



**BID DOCUMENTS  
FOR  
ZEMOSA ACRES CULVERT  
REPLACEMENTS  
PROJECT NO. 2014-027**

**SET # \_\_\_\_\_**

ENGINEERING DEPARTMENT  
850 WARREN C COLEMAN BLVD, POST OFFICE BOX 308  
CONCORD, NORTH CAROLINA 28026-0308

This page left blank intentionally

TABLE OF CONTENTS

SECTION I – BIDS, AGREEMENTS, AND NOTICES

ADVERTISEMENT/INVITATION TO BID..... 3  
INSTRUCTIONS TO BIDDERS..... 6  
DEBARRED FIRMS CERTIFICATION FORM..... 12  
BID FORM ..... 13  
FORM A-1 BASE BID ..... 15  
FORM A-2 ADDITIVE ALTERNATE BID..... 17  
FORM B PERFORMANCE BOND ..... 22  
SPECIAL PROVISIONS ..... 24  
NOTICE OF AWARD..... 29  
NOTICE TO PROCEED..... 30  
STANDARD FORM CONSTRUCTION CONTRACT ..... 31  
    CONTRACT EXHIBIT “B” AFFIDAVIT ..... 41  
    CONTRACT EXHIBIT “C” TAX FORM(S)..... 43  
    CONTRACT EXHIBIT “D” CERTIFICATE OF INSURANCE..... 44  
PAY REQUEST FORM ..... 45  
ENGINEERING’S APPLICATION FOR PAYMENT FORM FOR BASE BID..... 46  
ENGINEERING’S APPLICATION FOR PAYMENT FORM FOR ADDITIVE ALTERNATE BID..... 48  
CONTRACT CHANGE ORDER ..... 50  
CERTIFICATE OF INFRASTRUCTURE COMPLETION ..... 51  
FIELD ORDER..... 52  
NORTH CAROLINA SALES TAX REPORT..... 53  
NORTH CAROLINA ONE CALL CENTER, INC. .... 54

SECTION II – GENERAL CONDITIONS

ARTICLE 1 DEFINITIONS..... II-2  
ARTICLE 2 PRELIMINARY MATTERS..... II-6  
ARTICLE 3 CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE ..... II-8  
ARTICLE 4 AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL  
CONDITIONS; REFERENCE POINTS ..... II-9  
ARTICLE 5 BONDS AND INSURANCE..... II-13  
ARTICLE 6 CONTRACTOR’S RESPONSIBILITIES ..... II-18  
ARTICLE 7 OTHER WORK ..... II-29  
ARTICLE 8 OWNER’S RESPONSIBILITIES ..... II-30  
ARTICLE 9 ENGINEER’S STATUS DURING CONSTRUCTION..... II-31  
ARTICLE 10 CHANGES IN THE WORK; CLAIMS ..... II-33  
ARTICLE 11 COST OF WORK; UNIT PRICE WORK..... II-35  
ARTICLE 12 CHANGE OF CONTRACT PRICES; CHANGE OF CONTRACT TIMES..... II-38  
ARTICLE 13 TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR  
ACCEPTANCE OF DEFECTIVE WORK ..... II-40  
ARTICLE 14 PAYMENTS TO CONTRACTOR AND COMPLETION ..... II-44  
ARTICLE 15 SUSPENSION OF WORK AND TERMINATION..... II-49  
ARTICLE 16 DISPUTE RESOLUTION ..... II-51

SECTION III –PROJECT SPECIAL SPECIFICATIONS

GENERAL SPECIFICATIONS ..... III-1  
WATER AND SEWER SPECIFICATIONS..... III-11  
MEASUREMENT AND PAYMENT ..... III-55

SECTION IV – PROJECT REPORTS AND PERMITS  
ENGINEER’S GEOTECHNICAL REPORT  
401 WATER QUALITY CERTIFICATION AND ADDITIONAL CONDITIONS  
USACE GENERAL PERMIT VERIFICATION



## **ADVERTISEMENT/INVITATION TO BID**

**Date: October 6, 2016**

Project Title: **Zemosa Acres Culvert Replacements**

Project #: **2014-027**

Project Description: The proposed work is generally described as follows:

The **Zemosa Acres Culvert Replacements** project includes the removal of three existing sets of culverts, the construction of three multi-barrel sets of culverts, and associated services that will include relocation of gravity sanitary sewer mains, relocation of water mains, coordination with utility agencies on other utility adjustments by others, roadway pavement reconstruction, and other appurtenances along Chadbourne Avenue, Chelwood Drive, and Channing Circle. An Additive Alternate is included that consists of the removal of one existing set of culverts, the construction of one multi-barrel set of culverts, and associated services that will include relocation of gravity sanitary sewer mains, relocation of water mains, coordination with utility agencies on other utility adjustments by others, and roadway pavement reconstruction on Hanover Drive, Concord, NC.

