



CITY OF MEMPHIS

REQUEST FOR PROPOSAL

#28179

DIVISION OF ENGINEERING

AW WILLIS / CROSSTOWN DRAINAGE REMEDIATION

Advertise Dates: November 15 & 16, 2016

Proposal Submission Deadline: December 30, 2016

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1. OVERVIEW

The City of Memphis extends this invitation to qualified construction contractors interested in providing in situ repair services for two existing drainage culverts. The purpose of this RFP is to identify and describe the proposed project site and establish the framework with which received proposals will be evaluated. The successful bidding contractor will provide a process to clean, prepare, and rehabilitate two deteriorating drainage culverts while providing a structurally sound and independent finished product.

Term of the agreement shall be determined by negotiation, based upon proposed business model.

1.1 GENERAL CONDITIONS

The following data is intended to form the basis for a submission of proposals to successfully repair two deteriorating drainage culverts on behalf of the City of Memphis Division of Engineering. This material contains general conditions for the procurement process, the scope of service requested, contract requirements, instructions for submissions of proposals, and submission forms that must be included in the proposal. The RFP should be read in its entirety before preparing the proposal. All materials submitted pursuant to this RFP shall become the property of the City of Memphis.

To the extent permitted by law, all documents pertaining to this Request for Proposals shall be kept confidential, to the extent necessary for review, until the proposal evaluation is complete. No information about any submission of proposals shall be released until the process is complete, except to the members of the Evaluation Committee established by the City and other appropriate designated City staff. All information provided shall be considered by the Evaluation Committee in making a recommendation to enter into an agreement with the selected consultant.

Any inquiries, suggestions or requests concerning interpretation, clarification or additional information pertaining to the RFP shall be made **in writing and be in the hands of the Purchasing Agent by the close of the business day on December 2, 2016**. Questions must be submitted by email to Eric.Mayse@memphistn.gov. Subject line must read "Questions – AW Willis / Crosstown Drainage Remediation" The City of Memphis is not responsible for oral interpretations given by any City employee, representative, or others. The issuance of written addenda is the only official method whereby interpretation, clarification, or additional information can be given. Any questions or concerns not submitted by the stated time and date will be deemed waived.

If any addenda are issued to this Request for Proposals, the Purchasing Division will post them to the City's website at <http://www.memphistn.gov/Business.aspx/RFPsRFQs.aspx>. Submitting organizations are strongly encouraged to view this website often to see if addenda are posted. Failure of any proposer to receive such addendum or interpretation shall not relieve such Proposer from any obligation under his proposal as submitted. All addenda so issued shall become part of the Contract Documents.

The City of Memphis reserves the right to (a) accept or reject any and/or all submissions of proposals; (b) to waive irregularities, informalities, and technicalities; and (c) to accept any alternative submission of proposals presented which, in its opinion, would best serve the interests of the City. The City shall be the sole judge of the proposals, and the resulting negotiated agreement that is in its best interest, and its decision shall be final. The City also reserves the right to make such investigation as it deems necessary to determine the ability of any submitting entity to perform the work or service requested. Information the City deems necessary to make this determination shall be provided by the submitting entity. Such information may include, but is not limited to, current financial statements by an independent CPA, verification of availability of equipment and personnel, and past performance records.

1.2 PROJECT OBJECTIVE

The successful bidder will perform all construction duties related to the in-site rehabilitation of two drainage culverts in the City of Memphis. One culvert is a 54" reinforced concrete pipe (RCP) approximately 15-20 feet beneath the road surface of AW Willis, a major downtown road. The second culvert is a twin reinforced concrete box culvert, with each barrel measuring 8 feet wide by 8.5 feet high. The twin box culvert is located within the Crosstown Concourse project site (formerly referred to as Sears Crosstown) and beneath the building. In both instances, a "dig and replace" option is not considered viable by Division of Engineering staff, and in situ methodologies will be required.

1.3 PROJECT BACKGROUND

This proposed construction activities are centered on the rehabilitation of two deteriorating drainage culverts and are intended to include all materials, appurtenances, and adjunct activities required for the successful completion of the included projects. The intent of the Division is to issue a contract covering the necessary construction activities at both project sites with the intent of construction activities occurring either concurrently or successively in a relatively short duration. The projects are described in further detail below.

AW Willis 54" Culvert

The 54" concrete storm drain beneath AW Willis directs stormwater runoff from the Gayoso Basin, discharging into the most downstream basin of the Gayoso Bayou Pumping Station. It was initially constructed prior to 1920 and has been used over the course of its lifespan to convey both stormwater runoff and wastewater. In its current state, it is considered to have deteriorated to the point where the functionality needs to be replaced.

The existing pipe runs approximately 1,190 feet from the intersection of AW Willis and Front Street to the intersection of AW Willis and BB King (N. 3rd Street), where it runs to the south approximately 190 feet. The existing pipe is approximately 15 to 20 feet beneath the existing road surface. An in-situ approach to remediation is considered necessary based on the high daily traffic volumes; proximity of

key infrastructure; and numerous underground utilities. Furthermore, this system is partially blocked with gravel and debris, and will require a significant effort prior to and successful remediation efforts.

A preliminary engineering study was performed to determine the necessary hydraulic capacity of the system. Based on these preliminary results, it is considered essential to restore and maintain as much of the original system hydraulics as feasible.

Sears Crosstown Box Culvert

The twin 8.5' by 8' concrete box culvert is part of the Madison Heights drainage basin, and represents the main channel through this section of the basin. The culvert was constructed along with the Sears Crosstown building that is currently being redeveloped by a private entity. The building was constructed over the existing culvert; preventing a dig and replace option from being viable. A recent engineering assessment of the condition of the box culverts show deterioration and recommend repair. This report is included as Exhibit 5 of this RFP.

The existing culvert is approximately 500 feet of reinforced concrete in each barrel, for a total length of approximately 1,000 feet. Due to the size, nature, and location of the drainage culverts; maintenance of drainage capacity is an essential component of the project. Furthermore, construction activities must include contingency plans manage the impacts of significant stormwater runoff from any storms that may occur during the construction period.

1.4 SPECIAL CONDITIONS

Construction activities related to both included project sites are expected to occur in close relative proximity to each other; as both are deemed important and necessary.

All bills and invoices must be sent to: City of Memphis Division of Engineering; 125 N. Main St., Rm. 677; Memphis, TN, 38134; Attn: Civil Design. All bills and invoices shall be numbered in succession and arrive at the Division of Engineering no more than 3 days after the date printed on the invoice.

2. SCOPE OF SERVICES

This Request for Proposals (RFP) will serve to identify a company capable of providing all labor, material, and equipment to provide for the structural reconstruction of existing underground drainage pipes and culverts by forming a new conduit within existing structurally deteriorating conduits, which have generally maintained their original shapes. Furthermore, the selected rehabilitation technology must be able to show minimal or no impact to the hydraulic function of the existing system; assuming the existing system is clear and free of sediment and debris. Considering the general nature of this RFP; specific material properties necessary for the success of this project have not been included and are expected to be included in a contractor's proposal package for review by the selection committee.

2.1 WORK AND COMPONENTS INCLUDED

The successful proposer will be responsible for the installation of the product or material included in the proposal d to rehabilitate and refurbish the included drainage conduits. At a minimum, the project is expected to include the following tasks:

1. Development and approval of a work plan, including traffic control and any permits required,
2. Pre-installation cleaning and inspection of existing drainage conduits,
3. Bypass pumping or alternate plans to ensure system operation during rainfall events,
4. Conduit cleaning and preparation,
5. Installation or application of remedial technology,
6. Quality control measures, and
7. Post-rehabilitation videotaping and review of drainage conduits.

2.2 QUALIFICATIONS

The successful proposer shall be able to demonstrate a proven record of successfully installing the material or system proposed; and able to supply municipal references to support any and all claims. Once a decision is made, no substitutions will be allowed and misrepresentations or omissions will be grounds for contract termination with the Contractor waiving any and all claims against the City of work performed or cost incurred.

Furthermore, all submitting Contractors shall be able to provide a qualified superintendent who shall be able to supply a list of qualifying experience to the City on request. All pertinent information, including: project name, owner, owner's representative, phone number, dimensions of project completed shall be furnished for each project.

2.3 TECHNICAL SPECIFICATIONS

Technical specifications for the product and installation are included in this RFP as EXHIBIT 6. These specifications will be used as part of the evaluation criteria, detailed in Section 5.2.

2.4 PROJECT DURATION

The project duration will be a negotiated part of the contract; however, work will be expected to be completed expeditiously, as components of this work will be disruptive to daily traffic flow and ongoing construction activities.

3. PROPOSAL RESPONSE

This Section describes the contents of Proposer’s Proposal and provides an outline of how the Proposer should organize it. Proposer’s Proposal will not be considered responsive unless it fully complies with the requirements in this Section, as well as, the additional instructions provided in Section 4.6 regarding the required Proposal formats and submission process.

Specifically, Proposer’s Proposal shall include each of the sections referenced in the table below. The requirements for each of these Proposal sections are described in more detail in this Section.

PROPOSER'S PROPOSAL WILL BE DISQUALIFIED FROM THIS RFP PROCESS IF THE PROPOSER FAILS TO CONFORM TO THE PROPOSAL INSTRUCTIONS IN THIS SECTION.

| Sections and Topics |
|---|
| Section 1 – Cover Letter |
| Section 2 – Non-Collusion Affidavit |
| Section 3 – Solution/Implementation Design/Technical Data |
| Section 4 – Relevant Experience |
| Section 5 – Complete Price Form |
| Section 6 – Equal Business Opportunity (EBO) Program |

3.1 COVER LETTER

Proposal shall contain a cover letter acknowledging Proposer's understanding of the RFP process and requirements set forth in this RFP, including its commitment to its Proposal. The cover letter shall be signed by an authorized representative of Proposer's company.

Provide agency’s name, address, web address, telephone and fax numbers. Please include name, title and e-mail address of the individual who will serve as agency’s primary contact. Describe your company’s ownership.

3.2 NON-COLLUSION AFFIDAVIT

Please use the form provided in Exhibit 3.

3.3 SOLUTION/IMPLEMENTATION DESIGN / TECHNICAL DATA

Proposal shall describe Proposer's "Solution/Implementation Design". This will include, at a minimum, a description of all pertinent physical properties of the material, hydraulic calculations, anticipated length of construction activities, and a description of the proposed construction activities. Please provide samples of the proposed material or product , if possible

3.4 RELEVANT EXPERIENCE

Briefly describe contractor's relevant experience, especially as it relates to installations of this type and nature. Include the number of completed and successful installations similar in job scope to this project. List references and contact information.

3.5 PRICE FORM

Please provide pricing using the Price Form located in Exhibit 2 of this RFP.

3.6 EQUAL BUSINESS OPPORTUNITY (EBO) PROGRAM

Proposer shall provide a complete participation plan or well documented good faith efforts. See the following pages for descriptions and forms.

Equal Business Opportunity Program

This contract will be subject to the requirements of the City of Memphis Ordinance #5384 which establishes the Equal Business Opportunity (“EBO”) Program. It is up to the Respondent to ensure that all requirements of this ordinance are met. The Ordinance may be accessed on the City’s website at www.memphistn.gov under “Doing Business”. The intent of the EBO Program is to increase the participation of locally owned minority and women owned business enterprises (“M/WBE”) in the City’s purchasing activities. Toward achieving this objective, the M/WBE participation goal for this solicitation is 2.5%. The percentage of M/WBE participation is defined as the dollar value of subcontracts awarded to certified minority and/or women business enterprises divided by the total proposed base bid amount.

Participation Plan

The Participation Plan must include: (1) level and dollar amount of participation your firm anticipates to achieve in the performance of contract resulting from this RFP; (2) the type of work to be performed by the M/WBE participation; and (3) the names of the M/WBEs the Respondent plans to utilize in the performance of the contract resulting from this RFP.

Good Faith Efforts Documentation

If a Respondent proposes an M/WBE percentage less than the established goal, the Respondent must, at the time of the response, submit a Good Faith Efforts statement accompanied by the appropriate documentation justifying its submitted M/WBE percentage. The ability of the Respondent to perform the work with its own work force will not in itself excuse the Respondent from making good faith efforts to meet participation goals. The determination of whether a Respondent has made a good faith effort will be made by the City’s Contract Compliance Officer, Director of Finance and the Purchasing Agent, prior to the award of the project.

Eligible M/WBE Firms

To qualify as an M/WBE firm, per the requirements of City of Memphis Ordinance #5384, a firm must be included on the City’s list of certified M/WBE firms. One or a combination of several M/WBEs may be utilized to meet the established goal of 2.5%.

Requests for verification must be submitted to the City’s Contract Compliance Office listed below:

Joann Massey; City of Memphis; Phone 901-636-6210; Fax 901-636-6560
Director, Business Diversity & Compliance
joann.massey@memphistn.gov
125 North Main Street, Suite 546
Memphis, TN 38103

CITY OF MEMPHIS

EQUAL BUSINESS OPPORTUNITY PROGRAM COMPLIANCE FORM

PROJECT TITLE: AW Willis / Crosstown Drainage Remediation

Project M/WBE GOAL: 2.5%

The following sections must be completed by bidder. A certified subcontractor or supplier is defined as a firm from the list of certified firms provided with this specification.

Bidder's Name

Section A - If the bidder is a certified firm, so indicate here with a check mark.

_____ MBE _____ WBE

Section B - Identify below those certified firms that will be employed as subcontractors or suppliers on this project. By submitting this bid, the bidder commits to the use of the firms listed below.

\$ = Show the dollar value of the subcontract to be awarded to this firm

% = Show the percentage this subcontract is of your base bid

M/WBE = Show by inserting an M or W whether the subcontractor is an MBE or WBE

| \$ / % | M/WBE | SERVICE | CERTIFIED SUBCONTR. NAME, ADDRESS, TEL. # |
|--------|-------|---------|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| | | |
|--------------|-----------|----------|
| Total | \$ | % |
| MBE | | |
| WBE | | |

THIS FORM and SUPPORTING DOCUMENTATION MUST BE SUBMITTED WITH THE BID OR THE BID WILL BE CONSIDERED NON-CONFORMING.

**CITY OF MEMPHIS
GOOD FAITH EFFORT DOCUMENTATION FORM**

To The Honorable Mayor City of Memphis, Tennessee
From:

PROPOSER NAME _____

PROJECT TITLE: **AW Willis / Crosstown Drainage Remediation**

Enclosed please find the required documents:

Said Bidder ____ did / or ____ did not attend the project pre-bid meeting.

***Copies of all written notification to City of Memphis M/WBE listed firms. (Please attach list of all firms notified, detail how they were notified and when).**

Said Bidder ____ did / or ____ did not select economically feasible portions of the work to be performed by M/WBE firms.

***List all M/WBE firms with which negotiations took place. (Attach list. If no negotiations were held, please state so.) Provide names, addresses, and dates of negotiations.**

***Statement of efforts to assist M/WBE firms, with bonding, insurance, financing, or with document review. (Attach list. If no assistance was provided, please state so.)**

The Bidder ____ did / or ____ did not use all M/WBE quotations received. If the Bidder did not use all M/WBE quotations received, list on attached sheets, as required as to the reasons those quotes were not used.

***List (on attached sheets as required) all M/WBE firms contacted that the bidder considered not to be qualified, and a statement of the reasons for the bidder's conclusions. If no firms were found to be non-qualified, please state so.**

THIS SIGNED FORM AND REQUESTED DOCUMENTATION (noted by an asterisk ‘*’) MUST BE SUBMITTED WITH THE BID IF THE BIDDER DOES NOT MEET THE REQUIRED M/WBE PROJECT GOAL. IF REQUESTED DOCUMENTATION IS NOT SUBMITTED THE BID WILL BE CONSIDERED NON-CONFORMING.

Contractor's Name

Signature

Printed or Typed Name and Title

4. INSTRUCTIONS ON RFP PROCESS

4.1 USE OF INFORMATION

All correspondence about this RFP and the Initiative should be limited to the Principal Contact described in Section 4.2 or other designated City personnel or agents.

4.2 PRINCIPAL CONTACT AND INFORMATION REQUESTS

Eric Mayse is the single point of contact (the “Principal Contact”) for all matters relating to this RFP. Proposer should direct all inquiries to the Principal Contact at:

eric.mayse@memphistn.gov

Proposer should not, under any circumstances, contact any City personnel (including senior City management or City employees with whom Proposer has an existing business or personal relationship) to discuss this RFP without the Principal Contact’s prior written consent. Utmost discretion is expected of Proposer and all other RFP recipients. Any recipient attempting to circumvent this process will risk elimination from further participation in the bidding process.

4.3 SCHEDULE OF ACTIVITIES

- In order to accelerate the business transformation, service improvements and cost savings the City anticipates, the City has developed an estimated timeline for this Initiative. The City will move as quickly and efficiently as possible to determine the feasibility of each Proposer’s Proposal and to move forward with term sheet discussions and ultimately conclude an agreement accordingly.
- As a result, the City requests that Proposer make a dedicated team available to participate in the proposal development and evaluation processes as necessary to participate in the activities and meet the deadlines provided in the table below.
- It is the City’s option to conduct interviews with finalists. However, in no way is the City obligated to interview finalists.
- The City reserves the right to modify or update this schedule at any point in time.

In no event shall the deadline for submission of the proposal be changed except by written modification by the City of Memphis Purchasing Department.

| Activity | Date |
|---|---|
| Advertise Date | November 15 & 16, 2016 |
| Proposer Questions Deadline | December 2, 2016 by end of business day |
| City Response to Questions | December 9, 2016 by end of business day |
| Proposal Submission Deadline | December 30, 2016 by 2:00 p.m. |
| Finalist Selections – Optional | January 2017 |
| Finalist Presentations – Optional (City’s Discretion) | January 2017 |
| Negotiations | January 2017 |
| Agreement Finalization | 1st Quarter, 2017 |

Several of the activities identified in the above table are described in more detail in the remainder of this Section 4.

4.4 PRE-SUBMITTAL CONFERENCE

No Pre-Submittal Conference is scheduled for this RFP.

4.5 INITIAL QUESTIONS SUBMISSIONS, FINAL QUESTIONS SUBMISSION

Proposer may submit an initial set of questions based on its review of this RFP, by completing the template provided at Exhibit 1 (Proposer Questions Template) and sending it via email by December 2, 2016 by 5:00 pm CDT. Questions received after 5:00 will not be answered. This email should be sent to the individual(s) described in Section 4.2, with the subject heading: “[Your company’s name] – AW Willis / Crosstown Drainage Remediation RFP Questions.” The City will post the responses to the questions on the City’s web site on or before December 9, 2016 by 5:00 pm CDT. To ensure the fair and consistent distribution of information, no individual answers will be given. The only official answer or position of the City will be the one posted via the City's website. Any questions or concerns not submitted by the stated time and date will be deemed waived.

4.6 PROPOSAL SUBMISSIONS

PROPOSAL SUBMISSION AND DUE DATE

Proposer shall submit (A) one (1) original (marked as such) and five (5) complete printed copies of its Proposal (including the signed Cover Letters) on or before December 30, 2016 at 2:00 p.m. CDT, in a sealed package, to the addressee provided below:

**City of Memphis Purchasing Department
125 N. Main Street, Room 354
Memphis, TN 38103**

The label should identify the contents as: **AW Willis / Crosstown Drainage Remediation, RFP #28179.**

PROPOSALS SUBMITTED AFTER THE DEADLINE OR WHICH STATE THAT INFORMATION WILL BE PROVIDED 'AT A LATER DATE', OR WHICH ARE OTHERWISE INCOMPLETE OR FAIL TO COMPLY WITH THE REQUIREMENTS SET FORTH IN THIS RFP WILL BE DISQUALIFIED FROM PARTICIPATION IN THIS RFP PROCESS.

Proposals may not be amended after the submission deadline.

Notwithstanding any legends on the proposal or any other statements to the contrary, all materials submitted in connection with proposer's response to this RFP will become the property of the city and may be returned only at the City's option.

PROPOSAL FORMAT

The City expects the Proposal to be a compilation of various documents, in particular because Proposer's Proposal must utilize the RFP response templates, if provided, set forth in the Exhibits in this RFP.

Proposer shall use Microsoft Office file formats in preparing its Proposal to the maximum extent possible. All pages should be formatted to print on 8 ½" x 11" paper, unless another format is provided by the response template. Proposer responses should be specific, factual, brief and to the point.

PROPOSAL EXPIRATION DATE

Proposals in response to this RFP shall remain valid for six (6) months from the Proposal due date. The City may request an extension of time if needed.

PROPOSER DATA

The confidentiality of information and data contained in the firm of contractor's Proposal shall be subject to and governed by the Open Records Act and any other Public Records laws with which the City is legally obligated to comply (including a Freedom of Information Act Request under "FOIA").

Deadline Extension

The City reserves the right to extend the submission deadline, if such action is considered necessary by the City.

