenly supported when lowered into place.
    a. Accurately locate incoming and outgoing sewer lines and cut the FRP manhole liner for a close fit within 1 inch to both.
    b. Seal the cut edges with resin.
5. Lower the FRP manhole liner into a 4-inch deep layer of quick-setting grout mixture or concrete, making sure that the sewer lines and insert openings align.
6. Place a 6-inch deep layer of quick-setting grout at the bottom of the annular space between the FRP manhole liner and the wall.
7. Seal the sewer openings with Oakum soaked in sealing gel, or other material approved by the ENGINEER.
8. Fill the remaining annular space with grout. Consolidate the grout without damage to the FRP manhole liner.
9. Install the manhole grade rings, frame, and cover per STS 33 05 61 Concrete Manholes.
10. Furnish and install PCC collar per fiberglass manufacturers recommendations in order to meet HS-20 loading.
11. Refer to the construction plans for requirements to install an Epoxy Lining System or Polyurethane and Epoxy Protective Lining System per STS 33 01 30.81 Manhole Rehabilitation on the remaining existing manhole base.

3.4 ACCEPTANCE

A. Performance Testing:

1. After the FRP manhole liner and bench rehabilitation has been completed, the work shall be visually inspected in the presence of the OWNER and/or ENGINEER for compliance with these specifications and the manufacturer's recommendations.

B. Photographs:

1. Provide digital photographs of the finished manhole upon completion of repair and rehabilitation work.
2. The photograph shall be taken looking down into the manhole, oriented so that the effluent pipe is at the bottom of the photograph.
3. Photographs shall be named by the corresponding manhole number. When duplicate numbers occur, the photograph name shall also contain an approximate address or street location. These photographs shall be submitted to the OWNER digitally on a USB flash drive, periodically to accompany pay applications.
4. Final project acceptance is contingent upon receiving all manhole photographs.

END OF SECTION 33 05 76

EXHIBIT A

Buy-Board Proposal

Supply and Installation of CIPP Lining System

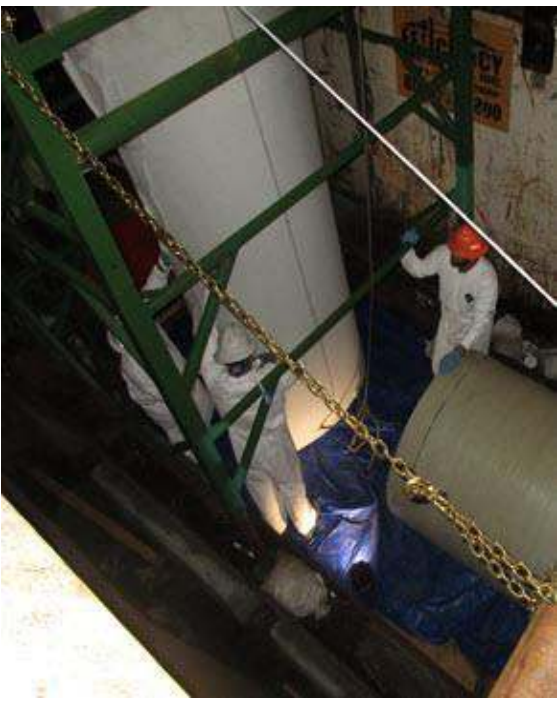
Project: I-40, Western Trail

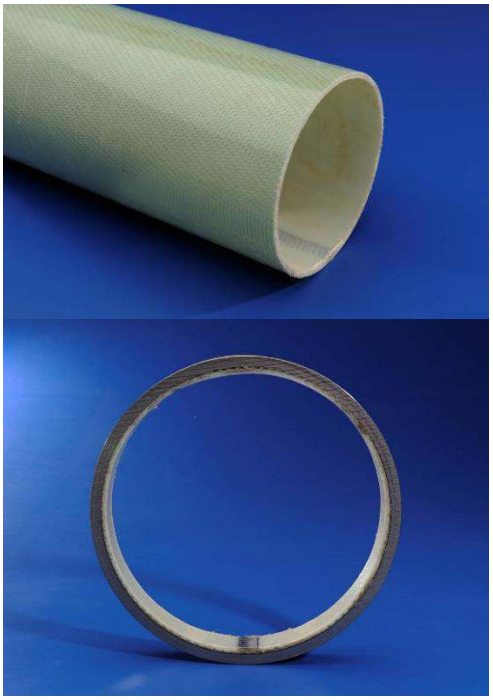
Prepared for:

ABCWUA
Smith Engineering

Prepared by:

Todd Venable – Insituform Technologies, LLC





Insituform Technologies, LLC an Aegion Company
580 Goddard Avenue, Chesterfield, MO USA 63005
www.insituform.com (636) 530-8000

Project Proposal

January 3, 2023

David Laughlin, PE
Chief Engineer – Planning & Engineering Division
Albuquerque Bernalillo County Water Utility Authority
PO Box 568 | Albuquerque NM | 87103

Buyboard Proposal

Project Name: **ABCWUA – I40 Western Trail Pipeline Rehab**

INSITUFORM TECHNOLOGIES, LLC herein proposes to furnish all labor, materials, equipment, and services necessary to reconstruct the referenced project (as detailed in the project location maps presented by ABCWUA utilizing The Local Government Purchasing Cooperative Contract #635-21 administered through the Buyboard.

ASSUMPTIONS AND QUALIFICATIONS

Insituform™ Design is based on the 60% CIPP specification provided by Owner/ Engineer at the time of bid.

Insituform will supply the ABCWUA Payment, Performance Bonds, and Certificate of Insurance as necessary following acceptance of this proposal. If Maintenance Bonds are required, they can be provided at an additional cost of 1.5%.

Insituform Technologies, LLC is not a union shop and considered a specialty contractor and shall not be subject to any union requirements or project labor agreements.

The pricing in this proposal assumes that all Technical Specifications set forth by the BuyBoard will be strictly adhered to along with ABCWUA General Conditions, Special Conditions and Contract provided by the water authority with any exceptions noted below. Any changes to these specifications must be noted and agreed upon by both parties prior to finalizing the proposal pricing.

- Pricing above completed utilizing “Buy Board” procurement contract.
- Price assumes work will be started in Q1 of 2023.
- Price assumes 2 phases of bypass
- Pricing was originally done using bid items provided by Owner/ Engineer but changed to Buy Board bid items. All buy board bid items will be included in billing for sum total of the bid items provided by Owner.

PROPOSAL INCLUSIONS

Insituform Technologies, LLC proposal pricing includes items listed below and items listed above within the pricing table.

1. Installation of Cured-In-Place Pipe (CIPP) – Pipe Lining including inversion, curing, and finishing per ABCWUA specifications and scope provided.
2. Cleaning and CCTV - pre and post.
3. Bypass Pumping and trenching needed for bypass piping
4. MH Rehab per scope
5. Manhole installation, rehabilitation, and/or replacement per scope
6. Lateral reinstatements, if any.
7. Landscaping and restorations in Golf Course area, per scope

8. Slip Lining per scope
9. Confined space safe entry practices.
10. Standard construction warranty as indicated in Warranty section of project specifications.
11. Sales and Gross Receipts taxes.
12. Buy Board fees (2%)
13. Certificate of insurance with a standard coverage.

PROPOSAL EXCLUSIONS

Insituform Technologies, LLC proposal pricing excludes all items and scope of work listed below. Any and all items below are to be furnished "by others". Insituform Technologies, LLC is not responsible for any costs associated with items listed below – Excluded in proposal pricing.

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a) Lateral Sealing – not required. Lateral reinstatements included.
b) Point repairs, if required, prior to lining. Any work needed to be determined through "Owner directed Change Order"
c) Sectional Liners.
d) Archaeological Monitoring.
e) *If any hazardous or toxic materials are encountered during the project, Insituform will not be responsible for the removal and disposal of the materials.*
f) Additional premiums for special insurance coverage(s) demanded by you or other parties particular to this project.

PROPOSAL TERMS AND CONDITIONS

Terms and Conditions from the National Statewide Cooperative Purchasing Contract are available upon request from the BuyBoard. Any changes to these conditions must be noted and agreed upon by both parties.

PROPOSAL PRICING

REFER TO ATTACHED PROPOSAL

OFFERED BY:

INSITUFORM TECHNOLOGIES, LLC

Todd Venable

TODD VENABLE
BUSINESS DEVELOPMENT MANAGER
(480) 938-7145
evenable@aegion.com

Arizona Office: 645 S. 24th Street
Tempe, AZ 85282
(480) 446-0620

CONTRACTOR LICENSE & REGISTRATION NUMBERS - Western.US:

AZ (277787) **UT** (6981198-5501) **NM** (374011) **CA** (758411) **OR** (133115) **WA** (INSITTL883CW) **NV** (0048110) **HI** (21894)

ACCEPTED BY:

OWNER/ CONTRACTOR NAME

AUTHORIZED REPRESENTATIVE

SIGNATURE

OWNER/ CONTRACTOR

cc: Seth Ganesan
Chantal Evans
Joe Lane
Whittney Schulte
National Buyboard

This accepted proposal constitutes a formal agreement. If you initiate a purchase order or other document, it will not be acknowledged without this proposal being referenced or as an attachment.