Sealed Bids will be received by the City of Concord (Owner) at the address below. Please submit notarized bids in a sealed envelope by the bid opening time and date. All Bids must be in accordance with the Bidding Documents on file with the City of Concord Engineering Department. Bidders must be licensed contractors in the State of North Carolina. Bids will be received on a unit price basis. A Bid Bond must accompany each bid. The Successful Bidder will be required to furnish a Construction Performance Bond and a Construction Payment Bond as security for the faithful performance and the payment of all bills and obligations arising from the performance of the Contract. Contractor and all Subcontractors will be required to conform to the labor standards set forth in the Contract Documents. Owner reserves the right to reject any or all Bids, including without limitation the rights to reject any or all nonconforming, nonresponsive, unbalanced, or conditional Bids, and will award to lowest responsible Bidder taking into consideration quality, performance, and time specified in Bid Form for performance of Work.

A non-mandatory Pre-Bid Meeting will be held at **2:00 PM, October 18, 2016** at the Alfred M. Brown Operations Center, 850 Warren C. Coleman Blvd., Concord, NC. Conference room to be determined. Prime Bidders wishing to submit bids are **encouraged** to attend the Pre-Bid Meeting.

W. Brian Hiatt  
City Manager

Engineer: Patrick Blandford, P.E.  
HDR Engineering, Inc. of the Carolinas  
440 South Church Street, Suite 1000  
Charlotte, North Carolina 28202-2075

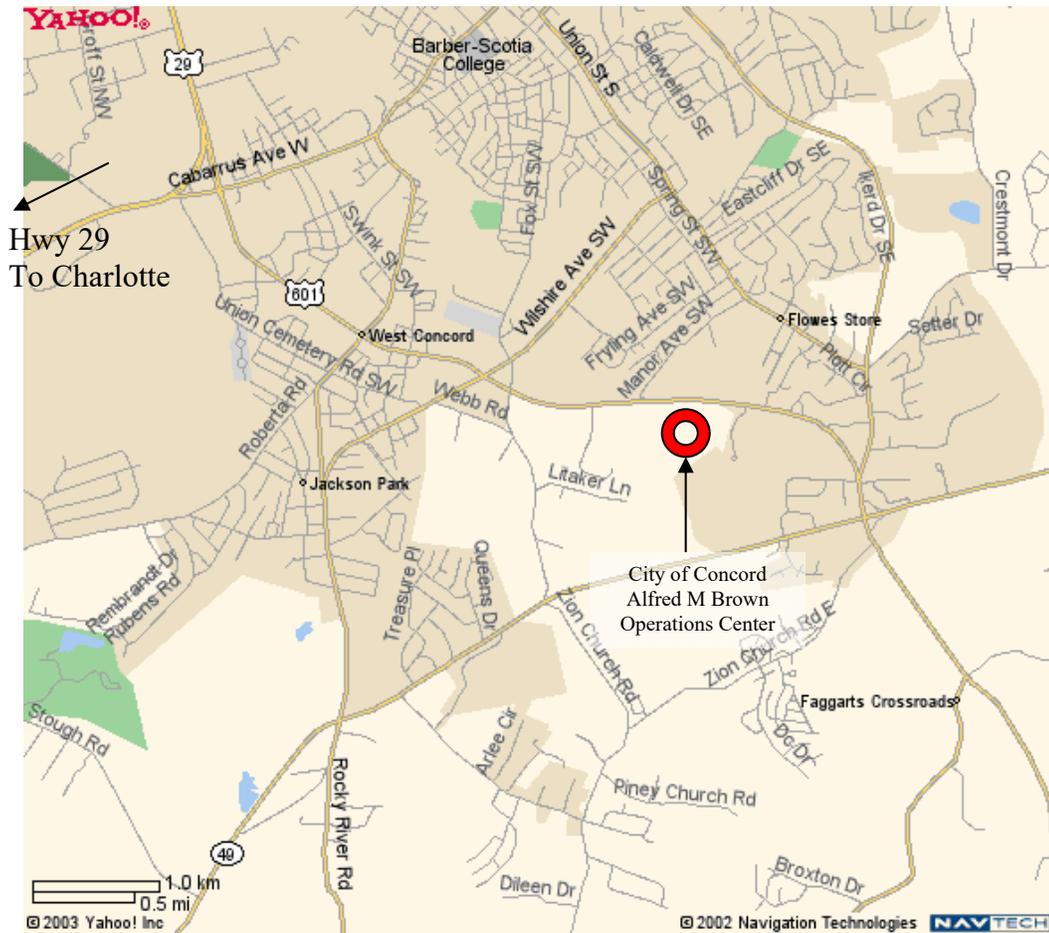
Bid Plans and Specifications can be obtained from Duncan Parnell at 651 Church St. North, Concord NC 28025  
Ph: 704-782-2625, Fax 704-782-2625, Email: [concord@duncan-parnell.com](mailto:concord@duncan-parnell.com) Contact Duncan Parnell for bid package pricing.