Ambiguity, Conflict, or other Errors in the RFP

If a Proposer discovers any ambiguity, conflict, discrepancy, omission or other error in the RFP, it shall immediately notify, in writing e-mail, the City of such error and request modification or clarification of the document. The Proposer shall include the RFP number, page number and the applicable paragraph title. The City will issue/post any revisions to the RFP on the City's website (www.memphistn.gov). The Proposer is responsible for clarifying any ambiguity, conflict, discrepancy, omission, or other error in the Request for Proposals prior to submitting the proposal or any ambiguity, conflict, discrepancy, etc. shall be waived.

Failed Competition

The City reserves the right to reject any or all proposals which are not responsive to the specifications of this Request for Proposal (RFP). Competitive negotiation requires that at least two responsive proposals for the same scope of work and service area be received in response to the RFP. A competition is considered failed if only one responsive proposal is received. If a competition has been declared failed, the City then has the option to reopen the procurement or enter into a non-competitive procurement.

Withdrawing or Amending a Proposal

At any time prior to the scheduled deadline for receipt of proposals, the Proposer may withdraw or amend its proposal by submitting a written request from the authorized representative whose name and signature appears on the proposal. A written request to withdraw or amend the proposal must be submitted to the individual and address to whom/which the proposal was submitted in accordance with the section above titled "PROPOSAL SUBMISSION AND DUE DATE."

Acceptance/Rejection of Proposals

The City reserves the right to accept or reject, in whole or in part, any or all proposals submitted. The City shall reject the proposal of any Proposer that is determined to be non-responsive.

Informalities/Minor Irregularities

The City reserves the right to waive minor irregularities or informalities in a Proposer's proposal when the City determines that it will be in City's best interest to do so. Any such waiver shall not modify any remaining RFP specifications or excuse the Proposer from full compliance with the RFP specifications and other contract requirements if the Proposer is awarded the contract.

Proposer indebted to the City

No contract will be knowingly awarded to any organization which, in the City's sole discretion, is in arrears to the City of Memphis upon any debt or contract, or which is a defaulter as surety or otherwise under any obligations to the City of Memphis, or which has failed to perform faithfully on any previous contract with the City of Memphis.

Tax Payments

The City of Memphis is exempt from federal excise, state and local taxes on all purchases and will issue tax exemption certificates, upon request.

4.7 FINALIST SELECTIONS (OPTIONAL)

The City may or may not select a number of the RFP respondents who will be asked to give an oral presentation of its proposal to the City. However the City is not obligated to interview any finalist. If interviews are conducted, these providers will be selected based on an evaluation of their Proposals against the criteria described in Section 5 of this RFP. RFP recipients that are not selected to progress to the oral presentations likely will be excluded from further consideration.

For this reason, Proposer is strongly encouraged to make as complete and compelling a Proposal as possible. The RFP recipient who fails to comply risks being dropped from further consideration without having an opportunity to improve its offer.

4.8 RECIPIENT PRESENTATIONS (OPTIONAL)

Presentations are not anticipated to be required as a part of the selection process. However, should the selection committee ascertain they are required to complete the selection process, they will be tentatively scheduled for January, 2017. Details pertaining to the oral presentation phase of the RFP process will be confirmed after Proposal Submission.

If Proposer is one of the RFP recipients asked to give an oral presentation, Proposer should prepare a comprehensive presentation that concentrates on the business and technical aspects of the Proposal, and should not be marketing discussions. **PROPOSER'S PROPOSAL WILL NOT BE ALTERED OR ENHANCED DURING THE ORAL PRESENTATION.**

Appropriate visual and written materials are expected, but the format will be left to the discretion of the Proposer. A soft copy of all presentation materials must be delivered to the Principal Contact at least one business day before the beginning of the presentation. Proposer should also bring a sufficient number of printed copies of the materials for the City attendees at the presentation.

The City may provide a last minute agenda or other direction for the Proposer's presentation based on the City's initial review of the Proposals.

4.9 CONTRACT AWARD

The award of contract will be made on the basis of the best proposal, as solely determined by the City, which meets the requirements and criteria set forth in the solicitation. The City will only accept proposals for the services requested. The proposal submitted in response to this solicitation is not a legally binding document; however, the contract, which will be based on information provided in the proposal, becomes legally binding once all parties have signed it. Any contract resulting from this RFP shall be subject to the City of Memphis General Terms and Conditions set forth in this solicitation and any additional terms imposed by City. The successful Contractor shall be required to execute the contract originated by the City of Memphis and satisfy all contract requirements as specified by the City. One or more contracts may be awarded under this RFP, and any contract awards and amounts are subject to the availability and appropriation of funds.

4.10 PROTESTS

Any protest of award must be filed in writing with the Purchasing Agent within five (5) calendar days of the award announcement at the following address:

City of Memphis Purchasing Agent:
125 North Main, Room 354, Memphis, Tennessee 38103.

4.11 MODIFICATION OF TERMINATION OF RFP PROCESS

Subject to the rules and regulations of the City's Procurement Office, including with respect to providing notification and, where applicable, providing the opportunity to revise proposals, the City reserves the right to, in its sole discretion, discontinue, amend, supplement, or otherwise change this RFP, the Initiative, the process used for evaluation, and the expected timeline at any time and for any reason, and makes no commitments, implied or otherwise, that this process will result in a business transaction with any provider.

4.12 SUPPLEMENTAL INFORMATION

If, subsequent to issuance of this RFP, additional relevant material is produced by or becomes available to the City, such material will (where appropriate) be transmitted to all RFP participants for their consideration. The City will make modifications by issuing a written addendum, which will be posted on the City's website. Any revisions to the solicitation will be made only by an addendum issued by the City. It is the responsibility of the Proposer to check the website for possible addenda and should consider such information in its Proposal. The City will assume that all changes or additional requirements transmitted have been taken into account in Proposer's Proposal (including with respect to pricing), unless otherwise specified.

4.13 NO REPRESENTATIONS OR WARRANTIES

The City makes no representations or warranties regarding the accuracy or completeness of the information contained in this RFP or otherwise provided by the City through the RFP process. Proposer is responsible for making its own evaluation of information and data contained in this RFP or otherwise provided by the City, and for preparing and submitting responses to the RFP. The City has attempted to validate the information provided in this RFP, but it is possible that Proposer may detect inconsistencies or potential errors. While Proposer should identify these potential issues in its questions or in an appendix to its Proposal, Proposer should use the information provided on an “as-is” basis for its initial Proposal. Information regarding the City and the Initiative may be revised or updated, and republished for inclusion in a final response.

4.14 PROPOSAL PREPARATION COSTS

Proposer will be responsible for all costs it incurs in connection with this RFP process (including but not limited to Proposal preparation, personnel time, travel-related costs, and other expenses) and any subsequent agreement negotiations.

5. EVALUATION MODEL

5.1 QUALIFYING PROPOSALS

City will review each submitted Proposal to determine whether it is a Qualifying Proposal. A Qualifying Proposal is one that meets all of the criteria set forth below. All Proposals that ARE NOT a Qualifying Proposal will be disqualified from this RFP process. A Qualifying Proposal is a Proposal that:

- Was submitted (in the form and format required) by the due date as specified in Section 4.6.
- Conforms to the requirements of the RFP (as outlined in Section 3).

5.2 EVALUATION OF QUALIFYING PROPOSALS

An evaluation team composed of representatives of the City will evaluate proposals on a variety of quantitative and qualitative criteria. Upon receipt of proposals, the City will review to determine whether the proposal is acceptable or non-acceptable based on the criteria outlined below.

The criteria, and their associated weights, upon which the evaluation of the proposals will be based on the following:

- a. Constructability of solution, including disruption to surrounding activities (20%)**
- b. Strength of completed product (20%)**
- c. Cost of project (30%)**
- d. Number of completed and successful installations (10%), and**
- e. Results of hydraulic analysis / Maintenance of system functionality (20%).**

6. RFP TERMS AND CONDITIONS

The City of Memphis seeks proposals from firms who have the expertise to provide drainage pipe and culvert rehabilitation services with this RFP document. This is a Request for Proposal that may be modified by the City in the selection process.

THE CITY OF MEMPHIS ENCOURAGES THE PARTICIPATION OF SMALL, MINORITY AND WOMEN-OWNED BUSINESSES IN THE PURCHASING PROCESS.

The City of Memphis is an Equal Opportunity Employer and does not discriminate on the basis of race, color, national origin, sex, religion, age, or handicap status in employment or in the provision of services.

This procurement may be subject to the requirements of Ordinance No. 5114 which establishes a local preference for local businesses located within the City of Memphis. A copy of your current Memphis and Shelby County Tennessee Business Tax Receipt must accompany the proposal for consideration of this ordinance.

Any protest of award must be filed in writing with the Purchasing Agent within five (5) calendar days of the intent to award announcement at the following address: City of Memphis Purchasing Agent; 125 North Main, Room 354; Memphis, Tennessee 38103. Notice will be posted on the City's website and outside Council Chambers, located on the lobby floor of City Hall. The intent to award notification shall be deemed publicly announced on the date specified on the notice.

Only proposals submitted on the provided form(s) with no changes, additions or deletions to the terms and conditions will be considered. Proposals containing terms and conditions other than those contained herein may be considered nonconforming.

No objections with regard to the application, meaning, or interpretation of the specifications will be considered after the opening of the subject proposals. If there are questions or concerns regarding any part of plans, terms, specifications or other proposed documents, a written request for interpretation thereof may be submitted to the City Purchasing Agent prior to the deadline date. The organization submitting the request shall be responsible for the prompt delivery of the request. Any interpretation in response to the written request will be made only by addendum duly issued, and a copy of such addendum will be mailed or delivered to each organization receiving a set of such documents and/or posted on the City's website. The City of Memphis will not be responsible for any other explanation or interpretation of the proposed documents. By submission of its proposal, a proposer shall be deemed to have understood fully the contents and meaning of the RFP.

All proposals must be signed by an authorized representative of your organization. Unsigned proposals will be considered nonconforming.

Any contract resulting from the proposals received in response to this solicitation shall be construed in accordance with and governed by the laws of the State of Tennessee. All actions, whether sounding in contract or in tort, relating to the validity, construction, interpretation and enforcement of this Agreement shall be instituted and litigated in the courts of the State of Tennessee, located in Shelby County, Tennessee without regard to conflicts of laws principles.

By order of the Mayor of the City of Memphis, Tennessee.

JIM STRICKLAND, MAYOR

Eric Mayse, City Purchasing Agent

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INSTRUCTIONS TO PROPOSERS

Proposers shall submit their signed proposal in a sealed envelope INDICATING ON THE OUTSIDE: THE COMPANY NAME and THE REQUEST FOR PROPOSAL NUMBER.

Proposers must comply with all applicable licensing requirements. Pursuant to the City of Memphis Charter, Article 71, Section 777 et seq., it is unlawful to operate a business within the limits of the city of Memphis without possessing a Memphis and Shelby County business license, excepting non-profit organizations that qualify as tax exempt under Sec. 501(c)(3) of the Internal Revenue Code. Upon award notification and prior to the City issuing a properly executed purchase order or entering into a contract with the proposer, the successful proposer, whose principal business address is located within the limits of the city of Memphis, will be required to submit, along with the required insurance and other required documentation, a copy of (1) the tax-exempt ruling or determination letter from the Internal Revenue Services; or (2) its current Memphis and Shelby County Business Tax Receipt/License.

Issuance of this RFP does not obligate the City to contract, in whole or in part, for services specified herein. The City of Memphis reserves the right to cancel this solicitation, in whole or in part, or to reject, in whole or in part, any and all proposals. Cancellation of this RFP or any subsequent award will be posted on the City's website: www.memphistn.gov under the section titled "Government News."

Any firm receiving a mailed solicitation on the above subject and not bidding will be electronically removed from the City's mailing list used for the above-referenced subject after 3 consecutive non-responses or no bids.

For additional information concerning this solicitation, please contact: Eric Mayse via e-mail at Eric.Mayse@memphistn.gov. Subject line must read "Questions – AW Willis / Crosstown Drainage Remediation."

This solicitation shall be in accordance with the City of Memphis Ordinances and Purchasing Policies and Procedures, which may be amended from time to time.

All materials submitted pursuant to this RFP shall become the property of the City of Memphis.

To the extent permitted by law, all proposals submitted in response to this RFP shall be kept confidential until the proposals have been evaluated and the intent to award is announced. Until the intent to award is announced, no information regarding any proposal will be released to anyone, except members of the Evaluation Committee who are responsible for evaluating the proposals and other appropriate City staff. All information provided by the Proposer in response to this RFP will be considered by the Evaluation Committee in evaluating the proposal and making an award recommendation to the City.

The Mayor of the City of Memphis is the only individual who can legally sign contracts on behalf of the City. Costs chargeable to the proposed contract shall not be incurred before receipt of a fully executed contract.

PROPOSED BUDGET FOR CONSTRUCTION ACTIVITIES

| | |
|---|---|
| 1 | <p>Mobilization / Demobilization</p> <p>Budgeted Cost \$ Percentage %</p> |
| 2 | <p>Insurance and Bond</p> <p>Budgeted Cost \$ Percentage %</p> |
| 3 | <p>Project preparation, Work Plan, Permits, Reviews and Approvals</p> <ul style="list-style-type: none"> • Development of all project documents needed prior to start of construction activities • Obtain all requisite approvals and permits <p>Budgeted Cost \$ Percentage %</p> |
| 4 | <p>Traffic Control for AW Willis Project</p> <ul style="list-style-type: none"> • Setup and maintenance of traffic control <p>Budgeted Cost \$ Percentage %</p> |
| 5 | <p>Site Preparation for AW Willis Project</p> <ul style="list-style-type: none"> • Includes cleaning and any other activities required to prepare the site for planned construction activities <p>Budgeted Cost \$ Percentage %</p> |
| 6 | <p>Installation of Rehabilitation Product for AW Willis Project</p> <ul style="list-style-type: none"> • This items includes implementation of the planned remedial technology, all post-construction review and repair activities <p>Budgeted Cost \$ Percentage %</p> |

| | |
|---|---|
| 7 | <p>Traffic Control for Sears Crosstown Project</p> <ul style="list-style-type: none"> • Development of all project documents needed prior to start of construction activities • Note: development and approval of plan included in Item 3 <p>Budgeted Cost \$ Percentage %</p> |
| 8 | <p>Site Preparation for Sears Crosstown Project</p> <ul style="list-style-type: none"> • Includes cleaning and any other activities required to prepare the site for planned construction activities <p>Budgeted Cost \$ Percentage %</p> |
| 9 | <p>Installation of Rehabilitation Product for Sears Crosstown Project</p> <ul style="list-style-type: none"> • This items includes implementation of the planned remedial technology, all post-construction review and repair activities <p>Budgeted Cost \$ Percentage %</p> |
| | <p>Total Proposed Cost: \$</p> |

EXHIBIT 3 – NON-COLLUSION AFFADAVIT

The Proposer, by its officers and its agents or representatives present at the time of filing this Proposal, being duly sworn on their oaths say, that neither they nor any of them have in any way, directly or indirectly, entered into any arrangement or agreement with any other Proposer, or with any officer of the Owner or Owner’s representative whereby such affiant or affiants or either of them has paid or is to pay such other Proposer or officer any sum of money, or has given or is to give to such other Proposer or officer anything of value whatever, or such affiant or affiants or either of them has not directly or indirectly, entered into any arrangement or agreement with any other free competition into the letting of the contract sought for by the attached prices that no inducement of any form or character other than that which appears on the face of the Proposal will be suggested, offered, paid or delivered to any person whomsoever to influence the acceptance of the Proposal or awarding of the Contract, nor has this Proposer any agreement or understanding of any kind whatsoever, with any person whomsoever to pay, deliver to, or share with any other person in any way or manner, any of the proceeds of the Contractor sought by this Proposal.

Submitted By:

Firm Name _____

Authorized Signature _____

Date _____

SIGNATURES

If PROPOSER is:

A. An Individual

By _____

(SEAL)

(Individual's Name)

Doing business as

Business Address:

Phone Number: _____

B. A Partnership

By _____

(SEAL)

(Firm Name)

(General Partner)

Business Address:

Phone Number: _____

C. A Corporation

By _____

(SEAL)

(Corporation Name)

(State of Incorporation)

By _____

(Name of Person Authorized to Sign)

Title _____

Attest _____

(Secretary)

Business Address:

Phone Number:

D. A Joint Venture

By _____
(Name)

Business Address:

By _____
(Name)

Business Address:

Each joint venture member must sign. The manner of signing for each individual partnership and corporation that is party to joint venture should be in manner indicated above.

The successful Contractor will be required to comply with and execute an agreement specifying the following general terms and conditions, as may be modified and/or supplemented at the City's sole discretion:

ARTICLE 1 - SCOPE OF THE WORK

Section 1.1 Scope of the Work

- A. The Contractor shall provide for the Lump Sum Price based on the submitted unit prices set forth herein, all of the labor, supervision, materials, supplies, tools, equipment, appliances, and facilities necessary to construct the Project upon the real property owned by the Owner as described in the contract documents. Contractor agrees that the Project shall be constructed in accordance with the terms of this Agreement and the Contract Documents as defined in Article Two of this Agreement (herein the "Work"). The term "Work" includes, but is not limited to, all labor necessary to construct the Project as described in the Contract Documents, all materials and/or equipment incorporated or to be incorporated in the Project as described in the Contract Documents.

ARTICLE 2 - CONTRACT DOCUMENTS

Section 2.1 Definition

- A. The Contract Documents include the General Conditions of the Contract, the Construction Contract, the Drawings and Specifications, all Addenda, all Exhibits or modifications to any of them, issued prior to or after execution of the Construction Contract, as well as each document as set forth in Section 00510-2 of the Agreement attached hereto. As used in this Agreement, a "modification" is either:
 - 1. A written and signed amendment to the Agreement;
 - 2. A Change Order or Construction Change Order (as defined in this Agreement);
 - 3. A written interpretation issued by the Owner;
 - 4. A Construction Change Directive issued by the Owner.

Section 2.2 Intent of Contract Documents

- A. The intent of the Contract Documents is to include all materials, appliances, labor and services of every kind necessary for the proper execution of the Work. The Contract Documents are to be considered as one document, and whatever is called for by any one of the documents shall be as binding as if called for by all.

Section 2.3 Errors in Contract Documents

- A. If the Contractor finds any error, inconsistency, omission, discrepancy or variance with any applicable laws in any respect in the Contract Documents, it shall notify the Owner in writing of any errors discovered within five (5) working days of such discovery and before beginning the affected portion of the Work. The Owner will make any correction, interpretation or clarification promptly, basing its decision on the intent of the Contract Documents. Failure of the Contractor to timely notify the Owner of any such error or inconsistency within the time provided by this paragraph shall bar the Contractor from making any claim for additional time or compensation caused by any such error or inconsistency even if the error or inconsistency caused the Contractor to incur additional expense or time of performance.

Section 2.4 Copies of Contract Documents

- A. The Owner shall furnish to the Contractor up to five (5) copies of the Contract. Additional copies will be furnished, upon request, at the cost of reproduction.

Section 2.5 Reuse of Contract Documents

- A. Neither the Contractor nor any Subcontractor or Supplier or other person or organization Performing or furnishing any of the Work under a direct or indirect contract with the Owner shall have or acquire any title to or ownership rights in any of the Drawings, Specifications or other documents (or copies of any thereof) prepared by or bearing the seal of Owner/Engineer; and they shall not reuse any of them on extensions of the Project or any other project without written consent of the Owner and specific written verification or adaptation by the Owner.

ARTICLE 3 - PROGRESS OF THE WORK

Section 3.1 Commencement and Completion

- A. The Contractor shall commence the Work within ten (10) working days following receipt of a written Notice to Proceed from the Owner and shall substantially complete the work per Section 00510, the "Construction Contract". The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time. The Contractor warrants that it will deliver the Project to the Owner free from any and all liens or other encumbrances. Contractor further agrees to promptly (which is defined for purposes of this paragraph as no more than three (3) working days from receipt of any lien or other notice) notify the Owner of the existence of any and all liens filed by any subcontractors, materialmen, suppliers or sub-contractors. Time is of the essence, and the Substantial Completion Date may be altered only as provided in this Agreement. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work. For purposes

of this Agreement, substantial completion shall occur when the Project has been constructed to the point that only minor or punch list items remain to be performed and the Work can be occupied by the Owner and used for the purpose for which it was intended ("Substantial Completion"). Owner will, upon request of the Contractor, issue a certificate establishing the Substantial Completion Date at any time after Substantial Completion has occurred.