EXHIBIT B
COST PROPOSAL

ABCWUA - I40 Western Trail Pipeline Rehab		ITI Offering - BUY BOARD FINAL			
		QTY	U/M	Unit Price	Total
Section A - CIPP Mainline Rehabilitation Gravity Applications					
14	48" x 15.0mm	12,455.0	LF	$ 319.35	$ 3,977,504.25
25	48" Additional 1.5mm	101,149.0	LF	$ 36.00	$ 3,641,364.00
30	36" or Larger CIPP Setup Charge Per Install Length	12,455.0	LF	$ 41.00	$ 510,655.00
33	Timber/Matting/Rock/Access	777.8	SY	$ 150.00	$ 116,666.67
36	Scaffold setup Non-Standard	4.0	EA	$ 10,000.00	$ 40,000.00
37	Steel plate (per plate)	-	Day	$ 250.00	$ -
Section C - Bypass for Gravity Pipelines and Associated Items		-		$ -	$ -
56	Bypass System Equip/pipe delivery, tear down, pick up 4"	4.0	EA	$ 6,218.00	$ 24,872.00
57	Bypass System Equip/pipe delivery, tear down, pick up 6"	2.0	EA	$ 8,291.00	$ 16,582.00
59	Bypass System Equip/pipe delivery, tear down, pick up 12"	2.0	EA	$ 20,727.00	$ 41,454.00
60	Set Up 4" Pump (Per Pump)	4.0	EA	$ 207.00	$ 828.00
61	Set Up 6" Pump (Per Pump)	4.0	EA	$ 518.00	$ 2,072.00
63	Set Up 12" Pump (Per Pump)	4.0	EA	$ 1,244.00	$ 4,976.00
64	Set Up 4" Piping	500.0	LF	$ 4.00	$ 2,000.00
65	Set Up 6" Piping	500.0	LF	$ 8.00	$ 4,000.00
68	Set Up 18" Piping	35,986.0	LF	$ 23.00	$ 827,678.00
70	Operate 4" pumping System (Fuel & Maint. Per pump)	67.5	DAY	$ 104.00	$ 7,020.00
71	Operate 6" pumping System (Fuel & Maint. Per pump)	67.5	DAY	$ 269.00	$ 18,157.50
73	Operate 12" pumping System (Fuel & Maint. Per pump)	270.0	DAY	$ 497.00	$ 134,190.00
74	Bypass Pump watch labor	180.0	DAY	$ 933.00	$ 167,940.00
75	Bypass Line watch labor	90.0	DAY	$ 829.00	$ 74,610.00
76	Plug rental 8" - 15"	90.0	DAY	$ 145.00	$ 13,050.00
78	Plug rental >30"	90.0	DAY	$ 415.00	$ 37,350.00
79	Bypass - Driveway Ramp (Setup, Operate, Maintain)	90.0	DAY	$ 207.00	$ 18,630.00
83	Bypass - Street Trenching for 18" Pipe (Setup, Operate, Maintain)	1,900.0	LF	$ 52.00	$ 98,800.00
Section D - Clean/TV & Evaluation for Gravity Pipelines		-		$ -	$ -
98	48" Clean and TV sanitary sewer	12,666.0	LF	$ 45.00	$ 569,970.00
102	42" or Larger Post TV Inspection After Rehabilitation	12,666.0	LF	$ 5.00	$ 63,330.00
1000	**Additional to Cleaning & CCTV quote**	**1.0**	**LS**	**$ 221,990.43**	**$ 221,990.43**
114	Pre-Construction Video/Drone/Photos	30,000.0	LF	$ 3.00	$ 90,000.00
Section E - Excavation		-		$ -	$ -
136	Access Pit (>15'-20' deep)	4.0	EA	$ 40,000.00	$ 160,000.00
137	Extra Depth Access Pit (>20VF)	4.0	VF	$ 5,000.00	$ 20,000.00
138	Potholing for Nearby Utility Location (0'-8' deep up to 4Hr duration)	1.0	EA	$ 1,500.00	$ 1,500.00