Contractors wishing to bid on the project must register with Rick Blat via email at [blatr@ci.concord.nc.us](mailto:blatr@ci.concord.nc.us) to be considered on the project. All correspondence including addendums will be via email.

**Technical questions:** Tom Bach, P.E., 704.920.5344

Bid Due Date: **November 10, 2016 @ 2:00 PM**  
Location: City of Concord, Alfred M. Brown Operations Center  
850 Warren C. Coleman Blvd. (Hwy 601 S.)  
Conference Room C, Concord, NC 28026

**MAP AND DIRECTIONS TO CITY OF CONCORD  
ALFRED M BROWN OPERATIONS CENTER**



**Directions from Charlotte**

- Take I-77 north to I-85 north from Charlotte to Concord
- From I-85 north, take exit 49 to the right towards Lowe’s Motor Speedway
- At the Lowe’s Motor Speedway, turn left onto Highway 29 (Concord Pkwy) north
- Keep going north while you pass the Wal-Mart shopping center on your right
- Turn right at the light at the Chevrolet dealership onto Cabarrus Avenue
- Turn right at the next traffic light at the Walgreens onto Hwy 601 South (bypass)
- (Hwy 601 S is also Warren C. Coleman Boulevard)
- Go straight through two traffic lights at Old Charlotte Road and Wilshire Avenue
- Pass the Bi-Lo shopping center on your left
- Turn right at the next traffic light at Manor Avenue (blue & white sign on right for the City of Concord Alfred M. Brown Operations Center)
- You will be on the entrance road into our complex
- Follow signs to the left to Visitor Parking.
- Proceed to the front desk at the Administration Building and sign in with the receptionist

SITE VICINITY MAP



## INSTRUCTIONS TO BIDDERS

1. DEFINED TERMS. Terms used in these Instructions to Bidders are meanings assigned to them in the General Conditions and the Supplementary Conditions. An additional term is defined as follows:

Successful Bidder - The lowest, qualified, responsible, and responsive Bidder to whom Owner (on the basis of Owner's evaluation as herein provided) makes an award.

2. COPIES OF BID DOCUMENTS. Bid Documents which include all front-end documents may be obtained from Owner at:

Duncan Parnell at 651 Church St. North, Concord NC 28025  
Ph: 704-782-2625, Fax 704-782-2625, Email: [concord@duncan-parnell.com](mailto:concord@duncan-parnell.com)

Partial sets of Bid Documents will not be issued in response to requests by subject matter.

Complete sets of Bid Documents must be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misrepresentations resulting from the use of incomplete sets of Quoting Documents.

Owner and Engineer, in making copies of Quoting Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.