Section 3.2 The Progress Schedule

- A. Prior to commencement of on site construction activities and in any event within ten (10) working days from the receipt of the Notice to Proceed from Owner, Contractor shall submit to the Owner a preliminary progress schedule in the form of either a bar chart or Critical Path Method (CPM) schedule. Said preliminary progress schedule will be consistent with the information set forth in the bidding documents concerning the Substantial Completion Dates, the sequencing of activities and shall include, but not be limited to, the durations for all major items of work to be performed; the start and finish date of all such activities; and the Substantial Completion Date of the Project as set out in this Agreement. Within thirty (30) working days from the submission of the preliminary progress schedule, the Contractor shall submit to the Owner for approval, a more detailed progress schedule, which shall be either a bar chart or Critical Path Method (CPM) schedule depicting all activities which will occur on the Project; the duration of such activities; the start and finish dates of such activities; the final and Substantial Completion Date; and the inter dependence of all such activities. The Contractor shall submit to the Owner updated progress schedules each month to reflect actual progress made and to forecast future progress of the Work. The Owner reserves the right to reasonably reschedule the Work or the sequence of the activities of the Contractor for no additional compensation should it deem such rescheduling to be in its best interest. Float is defined as the amount of time between the early start date and the late start date for any of the activities depicted on the CPM Progress Schedule. Float is not for the exclusive use or benefit of either the Owner or the Contractor. Ownership of the float is vested in the Project rather than the Owner or the Contractor.

Section 3.3 Extension of Substantial or Final Completion Date

- A. The Substantial Completion Date or Final Completion Dates (which are defined in Sections 3.1A and 4.6B respectively of this Agreement) shall be extended only for such number of working days that the Work is actually delayed by a natural catastrophe, abnormal inclement weather, as defined in Paragraph 3.3C and Paragraph 3.6, or by a Change Order or Change Order Directive (herein "Excusable Delays"). No extensions to the Substantial Completion Date shall be granted due to the negligence or fault of the Contractor or its Subcontractors. Non availability of materials and non availability of local labor will not be considered cause for extension of the Substantial Completion Date. No extension to the Substantial Completion Date shall be granted for the period of time during a delay in the performance of the Work which is caused in part by

the Owner and in part by the Contractor or one for whom the Contractor is responsible (“Concurrent Delays”).

- B. In order to obtain an extension of the Substantial Completion Date or the Final Completion Date due to an Excusable Delay, the Contractor in each instance shall give written notice to the Owner within five (5) working days after the occurrence of each Excusable Delay, and upon the failure of the Contractor to do so, its right, if any, to an extension will be considered waived. The Owner shall render a written decision which shall be made in good faith and shall be conclusive upon the parties granting, or refusing the request of the Contractor for an extension, within thirty (30) working days after receipt of the request for a time extension.
- C. Construction time generally will not include inclement weather conditions, such as rain, snow, and freezing temperatures. Extension of contract time may be allowed by the Owner based on the impact of the inclement weather on construction as determined by the Owner and in accordance with Section 00710 Paragraph 3.6.

Section 3.4 No Damage for Delay

- A. Contractor agrees to prosecute the Work and to require the subcontractors to prosecute the Work in a timely and proper method so as to meet the dates reflected on the progress schedule. In the event that the Contractor is delayed in the prosecution of the Work through no fault of the Contractor or its subcontractors, and for causes as set forth in Paragraph 3.3A and Paragraph 3.6 of Section 00710, and defined therein as Excusable Delay, then the Contractor may seek a time extension in accordance with the provisions of Paragraph 3.3B. Contractor agrees that such time extension is its sole and exclusive remedy for any damages caused by delays to the Project and that the Owner shall not be liable for any monetary delay damages. Contractor also agrees that the Owner shall not be liable for any monetary damages, including but not limited to, home office overhead, sustained by Contractor for acceleration, disruption, suspension of the work or any other damages related to the progress schedule. The Owner shall not be liable for consequential damages of any nature for any reason at any time.

Section 3.5 Liquidated Damage

- A. In order to compensate the Owner for failing to achieve the Substantial Completion Date or Final Completion Date, as such date has been adjusted for Excusable Delays as defined herein, the Contractor shall pay to the Owner as liquidated damages and not as a penalty the following amounts:
 - 1. The Contractor agrees to pay the City of Memphis the sum of (\$ _____) per day for every working day the work remains incomplete until Substantial Completion is achieved.
 - 2. The Contractor agrees to pay the City of Memphis the sum of (\$ _____) per day for each working day the punchlist work and submission of all close-out documents remains incomplete beyond thirty (30) working days from date of Substantial Completion.

Section 3.6 Working Day

- A. A working day as defined below shall constitute a day in the Contract Documents. A working day is defined as any day, except as follows:
 - 1. Saturdays, Sundays and legal holidays;
 - 2. Days on which the Contractor is prevented by inclement weather or conditions resulting immediately there from adverse to the current controlling operation or operations, as determined by the Owner, from proceeding with at least seventy-five (75) percent of the normal labor and equipment force engaged on such operation or operations for at least sixty (60) percent of the total daily time being currently spent on the controlling operation or operations; or
 - 3. Days on which the Contractor is prevented, by reason or requirements in the special provisions, from working on the controlling operation or operations for at least sixty (60) percent of the total daily time being currently spent on such controlling operation or operations.
- B. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

Section 3.7 Contract Required Means and Methods

- A. If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, during the course of construction the Contractor may furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to Owner, if the Contractor submits sufficient information to allow the Owner to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents. The procedure for review by the Owner will be similar to that provided in Section 5.5.

ARTICLE 4 - PAYMENT

Section 4.1 Schedule of Values

- A. Within ten working days after the Notice to Proceed, the Contractor shall submit to the Owner a Schedule of Values for review and approval.
- B. The Schedule of Values for all of the Work which will include quantities and prices of items aggregating the Contract Price and will subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work which will be confirmed in writing by the Contractor at the time of submission.

- C. The Schedule of Values will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to the Owner. Progress payments on account of unit price work will be based on the number of units completed.

Section 4.2 Payment Procedure

- A. Progress payments shall be made by the Owner to the Contractor in accordance with the following procedure:
 - 1. Within ten (10) working days from the Notice to Proceed, the Contractor shall send the Owner the completed schedule of values.
 - a. At least ten days before the date established for each progress payment, the Contractor shall submit to the Owner an itemized and notarized Application and Certificate for Payment, based on the Work completed during the current month, using AIA Document G702. Contractor shall not be paid any amounts exceeding the Contract Price as set forth in the construction contract, Section 00510, unless modified by a properly executed written Change Order or Change Order Directive in accordance with the Provisions of Article 9 of this Agreement.
 - 2. Each Application and Certificate for Payment, at the Owner's request, shall be accompanied by:
 - a. Payroll information.
 - b. Affidavit from each certified sub-contractor indicating they have been paid what is due them through the previous applications for payment utilizing the forms found in section 00640 or section 00641 as appropriate.
 - c. An approved updated progress schedule as required in Section 3.2.
 - d. Certification of M/WBE payments utilizing the forms found in section 00640 or section 00641 as appropriate.
 - e. Updated schedule of submittals/submittal status log per Section 15.6.
 - f. Other documentation as may be requested by the Owner for his proper review of the Application and Certificate for Payment.
 - 3. The Owner will, within ten (10) days after receipt of each Application for Payment, either begin processing the recommendation of payment or return the Application to the Contractor indicating in writing the Owner's reasons for refusing to recommend payment. In the latter case, the Contractor may make the necessary corrections and resubmit the Application.

Section 4.3 Retainage

- A. In making progress payments pursuant to Section 4.1, the Owner shall retain five percent (5%) of the approved amount of any Application and Certificate for Payment. Such retained amounts shall not be due and payable to the Contractor until Final Completion of the Work by the Contractor and Final Acceptance, as defined in Section 4.6 of this Agreement, of the Work by the

Owner. Periodic reductions in the amount of retainage will be permitted by the Owner if deemed appropriate to the state of contract completion. The contractor may retain from each sub-contractor a percentage no greater than that retained by the Owner.

- B. For Contract values of \$500,000 or greater, the retained funds must be deposited in a separate interest bearing escrow account with a third party providing proper security for the performance of the obligation of the Owner or the Contractor pursuant to T.C.A. 66-11-144. The Contractor must submit the signed documents contained in Sections 00520 "Escrow Agreement" and 00525 "Agreement Between City, Contractor, & Bank" at the time he submits his signed contract to the City. If the Contractor fails to submit these documents at the time of contract submission to the City, the City will not execute a construction contract with the Contractor.
- C. By signing this Agreement, the Contractor expressly waives (herein referred to as a "Waiver") all liens, claims, rights, encumbrances, security interests, any other benefit of, and all rights that might arise pursuant to T.C.A.' 66-11-101 et. seq. or any other Tennessee statute (herein referred to as a "Lien"). As a condition precedent to subcontracting any portion of the Work, the Contractor shall first obtain a similar universal Waiver of Lien in writing from each Subcontractor, Sub-subcontractor, materialman, supplier, lessor, vendor performing services or providing materials or labor in connection with the Work and any other person that could qualify for a Lien, claim, right or other security interest under Tennessee law.

Section 4.4 Payment for Material Stored On-Site

- A. Payment for the actual unit cost of materials suitably stored on the site of the Work and intended for incorporation in the Work will be made by the Owner to the Contractor upon storage subject to the provisions of Sections 4.1 and 4.2 and the following conditions:
 - 1. The Contractor shall furnish supporting evidence satisfactory to the Owner evidencing the cost of the materials and shipment to the site of the Work;
 - 2. The materials shall not be stored on the site of the Work for more than forty five (45) working days before they are installed in place, without the written consent of Owner;
 - 3. The materials shall be stored on site in accordance with applicable recommendations of the manufacturer and the instructions of the Owner;
 - 4. All materials delivered to the site of the Work shall be stored and handled so as to preclude inclusion of any foreign substances and to prevent any discoloration or damage which might reduce the effectiveness of the materials as part of the Work.
 - 5. Payment for stored materials will be subject to retainage as defined in Section 4.2;
 - 6. The representative of the Owner may inspect and inventory any stored materials;
 - 7. No payment will be made for stored material unless such material is specially manufactured for the Project. For example, no payment will be made for material that is commercially available such as conduit, sheetrock, piping, etc.
 - 8. Payment will not be made for materials stored off the site of the Work without the written consent of Owner. In the event that the Owner consents to payment for materials stored off site, such payment shall be conditioned upon submission by the

Contractor of bills of sale or such other documentation satisfactory to the Owner to establish the title of the Owner to such materials or equipment, and the submission of satisfactory insurance certificates for the stored materials.

Section 4.5 Use of Payments

- A. The Contractor shall use all sums paid to it pursuant to this Agreement for the performance of the Work in accordance with the Contract Documents and Article 8 of this Agreement. Upon the request of the Owner, the Contractor shall furnish satisfactory proof, including but not limited to partial releases of liens utilizing the form found in section 00640 of the contract documents, as to the disposition of any monies paid to the Contractor by the Owner; provided, however, no provision of this agreement shall be construed to require the Owner to be in any way responsible for the proper disposition or application of the monies paid to the Contractor.

Section 4.6 Payment Not a Waiver

- A. Neither the approval or making of any payment to the Contractor, nor the partial or entire use or occupancy of the Work by the Owner shall be an acceptance of any portion of Work.

Section 4.7 Final Payment, Final Acceptance and Final Completion

- A. Final Payment by the Owner shall constitute a waiver of all claims by the Owner for performance of the Work except for claims of the Owner arising from unsettled liens, incomplete or defective workmanship, defective materials, failure to perform in accordance with the progress schedule, or for the breach of any guarantees of warranties provided by the Contractor under this Agreement. Acceptance of the Final Payment by the Contractor shall constitute a waiver and release of any and all claims which the Contractor may have then or in the future have against the Owner arising from the Work or this Agreement.
- B. Final Completion of the Work shall occur only after all Work (including punch list items) provided for in the Contract Documents has been finally completed ("Final Completion"). Final Acceptance of the Work shall occur when all Work has been accepted in writing by the Owner and the Contractor has provided the Owner with instructions and operating manuals, parts lists, modified construction documents approved by the Owner are suitable for preparing final "as-built" drawings, final release of liens by all subcontractors utilizing the form found in section 00641 of the contract documents, final release of liens from the General Contractor utilizing the form found in section 00642 of the contract documents and all other items required by the Contract Documents and this Agreement ("Final Acceptance").
- C. Neither the Final Payment nor the remaining retainage shall become due until the Contractor submits to the Owner the following:
 - 1. An affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or its property might in any way be responsible, have been paid or otherwise satisfied;
 - 2. A consent of surety to Final Payment; and

3. Other data establishing payment or satisfaction of all such obligations, such as receipts, final release of liens by all subcontractors utilizing the form found in section 00641 of the contract documents and final release of liens from the General Contractor utilizing the form found in section 00642 of the contract documents.
- D. If any subcontractor, sub-subcontractor, laborer, vendor or materialman refuses to furnish a release or waiver required by the Owner, the Contractor shall furnish a bond satisfactory to the Owner to indemnify it against any such lien. If any such lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees incurred by Owner.
- E. The Owner shall issue a Certificate of Final Completion when, the Project has been completed and all conditions required by Paragraph 4.7 have been complied with by Contractor.

Section 4.8 The Right of Owner to Withhold Payment

- A. The Owner may withhold or, on account of subsequent discovered evidence, nullify the whole or part of any payment, including Final Payment, and withhold retainage, to such extent as may be necessary to reasonably protect itself from any of the following:
 1. Defective work; or
 2. Third party claims filed or reasonable evidence indicating probable filing of such claims; or
 3. Reasonable doubt that the Work will be substantially completed by the Substantial Completion Dates; or
 4. Failure of the Contractor to make payments to subcontractors or for equipment, materials or labor; or
 5. Evidence of fraud, over billing or overpayment; or
 6. Failure of the Contractor to prosecute the Work in accordance with the Contract Documents; or
 7. A reasonable doubt that the Work can be completed for the unpaid balance of the Lump Sum Price as defined herein; or
 8. Damage to another contractor, subcontractor or sub subcontractor caused by the Contractor; or
 9. Failure to submit M/WBE Certificate of Payment; or
 10. Failure to pay Prevailing Wage Rates per Section 00100, paragraph 20; or
 11. Failure of the Contractor to maintain monthly updates to the As-Built Drawings.
 12. Failure of the Contractor to submit partial release of liens from all subcontractors utilizing the form found in section 00640 of the contract documents.

ARTICLE 5 - EQUIPMENT AND MATERIALS

Section 5.1 Materials Provided by Contractor

- A. Unless otherwise provided in the Contract Documents, the Contractor shall provide all equipment, materials, labor, tools, water, power to the site of the Work, and all other facilities necessary for the performance of the Work.
- B. All equipment, machinery, material, and articles incorporated in the Work shall be new and unused, and when not specified in detail in the Contract Documents, the same shall be of the most suitable grade and quality for the purpose intended.

Section 5.2 Type of Equipment Used

- A. When any equipment, material or article is referred to by trade name, make or catalog number, the reference shall be regarded as establishing the standard of quality and performance required and shall not be construed as limiting competition. The Contractor may, with the prior written approval of the Owner, use other equipment, materials or articles which are equal in quality and performance to that named in the Contract Documents; provided, however, that in no event shall such approval be construed as a waiver of the right of Owner to require equipment, materials or articles which conform to the standard of quality and performance established by reference to the trade name, make or catalog number of the equipment, materials or article for which the situation has been approved. Any cost of re design and additional expense resulting from the substitution shall be at the sole expense of the Contractor.

Section 5.3 Non-Conforming Materials

- A. Equipment, materials or articles installed or used in the Work which do not comply with the requirements of the Contract Documents, and which have not been previously approved in writing by the Owner shall be installed or used at the risk to the Contractor of subsequent rejection by the Owner.
- B. The Contractor shall be fully and solely responsible for quality control for all materials used in the performance of the Work.

Section 5.4 Owner Furnishing Equipment or Fixtures

- A. The Owner may directly furnish any or all of the equipment or fixtures required for the Project. In the event the Owner elects to do so, the contract contingency shall be increased by the amount which was to be charged by the Contractor for such equipment or fixtures as set forth and included in the Contract Documents. A Construction Change Order increasing the contract contingency for that item of work shall be executed by Owner and Contractor to reflect an increase in the contract contingency for that item of Work. The Contractor shall assume responsibility for and be fully responsible for the care, custody and control of all Owner furnished equipment once said equipment arrives on the job site or in any approved off site storage facility.

Section 5.5 Substitutes or “Or Equal” Items

- A. Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier the naming of the item is intended to establish the type, function and quality required. Unless the name is followed by words indicating that no substitution is permitted, materials or equipment of other Suppliers may be accepted by the Owner if sufficient information is submitted by the Contractor to allow the Owner to determine that the material or equipment proposed is equivalent or equal to that named. The procedure for review by the Owner will include the following as supplemented in the General Requirements.
1. Requests for review of substitute items of material and equipment will not be accepted by the Owner from anyone other than the Contractor.
 2. The Contractor shall make written application to the Owner for acceptance thereof;
 3. The application will certify that the proposed substitute will perform adequately the functions and achieve the results called for by the general design;
 4. The application will state that the substitution is similar and of equal substance to that specified and be suited to the same use as that specified;
 5. The application will state that the evaluation and acceptance of the proposed will not prejudice the Contractor’s achievement of Substantial Completion on time;
 6. The application will state whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with the Owner for work on the Project) to adapt the design to the proposed substitute;
 7. The application will state whether or not incorporation or use of the substitute in with the Work is subject to payment of any license fee or royalty;
 8. The application will identify all variations of the proposed substitute from that specified and also indicate available maintenance, repair and replacement service;
 9. The application will also contain an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which shall be considered by the Owner in evaluating the proposed substitute. The Owner may require the Contractor to furnish at the Contractor’s expense additional data about the proposed substitute;
- B. The Owner will be allowed a reasonable time within which to evaluate each proposed substitute during the course of construction. The Owner will be the sole judge of acceptability, and no substitute will be ordered, installed or utilized without the Owner’s prior written acceptance which will be evidenced by either a Change Order or an approved Shop Drawing. The Owner may require the Contractor to furnish at the Contractor’s expense a special performance guarantee or other surety with respect to any substitute. The Owner will record the Owner’s consultants in evaluating substitutions proposed by the Contractor and in making changes in the Contract Documents occasioned thereby.

ARTICLE 6 - "AS BUILT" DRAWINGS AND DATA

Section 6.1 "As Built" Drawings

- A. A complete set of drawings shall be maintained by the Contractor at the construction site for the purpose of showing "as built" conditions. The drawings shall be kept up to date and marked each day to show all changes and variations and each entry shall be dated and verified as made. At the completion of the Work and prior to Final Payment, a complete set of modified construction documents approved by the Owner and suitable for preparing final "as built" drawings shall be submitted to the Owner.

Section 6.2 Operation Maintenance Data and Training (Not Applicable)

Section 6.3 Information From Suppliers (Not Applicable)

ARTICLE 7 - SUBCONTRACTS

Section 7.1 Definition

- A. As used in the Contract Documents, a "Subcontractor" is a person or organization that has a contract with the Contractor to perform any portion of the Work or to furnish any equipment or materials to the Project.
- B. As used in the Contract Documents, a "Sub subcontractor" is a person or organization that has a direct or indirect contract with the Subcontractor to perform any portion of the Work, or to furnish any equipment or materials to the Project.

Section 7.2 No Contractual Relationship with Owner

- A. Nothing contained in the Contract Documents or otherwise shall create any contractual relationship between the Owner and any Subcontractor or Sub subcontractor, and no subcontract or sub subcontract shall relieve the Contractor of its responsibilities and obligations should any Subcontractor or Sub subcontractor fail to perform its work in a satisfactory manner. The Contractor agrees to be as fully responsible to the Owner for the acts and omissions of its Subcontractors and their Sub subcontractors and of persons either directly or indirectly employed by them as it is for the acts and omissions of persons directly employed by it.

Section 7.3 Award of Subcontracts

- A. Unless otherwise specified in the Contract Documents, the Contractor, within fourteen (14) working days after bids are opened, the apparent low bidder, and any other bidder so requested, shall submit a list of all subcontractors he expects to use in the work. An experience statement with pertinent information as to similar projects and other evidence of qualification shall be furnished for each named subcontractor, as requested by the City. If the City, after due

investigation, has a reasonable objection to any proposed subcontractor, he may, before contract execution, request the apparent low bidder to submit an acceptable substitute without an increase in his/her bid. If the apparent low bidder declines to make any such substitution, he will not thereby sacrifice his/her bid security. Any subcontractor so listed and to whom the City does not make any written objection prior to contract execution will be deemed acceptable to Owner. The Contractor shall not be required to employ any subcontractor against whom he has reasonable objection. The use of subcontractors listed by the bidder and accepted by the City prior to contract execution will be required in the performance of the work. Every subcontractor proposed for this project shall be required to execute the appropriate City form entitled "Construction Contract Certificate of Non-Discrimination", Section 00420.