139	Potholing for Nearby Utility Location (8'-12' deep up to 4Hr duration)	1.0	EA	$ 2,000.00	$ 2,000.00
140	Potholing for Nearby Utility Location (>12' deep up to 4Hr duration)	1.0	EA	$ 3,000.00	$ 3,000.00
141	Trench safety	950.0	LF	$ 20.00	$ 19,000.00
142	Modified Trench safety (other than conventional shore boxes)	45.0	VF	$ 500.00	$ 22,500.00
1001	***Install New 8' DIA manhole 0'-6' deep***	***2.0***	***EA***	**$ 58,320.00**	**$ 116,640.00**
1002	***Extra depth 8' DIA manhole > 6' deep***	***6.6***	***VF***	**$ 1,563.00**	**$ 10,315.80**
150	R/R MH cone	9.0	EA	$ 7,500.00	$ 67,500.00
151	Install WW Access Chamber	-	EA	$ 5,000.00	$ -
152	Remove existing MH 0'-6' deep	10.0	EA	$ 2,500.00	$ 25,000.00
153	Extra depth Remove existing MH >6' deep	190.0	VF	$ 500.00	$ 95,000.00
154	Reconstruct external MH drop	9.0	EA	$ 7,500.00	$ 67,500.00
157	Flowable Fill	160.0	CY	$ 175.00	$ 28,000.00
161	Construction entrance	1.0	EA	$ 7,500.00	$ 7,500.00
162	Install/Remove crushed rock road w/ filter fabric 15' wide	50.0	LF	$ 75.00	$ 3,750.00
170	Man Entry Internal reconnects	***12.0***	***EA***	$ 750.00	$ 9,000.00
172	Repair/Rehab 2" Asphalt pavement	950.0	SY	$ 150.00	$ 142,500.00
174	Repair/Rehab 8" Concrete pavement	124.0	SY	$ 275.00	$ 34,100.00
177	Repair/Rehab Concrete curb and gutter	370.0	LF	$ 50.00	$ 18,500.00
178	Sod	7,777.8	SY	$ 20.00	$ 155,555.56
1003	**Misc items - Irrigation, Native Areas, Survey & topographical mapping**	**1.0**	**LS**	**$ 67,104.02**	**$ 67,104.02**
377	New manhole frame and cover	57	EA	$ 1,000.00	$ 57,000.00
382	Manhole, Pipe or Other Structures - Spray Rehabilitation	23546	SQFT	$ 76.00	$ 1,789,496.00
383	Manhole Rehabilitation - modified polymer	0	SQFT	$ 30.00	$ -
384	Manhole Bench Rehabilitation - cementitious	273.6	SQFT	$ 35.00	$ 9,576.00
386	Manhole Bench Rebuild	15	EA	$ 750.00	$ 11,250.00
1000	Rust Inhibitor	62	EA	$ 130.00	$ 8,060.00
409	Void Filling Exterior of Pipe or Structure (Flow Fill or Other Material)	810	CF	$ 150.00	$ 121,500.00
410	Pipe or Other Confined Space Man Entry Safety System	198.25	DAY	$ 1,500.00	$ 297,375.00
411	Confined Space Man Entry Safety Plan (3rd Party Certified)	0	EA	$ 5,000.00	$ -
Section S - Sliplining 48" Hobas Pipe		0		$ -	$ -
1005	**Sliplining w / 48" Hobas Pipep**	**211.0**	**LF**	**$ 1,870.00**	**$ 394,570.00**
1008	Project Signs incl. screens	1	FA	$ 1,200.00	$ 1,200.00
1009	Testing	1	FA	$ 8,000.00	$ 8,000.00
1010	Interceptor Point Repair	1	FA	$ 200,000.00	$ 200,000.00
1011	Temporary Traffic Control	1	FA	$ 120,000.00	$ 120,000.00