3. QUALIFICATIONS OF Bidders. To demonstrate qualifications to perform the Work, Bidder may be required to submit written evidence on financial data, previous experience, present commitments, and other such data as may be requested by Owner or Engineer. Each Bid must contain evidence of Bidder's qualification to do business in the state where the Project is located, or Bidder must agree to obtain such qualification prior to award of the Contract. **A non-mandatory Pre-Bid Meeting will be held at 2:00 PM, October 18, 2016 at the Alfred M. Brown Operations Center, 850 Warren C. Coleman Blvd., Concord, NC in conference room C. Prime Bidders wishing to submit bids are encouraged to attend the Pre-Bid Meeting.**

4. EXAMINATION OF CONTRACT DOCUMENTS AND SITE. It is the responsibility of each Bidder, before submitting a Bid, to (a) thoroughly examine the Contract Documents, (b) visit the site to become familiar with local conditions that may affect cost, progress, performance, or furnishing of the Work, (c) consider federal, state, and local laws and regulations that may affect cost, progress, performance, or furnishing of the Work, (d) study and carefully correlate Bidder's observations with the Contract Documents, and (e) notify Engineer of all conflicts, errors, or discrepancies discovered by Bidder in the Contract Documents.

4.02. Underground Facilities. Information and data reflected in the Contract Documents with respect to underground facilities at or contiguous to the site are based upon information and data furnished to Owner and Engineer by owners of such underground facilities or others, and Owner and Engineer disclaim responsibility for the accuracy or completeness thereof unless it is expressly provided otherwise in the Supplementary Conditions.

4.03. Additional Information. Before submitting a Bid, each Bidder may, at Bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests, and studies and obtain any additional information and data which pertain to the physical conditions (surface, subsurface, and underground facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance, or furnishing of the Work and which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price, and other terms and conditions of the Contract Documents.

The Engineer's geotechnical report is included in this package for consideration by the Bidder in preparing their Bid. The Engineer or Owner will not be held liable for the findings of the geotechnical report and how it may inform the Bid or performance of the Work in particular, where discrepancies are discovered between the geotechnical report and conditions encountered during performance of the Work.

4.04. Easements. The lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and other lands designated for use by Contractor in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are shown on the plans, with additional land necessary to be provided by Contractor. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by Owner unless otherwise specified in the Contract Documents.

4.05. Unit Price Contracts. Bidders must satisfy themselves of the accuracy of the estimated quantities in the Bid schedule by examination of the site and a review of the drawings and the specifications, including the addenda. After Bids have been submitted, the Bidder shall not assert that there was a misunderstanding concerning the quantities of work or the nature of the work to be done.

4.06. Bidder's Representation. The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement concerning examination of the Contract Documents and the site, that without exception the Bid is premised upon performing and furnishing the Work required by the Contract Documents, and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

5. INTERPRETATIONS AND ADDENDA. All questions about the meaning or intent of the Quoting Documents and the Contract Documents shall be submitted to Owner in writing. Interpretations or clarifications considered necessary by Owner in response to such questions will be issued by Addenda emailed with delivery and read receipts to all parties recorded by Engineer as having received the Quoting Documents. Questions received less than 7 days prior to the date for opening of Bids may not be answered. Only answers issued by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

6. **BID SECURITY. Each Proposal must be accompanied by a deposit equal to 5% of the net price bid.** This deposit may consist of cash, or a Cashier's Check issued by, or a Certified Check drawn on a Bank or Trust Company authorized to do business in North Carolina, or on a Bank insured by the Federal Deposit Insurance Corporation, or a U.S. Money Order, payable to the City of Concord or 5% Bid Bond in the form required by G.S. 143-129 as amended, issued by an Insurance Company authorized to do business in North Carolina, said deposit to be retained in the event of failure of the successful bidder to execute a formal contract within ten (10) days after award or to give satisfactory surety required.

The Bid security of the Successful Bidder (if so required) will be retained until such Bidder has executed the Agreement, furnished the required contract security (if so required), and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Agreement and furnish the required contract security within the number of days set forth in the Bid Form, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security (if so required) of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of 7 days after the Effective Date of the Agreement or the day after the last day the Bid remain subject to acceptance as set forth in the Bid Form, whereupon Bid security furnished by such Bidders will be returned. Bid security accompanying Bid which are deemed by Owner to be noncompetitive will be returned within 7 days after the designated Bid opening.

7. CONTRACT TIMES. The numbers of calendar days within which, or the dates by which, the Work is to be substantially completed and also completed and ready for final payment (the Contract Times) are set forth in the Bid Form.