- B. The Contractor shall not contract with any Subcontractor or material supplier (nor shall they contract with any Sub subcontractor) or any person or organization (including those who are to furnish materials or equipment) proposed for portions of the Work designated in the Contract Documents or, if none is so designated, with any Subcontractor proposed for principal portions of the Work who has not been previously approved in writing by the Owner.
- C. If the Owner, for good cause, refuses to accept any Subcontractor or material supplier (or Sub subcontractor) or person or organization on a list submitted by the Contractor, the Contractor shall submit an acceptable substitute. The Contractor shall indemnify, defend and hold harmless the Owner, its directors, officers and employees from all liabilities, claims or causes of action arising from the rejection of any Subcontractor, Sub subcontractor or material supplier by the Owner.

Section 7.4 Change of Subcontractors

- A. The Owner may require a change of any Subcontractor. In such event, the Contractor shall submit a suitable substitute which is approved by the Owner.

Section 7.5 Substitution of Subcontractors

- A. The Contractor shall not make any substitution for any Subcontractor nor allow the substitution of any Sub subcontractor who has been accepted by the Owner, unless the substitution is required and previously approved by the Owner. Acceptable reasons for substitution (other than where required by the Owner) shall be limited to the following:
 - 1. Inability of the Subcontractor or Sub-subcontractor to provide bonds, if required;
 - 2. Failure of the Subcontractor or Sub-subcontractor to perform according to approved schedules or other provisions of the Contract Documents; or
 - 3. Other reasons which would reasonably render the Subcontractor or Sub-subcontractor unable to perform its work according to the Contract Documents as evidenced in writing by the Contractor.

Section 7.6 Subcontract Terms

- A. All portions of the Work performed by a Subcontractor or Sub subcontractor shall be pursuant to an appropriate agreement between the Contractor and the Subcontractor (and where appropriate between Subcontractors and Sub subcontractors) which shall contain provisions that:
1. Preserve and protect the rights of the Owner under the Contract Documents with respect to the portion of the Work to be performed under the Subcontract (or Sub subcontract) so that the subcontracting will not prejudice such rights;
 2. Require that such work be performed in accordance with the requirements of the Contract Documents;
 3. Require submission to the Contractor of applications for payment under each subcontract to which the Contractor is a party including a partial release of liens utilizing the form found in section 00640 of the contract documents;
 4. Require that all requests for additional compensation, extensions of time or otherwise with respect to subcontracted portions of the Work shall be submitted to the Contractor (via any Subcontractor or Sub subcontractor where appropriate) in sufficient time so that the Contractor may comply in the manner provided in the Contract Documents for like requests by the Contractor upon the Owner; and
 5. Obligate each Subcontractor or Sub subcontractor specifically to consent to the provisions of Sections 3.2, 3.3, 3.4, 16.1, 24.2 and 24.3.

Section 7.7 Subcontractor Reporting

- A. Contractor shall submit and, as necessary, update subcontractor information (including but not limited to payments thereto), for any and all subcontractors used on City project(s), in the Owner's compliance tracking software, B2GNow. The City shall have the right to withhold future disbursement of funds under this Agreement and any future agreements until the requirements of this provision have been met.

ARTICLE 8 - PAYMENT TO SUBCONTRACTORS FROM CONTRACTOR

Section 8.1 Payments to Subcontractors From the Contractor

- A. The Contractor shall pay each Subcontractor an amount equal to the percentage of completion allowed to the Contractor on account of the work of such Subcontractor, less the percentage retained from payments to the Contractor. The Contractor shall also require each Subcontractor to make similar payments to its Sub subcontractors.

Section 8.2 Withholding of Payment by the Owner

- A. If the Owner withholds monies for any cause which is the fault of the Contractor and not the fault of a particular Subcontractor, the Contractor shall pay that Subcontractor on demand, made at any time after the progress payment by the Owner should otherwise have been issued, for its work to the extent completed, less the retained percentage. Notwithstanding this Section 8.2, Contractor may withhold funds from any Subcontractor that is not performing its work in accordance with the Contract Documents. If the Owner has paid the Contractor for the work of a Subcontractor, which is withheld by the Contractor, then the Contractor shall refund to the Owner all funds paid by the Owner for such Subcontractor's work.

Section 8.3 Independent Obligation to Pay

- A. The obligation of the Contractor to pay its subcontractors (and their obligation to pay sub subcontractors) is an independent obligation from the obligation of the Owner to make payment to the Contractor. The Owner shall have no obligation to pay or to see to the payment of any monies to any Subcontractor or Sub subcontractor.

ARTICLE 9 - CHANGES

Section 9.1 Changes in The Work

- A. The Owner, without invalidating the Agreement, may order extra work or make changes by altering, adding to or deducting from the Work by executing a Change Order, Change Order Directive, Construction Change Order or Construction Change Order Directive in a form provided by the Owner. A Change Order/Change Order Directive is defined as any change to the contract which increases the lump sum contract amount or increases contract time. A Construction Change Order/Construction Change Order Directive is defined as any action taking place within the confines of the contract contingency fund. A Construction Change Order can not change the lump sum contract amount nor can it change contract time. All work performed pursuant to a valid Change Order/Change Order Directive or Construction Change Order/Construction Change Order Directive shall be performed under the conditions of this Agreement and the Contract Documents.
- B. The Owner shall have authority to make changes in the Work not involving extra cost, and not inconsistent with the purposes of the Work, but otherwise, no extra Work or change in the Work shall be made unless pursuant to a Change Order and no claim by Contractor for additional cost or fee or any extension of the Substantial Completion Date shall be valid unless so ordered in a written Change Order.

Section 9.2 Change Order / Construction Change Order Procedure

- A. Upon receipt of a request from the Owner for extra Work or changes in the Work, the Contractor shall furnish to the Owner a statement setting forth in detail the proposal of the Contractor for performing the extra Work or changes and the effect of the extra Work or changes, if any, on the Lump Sum Price / Substantial Completion Date (Change Order) or changes in the contingency fund (Construction Change Order). If the Owner approves in writing the proposal of the Contractor, a Change Order or Construction Change Order in the form provided by the Owner shall be executed by the parties and the Lump Sum Price or Substantial Completion Date or the contingency fund shall be adjusted accordingly.

Section 9.3 Changes in the Lump Sum Price / Contingency Fund

- A. Increases in the Scope: The increase in the Lump Sum Price or decrease in the contract contingency fund attributable to a Change Order/Construction Change Order or Change Order Directive/Construction Change Order Directive (as defined in Section 9.4 "Force Account"), performed by the Contractor or any of its subcontractors shall not exceed the sum of the following:
 - 1. The actual labor cost to perform the Change Order/Construction Change Order or Change Order Directive/Construction Change Order Directive, including insurance and taxes;
 - 2. The actual unit cost of materials used in performing the Change Order/Construction Change Order or Change Order Directive/Construction Change Order Directive, including sales taxes;
 - 3. The actual cost for additional bond (change orders/change order directives only); and
 - 4. For Change Order/Construction Change Order or Change Order Directive/Construction Change Order Directive, the total percent of overhead and profit (OH&P), shall not exceed the following:
 - a. Change Order / Construction Change Order or Change Order Directive / Construction Change Order Directive involving contractor's work only: The contractor shall be entitled to a 10% OH&P mark-up.
 - b. Change Order / Construction Change Order or Change Order Directive / Construction Change Order Directive involving subcontractor and contractor work: The firm(s) doing the work shall be entitled to a 10% OH&P mark-up. The contractor shall be entitled to a 5% OH&P Mark-up on the subcontractor's work.
 - c. Change Order/Construction Change Order or Change Order Directive/Construction Change Order Directive involving multiple (two or more) tiers of subcontractors: The firm(s) doing the work shall be entitled to a 10% OH&P mark-up. One 5% OH&P subcontractor mark-up shall be allowed. The contractor shall be entitled to a 5% OH&P mark-up on the subcontractor's work.

- B. Decreases in the Scope: The decrease in the Lump Sum Price or increase in the contract contingency fund attributable to a Change Order/Construction Change Order or Change Order Directive/Construction Change Order Directive deleting a portion of the Scope of Work shall equal the sum of the following:
1. The actual labor cost that the Contractor would have incurred to perform the Work deleted in the Change Order/Construction Change Order or Change Order Directive/Construction Change Order Directive including the cost of over head, profit, general conditions, insurance and taxes.
 2. The actual unit cost of materials, supplies, products, equipment and rental equipment that the Contractor would have used in performing the Work deleted in the Change Order/Construction Change Order or Change Order Directive/Construction Change Order Directive, including sales taxes;
 3. The actual cost of Subcontractors and Sub-subcontractors that the Contractor would have incurred in performing the Work deleted in the Change Order/Construction Change Order or Change Order Directive/Construction Change Order Directive, including overhead, profit, general conditions, insurance and taxes; and
 4. The actual credit for the cost associated with the lower limits required for the bonds including Subcontractor and Sub-subcontractor bonds, if applicable, as a result of the reduction in the Scope of the Work.

Section 9.4 Force Account

- A. In the event that the Owner and the Contractor cannot agree on the amount or extension, if any, due to the Contractor for a Change Order or Construction Change Order pursuant to this Agreement, the Owner may direct the Contractor to proceed the performance of the Change Order or Construction Change Order by a Change Order Directive or Construction Change Order Directive as applicable. In such event, the Contractor's compensation will be calculated pursuant to the provisions of Section 9.3.

Section 9.5 Unconditional Obligation to Proceed

- A. Notwithstanding anything herein to the contrary, the Contractor will proceed with the Work so as to complete the Work on or before the Substantial Completion Dates even if it has a dispute with the Owner concerning the amount to be paid under this Section or any extension of time which is or could be due to the Contractor pursuant to a Change Order/Construction Change Order or Change Order Directive/Construction Change Order Directive or otherwise.

Section 9.6 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the established unit prices for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. The estimated

quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by the Contractor will be made by the Owner.

- B. Each unit price will be deemed to include an amount considered by the Contractor to be adequate to cover the Contractor's overhead and profit for each separately identified item.
- C. Where the quantity of any item of Unit Price Work performed by the Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement and there is no corresponding adjustment with respect to any other item of Work and if the Contractor believes that the Contractor has incurred additional expense as a result thereof, the Contractor may request a Change Order per Section 9.2.

ARTICLE 10 - THE UNDERSTANDING OF THE CONTRACTOR

Section 10.1 Examination of Work Site

- A. The Contractor acknowledges that it has, by careful examination, satisfied itself as to the nature and location of the Work, the conformation of the ground, the character, quality and quantity of the materials, equipment and facilities needed preliminary to and during the prosecution of the Work, the general and local conditions and all other matters which can in any way affect the Work.
- B. If the Owner has obtained any geotechnical data, soil and subsurface tests and other soil engineering tests and reports in areas where the Work is to be performed for the purpose of study and design, which data, tests and reports will be made available to Contractor on request. The interpretation of such data, tests and reports shall be the sole responsibility of the Contractor. Owner does not assume any responsibility whatsoever in respect to the sufficiency or accuracy of such investigation, the reports thereof, or the interpretation set forth and there is no warranty or guarantee, either express or implied, that the conditions indicated by such investigations or records thereof are representative of those existing throughout such areas, or any part thereof, or that unforeseen developments may not occur, or that materials other than or in proportions different from those indicated may not be encountered. Notwithstanding anything herein to the contrary, should the Contractor encounter underground conditions which were unknown, unforeseen in the exercise of the Contractor's best professional judgment, and not reflected on the geotechnical data, the soils and subsurface tests or reports furnished to or available to the Contractor, the Contractor shall be reimbursed, pursuant to Section 9.3 of this Agreement, by the Owner for all actual documented additional costs incurred by the Contractor as a result of the unknown and unforeseen underground conditions.

Section 10.2 Sufficiency of Contract Documents

- A. The Contractor acknowledges that the Contract Documents are sufficient to enable it to determine the cost of all of the Work and that the Work can be completed in accordance with the Contract Documents for the Lump Sum Price.
- B. The Contractor acknowledges that any observed discrepancies, omissions, ambiguities or conflicts in the Contract Documents will be brought to the attention of the Owner, as set forth in Section 2.3 "Errors in Contract Documents" of this Agreement, and in a timely manner in order to insure substantial completion of the Work by the Substantial Completion Dates. In addition, the Contractor acknowledges that the Owner has not made nor shall it be deemed to have made any warranties, guarantees or representations of any kind whatsoever regarding the sufficiency of the Contract Documents.
- C. The Owner shall not be responsible for any damages resulting from any errors, inconsistencies or omissions in the Contract Documents which were discovered or observed and not noted by the Contractor in accordance with Paragraph (B) and Section 2.3.

Section 10.3 No Oral Modification

- A. No oral agreement or conversation with any officer, agent or employee of the Owner or its representatives, either before or after the execution of this Agreement shall affect or modify any of the terms or obligations contained in this Agreement or the Contract Documents. No extra compensation will be due from the Owner as a result of the Contractor not being aware of any matter which may affect the Work.

ARTICLE 11 - THE REPRESENTATIVE OF THE OWNER

Section 11.1 The Representative of the Owner

- A. The Representative of the Owner (The Owner is defined as the City of Memphis) will be a City project manager assigned from the Transportation Planning and Design Office of the Division of Engineering. The Owner will also be represented by an inspector from the Office of Construction Inspections of the Division of Engineering. The Owner shall have the right to replace the Representative of the Owner at any time with or without cause.

Section 11.2 Decisions of the Owner

- A. Initial Decision: The Representative of the Owner shall decide meaning and intent of the technical specifications and any plan or drawing where same may be found obscure or to be in dispute.
- B. Final Decision: Any unresolved dispute between the Representative of the Owner and the Contractor shall be referred to the Transportation Planning and Design Administrator for resolution. Should the Contractor not be satisfied with the decision of the Transportation

Planning and Design Administrator, he shall be allowed to appeal the decision to the City Engineer, who, after such hearings and discussions as he deems appropriate, shall render a final and conclusive decision.

- C. Disputes: Any dispute arising from the execution of this contract shall be governed, construed and enforced according to the laws of the State of Tennessee. All actions, whether sounding in contract or in tort, relating to the validity, the construction, the interpretation, and the enforcement of this contract shall be instituted and litigated in courts of the State of Tennessee located in Shelby County, Tennessee, and in no other. In accordance herewith parties to this contract submit to the jurisdiction of the courts of the State of Tennessee, located in Shelby County, Tennessee.

ARTICLE 12 - SUPERVISION OF THE WORK; SAFETY AND SECURITY

Section 12.1 The Project Management of the Contractor

- A. The Contractor shall designate in writing to the Owner and keep on the Work during its progress a competent Project Management Team, including at a minimum a Project Manager and a Superintendent, satisfactory to the Owner. Any of these individuals shall be changed upon written request of the Owner, but shall not be changed by the Contractor except with the consent of the Owner. These individuals shall represent the Contractor and all directions given to any of them by the Owner shall be as binding. These individuals shall devote their full time to the Work and shall maintain an office on the site of the Work. They shall direct, coordinate and supervise all Work, inspect all materials delivered to the site of the Work to ascertain whether or not they comply with the requirements of the Contract Documents, and reject all non conforming materials or workmanship.
- B. The Superintendent shall be designated by the Contractor in writing at the time of submission of proposed subcontractors and a list of work experience shall be submitted for the Superintendent. The Superintendent shall be subject to the approval of the Owner. The Owner shall be notified immediately in writing of any change in superintendent. A list of work experience shall be submitted for the newly designated superintendent.

Section 12.2 Order and Discipline

- A. The Contractor shall at all times be responsible for enforcing strict discipline and good order among its employees, and any employee of its subcontractors and sub subcontractors. If any person on the site of the Work shall appear to be incompetent, disorderly or intemperate, in any way disrupts or interferes with the Work, or is in any other way disqualified for or unfaithful to the job entrusted to him, such person shall be discharged immediately and he shall not again be employed on the Work without the prior written consent of the Owner.

Section 12.3 Cleaning Up

- A. During the performance of the Work, the Contractor shall keep the site of the Work clean and free of all rubbish, waste materials, debris and other materials in accordance with the instructions set forth in the Contract Documents. At the end of each working day the Contractor shall remove all waste materials, rubbish and debris from and about the Work as well as all surplus materials, and will leave the site of the Work clean in accordance with the Contract Documents.

Section 12.4 Safety and Security

- A. The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to:
 - 1. employees on the Work and other persons who may be affected thereby;
 - 2. the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
 - 3. other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.
- B. The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.
- C. The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.
- D. When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such The Contractor shall promptly remedy all damage or loss to any property referred to in clause 12.4.A.2 activities under supervision of properly qualified personnel.
- E. The Contractor shall promptly remedy all damage or loss to any property referred to in clause 12.4.A.2 and 12.4.A.3 caused in whole or in part by the Contractor, any Subcontractor, and Sub-subcontractor, anyone directly or indirectly employed by and of them, or by anyone for whose acts any of them may be liable, and for which Contractor is responsible under clause 12.4.A.2 and 12.4.A.3.
- F. The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's Superintendent unless otherwise designated by the Contractor in writing to the Owner.
- G. These construction documents and the construction hereby contemplated are to be governed at all times by applicable provisions of the Federal and Local Laws including but not limited to the latest amendments of the following:

1. William-Steiger Occupational Safety and Health Act of 1970 Public Law 91-596.
 2. Part 1910 -Occupational Safety and Health Regulations for Construction, Chapter XIII of Title 29, Code of Federal Regulations.
 3. Part 1518 - Safety and Health Regulations for Construction , Chapter XII of Title 29, Code of Federal Regulations.
- H. Contractor alone shall be responsible for the safety, efficiency, and adequacy of his/her plant, appliances and methods; and for any damage which may result from their failure or their improper construction, maintenance or operation.
- I. In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the Owner, is obligated to act to prevent threatened damage, injury or loss. The Contractor shall give the Owner prompt written notice if the Contractor believes that any significant changes in the Work or variations from the Contract Documents is required because of the action taken in response to an emergency, a Change Order may be issued to document the consequences of the changes or variations.

Section 12.5 Inspection of the Work

- A. The Owner and persons designated by the Owner shall at all times have access to the Work whenever it is in preparation or progress and the Contractor shall provide proper facilities for such access and for inspection. If the Owner discovers any defective Work in connection with any inspection, it shall report such defective Work to the Contractor in writing and the Contractor shall, at its expense, correct it.
- B. If the Contract Documents, the written instructions of the Owner, laws, ordinances, rules or regulations, or any public authority require any of the Work to be specifically tested or inspected, the Contractor shall give the Owner timely notice of its readiness for inspection and testing, and if the test or inspection is performed by an authority other than the Owner, of the date set for such test or inspection. Inspections by the Owner shall be promptly made and, where practicable, at the source of supply. If any of the Work should be covered up without the approval or consent of the Owner or any necessary authority, it shall be uncovered for examination, if required by the Owner or such other authority, at the sole expense of the Contractor.
- C. Re examination of questioned Work that has been previously inspected by the Owner may be ordered by the Owner and, if so ordered, the questioned Work shall be uncovered by the Contractor. If such Work is found to be in compliance with the Contract Documents, the Owner shall pay the actual cost of the re examination and repairs. If such Work is found not to be in compliance with the Contract Documents, the Contractor shall bear the costs of the re examination and repairs.

ARTICLE 13 - PERMITS, LICENSES, LAWS AND REGULATIONS

Section 13.1 Contractor to Secure all Permits

- A. The Contractor shall secure and pay for all permits. Contractor shall be responsible for all inspections required by the City in conjunction with the issuance of said permits. Contractor shall secure and pay for all governmental fees, utilities, licenses and other permits necessary for the lawful and proper execution and completion of the Work.

Section 13.2 Compliance with Laws

- A. The Contractor shall give all notices and shall comply with all laws, ordinances, rules, regulations and orders of any public authority having jurisdiction over the Work, which have any bearing on the execution of the Work. If the Contractor observes that any of the Contract Documents are at variance in any respect with any such laws, ordinances, rules, regulations and orders, it shall promptly notify the Owner in writing and any necessary changes shall be made. If the Contractor fails to give such notice or executes any of the Work when it knew or should have known such Work was contrary to any such laws, ordinances, rules, regulations or orders, it shall bear all resulting costs to correct said Work to comply with such laws and regulations and be liable for any resulting fines, penalties, judgments or damages imposed on or incurred by the Owner.
- B. The Contractor certifies that it is qualified or will take steps necessary to qualify to do business in the State of Tennessee and that it shall take such action as, from time to time, may be necessary to remain so qualified and shall obtain and maintain, at its own expense, all licenses, permits, insurance, and governmental approvals, if any, necessary to the performance of its obligations under this Agreement. Such permits and licenses shall be made available to the City, upon request.
- C. The Contractor is assumed to be familiar with and shall comply with all applicable federal, state, and local laws, ordinances, and regulations in performing any of its obligations under this Agreement, including but not limited to the Fair Labor Standards Act, Occupational Safety and Health Administration (OSHA), and the Americans with Disabilities Act (ADA). The Contractor shall promptly notify the City of any conflict discovered between this Agreement and any applicable laws, rules, regulations, and/or permits and licenses, and await resolution of the conflict

ARTICLE 14 - TAXES

Section 14.1 Payment of Taxes by Contractor

- A. Any and all taxes, excise, duties and assessments in any manner levied, assessed or imposed by any government or subdivision or agency having jurisdiction over the Work (other than taxes on the real property of Owner) shall be the sole responsibility and liability of the Contractor. The

taxes to be paid by the Contractor are those legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

- B. The Contractor shall promptly pay and discharge when due, unless the validity or application is being contested by the Contractor in good faith, any and all taxes, excises, duties and assessments, together with any interest and penalties, if any, the responsibility and liability for which the Contractor has assumed pursuant to the provisions of Paragraph (a), unless any such tax, excise, duty or assessment is levied, assessed or imposed upon the Owner, in which case the Owner shall promptly give the Contractor notice of such levy, assessment or imposition, whereupon the Contractor shall promptly pay and discharge the same. Upon the written request and at the sole expense of the Contractor, the Owner shall assist the Contractor in contesting the validity or application of any such levy, assessment or imposition, and in the event a refund of all or any part of any tax, excise, duty or assessment (including interest and penalties, if any), said refund shall be refunded to the Contractor (less the amount of expenses associated with such contest not previously reimbursed by the Contractor to the Owner).