1012	Permits	1	FA	$ 100,000.00	$ 100,000.00
					$ 14,919,682.22
1007	**NM Gross Receipts Tax**	##########		**7.75%**	**$ 1,156,283.65**
1006	**Texas Buy Board Commissions**				
				Total	**$ 16,075,965.86**

Smith Engineering Bid Schedule

	Bid Item Description	Unit Desc	Unit Qty	Unit Price	
1	Grout Annular Space and Voids in Rehabilitated (sliplined) GravitySanitary Sewer Pipeline, Complete	CY	30	$ 3,168.00	$ 95,040.00
2	Pre-rehabilitation CCTV inspection, 48-inch sanitary sewer pipeline, perSupplemental Technical Specificati	LF	12,661	$ 7.00	$ 88,627.00
3	Pre-rehabilitation Pipeline Cleaning, Non-Metallic Pipeline, 48-inch sanitary sewer pipeline, including rem	LF	12,661	$ 62.00	$ 784,982.00
4	Disposal of Debris from Pre-Rehabilitation Preparation, SupplementalTechnical Specification section 33 01	TON	1,000	$ 270.00	$ 270,000.00
5	Rehabilitate Pipeline by Slip-lining, 48-inch diameter, Existing pipe depth per plans, Surface restoration ty	LF	211	$ 1,868.00	$ 394,148.00
6	Rehabilitate Pipeline by Cured-In-Place Pipe, 48-inch RCP sanitary sewer pipeline, per supplemental Tech	LF	12,450	$ 694.00	$ 8,640,300.00
7	Installation and Removal of the By-Pass Pumping System, including all work and material complete. Bid it	LS	1	$ 1,565,104.00	$ 1,565,104.00
8	Reinstate service lateral connection on pipeline rehabilitation by trenchless methodology, per supplemental	EA	12	$ 354.00	$ 4,248.00
9	Rehabilitate Existing Concrete Sanitary Sewer Manhole, 6-foot diameter Type C or E, depth category 18+	EA	6	$ 14,993.00	$ 89,958.00
10	Rehabilitate Existing Concrete Sanitary Sewer Manhole, 8-foot diameter Type C or E, depth category 18+	EA	2	$ 18,468.00	$ 36,936.00
11	Rehabilitate Existing Concrete Sanitary Sewer Manhole (Vault Manhole), depth category 18+ feet, per Sup	EA	27	$ 7,801.00	$ 210,627.00
12	Rehabilitate Existing Concrete Sanitary Sewer Manhole, 8-foot diameter Type C or E, depth category 18+ f	EA	1	$ 149,823.00	$ 149,823.00
13	Rehabilitate Existing Concrete Sanitary Sewer Manhole (Vault Manhole), depth category 18+ feet, per Det	EA	2	$ 153,575.00	$ 307,150.00
14	Rehabilitate exposed reinforced steel in existing Concrete Sanitary Sewer Manhole including replacement a	FT	1,140	$ 55.00	$ 62,700.00
15	Install Concrete Manhole, 8-feet diameter, Type C or E, 6 - 10 feet deep per Supplemental Technical Speci	EA	2	$ 138,300.00	$ 276,600.00
16	Manhole Lining System Application, per Supplemental TechnicalSpecification 33 01 30.81, complete.	SF	12,129	$ 25.00	$ 303,225.00
17	Remove and Replace existing 24" manhole frame, cover, and collar per Supplemental Technical Specificat	EA	33	$ 10,191.00	$ 336,303.00
18	Construction mobilization (not to exceed 5% of above Subtotal)complete.	LS	1	$ 52,713.00	$ 52,713.00
19	Rehabilitating Existing Concrete Sanitary Sewer Manhole, depth category 10-14 feet, per Supplemental Tec	EA	10	$ 6,198.00	$ 61,980.00
20	Rehabilitating Existing Concrete Sanitary Sewer Manhole, depth category 14-18 feet, per Supplemental Tec	EA	5	$ 11,143.00	$ 55,715.00
21	Rehabilitating Existing Concrete Sanitary Sewer Manhole, depth category 18+ feet, per Supplemental Techn	EA	11	$ 15,689.00	$ 172,579.00
22	Rehabilitate exposed reinforced steel in existing Concrete Sanitary Sewer Manhole including replacement a	FT	780	$ 53.00	$ 41,340.00
23	Manhole Lining System Application, per Supplemental TechnicalSpecification 33 01 30.81, complete.	SF	11,417	$ 25.00	$ 285,425.00
24	Remove and Replace existing 24" manhole frame, cover, and collar per Supplemental Technical Specificat	EA	24	$ 6,753.00	$ 162,072.00
25	Construction mobilization (not to exceed 5% of above Subtotal)complete.	LS	1	$ 42,280.00	$ 42,280.00
26	Project Signs incl. screens	FA	1	$ 1,200.00	$ 1,200.00
27	Testing	FA	1	$ 8,000.00	$ 8,000.00
28	Interceptor Point Repair	FA	1	$ 200,000.00	$ 200,000.00
29	Temporary Traffic Control	FA	1	$ 120,000.00	$ 120,000.00
30	Permits	FA	1	$ 100,000.00	$ 100,000.00
31	**NM Gross Receipts Tax**	**% age**	**14,919,075**	**7.75%**	**$ 1,156,228.31**
	TOTAL				$ 16,075,303.31
	Adjustment to match Buy Board Pricing				$ 662.55
	TOTAL After Adjustmen				**$ 16,075,965.86**