8. LIQUIDATED DAMAGES. Provisions for liquidated damages, if any, are set forth in the Agreement.

9. SUBSTITUTES OR "OR-EQUAL ITEMS. Bidder's attention is directed to Article 6.5 of the General Conditions concerning substitutes and "or-equal" items. Where an item or material is specified by a proprietary name, it is done for the purpose of establishing a basis of quality and not for the purpose of limiting competition.

The Engineer's intent is to consider alternative products which have the desired essential characteristics. The Engineer will consider any such products offered. Requests for acceptance of alternative products shall be made through Bidders quoting as prime Contractors. Acceptances for substitutions will not be granted directly to suppliers, distributors, or subcontractors. Pursuant to Section 133-3, General Statutes of North Carolina, the following procedures shall be used:

Bidders desiring to submit alternative product proposals for prior acceptance of the Engineers shall submit, in writing, such proposals within ten (10) days of the bid opening. Applications received after this time will not be reviewed. Each such request shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitute, including drawings, cuts, performance and test data, and other information necessary for an evaluation. A statement setting forth any changes in other materials, equipment, or other work that incorporation of the substitute would require shall be included. The Engineer shall consider and either accept or reject all alternative product proposals submitted.

If, by the close of the fifth day prior to the deadline for receiving Bid, the Engineer has accepted any alternative product proposals, the Quoting Documents shall be modified to include the alternative products. The Engineer shall publish the modification in an Addenda at least five (5) days prior to the deadline for receiving Bids. The Engineer's decision of acceptance or rejection of a proposed substitute shall be final.

10. SUBCONTRACTORS, SUPPLIERS, AND OTHERS. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, and other persons and organizations (including those who are to furnish the principal items of material and equipment) to be submitted to Owner in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within 3 days after the opening submit to Owner the List of Subcontractors completed with all such Subcontractors, Suppliers, and other persons and organizations proposed for those portions of the Work for which such identification is required. The list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, person, or organization, if requested by Owner. If Owner or Engineer after due investigation has reasonable objection to any proposed Subcontractor, Supplier, or other person or organization, Owner may, before the Notice of Award is given, request the apparent Successful Bidder to submit an acceptable substitute without an increase in the Bid. All Subcontractors shall be a licensed utility contractor in the State of North Carolina.

11. BID FORM. The Bid Form is bound in the Quoting Documents and shall not be removed therefrom. Bid Forms must be completed in ink.

Bids by corporations must be executed in the corporate name by the president or vice-president (or other corporate officer accompanied by evidence of authority to sign for the corporation). Bids by partnerships must be executed in the partnership name and signed by a partner. Bids by joint ventures shall be signed by each participant in the joint venture or by a representative of the joint venture accompanied by evidence of authority to sign for the joint venture.

The names of all persons signing shall be legibly printed below the signature. A Bid by a person who affixes to his signature the word "president", "secretary", "agent", or other designation without disclosing his principal may be held to be the Bid of the individual signing. When requested by Owner, evidence of the authority of the person signing shall be furnished.

All blanks in the Bid Form shall be filled. A Bid price shall be indicated for each unit price item listed therein, or the words "No Bid", "No Charge", "No Change", or other appropriate phrase shall be entered.

The Bid shall contain an acknowledgment of receipt of all Addenda; the numbers and dates of which shall be filled in on the Bid Form.

No alterations in Bids, or in the printed forms therefore, by erasures, interpolations, or otherwise will be acceptable unless each such alteration is signed or initialed by the Bidder; if initialed, Owner may require the Bidder to identify any alteration so initialed.

11.01. Bid Pricing. The Bidder shall complete the schedule of unit prices included in the Bid Form and shall accept all fixed unit prices listed therein.

The total Bid will be determined as the sum of the products of the estimated quantity of each item and the unit price Bid. The final Contract Price will be subject to adjustment according to final measured, used, or delivered quantities as provided in Article 9.7 of the General Conditions, and the unit prices in the Bid will apply to such final quantities except that unit prices will be subject to change by Change Order as stipulated in the Supplementary Conditions.

11.02. Contingency. The Contingency is to be added to the Bid price and is to be used for minor change order items. If the Contingency is to be used, a scope of work and price would be negotiated. The Contingency is for the sole use of Owner. A change order will be issued to delete any unauthorized portion of the Contingency.