ARTICLE 15 - SHOP DRAWINGS AND SAMPLES; MATERIAL TESTING

Section 15.1 Definitions

- A. As used in this Agreement "Shop Drawings" are drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are prepared by the Contractor, any subcontractor, sub subcontractor, manufacturer, supplier or distributor, and which illustrates some portion of the Work. Five (5) copies of required shop drawings shall be submitted to the City for review approval or correction. One (1) copy shall be returned to the Contractor with approval or rejection.
- B. As used in this Agreement, "Samples" are physical examples furnished by the Contractor to illustrate materials, equipment or workmanship.

Section 15.2 Submissions

- A. Contractor shall review, stamp with its approval and submit, in orderly sequence so as to cause no delay in the Work or the work of any other contractor, all Shop Drawings and Samples required by the Contract Documents or subsequently by the Owner. Shop Drawings and Samples shall be properly identified as specified in the Contract Documents, or as the Owner may require. At the time of submission the Contractor shall inform the Owner in writing of any deviation in the Shop Drawings or Samples from the requirements of the Contract Documents.
- B. By approving and submitting Shop Drawings and Samples, the Contractor represents that it has determined and verified all field measurements, field construction criteria, materials, catalog numbers and other data, and that it has checked and coordinated each Shop Drawing and Sample with the requirements of the Work and the Contract Documents.

Section 15.3 Review by The Owner

- A. The City will review and approve Shop Drawings and Samples within fourteen (14) working days for conformance with the design concept of the Work and with the information given in the Contract Documents. The approval of the Owner or its agents of a given item shall not indicate approval of an assembly in which the item functions.
- B. The approval by the Owner of Shop Drawings or Samples shall not relieve the Contractor of responsibility for any deviation from the requirements of the Contract Documents unless the Contractor has informed the Owner in writing of such deviation at the time of submission and the Owner has given written approval of the specific deviation, nor shall the approval of the Owner relieve the Contractor from responsibility for errors or omissions in the Shop Drawings or Samples.

Section 15.4 Corrections Made by Contractor

- A. The Contractor shall make any corrections required by the Owner and shall submit the required number of corrected copies of Shop Drawings or new Samples until approved. The Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections requested by the Owner on previous submissions.

Section 15.5 Prior Approval Required

- A. No portion of the Work requiring a Shop Drawing or Sample submission shall be commenced until the submission has been approved by the Owner. All such portions of the Work shall be performed in accordance with approved Shop Drawings and Samples and the Contract Documents.

Section 15.6 Submittal Schedule

- A. Within seven (7) working days after execution of this Agreement, the Contractor shall provide the Owner with a preliminary submittal schedule of the dates that each Shop Drawing or Sample will be submitted for approval. Within thirty (30) working days after execution of this Agreement, the Contractor shall provide the Owner with a final schedule of the dates that each Shop Drawing or Sample will be submitted for approval. The sequence of the submittals of the Contractor shall be scheduled so as to permit an orderly review by the Owner. The schedule shall allow reasonable added time according to the number or complexity of Shop Drawings in each submittal for the checking, correction and rechecking of corrections, as well as for return of approved or rejected Shop Drawings and Samples to the Contractor. The submittal schedule shall allow not less than fourteen (14) working days for the Owner to review any Shop Drawing or Sample.

Section 15.7 Material Testing

- A. If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any portion of the Work to be inspected, tested or approved, the Contractor shall give the Owner timely notice of its readiness so the Owner may observe such inspection, testing or approval. The Owner shall bear all costs of other inspection, tests or approvals.
- B. If the Owner determines that any Work requires special inspection, testing or approval which paragraph 15.7(A) does not include, he will instruct the Contractor to order such special inspection, testing or approval, and the Contractor shall give notice as provided in paragraph 15.7(A). If such special inspection or testing reveals a failure of the Work to comply with the requirements of the Contract Documents, the Contractor shall bear all costs thereof, including compensation for the Owner's additional services made necessary by such failure; otherwise the Owner shall bear such costs, and an appropriate Change Order or Construction Change Order shall be issued.

ARTICLE 16 - THE RIGHT OF THE OWNER TO AUDIT

Section 16.1 Right to Audit

- A. The Contractor shall keep full and accurate records of all costs incurred and items billed in connection with the Work, which records shall be open to audit by the Owner, or any authorized representative for the Owner, during the course of the Work and until five (5) years after the Final Payment by Owner. In addition, the Contractor shall make it a condition of all subcontracts and sub subcontracts entered into in furtherance of the Work that any and all Subcontractors and Sub subcontractors will keep accurate records of costs incurred and items billed in connection with the subcontract (or sub subcontract), and that such records shall be open to audit by the Owner, or any authorized representative of the Owner, during the course of the Work of the Subcontractor (or Sub subcontractor) and until four (4) years after Final Payment by the Owner to the Contractor. The failure of the Contractor to obtain such a clause in any subcontract (or sub subcontract) shall be grounds for termination of this Agreement by the Owner.

Section 16.2 Review of Subcontracts

- A. The Contractor shall provide the Owner with an executed copy of all subcontracts, sub subcontracts and purchase orders entered into in furtherance of the Work, within seven (7) working days after the execution by Contractor of any and all subcontracts. Notwithstanding the provisions of this section, the Contractor shall furnish all M/WBE information, including copies of Subcontracts, in a timely manner and as set forth in Article 27.

ARTICLE 17 - SEPARATE CONTRACTS

Section 17.1 The Right of The Owner to Award Separate Contracts

- A. The Owner reserves the right to award other contracts in connection with work at or in the vicinity of the Work and the Contractor agrees to cooperate fully and not to unreasonably interfere with the work of such other contractors.

Section 17.2 Cooperation

- A. The Contractor shall afford the other contractors of Owner the opportunity for the introduction and storage of their materials and equipment and the execution of their work, and shall, in accordance with the Contract Documents, properly connect and coordinate the Work with their work.

Section 17.3 Inspection of Work of Other Contractors

- A. If any part of the Work depends for proper execution or results upon the work of any other of the contractors of Owner, the Contractor shall inspect and promptly report to the Owner any discrepancies or defects in such work that render it unsuitable for such proper execution or results. Failure of the Contractor to so inspect and report shall constitute an acceptance of the Work of the other contractor as fit and proper to receive the Work.

Section 17.4 Responsibility for Damage

- A. Should the Contractor cause damage to the work or property of any other contractor of the Owner, including but not limited to, delay, disruption, suspension of work and/or acceleration damages, the Contractor shall settle with such other contractor by agreement or arbitration (if appropriate) if the other contractor will so settle. If such other contractor sues the Owner on account of any damage alleged to have been so sustained, the Owner shall notify the Contractor who shall defend such proceedings at the expense of the Contractor, or provide counsel of Owner's choice for Owner at the expense of Contractor, and if any judgment or award against the Owner results, the Contractor shall pay or satisfy it and shall reimburse the Owner for all attorney's fees and court costs which the Owner has incurred.

Section 17.5 Owner's Right to Clean Up

- A. If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish as described in Section 12.3, the Owner may clean up and allocate the cost amount those responsible as determined by the Owner.

ARTICLE 18 - WARRANTIES OF THE CONTRACTOR

Section 18.1 Warranty of Title

- A. The Contractor warrants and guarantees that title to all Work, materials and equipment covered by an Application and Certificate for Payment, whether incorporated in the Work or not, will pass to the Owner upon the receipt of payment by the Contractor, free and clear of all liens, claims, security interests or encumbrances (herein "Liens") and that none of the Work, materials or equipment covered by an Application and Certificate for Payment will have been acquired by the Contractor, or by any other person performing any part of the Work or furnishing materials and equipment for the Work, subject to an agreement under which a Lien is retained by the seller or supplier.

Section 18.2 Special Warranties

- A. When special guarantees or warranties are required by the Contract Documents for specific parts of the Work, the Contractor shall procure certified copies of such guarantees or warranties, countersign them and submit them to the Owner in triplicate. Delivery of such guarantees or warranties will not relieve the Contractor from any obligations assumed under any provision of this Agreement of the Contract Documents

Section 18.3 Assignment of Warranties

- A. The Contractor hereby assigns to the Owner any and all existing assignable warranties, service life policies and patent indemnities of manufacturers other than the Contractor of materials, equipment or items incorporated in the Work. Upon the request of the Owner, the Contractor shall give the Owner assistance in enforcing the rights of the Owner arising under such warranties, service life policies and patent indemnities. At the request of the Owner, the Contractor shall give notice (with copies to the Owner) to any such manufacturers of the assignment of such warranties, service life policies and patent indemnities.

Section 18.4 General Warranty and Correction of Work

- A. In addition to any special guarantees or warranties contained in the Contract Documents, the Contractor warrants to the Owner that all materials and equipment furnished in performance of the Work will be new unless otherwise specified, and that all Work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All work not so conforming to these standards shall be considered defective.
- B. The Contractor shall promptly correct all defective Work whether observed before or after the Substantial Completion Dates and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such defective Work.
- C. If, within one (1) year after either Substantial Completion Date or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee or warranty required by the Contract Documents, any of the Work is found to be defective and not

in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner to do so.

- D. All defective or non conforming Work shall be removed from the site of the Work if necessary, and the Work shall be corrected to comply with the Contract Documents without cost to the Owner. The Contractor also shall bear the cost of making good all work of other contractors destroyed or damaged by removal or correction of the defective Work of Contractor.
- E. If the Contractor fails to correct defective Work in accordance with this Section and the Contract Documents, the Owner may correct it and hold the Contractor liable for all costs, expenses and damages, including attorney's fees and litigation costs incurred by Owner in correcting it.
- F. In addition to the foregoing warranty, a warranty period of one (1) year shall apply to workmanship under the same terms and conditions as the original warranty, to any work, supplied in correction of the defective work under warranty or the property of the Owner pursuant to the provisions of this Section 18.4 and the Contractor shall assign to the Owner any warranties, including extended warranties, as to materials or designs furnished in the performance of such correction of defective Work.
- G. The Contractor shall furnish a written guarantee that all work executed under this contract shall be free from defects of materials and workmanship for a period of one year from date of acceptance of work by the Owner. This shall be understood to mean the replacement or correction of such defective work and material, together with the correction of damage to other work, occasioned by the defect, at the Contractor's expense. Where guarantees and/or warranties are written in the specification (or offered by the manufacturer at no additional cost) for a longer period than one year, such longer terms shall apply.
- H. Where a guarantee and/or warranty is required covering the results obtained from the use of a proprietary product or from installation, detail or method of application shown in the drawings or specified, if the Contractor is of the opinion that he will not be able to produce the required results, he shall file a written objection with the Owner and await further instructions before proceeding with this part of the work.
- I. A manufacturer's warranty shall not relieve the contractor from his/her full responsibilities under guarantees and/or warranties called for in these specifications.
- J. The Contractor and/or the Manufacturer, depending which warranty is in effect, shall respond to a request for warranty work within one (1) working day of written notification by the Owner. Required repairs shall be initiated immediately upon response and proceed continuously until satisfactorily completed.
- K. It is understood that the Owner will perform or have performed emergency repairs as necessary, and that such work will in no way void the Contractor's and/or the Manufacturer's responsibilities under the warranty.

ARTICLE 19 - RIGHT OF THE OWNER TO DO WORK

Section 19.1 Right of The Owner to Do Work

- A. If the Contractor should neglect to prosecute the Work properly or fail to do anything required by the Contract Documents, and the Owner does not receive assurances from the Contractor of due performance reasonably satisfactory to the Owner within seven (7) working days after written demand is made, then the Owner may, without prejudice to any other remedy it may have under this Agreement or at law or in equity, make good any deficiencies in the Work, including but not limited to, supplementing the forces of the Contractor and deduct all costs of doing so from the payment then due and any payment thereafter due the Contractor.

Section 19.2 Deduction For Uncorrected Work.

- A. If the Owner deems it inexpedient to correct deficiencies in the Work pursuant to Section 19.1, the Owner may deduct the reasonable cost of doing so from the payment then due or any payment thereafter due the Contractor, but the making of such a deduction shall in no way be deemed an election of remedies by the Owner.

Section 19.3 Correction of Work Before Final Payment

- A. The Contractor shall promptly remove from the site of the Work all materials, equipment or other items rejected by the Owner as failing to conform to the Contract Documents, whether incorporated in the Work or not, and the Contractor shall promptly replace and re execute its original work to comply with the Contract Documents and without expense to the Owner. In addition, the Contractor shall bear the expense of making good all work of other contractors destroyed or damaged by such removal or replacement.
- B. If the Contractor does not remove rejected material, equipment or other items within a reasonable time (as fixed by written notice from the Owner) the Owner may remove such items and store them at the expense of the Contractor, or dispose of such material, equipment or other items at the sole discretion of Owner. If the Contractor does not pay the expense of such removal within ten (10) working days, the Owner may, upon ten (10) working days written notice, sell such items at auction or at private sale and shall account for the net proceeds of such sale, after deducting all the costs and expenses of removal that should have been borne by the Contractor.

Section 19.4 Owner May Stop the Work

- A. If the Work is defective, or the Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, the Owner may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of the Contractor or any other party.

Section 19.5 Acceptance of Defective Work

- A. If, instead of requiring correction or removal and replacement of defective Work, the Owner prefers to accept it, the Owner may do so. The Contractor shall bear all direct, indirect and consequential costs attributable to the Owner's evaluation of and determination to accept such defective Work. If any such acceptance occurs prior to final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and owner shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, the Owner may issue a Change Order Directive as provided in Article 9.

ARTICLE 20 - INSURANCE

Section 20.1 Owner Controlled Insurance Program

- A. If the Owner is utilizing an Owner Controlled Insurance Program for the Work, substitution insurance language will be provided by the Owner.

Section 20.2 Contractor's Liability Insurance

- A. The Contractor shall not commence work under this contract until he has obtained all insurance required under this paragraph and such insurance has been approved by the City of Memphis Risk Manager, nor shall the contractor allow any sub-contractor to commence work on his sub-contract until all similar insurance required of the sub-contractor has been so obtained and approved by the City.
- B. Before commencing any work, the Contractor shall furnish the City of Memphis Risk Manager with Certificates of Insurance attested by a duly authorized representative of the insurance carrier evidencing that the insurance required hereunder is in force and effect. The theme/title of the project shall also be specified on the Certificate of Insurance.
- C. The Contractor shall be responsible from the time of signing the Contract or from the time of the beginning of the first work, whichever shall be earlier, for all injury or damage of any kind resulting from this work to persons or property. In addition to the liability imposed upon the Contractor on account of bodily injury (including death) or property damage suffered through the Contractor's negligence, which liability is not impaired or otherwise affected hereby, the Contractor assumes the obligation to protect, defend, indemnify and hold the City, its officers and directors, employees and agents free and harmless from and against any and all losses, penalties, damages, settlements, costs, charges, professional fees or other expenses or liabilities of any kind and character in connection with or arising directly or indirectly out of this contract and/or the performance hereof by act or omission of the Contractor or sub-contractor, or anyone either (1) directly or indirectly employed or (2) under the supervision of any of them in the prosecution of the work included in this contract.

4. **Property Insurance:** Contractor shall be responsible for maintaining any and all property insurance on their own equipment and shall require all sub-contractors to do likewise.

Builder's Risk Coverage: To be taken out in the name of the City and Contractor as their interest may appear.

An "All Risk" installation floater in the amount of the contract endorsed to contain the following condition: "It is understood and agreed that coverage will cease only when the new construction (including building materials) is accepted by the City.

Additional coverage and limits may be required based upon the particular services contracted. If such additional coverage is required for a specific contract, those requirements will be described in the "Special Conditions" of the contract specifications.

The Contractor is required to provide copies of the insurance policies upon request.

- F. The Contractor shall provide notice to the Owner within three (3) business days following receipt of any notice of cancellation or material change in the Contractor's insurance policy from Contractor's insurer. Such notice shall be provided to the Owner by registered mail, return receipt requested, to the following addresses:

City of Memphis
Attn: Risk Management
2714 Union Avenue Extended, Suite 200
Memphis, TN 38112

City of Memphis
City Engineer
125 N. Main Street, Room 644
Memphis, TN 38103

ARTICLE 21 - SURETY BONDS

Section 21.1 Performance Bonds Required

- A. The Contractor shall furnish a performance bond in an amount equal to 100% of the contract sum as security for the faithful performance of the contract for the payment for labor and material furnished and incorporated into the work. The only acceptable form of instrument for this bond is bound herein (see Section 00610). Bond shall be furnished through an agent domiciled and legally authorized to do business in the State of Tennessee and delivered to the

Owner not later than ten (10) working days after the date shown on written notice from the City. Surety company proposed shall be one acceptable to the Owner.

- B. If the Surety on any Bond furnished by the Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of the aforementioned bond stipulations, the Contractor shall within five (5) working days thereafter substitute another Bond and Surety, both of which must be acceptable to the Owner.

ARTICLE 22 - INDEMNIFICATION

Section 22.1 Indemnification of the Contractor

- A. To the fullest extent permitted by law, Contractor, on behalf of itself, its Subcontractors their agents, their employees or any entity or person for which the Contractor is or may be responsible, (all of said parties are herein sometimes collectively referred to as the "Indemnitors"), shall fully indemnify, defend, save and hold Owner, their agents, employees, officers, directors, partners and related entities, (all of said parties are herein collectively referred to as the "Indemnitees") harmless from and against all liability, damage, loss, claims, demands, actions and expenses of any nature whatsoever, including, but not limited to reasonable attorney's fees which arise out of or are connected with: (i) any negligent act, error or omission by any Indemnitor in the performance of this Agreement; or (ii) the failure of the Indemnitor in the performance of this Agreement to comply with the laws, statutes, ordinances or regulations of any governmental authority; or (iii) the material breach of any term or condition of this Agreement by any of the Indemnitors.
- B. Without limiting the generality of the foregoing, the indemnity herein above set forth shall include all liability, damages, loss, claims, demands and actions on account of personal injury, death or property loss to any third party, any Indemnitee, any of Indemnitee's employees, agents, licensees or invitees which arose out of or in connection with the work.
- C. The indemnity set forth in this Article shall survive any termination of this Agreement for the applicable statute of limitations period.

Section 22.2 Labor Indemnity

- A. The Contractor shall indemnify, defend and hold harmless the Owner from any and all administrative and judicial actions (including reasonable attorney's fees related to any such action) incurred by the Owner in connection with any labor related activity arising from the performance of the Work of the Contractor. As used in this Agreement, "labor related activity" includes, but is not limited to, strikes, walk outs, informational or organizational picketing, use of placards, distribution of hand outs, leaflets or in the vicinity of any facility where the Owner conducts business. The Owner shall advise the Contractor if any labor related activity occurs

and the Contractor shall arrange for the legal representation necessary to protect the Owner, provided such representation is previously approved by the Owner.

Section 22.3 Royalties and Patents

- A. The Contractor shall pay all royalties and license fees in any way relating to the Work, shall defend all suits or claims for infringement of any patent rights, and shall indemnify and hold the Owner harmless from loss on account of any such suit or claim.

Section 22.4 Attorneys' Fees

- A. In the event it becomes necessary for Owner to employ an attorney to enforce any provision of this Agreement, then the Contractor shall be liable for all attorneys' fees and litigation expense of Owner.

ARTICLE 23 - RIGHT TO OCCUPY BY OWNER

Section 23.1 Early Occupancy by Owner

- A. The Owner has the right to occupy or use ahead of schedule, at no additional cost to Owner, all or any substantially completed or partially completed portion of the Work when such occupancy and use are in its best interest, notwithstanding the time of completion for all of the Work.

Section 23.2 Corrections After Occupancy

- A. During the performance of the Work and after the Owner has taken occupancy of all or any substantially completed portion of the Work, the Contractor shall not disrupt the use and occupancy of the Owner to perform the Work or to make corrections in the Work but shall, at the discretion of the Owner, make such corrections at the expense of Contractor after normal working hours.