12. SUBMISSION OF BIDS. Bids shall be submitted at the time and place indicated in the Invitation to Bid, or the modified time and place indicated by Addendum. Bids shall be enclosed in a sealed envelope or wrapping, addressed to:

The City of Concord  
W. Brian Hiatt, City Manager  
c/o Enrique Blat, PE, Deputy City Engineer  
P.O. Box 308  
850 Warren C. Coleman Blvd.  
Concord, North Carolina 28026-0308

Bids shall be marked with the name, license number, and address of the Bidder and shall be accompanied by the Bid security (if required) and other required documents. If the Bid is sent through the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face of it.

Each Bid envelope shall be identified on the outside with the words:

“Project Title: **Zemosa Acres Culvert Replacements**

**Project #: 2014-027”**

Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids. Bids received after the time and date for receipt of Bids will be returned unopened.

**One copy of all pages of the BID FORM must be submitted with the Bid, as well as a Bid Bond and Debarred Firms Certification Form.**

Oral, telephone, facsimile, or telegraph Bids are invalid and will not receive consideration.

No Bidder may submit more than one Bid. Multiple Bids under different names will not be accepted from one firm or association.

A conditional or qualified Bid will not be accepted.

13. MODIFICATION AND WITHDRAWAL OF BIDS. Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

If, within 24 hours after Bids are opened, any Bidder files a duly signed, written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid and the Bid security (if any) will be returned. Thereafter, that Bidder will be disqualified from further quoting on the Work to be provided under the Contract Documents.

14. OPENING OF BIDS. Bids will be opened at the office and at the discretion of the Director of Engineering and read aloud.

The procedure for opening Bids will follow guidelines issued by the State Building Commission dated December 10, 1990 and endorsed by the American Council of Engineering Companies of North Carolina.

15. BIDS TO REMAIN SUBJECT TO ACCEPTANCE. All Bids will remain subject to acceptance for the number of days set forth in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the security (if any) prior to that date.

16. AWARD OF CONTRACT. Owner reserves the right to reject any or all Bids, including without limitation the rights to reject any or all nonconforming, nonresponsive, unbalanced, or conditional Bids, and will award to lowest responsible Bidder taking into consideration quality, performance, and time specified in Bid Form for performance of Work. Owner also reserves the right to waive informalities.

In evaluating Bids, Owner will consider the qualifications of the Bidders, whether or not the Bids comply with the prescribed requirements, and such alternatives, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.

Owner may consider the qualifications and experience of Subcontractors, Suppliers, and other persons and organizations proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other persons and organizations must be submitted as provided in the Supplementary Conditions. Owner also may consider the operating costs, maintenance requirements, performance data, and guarantees of major items of materials and equipment proposed for incorporation in the Work when such data is required to be submitted prior to the Notice of Award.

Owner may conduct such investigations as Owner deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, and other persons and organizations to perform and furnish the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.

If the Contract is to be awarded, it will be awarded to the lowest Bidder whose evaluation by Owner indicates to Owner that the award will be in the best interests of Owner. If the Contract is to be awarded, Owner will give the Successful Bidder a Notice of Award within the number of days set forth in the Bid Form. The evaluation of Suppliers' or manufacturers' data submitted with the Bid, or submitted upon request prior to the Notice of Award, will include consideration of the following:

- Owner-required inventory of spare parts.
- Building design changes which would be required to accommodate the proposed materials and equipment.
- Installation requirements and related engineering, training, and operating costs.
- Experience and performance record of the Supplier or the manufacturer.
- Maintenance and frequency of inspections required to assure reliable performance of the equipment.
- Suppliers' or manufacturers' service facilities and availability of qualified field service personnel.
- Efficiency and related operating expense during the anticipated useful life of the equipment.

17. CONTRACT SECURITY. The General Conditions set forth Owner's requirements as to Performance and Payment Bonds (required). These Bonds shall be delivered to Owner with the executed Agreement.

18. SIGNING OF AGREEMENT. When Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by two unsigned counterparts of the Agreement with all other written Contract Documents attached. Within the number of days set forth in the Bid Form, the Successful Bidder shall sign, leaving the dates blank, and deliver the required number of counterparts of the Agreement and attached documents to Owner with the required Bonds and power of attorney. Within 30 days thereafter, Owner shall execute all copies of the Agreement and other Contract Documents submitted by Contractor (Successful Bidder); shall insert the date of contract on the Agreement, Bonds, and power of attorney; and shall distribute signed copies as stipulated in the Agreement.