Section 23.3 Heating, Ventilating and Air Conditioning Systems (Not Applicable)

ARTICLE 24 - DEFAULT; RIGHT TO TERMINATE OF OWNER

Section 24.1 Event of Default

- A. For the purposes of this Agreement, an Event of Default shall be if:
 - 1. At any time there shall be filed by or against the Contractor in any court a petition in bankruptcy or insolvency or for reorganization or for the appointment of a receiver or trustee of all or a portion of the property of the Contractor, and within twenty (20) working days from the filing date the Contractor fails to secure a discharge; or
 - 2. The Contractor makes an assignment for the benefit of creditors or petitions for or enters into an agreement or arrangement with its creditors; or

3. The Contractor fails to timely and properly prosecute the Work, or fails to complete the work, or any portion thereof, entirely on or before any date established for partial, substantial or final completion; or
 4. The Contractor fails to make prompt payment to its Subcontractors or for materials or labor used in the Work; or
 5. The Contractor fails to supply sufficient labor, material and/or equipment so as to complete the Work timely and in accordance with the Contract Documents including, but not limited to the progress schedule; or
 6. The Contractor performs defective work and fails to promptly and properly correct such defective work; or
 7. Without limitation, the Contractor fails to perform any provision of this Agreement or the Contract Documents.
 8. The Contractor persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction.
- B. Upon the occurrence of an Event of Default, the Owner, by giving seven (7) working days prior written notice to the Contractor, and without prejudice to any other remedy the Owner may have, may provided such Event of Default has not been cured, terminate this Agreement and take possession of all or some of the materials, tools, equipment and appliances of the Contractor, and complete the Work by such means as the Owner deems fit. In such case, the Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Lump Sum Price shall exceed the aggregate of (1) the expense of the Owner of completing the Work, including compensation for additional managerial and administrative services, and (2) the losses and damages of Owner, including reasonable attorneys' fees and litigation expense because of the default of Contractor, such excess shall be paid to the Contractor. If the expense of completing the Work and the losses and damages of Owner shall exceed the unpaid balance of the Lump Sum Price, the Contractor and its Surety shall pay the difference to the Owner promptly on demand.

Section 24.2 Suspension by the Owner for Convenience

- A. The Owner may order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine (herein referred to as "Suspension").
- B. Provided the Suspension lasts for more than one hundred twenty (120) calendar days, an adjustment to the Lump Sum Price ("Adjustment") shall be made for the increased costs set forth in Section 24.2(c) which were incurred because of the Suspension. No Adjustment shall be made nor shall the date of Substantial Completion be extended except by written Change Order. No Adjustment shall be made to the extent:
 1. That performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is in full or in part responsible; or
 2. That an equitable adjustment is made or denied under another provision of this Agreement.

- C. The amount of the Contractor's compensation for a Suspension pursuant to this Section shall be limited to any properly documented costs of maintaining personnel and equipment in the field provided such costs are pre-approved by the Owner in writing. The Owner shall not be liable at any time for home office overhead expense or consequential damages. At the Owner's option, the Contractor may be ordered to demobilize its forces because the Project is suspended. In such event, the Owner will reimburse the Contractor for the reasonable cost of demobilization and remobilization.

Section 24.3 Termination Without Cause

- A. The Owner may terminate this Agreement without cause by giving seven-(7) working days' prior written notice to the Contractor. In such event, the Owner will pay the Contractor for that portion of the Lump Sum Price, less the aggregate of previous payments, allocable to the Work completed by the Contractor as of the date of termination. The Owner also will reimburse the Contractor for all documented costs necessarily incurred by the Contractor for organizing and carrying out the stoppage of the Work which are paid directly by the Contractor. The Owner will not compensate the Contractor for any loss of its own profits or the profits of its Subcontractors, suppliers, vendors and materialmen. The Owner will not be responsible to reimburse the Contractor for any of its continuing contractual commitments to subcontractors, suppliers, vendors and materialmen or for penalties or damages for canceling such contractual commitments, and the Contractor shall make all of its subcontracts and other commitments subject to this provision.

Section 24.4 Assignment of Subcontracts

- A. In the event of termination by the Owner pursuant to this Article 24, the Owner may require the Contractor to promptly assign to it all or some subcontracts, materials, tools, equipment to be installed under this Agreement, or rental agreements, and any other commitments which the Owner, in its sole discretion, chooses to take by assignment. In such event, the Contractor shall promptly execute and deliver to the Owner written assignments of such commitments.

ARTICLE 25 - HAZARDOUS MATERIALS COVENANTS

Section 25.1 Hazardous Materials Covenants

- A. Contractor hereby represents and warrants to and for the benefit of Owner that the Project or Project Site will not be used or operated in any manner that will result in the storage, use, treatment, manufacture and disposal of any Hazardous Materials (hereinafter defined) upon the Project or Project Site or any portion thereof or which will result in Hazardous Materials contamination (hereinafter defined). For purposes hereof, the term "Hazardous Materials" shall mean and refer to (i) any "hazardous waste" as defined by the Resource Conservation and Recovery Act of 1976 (42 U.S.C. ' 6901 et. seq.), as amended from time to time, and regulations

promulgated thereunder, (ii) any “hazardous substance” as defined by the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (42 U.S.C. ' 9601 et. seq.) (ACERCLA@), as amended from time to time, and regulations promulgated thereunder. (iii) asbestos; (iv) polychlorinated biphenyls; (v) urea formaldehyde; (vi) any substance the presence of which on the premises is prohibited by any applicable environmental laws or regulations (“Laws”) or by any other legal requirements affecting the Project or the Project Site; (vii) petroleum based materials (with the exception of times affixed to vehicles); and (viii) any other substance which is defined as hazardous, toxic, infectious or radioactive by any Laws or by any other legal requirements affecting the Project or Project Site. The term “Hazardous Materials Contamination” shall mean and refer to the contamination of the Project or Project Site, soil, surface water, ground water, air, or other elements on, or of, the buildings, facilities, soil, surface water, ground water, air, or other elements on, or of, any other property as a result of Hazardous Materials at any time emanating from the Project or Project Site.

- B. In addition to and without limiting the generality of any other provision of this Contract, Contractor shall and hereby does indemnify and hold Owner harmless from and against any and all losses, damages, expenses, fees, claims, demands, causes of action, judgments, costs and liabilities, including, but not limited to, attorney’s fees and costs of litigation, and costs and expenses of response, remedial and corrective work and other clean up activities, arising out of or in the manner connected with (i) the “release” or “threatened release” (as those terms are defined in CERCLA and the rules and regulations promulgated thereunder, as from time to time amended) by Contractor or Contractor’s employees, agents, delegees, invitees, licensees, concessionaires, sub-contractors or representatives, of any Hazardous Materials, or (ii) any occurrence of Hazardous Materials Contamination affecting the Project or Project Site. The provisions of this paragraph shall survive any payment or satisfaction of the Contract and such provisions shall remain in full force and effect.

ARTICLE 26 - MISCELLANEOUS

Section 26.1 No Waiver

- A. No consent or waiver, express or implied, by either party to or of any breach or default by the other in the performance of any of its obligations shall be deemed or construed to be a consent or waiver to or of any other breach or default by such party. Failure on the part of either party to complain of any act or failure to act of the other party or to declare the other party in default, irrespective of how long such failure continues, shall not constitute a waiver of the rights of such party.

Section 26.2 Conflicts

- A. In the event of any conflict between the terms or provisions expressed in this Agreement and any term or provision in any of the other Contract Documents, the term or provision of this Agreement shall govern to the extent of the conflict.

Section 26.3 Assignment

- A. This Agreement shall not be assigned, delegated or transferred in whole or in part by the Contractor nor shall the Contractor assign any monies due or to become due to it without the prior written consent of the Owner.

Section 26.4 Governing Law

- A. This Agreement is entered into in Tennessee and shall be governed by and construed according to the Laws of Tennessee. Any and all disputes arising out of this Agreement, and/or the Project shall be decided by a state or federal court of competent jurisdiction in Memphis, Shelby County, Tennessee.

Section 26.5 Counterparts

- A. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same agreement.

Section 26.6 Article and Section Headings

- A. Article and Section headings contained in this Agreement are for ease of reference only and shall not affect the interpretation or meaning of this Agreement.

Section 26.7 Parties in Interest

- A. This Agreement shall inure to the benefit of and be binding upon the parties and their respective successors, assigns and legal representatives.

Section 26.8 Severability

- A. If any one or more of the provisions contained in this Agreement shall for any reason be held invalid, illegal, unenforceable in any respect, such invalidity, illegality or unenforceability shall not affect any other provision of this Agreement, but it shall be construed as if such invalid, illegal or unenforceable provision had never been contained in it.

Section 26.9 Subcontractor Relations Requirements

- A. By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the obligations, terms and conditions of this Agreement and the Contract Documents, and to

assume toward the Contractor the obligations, terms, conditions and responsibilities which the Contractor, by this Agreement and these Contract Documents, assumes toward the Owner. Each Subcontractor agreement shall preserve and protect the rights of the Owner under this Agreement and the Contract Documents which respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice the rights of the Owner. The Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor prior to the execution of the Subcontract agreement, copies of this Agreement and the Contract Documents to which the Subcontractor will be bound. Subcontractors shall similarly make copies of this Agreement and the Contract Documents available to their respective Sub-subcontractors.

Section 26.10 Third Party Beneficiary

- A. This Agreement shall not be deemed to create any other relation between Contractor and Owner other than as expressly provided herein and shall not be for the benefit of any third party.

Section 26.11 Entire Agreement

- A. This Agreement, together with the other Contract Documents, constitutes the entire agreement between the Owner and the Contractor and supersedes all prior written or oral agreements, understandings, representations, negotiations and correspondence between the parties. This Agreement shall not be supplemented, amended or modified by any course of dealing, course of performance or usage of trade and may only be amended or modified by a written instrument duly executed by officers of both parties.

ARTICLE 27 - NON-DISCRIMINATION

- A. Contractor agrees that it will not discriminate upon the basis of race, color, creed, religion, national origin, age, disability or sex in the performance of the Work and that each solicitation or advertisement for employees, and each Agreement to which Contractor is a party, including without limitation, Subcontractors, shall specifically contain a provision to this effect. The Contractor shall, upon request, show evidence of such non-discrimination and shall post notices of non-discrimination in conspicuous places available to all employees and applicants.
- B. The Contractor shall execute the specified City of Memphis Certificate of Nondiscrimination at the time he executes the formal bid form and includes it in the bid envelope.
- C. The Contractor and all subcontractors under general contract shall maintain copies of every subcontract awarded and their own payrolls, for each weekly payroll period for the life of the construction contract and for a period of five (5) years after final release and payment is made by the City to the Contractor.

- D. Each contractor's request for payment, including final payment and each partial payment, if permitted by the contract, shall contain a certification by the Contractor that the performance by the contractor and subcontractor for the period of work covered by the payment request has been in accordance with the clauses of the contract and the requirements with respect to nondiscrimination.
- E. Representatives of the State of Tennessee, Department of Labor and the City Of Memphis, as designated by the Mayor, shall have the right to inspect the Contractor's facilities and payroll records during the life of the construction contract and for a period of three (3) years after final release and final payment by the City for the purposes of verifying nondiscrimination in employment and payment of prevailing wages as appropriate.
- F. The Contractor shall incorporate the same requirements set forth in paragraphs A, B, C, D and E above, in all subcontracts awarded by him with the further requirement that each subcontract include identical requirements to be included in any lower tier subcontracts, together with the requirement to include it in any further subcontracts that might be made.

ARTICLE 28 - SUSPENSIVE LIABILITY AGREEMENT

Section 28.1 Suspensive Liability Condition

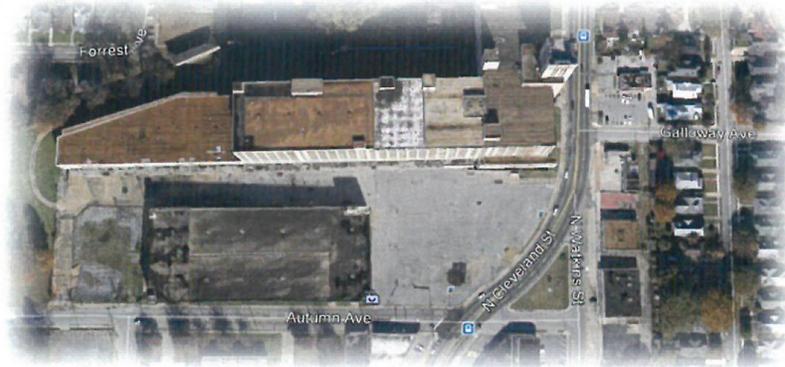
- A. Notwithstanding any term, condition, obligation or provision in this Agreement, any other writing, any other agreement, any oral understanding or agreement, or any conduct or failure to act by the Owner, Contractor stipulates and agrees conclusively that Contractor has against the Owner no right, entitlement or claim for any payment, compensation, cost or remuneration of any type other than pursuant to the terms of this Agreement.

ARTICLE 29 – EMPLOYMENT OF ILLEGAL IMMIGRANTS

- A. The Contractor hereby certifies to comply with all applicable federal and state laws prohibiting the employment of individuals not legally authorized to work in the United States. Contractor shall not knowingly (i) utilize the services of illegal immigrants; or (ii) utilize the services of any subcontractor who will utilize the services of illegal immigrants in the performance of the contract. In the event the Contractor fails to comply with any and all local, state and federal laws prohibiting the employment of individuals not legally authorized to work in the United States, this agreement may be canceled, terminated or suspended in whole or in part by the City, and the Contractor may be prohibited from contracting to supply goods and/or services to the City for a period of one (1) year from the date of discovery of the usage of illegal immigrant services in the performance of a contract with the City.

EXTRA

Crosstown Culvert Inspection Report



June 18, 2013

Prepared for

City of Memphis

Prepared by

**Dan Graddy Engineering
and
Toles and Associates**

Contract # 26635

Crosstown Culvert Inspection

Scope and Purpose of Inspection

The section of concrete box culvert that conveys the storm water from Madison Height Bayou under the old Sears Crosstown building and property is being inspected for the City of Memphis due to the redevelopment plans for the building. The limits of the inspection are the portion of the culvert under the old Sears Crosstown property along with a general condition review of the adjacent culvert on either side. The inspection will be a visual inspection, with no sampling or testing of materials. The inspection will include a research of construction plan information available from the City of Memphis.

Pre-inspection Research

Plan Information: Based on the attached plans the 500 ft long section of culvert under the Crosstown buildings was constructed between 1926, when the Autumn Ave Culvert was designed, and 1938, when the Madison Height Bayou project was designed, both designed by the City. The size of the Crosstown culvert matches the Autumn Avenue culvert of a twin 8'w x 8.5'h reinforced concrete box culvert. No construction plans or cross section of the original Crosstown culvert was found in the City files, but if the property owner extended the "light section" that the City used on the outside portions of the Autumn Ave culvert then the Crosstown culvert was designed for a total load of 500 psf (based on $f_s=18,000$ psi & $f_c=750$ psi). In 1938 the bottom of the existing Autumn Ave and Crosstown culverts were removed and lowered 1.5 ft by the City per the attached plans.

Inspection Limits: The section to be inspected will be from the south ROW line of Autumn Ave to 600 ft to the north which will be beyond the Crosstown building. The culvert will be walked for an additional 200 ft to the north for a general assessment.

Access for inspection: In the back of the post office parking lot on the south side of Autumn Ave, there is a 2' x 2' grated inlet over the east barrel of the box culvert (labeled as a "3x3 inlet" on the attached plans). A precast concrete parking bumper is on top of this inlet and will need to be removed and replaced to gain access at this location.

Inspection Summary

In this report the 600 foot long section of culvert north of Autumn Ave and under the old Sears Crosstown building, parking structure and parking lot will be referred to as the Crosstown culvert. The sections of culvert on each side of the Crosstown culvert are in good condition, including the Autumn Ave 80 ft long culvert constructed in 1926. The Crosstown culvert varies in condition from Fair on the south under the parking structure to Poor on the north under the old Sears building.

For the portion under the parking structure typical problems are minor amounts of exposed reinforcing steel. Most of these exposed rebar (reinforcing steel) are vertical bars in both the interior and exterior walls. From visual observation there is a minor

Crosstown Culvert Inspection

amount of cross section loss in these bars. Generally these exposed rebars are close to the surface of the concrete (approx. 1/8" of concrete cover), indicating that the cause of the spalling of the concrete was inadequate concrete cover of the reinforcing steel. Minimum required cover under current ACI code is .75", and should be more in a moist environment. If minimum concrete cover is not available the rebar will become moist, start corroding, the rust expands and pops the concrete off. The only other problem noted in this section was in the west barrel, at the north end of the parking structure, where there was significant soil migrating thru one of the vertical construction joint. The soil is being carried by water.

The section of the culvert under the truck court / loading dock drive area and the main building was in much worst condition than the section under the parking structure, with the area under the old Sears building being the worst. Specifically the east barrel started being in poor condition with a large amount of exposed rebar on the exterior wall right before the end of the parking structure, but there was a much larger amount of exposed rebar under the main building. The west barrel had a large amount of exposed reinforcing on the exterior wall for the area under the building.

The lateral pipes all had water coming in, but this water and the soil migration was worst in the area under the building and truck loading court. Also in the west barrel a 1/2" stream of water was pouring in the top of the walls at a couple of the construction joints around the north end of the building. There appears to be a water line leak underground in the area of the main building. The source of the leak is most likely on the west side of the culvert. The culvert walls were wetter in this portion and the depth of concrete that was spalling, or being popped off above the corroding rebar, was much deeper with some being as deep as 1/2". Soil migrating thru the construction joints, around the lateral pipes and being carried by the pipes were greater in this area also.

The inside of the culvert was extremely clean and free of debris in the bottom or trash attached at sides or top, which indicates high velocity on a regular basis. The capacity of the section is consistent with what is up and down stream. This section is part of the overall system improvement designed for the lower section of the Madison Height Bayou in 1939.

It should be noted that there has been a fairly recent inspection of the Crosstown culvert. There were paint markings on the walls at changes in geometry, changes in section and where problems were noted. Some of the photos included in this report show those markings.

Inspection Rating

The areas rated Poor were due to the main flexural reinforcing steel being corroded to the point where there is a loss of a portion of the cross sectional area of these steel bars. These "main flexural reinforcing steel" members are the ones on the inside of the center of the exterior wall, which resist the external lateral soil load, and the ones in the center of the bottom of the top slab, which resist the soil load and live load from above

Crosstown Culvert Inspection

the culvert. With the amount of moisture in the culvert the loss of section will continue, and likely will occur at an increasing rate. No signs of flexural distress were noted in the concrete walls.

Recommendations

The general cause of corroding reinforcing steel is inadequate cover (thickness of concrete over the rebar) for the moisture and chemical environment. This Crosstown section of culvert has substandard concrete cover of the rebars, as concrete cover of 1/8" to 1/2" was observed throughout the inspection. However the increased amount of exposed rebar (and the deeper depth of rebar that was corroding) on the northern end of this section would most likely be caused by the increase in moisture. The water observed coming in the construction joints, pipe penetrations, and pipes indicates that there is saturated soil on the outside of the wall. The constant saturation of the outside of the wall and the higher moisture inside due to all the leakage, would lead to increase in moisture of the concrete and thereby an increase in corroding of the rebar.

One option of repair is to try to stop the corrosion of the rebars, and the loss of section, at its present state, which will extend the usable life of the culvert. There are zinc based paints that coats the cleaned rebar and provide an anode to the rebar that that stops the corrosion beyond the point where the cleaning and zinc coating are applied. The corroded rebar would need to be scraped, any partially loose concrete covering the rebar removed, the surface of the rebar cleaned by water or sand blasting, and the zinc coating applied.

However the underlying problem of the moisture in the concrete must be addressed with any repair option. This saturated soil under the building slab will likely cause other problems in the building ranging from water/moisture in the building, mold or settlement. To help locate the source of the water, a series of monitoring wells should be installed inside the building (thru the slab) and around the building. One of the wells will need a pump installed to help determine where the leak is located. Possible sources of the water are rainwater leaders or potable water pipes. If potable water is determined to be the source, leak detection tests and isolation of portions of the system can be used to locate the leak. Once the source is located and corrected some of the monitoring wells should be kept in operation for verification.

Other internal repair options would include lining the culvert with a concrete liner or a fiber-reinforced polymer type liner, which works in composite with the existing concrete structure. Both of these will add strength to the section, and protection for the reinforcing. However with both of these all corroded rebar would need to be addressed and possible other actions to help lower the corrosiveness of the existing concrete. Also with both of these the existing moisture problem would need to be addressed. Both of these options are very expensive and with the concrete liner a significant amount of hydraulic capacity is lost.

Crosstown Culvert Inspection

Structural Capacity of the Culvert

No structural information of how the Crosstown culvert was originally designed or constructed was found during the plan research at the City. Without that cross-section information it cannot be determine if the culvert can support the new loads anticipated or if it was adequate to support the loads it was subjected to in the past. No distress cracks were noted in the exterior walls or top slabs during the inspection. However minor overloads does not always cause visible cracks.

Due to the worst condition sections of culvert being under the heavy loaded section of the truck court and building there is an alternative possible explanation to the increased amount and depth of corroded rebar. If this section was ever over stressed, cracks would be created and these would allow moisture to get to deeper reinforcement steel. This possibility cannot be ruled out, however the possible cause of increase moisture seems more likely.

Due to the age of the culvert, the unknown strength, and the possibility of past overload, monitoring strain gages should be placed on the interior high stress areas of the culvert in the high load area (truck court and under building). The gages should be hooked up to a real time recording link, including alarm, and have individual recording devices. The gages would indicate if strain is in acceptable limits for new loads like in the truck court or added dead load in the building but they will not indicate if the culvert is already overloaded. Enough strain gages must be installed so they monitor all high load areas to see if any are deflecting beyond acceptable limits. The correct type of gages and wiring will need to be used for the culvert environment.

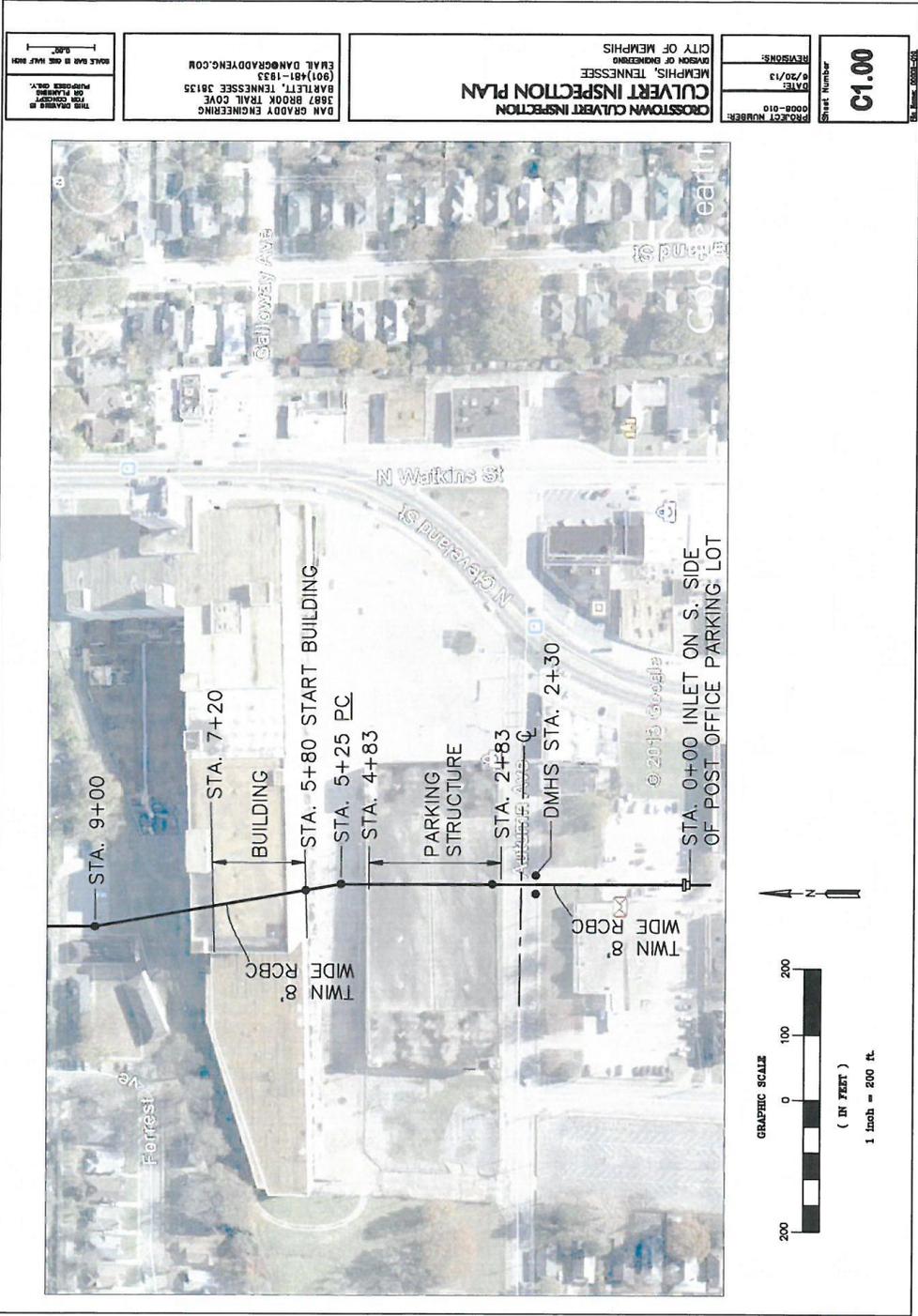
The Structural Engineer and Architect for the new redevelopment project will need to provide their own analysis of the culvert as part of the building redevelopment design to make sure the culvert is able to carry the required loads and that the culvert life is compatible with the project life.

Additional Inspections

Due to the Poor condition of the culvert annual inspection should be performed by a structural engineer. These inspections should be performed even after the repairs are performed until such time that no change is being noted. These inspections will need to occur more frequent if there is a worsening in the condition of the culvert and during the redevelopment of the building and land above the culvert.

Hydraulic Capacity Improvements

At station 2+86 of the west barrel a 18" diameter RCP is sticking out two feet into the culvert flow area. This pipe should be cut off flush with the wall, and grouted smooth to increase the flow capacity of the system.



THIS DRAWING IS FOR CHECK PURPOSE ONLY.
 DATE: 9/20/13
 PROJECT NUMBER: 0008-010

DAN GRADY ENGINEERING
 188 BROOK TRAIL COVE
 BARTLETT, TENNESSEE 38135
 (901) 481-1833
 EMAIL: DAN@GRADYENG.COM

CROSS TOWN CULVERT INSPECTION
 CULVERT INSPECTION PLAN
 CITY OF MEMPHIS
 DIVISION OF ENGINEERING
 MEMPHIS, TENNESSEE

REVISIONS:
 DATE: 9/20/13
 PROJECT NUMBER: 0008-010

Sheet Number
01.00

DATE: 09/20/13

Crosstown Culvert Inspection



Station 0+00 east barrel
#10 inlet 2' x 2'
Located in back of post office parking lot
south side of Auburn
Inspection entry location
Looking out



Station 0+04 east barrel
Typical construction joint
Fair condition
Approx. 30 ft spacing



Station 0+10 east barrel
Typical condition photo
8'w x 9.75'h wall w/ 6" invert twin RCBC
Good condition
Constructed 1938, by City
Dwg: Madison Height D-2-G-022

Crosstown Culvert Inspection



Station 0+47 east barrel
Equalization window in ctr wall
4' x 2'
Typical at approx. 200 ft ctr



Station 1+00 east barrel
Typical invert
Only a few large pieces of concrete
slabs in east barrel.
West barrel clean



Station 2+03 east barrel
Equalization window in ctr wall
5' x 2'
Typical at approx. 200 ft

Crosstown Culvert Inspection



Station 2+09 east barrel
Start of new section
South end of Autumn Culvert
8'w x 10.5'h wall w/ 6" invert RCBC (twin)
Fair condition
Original twin culvert 8'w x 8.5'h
Constructed in 1926 by City
Bottom lowered 1.5' in 1939 by City
Picture shows added bottom wall
Dwg: Madison Height D-2-G-022 & 034 &
Autumn Av 004.0



Station 2+09 east barrel
Top of downstream new section is higher
Looking upstream



Station 2+30 east barrel
DMH in ctr
Near south curb Autumn Ave

Crosstown Culvert Inspection



Station 2+40 east barrel
8" DIP in top of east wall



Station 2+87 east barrel
18' RCP in top of east wall
FL 9 ft above invert box

Parking Garage started at approx. 2+84



Station 3+00 east barrel
Exposed rebar on ctr wall
First during inspection of east barrel
Minor loss of section

Start of new section approx. sta 2+90
8'w x 10.5'h wall w/ 6" invert
Fair condition
Original twin culvert 8'w x 8.5'h
Constructed between 1926 -1939
No plans available at City
Bottom lowered 1.5' in 1939 by City

Crosstown Culvert Inspection



Station 4+10 east barrel
3' x 2' equalization port in ctr wall
Picture shows general condition of center wall



Station 4+55 east barrel
36" RCP east wall
Joints are straight and tight
FL 6.5 ft above box FL



Station 4+60 east barrel
General condition photo
Exposed rebar at 16" ctr w/ fair loss of section
Poor condition
Repair needed due to these rebars being the main lateral load reinforcement in the exterior wall

Parking Garage ends at approx. 4+84

Crosstown Culvert Inspection



Station 5+25 east barrel
Box turns 15 deg to left

Note previous survey mark on wall



Station 5+80 east barrel
Side exposed rebar getting worse
With more loss of section
(also the depth of spalled concrete is greater)



Station 5+80 east barrel
Side exposed rebar getting worse
With more loss of section

Building started at approx. 5+81

Crosstown Culvert Inspection



Station 5+90 east barrel
Patch in top
Located above where 3x3 culvert comes in
(likely closed inlet)



Station 5+90 east barrel
3' x 3' concrete box culvert from east
No joint openings noted
Some minor loss of concrete in flow line
FL 3x3 5' above bottom of culvert



Station 6+30 east barrel
Exposed rebar top (@ 30 ft spacing)
Exposed rebar on interior wall with minor loss
of section.
Typical this area

Crosstown Culvert Inspection



Station 6+67 east barrel
A few pieces of top main reinforcing and some longitudinal rebar exposed



Station 6+90 east barrel
Typical side rebar exposed exterior wall
Poor condition
Repair needed due to these rebars being the main lateral load reinforcement in the exterior wall
(approx. 3 lf of exposed rebar / ft of wall)



Station 6+90 east barrel
Typical side rebar exposed, exterior wall
1/2" square rebar
significant loss of section

Crosstown Culvert Inspection



Station 7+05 east barrel
Exterior wall
Frequent exposed rebar
Significant section loss



Station 7+05 east barrel
Interior wall
Frequent exposed rebar
Significant section loss
Note 1/8" thick cement skim coat in this area,
most is peeling off wall.
Walls are very moist



Station 7+50 east barrel
Patch in top

Building ended at approx. 7+20

Crosstown Culvert Inspection



Station 7+57 east barrel
24" terracotta pipe east wall
FL 7 ft from bottom of culvert



Station 8+10 east barrel
Round 18" grate
Next to center wall



Station 8+15 east barrel
End of lowered section

Crosstown Culvert Inspection



Station 8+20 east barrel
General condition photo of new section
8'w x10.5'h wall w/ 6" invert, RCBC (twin)
Good condition
Built by City 1939
Dwg: Madison Height D-2-G-022



Station 9+00 east barrel
Slow curve to right, approx. 15 deg
General condition of culvert is Good



Station 9+95 east barrel
2x2 inlet next to center wall
Partial steps
Good access point
End of east barrel inspection

Crosstown Culvert Inspection



Station 0+47 west barrel
General condition photo
8'w x 9.75'h wall w/ 6" invert twin RCBC
Good condition
Constructed 1938, by City
Dwg: Madison Height D-2-G-022

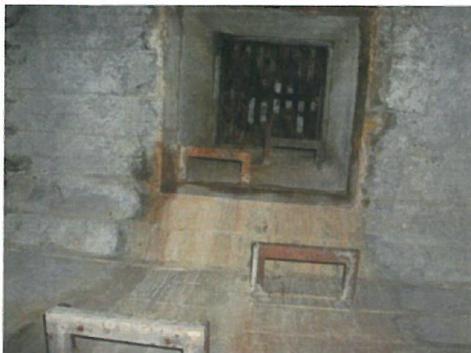


Station 0+97 west barrel
24" RCP in top of west wall
Filled with concrete



Station 1+50 west barrel
General condition photo
Good condition

Crosstown Culvert Inspection



Station 2+07 west barrel
Closed up #10 inlet (2'x2')
Next to ctr wall



Station 2+10 west barrel
Start of new section, S side Autumn Ave
8'w x 10.5'h wall w/ 6" invert RCBC (twin)
Fair condition
Original twin culvert 8'w x 8.5'h
Constructed in 1926 by City
Bottom lowered 1.5' in 1939 by City
Dwgs: Madison Height D-2-G-022, 034 &
Autumn AV 004.0

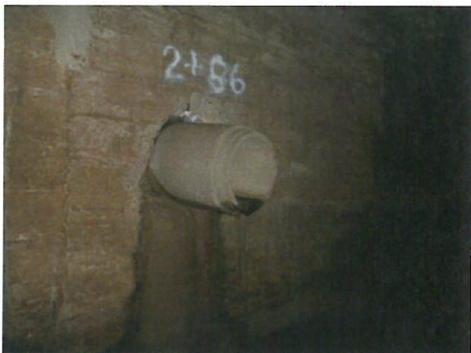


Station 2+30 west barrel
DMH in ctr
Near south curb Autumn Ave

Crosstown Culvert Inspection



Station 2+41 west barrel
24" RCP west wall
FL 5 ft above FL of culvert
Good joints



Station 2+86 west barrel
15" RCP west wall
FL 5 ft above FL of culvert
Sticking out 18" into culvert
Minimum soil leakage
Good joints

Parking Garage started at approx. 2+84



Station 3+43 west barrel
8" terracotta pipe in top
Start of new section approx. sta 2+90
8'w x 10.5'h wall w/ 6" invert
Fair condition
Original twin culvert 8'w x 8.5'h
Constructed between 1926 -1939
No plans available at City
Bottom lowered 1.5' in 1939 by City

Crosstown Culvert Inspection



Station 3+43 west barrel
Exposed rebars in center wall
First noted in west barrel



Station 4+30 west barrel
Joint seepage
Worst found in inspected segment
But starting to see joint seepage



Station 4+80 west barrel
4" DIP in top next to west wall

Parking Garage ended at approx. 4+84

Crosstown Culvert Inspection



Station 4+90 west barrel
10" terracotta pipe in top next to ctr wall



Station 5+40 west barrel
Top joint with exposed rebar



Station 5+50 west barrel
18" DIP west wall
FL 8.5 ft above FL Culvert

Crosstown Culvert Inspection



Station 5+60 west barrel
General condition photo
Fair Condition
Minimum wall reinforcement corrosion
Minor seepage



Station 5+75 west barrel
15" DIP in top next to west wall



Station 5+88 west barrel
Concrete patch in top
Building started at approx. 5+81

Crosstown Culvert Inspection



Station 6+00 west barrel
3 rebars in top slab
Next to outside wall
Median loss of section



Station 6+25 west barrel
Large amount of exposed rebar
On outside wall
Heavy corrosion and loss of section
For next 75 ft



Station 6+75 west barrel
Exposed corroded rebar in top slab
At construction joint

Crosstown Culvert Inspection



Station 6+90 west barrel
Heavy corrosion of rebar
Mostly minimum loss of section
Poor condition
*Repair needed due to these rebars being the
main lateral load reinforcement in the exterior
wall*



Station 7+03 west barrel
Leaking top joint
Two main top slab reinforcing bars corroding
Minimum loss of section



Station 7+10 west barrel
Typical condition photo
Exterior wall and top slab

Poor Condition

Building ends at approx. 7+21

Crosstown Culvert Inspection



Station 7+40 west barrel
Water pouring in top joint at exterior wall

Water leak should be fixed



Station 7+50 west barrel
Concrete patch in top



Station 7+60 west barrel
Typical condition photo
Condition improved
No corroded or exposed rebar

Crosstown Culvert Inspection



Station 8+07 west barrel
End of lowered section

General condition photo of new section
8'w x10.5'h wall w/ 6" invert, RCBC (twin)
Good condition
Built by City 1939



Station 8+07 west barrel
End of lowered section

SECTION 09915 - STRUCTURAL GEOPOLYMER LINING REHABILITATION SYSTEM

**SANITARY SEWER PIPE REHABILITATION BY THE ECOCAST® METHOD
(STRUCTURAL GEOPOLYMER LINING REHABILITATION SYSTEM)**

NOTE: This specification was originally prepared by others and has been modified to meet the needs of the City of Memphis in this particular situation. Any reference to the Owner may also be understood to include a designated representative of the Owner (Owner's Representative).

PART 1 GENERAL

Description of Work

Provide all labor, material and equipment to provide for the structural reconstruction of existing sanitary sewer pipes using an approved structural Geopolymer lining system by forming a new pipe within an existing structurally deteriorated pipe, which has generally maintained its original shape. This Specification covers the general requirements for the referenced specifications, Geopolymer manufacturer and installer qualifications, submittal and guaranty guidelines, materials, pre-installation and installation procedures, and testing. The Geopolymer liner may be spin cast or hand sprayed to various pipe surfaces including: brick, concrete, corrugated metal, clay tile, and various other materials.

1.1 Intent

It is the intent of this specification to provide for the structural reconstruction of existing sanitary sewer lines by centrifugally casting a structural Geopolymer liner, thereby creating a new pipe within an existing deteriorated pipe, which has generally maintained its original shape. The EcoCast System is used to install a Geopolymer liner inside sanitary sewer pipes resulting in a structural liner that stops further water infiltration, rebuilds the structure surface and protects it from chemical attack. The pipe surface is cleaned and a Geopolymer liner is spin cast applied to the interior surfaces. This specification describes all the work, materials, and equipment required for the purpose of structurally rehabilitating the pipe, stopping water infiltration and providing protection from chemical attack in sanitary sewer pipes and other underground structures. Applications include spin casting a Geopolymer liner throughout the length of the pipe. A uniform Geopolymer liner shall be spin cast applied, in a prescribed thickness to all cleaned interior surfaces. The Geopolymer liner may be spin cast or hand sprayed to various pipe surfaces including: brick, concrete, corrugated metal, clay tile, and various other materials. The pipe liner shall extend the full length of the original pipe and shall provide a structurally sound, joint-less, new structural pipe within the original pipe.

1.2 Objective

The primary objective of this section is to structurally reinforce the existing pipe while stopping any excessive infiltration and inflow of extraneous water into the sanitary sewer system and thereby reduce sewer overflows and the unnecessary treatment and transport costs associated with inflow/infiltration. It is critical that both the Product and the Installer have the ability to meet or exceed all requirements of the Owner. The secondary objective of this contract is to rehabilitate those sewers on which failure could be very disruptive, hazardous to public health, and/or be very expensive to repair after failure.

1.3 Work and Components Included

1. Pre-Installation Cleaning and TV Inspection of Sanitary Sewer Pipes
2. Bypass Pumping
3. Pipe Cleaning and Preparation
4. Application of Geopolymer Liner
5. Quality Control Measures
6. Post Rehabilitation Video Taping of Sanitary Sewer Pipes

1.4 Applicable ASTM and ACI Standards and Specifications

Unless revised herein, the Contractor shall follow the latest revision of the practices and standards of the following American Society for Testing and Materials (ASTM) Standards, which are made part of this specification:

ASTM Standards:

- C 39/39M-10 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
- C 469 – 02e1 Standard Test Method for Static Modulus of Elasticity and Poisson’s Ratio of Concrete in Compression
- C 496/C496-04e1 Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens
- C 882 – 05 Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete by Slant Shear
- C 1140-03A Standard Practice for Preparing and Testing Specimens from Shotcrete Test Panels
- F 2414 Practice for Sealing Sewer Manholes Using Chemical Grouting

ACI Standards:

- ACI 305R-99 Hot Weather Concreting
- ACI 306R-88 Cold Weather Concreting
- ACI Certified Concrete Field Testing Technician, Level 1

PART 2 QUALIFICATIONS

General

It is the intention of this Specification to set a standard of quality and design for the application of all Geopolymer materials used in the rehabilitation of Sanitary Sewer Pipes.

2.1 Acceptable Geopolymer Liner Manufacturers

1. In order to establish product quality and installation standards, the approved structural Geopolymer lining rehabilitation system shall be the EcoCast™ lining system as manufactured by GeoTree Technologies and installed by IPR, LLC.
2. Where discrepancies exist between this specification and established manufacturer’s product and process specifications, this Specification shall govern.

2.2 Manufacturer and Installer Experience

1. The installing Contractor must certify that the Geopolymer liner to be used is the EXACT system for which ALL SUBMITTALS AND CERTIFICATIONS were made. No substitutions will be allowed, and misrepresentations or omissions will be grounds for contract termination with the Contractor waiving any and all claims against the Owner for work performed or costs incurred.
2. The structural Geopolymer lining rehabilitation system and installing contractor must have a minimum proven performance record, using the exact name brand product must have been installed.
3. The Contractor must have completed a minimum of five projects that involved the installation of name brand product bid.
4. The Contractor must have been actively involved in the direct field installation of the exact name-brand product bid.