Should the Owner not execute the Contract within the period specified, the Successful Bidder may, by written notice, withdraw his signed Contract. Such notice or withdrawal shall be effective upon receipt of the notice by the Owner.

19. SALES AND USE TAXES. Provisions for sales and use taxes, if any, are set forth in the Supplementary Conditions.

20. RETAINAGE. Provisions concerning retainage are set forth in the Agreement.

21. LAWS AND REGULATIONS. Modifications, if any, to the General Conditions concerning Laws and Regulations are set forth in the Supplementary Conditions. Additional provisions, if any, concerning Laws and Regulations are set forth in the Agreement.

21.01. Collusive Bidding. In accordance with Section 112(c) of Title 23 USC, and G.S. 75-5(b)(7) of the State of North Carolina, the Contractor (Bidder), by submission and execution of this bid or Bid, certifies that he has not entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding or quoting in connection with his Bid on this project.

End of Section

**DEBARRED FIRMS CERTIFICATION FORM**

|                |  |                            |
|----------------|--|----------------------------|
| Project Title: | <b>Zemosa Acres Culvert Replacements</b> | <b>Project #: 2014-027</b> |
|----------------|--|----------------------------|

The undersigned hereby certifies that the firm of \_\_\_\_\_ has not been suspended by the State of North Carolina or any agency or department thereof for conviction or indictment or any of the offenses enumerated in G.S. 133-27 nor will award subcontracts of any tier to firms that have been suspended for conviction or indictment of any of the offenses enumerated in G.S. 133-27.

\_\_\_\_\_  
Name of Firm

ATTEST \_\_\_\_\_ (SEAL)

\_\_\_\_\_  
Signature of Authorized Official

\_\_\_\_\_  
Title

Sworn and subscribed before me this  
\_\_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Notary Public

**BID FORM**

PROJECT IDENTIFICATION:

Project Title:       **Zemosa Acres Culvert Replacements**

**Project #: 2014-027**

THIS BID IS SUBMITTED TO:

W. Brian Hiatt, City Manager  
c/o Enrique Blat, PE, Deputy City Engineer  
City of Concord  
850 Warren C. Coleman Blvd., P.O. Box 308  
Concord, North Carolina 28026-0308

1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an agreement with Owner in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents within the specified time and for the amount indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.

2. Bidder accepts all of the terms and conditions of the Invitation to Bid and the Instructions to Bid, including without limitation those dealing with the disposition of the Bid security (if security is required by the City Manager). This Bid will remain subject to acceptance for 60 days after the day designated for reception of Bids. Bidder will sign and submit the Agreement with the Bonds and other documents required by the Quoting Documents within 10 days after the date of Owner's Notice of Award.

3. In submitting this Bid, Bidder represents that:

a. Bidder has examined copies of all the Quoting Documents and of the following Addenda (receipt of all which is hereby acknowledged):

- |           |             |
|-----------|-------------|
| No. _____ | Dated _____ |

b. Bidder has visited the site and become familiar with and satisfied itself as to the general, local, and site conditions that may affect cost, progress, performance, and furnishing of the Work.

c. Bidder is familiar with and has satisfied itself as to all Federal, State, and Local Laws and Regulations that may affect cost, progress, performance, and furnishing of Work.

d. Bidder has carefully studied all reports of explorations and tests of subsurface conditions at or contiguous to the site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the site (except underground facilities) which have provided by the owner and under the conditions normally used and identified in the Supplementary Conditions

and Special Conditions as provided in Paragraph 4.2.1 of the General Conditions. Bidder accepts the determination set forth in the Supplementary Conditions and Special Conditions of the extent of the "technical data" contained in such reports and drawings upon which Bidder is entitled to rely as provided in Paragraph 4.2 of the General Conditions. Bidder acknowledges that such reports and drawings are not Contract Documents and may not be complete for Bidder's purposes. Bidder acknowledges that Owner and Engineer do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Quoting Documents with respect to underground facilities at or contiguous to the site. Bidder has obtained and carefully studied (or assumes responsibility for having done so) all such additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and underground facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance, or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder and safety precautions and programs incident thereto. Bidder does not consider that any additional examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance and furnishing of the Work in accordance with the time, price, and other terms and conditions of the Contract Documents.