2.3 Qualifying Superintendent and Crew

1. The contractor is required to have at least one Qualifying Superintendent on the job during construction activities. *The Qualifying Superintendent and crew that will be undertaking the work must meet the experience requirements.*
2. The Qualifying Superintendent must have been trained by the pump manufacturers and have received a certificate of completion. This factory certification of completion of the required training is kept on file. The Qualifying Superintendent must be thoroughly familiar with all aspects of the operation including safety and quality control measures.
3. The Qualifying Superintendent shall provide a list of qualifying experience to the OWNER upon request. All required information, including: project name, owner, and contact person, phone number, diameter and length of pipe and date completed shall be furnished for each project completed.
4. The work crew will have been thoroughly trained in the specific aspects of their jobs. This training includes training received from equipment manufacturers and in-field training. A fully trained field technician shall apply the Geopolymer liner. Moreover, the field technician is required to have a good understanding of the work and product usage. Field technicians must demonstrate their ability to improve their skills and be capable of properly cleaning the sanitary sewer pipe, developing a repair strategy for stopping any minor water infiltration, and spray applying the Geopolymer liner to fully rehabilitate the pipe. The trained field technician is required to follow the manufacturer's guidelines and keep in good standing with the product manufacturer. All of the work including the cleaning course of action, furnishing the materials, preparation of the materials and repair area, providing the installation of the materials and the testing method will be accomplished according to the manufacturer's specific recommendations.

PART 3 GENERAL REQUIREMENTS OF THE STRUCTURAL GEOPOLYMER LINER

General

The finished pipe must be such that when the Geopolymer liner sets, the total wall thickness will be homogeneous and monolithic. This structural liner is designed and installed to meet fully deteriorated pipe conditions.

3.1 Reference Specifications

Installation and material tests of Geopolymer liners must meet the minimum requirements demonstrated in the following **ASTM** standards:

1. Specifications: Centrifugally Cast or Sprayed Geopolymer Liner

3.2 Physical Properties

The Geopolymer lining material shall conform to the following 28-day minimum physical properties:

| Test Method | Duration | Value |
|---|------------------|----------------------------------|
| Compressive Strength ASTM C-109/C109 M-08 | 1 Day 28 Days | Min. 2,500 psi Min. 8,000 psi |
| Flexural Strength ASTM C-293 | 7 Day 28 Days | Min. 650 psi Min. 800 psi. |
| Modulus of Elasticity ASTM C469 – 02el | 1 Day 28 Days | 3,000,000 psi 6,750,000 psi |
| Bond Strength ASTM C882/C882M-05 | 1 Day 28 Days | Min. 1,300 psi Min. 1,600 psi |
| Sulfate Resistance (% change) ASTM C 1012-04 | | Less Than 0.01 % |
| Set Time ASTM C266 – 08 | | 120 minutes |
| Initial Cure Time | | 300 minutes |

3.3 Materials: Geopolymer Liner

1. The Geopolymer lining material is a micro-fiber reinforced ultra-dense Geopolymer. This material shall provide a high strength fiber reinforced mortar specifically designed for ease of mechanical pumping, spraying and spin casting.
2. The Geopolymer liner shall be designed to produce a liner with improved compressive and flexural strength, high adhesion to damp surfaces, lower permeability and increased resistance to aggressive chemical attack.

3.4 Materials: Anti Microbial System (AMS)

1. The work consists of rolling, spraying or centrifugally applying AMS Liquid to the inside of the newly cast pipe.
2. The AMS Liquid shall be used full strength as received from the manufacturer and shall not be diluted.
3. The AMS Liquid may be applied during the application of the EcoCast™ pipe or anytime thereafter.
4. The AMS Liquid shall be applied adequately to achieve surface saturation.
5. The surface must be completely dry for two (2) hours prior to releasing bypass or opening to any traffic.

PART 4 PIPE DESIGN

4.1 Liner Thickness

1. The Contractor shall submit liner thickness calculations to the OWNER for review. The structural Geopolymer lining rehabilitation system shall be designed in accordance with a “fully deteriorated (FD) gravity pipe condition”.
2. The Geopolymer liner material shall also conform to the minimum requirements demonstrated in the following table:

| Physical Properties | ASTM Reference | Requirements |
|------------------------------|-----------------------|---------------------------------|
| Compressive Strength | ASTM C-39 | Minimum 8,000 psi @ 28 days |
| Modulus of Elasticity | ASTM C-469/469M-10 | Minimum 6,750,000 psi @ 28 days |
| Flexural Strength | ASTM C-293 | Minimum 800 psi @ 28 days |

4.2 Minimum Acceptable Pipe Thickness

1. The minimum installed Geopolymer liner thickness shall be one inch. The design calculations listed in Appendix 1 will determine thicknesses over the one inch minimum.
2. The Contractor shall submit his proposed plan for ensuring that the installed Geopolymer liner meets the OWNER’s minimum thickness requirements. The plan shall include the proposed Geopolymer liner thickness to be installed.

PART 5 EXECUTION

General

All structural rehabilitation of existing storm or sewer pipe will follow the procedures listed below.

1. The Contractor shall carry out his operations in strict accordance with all applicable OSHA standards. Particular attention is drawn to those safety requirements involving work on an elevated platform and entry into a confined space.
2. The Owner will be responsible for locating all manholes. The Contractor shall be responsible for accessing all manholes as required, and shall provide all necessary water hydrants for cleaning and other work items requiring water as a part of the cost of this work.
3. All surfaces, which have been damaged by the Contractor's operations, shall be restored to a condition at least equal to that in which they were found immediately prior to the beginning of the Contractor’s operations. Suitable materials and methods shall be used for such restoration. The restoration of existing property or structures shall be done as promptly as practicable and shall not be left until the end of the construction period. Compensation for this work will be included in the rehabilitation item to which it pertains.

5.1 Installation Procedures

Pipe Cleaning and Preparation

1. The floor and interior walls of the pipe shall be thoroughly cleaned and made free of all materials including dirt, grit, roots, grease, sludge and all debris or material that may be attached to the wall or bottom of the pipe.
2. High pressure water blasting with a minimum of 3,500 psi shall be used to clean and free

all foreign material within the pipe.

3. When grease and oil are present within the pipe, an approved detergent or muriatic acid shall be used integrally with the high pressure cleaning water.
4. All materials resulting from the cleaning of the pipe shall be removed prior to application of the Geopolymer lining material.
5. All loose or defective concrete, brick, or grout, shall be removed to provide an even surface prior to application of the Geopolymer lining material.

5.2 Sealing Active Leaks

The work consists of hand applying a dry quick-setting cementitious mix designed to instantly stop running water or seepage in all types of concrete and masonry structures. The contractor shall apply an approved quick-setting mortar in accordance with manufacturer's recommendations. The use of chemical grouts is also an approved method for stopping leaks.

5.3 Invert Repair

The work consists of mixing and applying EcoCast™ or a suitable mortar, to fill all large voids and repair inverts prior to spraying or centrifugally casting the pipe. For invert repairs, flow must be restricted.

1. The area to be repaired must be cleaned and free of all debris.
2. Once mixed to proper consistency, the Geopolymer lining material shall be shot or hand trowelled for invert repairs. Care should be taken to not apply excessive material in the channel, which could restrict flow. Once applied, the Geopolymer lining material should be smoothed either by hand or trowel in order to facilitate flow.
3. Spray or centrifugal application of the Geopolymer lining material may proceed immediately after invert repairs are completed.

5.4 Inspections

The Contractor's experienced personnel trained in location breaks and obstacles by CCTV inspection shall perform inspection of the sewer pipe. Utilizing a color video inspection system with data recording capabilities, the entire pipe section to be lined shall be recorded on DVD and three (3) copies produced. The interior of the pipe shall be carefully inspected to determine the location of any conditions, which may prevent the proper installation of the Geopolymer liner, and it shall be noted so that these conditions can be corrected. A DVD and suitable log shall be submitted to the OWNER.

1. Sewers service connections shall also be TV inspected, which shall identify all service connections, openings, and condition of service connections to main.
2. Utilizing high-pressure jet cleaning equipment, several passes are completed to assure that all debris is removed from the pipe. If roots are present, root cutters or mechanical brushes are attached to the jet nozzle and sent through the line to remove all root intrusions.
3. **Identification and Pre-measurement of Lateral Connections**-Either man entry or a 360-degree Pan-and-Tilt view camera shall be used to inspect the pipe traveling upstream. At each connection the operator will stop and turn the camera lens toward the

lateral thereby inspecting the first 8 to 12 inches of the lateral connection. If there remains a doubt as to whether or not the connection is live, additional “dye and flush” tests shall be performed. It will be the responsibility of the Contractor to determine which lateral connections are live. For each existing service connection determined to be active, the Contractor shall determine the condition of the service connection to the main, make his recommendation for lateral connection repair, and record both items in his log.

4. The Contractor shall produce a report as to the active/inactive status of all connections and submit his findings to the OWNER before rehabilitation of the main line begins.

5.5 Bypass of Flow

As required for acceptable completion of the work and/or to avoid damages due to sewer spills or overflows, the Contractor shall provide for sewer flow maintenance around the section or sections of pipe designated for rehabilitation.

1. As the sewers to be rehabilitated convey both sanitary and possible infiltration/inflow water flows, EcoCast™ rehabilitation shall be undertaken during a dry-weather period. It is incumbent upon the Contractor to complete the installation of EcoCast™ during a time-frame wherein precipitation shall not impact the work process or prevent normal sanitary sewer flow into and along the subject sewers.
2. The bypass shall typically be made by plugging the line at an existing upstream manhole and pumping the flow into a downstream manhole or adjacent sanitary sewer system. The pump and bypass lines shall be of adequate capacity and size to handle the anticipated flow. Bypassing of sanitary sewerage into the storm water system will not be allowed. For all bypass pumping, pump noise shall be kept to a minimum. The Contractor shall be required to contact all residential and commercial customers whose service lines connect to the sewer main being bypassed and inform them that they will be temporarily out of service. The Contractor shall also advise those customers against water usage until the mainline is back in service. After completing the necessary work on the main line to allow its reuse, the Contractor shall advise those customers that the sewer main is back in service.

5.6 Cleaning of Sewers

Sewers to be rehabilitated shall be thoroughly cleaned using high-pressure jetting equipment or by hand. Loose debris and roots shall be removed from the subject sewers in order to facilitate the proper installation of the EcoCast™ liner material.

1. The cleaning of sewers under this Contract shall be incidental to the Work and no separate payment shall be made.
2. All debris cleaned from the pipe shall be removed and disposed of at a dumpsite designated by the OWNER at no additional cost to the OWNER. Debris shall not be allowed to wash into any other pipe segment either upstream or downstream from the pipe segment being cleaned.
3. The sewers shall be cleaned to the satisfaction of the OWNER.
4. OWNER shall inspect the sewers prior to any liner material application.

5.7. Application of Centrifugally Cast Geopolymer Liner Material

The work consists of spray applying and /or centrifugally casting Geopolymer liner to the inside of

the existing pipe.

Mixing Geopolymer Lining Material

1. Contractor shall add the Geopolymer material to the batch water not to exceed a 0.20 water/cement ratio. For example, add 100 lbs of Geopolymer powder to 18-20 lbs batch water.
2. Water to cement ratios shall be monitored and maintained throughout the application process to ensure consistent material strength.
3. The Geopolymer lining material shall be mixed in a high shear mixer.
4. The Geopolymer lining material shall be pumped through an adjustable rotor stator pump for continuous delivery to the appropriate application device.
5. Mixing operations must be performed so that the minimum of dust is released into the surrounding environment. Tents shall be used to cover the mixing area including pumps.
6. Mixing shall be accomplished with an automated mix/pump system to maintain consistent:
 - a. Water/cement/polymer ratios
 - b. Mix time, mix speed and dwell time
7. Pumps shall be equipped with multiple sensors to stop the pump if material either runs out or overflows.
8. A backup pump, spin casting unit and multiple nozzles shall be onsite at all times during the course of the work under this Contract. Multiple nozzles may be required to produce the required depth or finish of the liner surface.

Spray application of Geopolymer Lining Material

1. The Geopolymer lining material delivery hose shall be coupled to a medium-velocity spray application nozzle. Pumping of the material shall commence and the mortar shall be atomized by the introduction of air at the nozzle, creating a medium-velocity spray pattern for material application.
2. The spin cast nozzle must be capable of bidirectional operation.
3. The bidirectional nozzle should have the capability to be adjusted to match the angle or gauge of corrugations when lining corrugated metal pipe.
4. A variable speed reciprocating spin head for making multiple position changes per minute is required. The reciprocating head allows the spin cast mechanism and the associated selected nozzle to make multiple passes on the pipe wall in a single pass of the sled assembly.
5. Spraying shall be performed from the downstream to upstream of the sewer.
6. Retraction of the spin cast assembly shall be monitored and performed at a measureable, uniform rate. At the beginning of each pipe segment the retraction device shall be calibrated. The calibration process includes setting the digital readout to the desired retrieval rate (in inches per minute). Then the retrieval chain is laid out and marked to

show the distance traveled in two minutes. The rate obtained must be within 5% of the desired application speed. Prior to the lining of each segment, the Contractor shall submit to the OWNER to the desired application spin head speed and retraction rate. These values shall be based upon the condition of the sewer as made known by the Contractor's pre-installation CCTV inspection.

7. The Geopolymer liner shall be applied to a specified uniform minimum thickness no less than 1/4 inch per pass.
8. The Geopolymer delivery hose shall be coupled to a high speed rotating applicator device. The rotating casting applicator shall then be positioned within the center, or positioned higher than centerline inside the pipe as required by pipe diameter.
9. The high speed rotating applicator shall then be initialized and pumping of the material shall commence. As the mortar begins to be centrifugally cast evenly around the interior of the cavity, the rotating applicator head shall uniformly travel back and forth at the center point of the pipe at a controlled frequency conducive to providing a uniform material thickness to the pipe walls. Controlled multiple passes are then made until the specified minimum finished thickness is attained.
10. Material thickness shall be verified with depth gauges and shall be no less than the design thickness at any point within the pipe segment. If additional material is required at any level, the rotating applicator head shall be placed at the location and application shall recommence until that area meets the required thickness.
11. The Geopolymer lining material shall be applied to a damp surface, with no free water.
12. The medium-velocity spray nozzle and the centrifugal spin casting head may be used in conjunction to facilitate uniform application of the mortar material to irregularities in the contour of the pipe walls.
13. The Geopolymer liner may be trowelled following the spray application. Initial trowelling shall be in an upward motion, to compress the material into voids and solidify the pipe wall. The material surface under this Contract shall be trowelled smooth to the satisfaction of the OWNER.
14. Proper steps shall be taken to ensure the material is cured in a moist and moderate climate. General underground conditions are usually adequate to meet this curing requirement. In the event dry and/or hot conditions are present, the use of a wind barrier and fogging spray may be required.
15. The Geopolymer liner should not be placed when the ambient temperature is 37 degrees Fahrenheit and falling or when the temperature is anticipated to fall below 32 degrees Fahrenheit during the next 24 hours, unless specific precautions are employed.
16. During extreme hot weather conditions, chilled water may be used to mix the Geopolymer. The Geopolymer mortar should be maintained at a temperature lower than 90 degrees F.

5.8 Termination and Sealing at Manhole Outlets

Termination of the Geopolymer liner at the end of a pipe or manhole shall be completed by hand applying the Geopolymer liner to the outer surface of the pipe or into the interior of the manhole.

5.9 Internal Reconnection of Lateral Services

The Contractor shall reopen the existing active sanitary sewer connections after the final Geopolymer lining pass. Restored openings shall be neatly and smoothly open and without rough edges. Care must be exercised not to damage the Geopolymer lining while reinstating the lateral.

5.9 Final Inspection

At the completion of the rehabilitation of the sewer mains, a video inspection DVD and log (3 copies of both) of the completed line segments shall be given to the OWNER by the Contractor. This inspection shall be performed, one section at a time, by a color video inspection system. The finished Geopolymer shall be continuous over the entire length of all inversion runs and be free of dry spots, lifts, and delaminations. No infiltration of groundwater shall be observed. All service connections shall be accounted for and shall be unobstructed including all rehabilitated service lateral connection repair(s).

5.10 Sample Preparation and Testing of Geopolymer Liner

1. Submit the following information to the OWNER: Product data, including manufacturer and brand name along with laboratory tests results to verify 28-day compressive strength in accordance with Test C109/C109M-05. The project superintendent will require that samples of the applied material will be taken on a daily basis. The samples may be taken from the pump immediately before discharge into the hose or at the spin caster, if feasible. Three samples will be obtained and formed into cylinders as required by ASTM C 109. The samples must be undisturbed for a period of at least 24 hours before they can be transported. The material thickness may be determined by using depth gauges during the spraying process. Another process to determine thickness is to drill into the lined corrugated metal pipes to determine the amount of materials applied to the pipe walls. The depth measurements should be made at three clock positions around the pipe and near both ends and the middle of the pipe. These measurements must be written down in a log book which will be submitted to the OWNER at the end of the project, along with digital photos of the completed pipe. The OWNER may request additional testing to be performed. These additional tests should be addressed in writing before the project begins. In some instances clients request several cores be taken of the pipe into or through the original pipe to determine the thickness applied. Geophysical laboratories are available to perform this type of test on a routine basis.
2. The Contractor shall furnish all equipment and personnel necessary to conduct all required sample preparations.

5.11 Quality Assurance Control

The quality and performance of the material shall be maintained by one or all of the following measures to be determined and specified by the owner.

1. Material should be delivered in packaged and sealed condition and free of moisture. Do not use materials that have been exposed to moisture or there is visible damage to the packaging.
2. Application equipment should have mortar feed, high shear mixer and pump as a single operating unit. In addition, the application equipment shall have sensors that maintain uniform operation of all three functions and shut down the equipment in the event of interruption of any of the functions.

3. Application equipment shall have visible display for the rate of water addition to ensure water/cement ratios are known and controlled. Water/cement ratio must be maintained below 0.20.
4. Application equipment shall measure back pressure on the discharge side of the pump in order to alert the operator to any potential changes in flow rates. Do not exceed 25 bars of back pressure.
5. Spinner head shall be capable of spraying in a clock wise and counter clock wise direction and at multiple angles.
6. Spinner head shall be attached to a reciprocating mechanism to layer the materials. The reciprocating mechanism shall oscillate the spinner head by a minimum of 6 inches.
7. The system retraction system shall be capable of pulling the spinner head at a minimum rate of 4 inches per minute with no more than +/-5% tolerance and have a visible display that monitors the rate of retraction.
8. The rate of retraction, material discharge volume, dry material usage and length of pipe covered should be monitored and recorded on a daily basis.
9. All equipment should be in clean and good working conditions.
10. Maintenance and service should be performed on the equipment to manufacturer's standards.
11. Spare parts or extra equipment should be kept on site to ensure rapid redeployment in the event of equipment failure.

PART 6 SUBMITTALS

Before any field work by the Contractor, the Contractor shall submit to the OWNER for his review three (3) copies of the following:

1. Detailed shop drawings and/or legible catalog cuts of all items included within this Section
2. Detailed installation procedures and specific EcoCast™ procedures for rehabilitation of sewer mains, internal reestablishment of laterals, and lateral connection repairs
3. Certified copies of all test reports on materials referred to within this Section in accordance with ASTM or Federal Specification requirements.

After cleaning and TV inspection by the Contractor of all of the proposed sewer mains to be rehabilitated and before beginning any lining of sewer mains, the Contractor shall submit to the OWNER for his review three (3) copies of the following:

1. DVD and log (3 copies of both) of the Contractor's TV inspection of the sewer mains to be rehabilitated.
2. In the event actual field conditions require a deviation from the Contractor's submitted design submittal, a revised minimum design thickness calculation for the new liner based on Contractor's CCTV inspection.

After rehabilitation of sewer mains, the Contractor shall submit to the OWNER for his records the following:

1. DVD and log (3 copies of both) of the Contractor's TV inspection of the Completed Work.
2. Test results of samples of Geopolymer liner.

PART 7 WARRANTIES

1. The material shall be unconditionally guaranteed to meet or exceed the design criteria detailed in Part 4 of this Specification Section.
2. Should any of the Contractor's furnished and installed material specified in this Section fail to meet the indicated performance parameters as indicated herein for a period of FIVE (5) YEARS from the date of acceptance, the Contractor shall return to the site and remedy the problem at no charge to the OWNER.
3. The finished EcoCast™ liner shall be continuous over the entire length of the rehabilitated segment and be as free as commercially practicable from visual defects such as foreign inclusions, dry or thin spots and delamination. It shall also meet the test requirements specified in this Section. During the guarantee period any defects, which will affect the integrity or strength of the finished product, shall be repaired at the Contractor's expense.

This specification document is not all-inclusive. The Contractor who is ultimately hired is responsible for all details of the project such that the resulting facilities will be fully functional and maintainable in a manner acceptable to the City.

END OF SECTION 09915