- e. Bidder is aware of the general nature of Work to be performed by Owner and others at the site that relates to Work for which this Bid is submitted as indicated in the Contract Documents.
- f. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.
- g. Bidder has given Engineer written and verbal notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Contract Documents and the written resolution thereof by Engineer is acceptable to Bidder, and the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work for which this Bid is submitted.
- h. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm, or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid Bidder has not solicited or induced any person, firm, or corporation to refrain from quoting; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

4. Bidder will complete the Work for the following unit prices. Quantities indicated are estimated and not guaranteed; they are solely for comparing Bids and establishing the initial Contract Price. Final payment will be based on actual quantities.

**FORM A-1**  
**BASE BID**

| Project Title: Zemoso Acres Culvert Replacement Project #: 2014-027<br>(Chadbourne Avenue, Chelwood Avenue, and Channing Circle) |             |  |          |    |               |                |
|--|-------------|--|----------|----|---------------|----------------|
| ITEM   | SECT<br>NO* | DESCRIPTION  | QUANTITY |    | UNIT<br>PRICE | TOTAL<br>PRICE |
| <b>GENERAL WORK ITEMS</b>  |             |  |          |    |               |                |
| 1  | 800         | Mobilization   | 1        | LS |               |                |
| 2  | 801         | Construction Stakes, Lines and Grades                    | 1        | LS |               |                |
| 3  | SP-1        | Comprehensive Grading                                    | 1        | LS |               |                |
| 4  | SP-2        | Traffic Control  | 1        | LS |               |                |
| <b>ROADWAY/DRAINAGE ITEMS</b>  |             |  |          |    |               |                |
| 5  | 230         | Borrow Excavation  | 5,700    | CY |               |                |
| 6  | 400         | Foundation Conditioning Material                         | 2,790    | TN |               |                |
| 7  | SP-4        | 10'x9' Reinf. Concrete Box Culvert, Cl. III              | 177      | LF |               |                |
| 8  | SP-4        | 11'x9' Reinf. Concrete Box Culvert, Cl. III              | 96       | LF |               |                |
| 9  | SP-4        | 12'x9' Reinf. Concrete Box Culvert, Cl. III              | 238      | LF |               |                |
| 10   | 610         | Asphalt Concrete Base Course, B25.0B                     | 270      | TN |               |                |
| 11   | 610         | Asphalt Concrete Intermediate Course, I19.0B             | 110      | TN |               |                |
| 12   | 610         | Asphalt Concrete Surface Course, SF9.5A                  | 90       | TN |               |                |
| 13   | 620         | Asphalt Binder for Plant Mix                             | 29       | TN |               |                |
| 14   | 838         | Reinforced Endwalls                                      | 300      | CY |               |                |
| 15   | 876         | Rip Rap, CL. I   | 25       | TN |               |                |
| 16   | 876         | Rip Rap, CL. A   | 25       | TN |               |                |
| 17   | 876         | Rip Rap, CL. B   | 56       | TN |               |                |
| 18   | 862         | Guardrail (NCDOT STD.862.01), including anchor units     | 285      | LF |               |                |
| 19   | 1005        | Aggregate No. 57   | 46       | TN |               |                |
| 20   | 1056        | Geotextile Fabric, NCDOT Type 2                          | 3,000    | SY |               |                |
| 21   | SP-5        | Rock Sill  | 100      | LF |               |                |
| 22   | SP-6        | Coir Fiber Matting                                       | 1,500    | SY |               |                |
| <b>UTILITY ITEMS</b>   |             |  |          |    |               |                |
| 23   | SP-8        | 5' Sanitary Manhole (w/ Inside Drop) incl. Frame & Cover | 1        | EA |               |                |
| 24   | SP-8        | 5' Sanitary Manhole (w/ Inside Drop) Additional Depth    | 8        | VF |               |                |
| 25   | SP-8        | 5' Sanitary Manhole, including Frame & Cover             | 3        | EA |               |                |
| 26   | SP-8        | 5' Sanitary Manhole, Additional Depth                    | 16       | VF |               |                |
| 27   | SP-9        | 24" Sanitary Sewer, PVC, DR 35                           | 135      | LF |               |                |
| 28   | SP-9        | 8" Sanitary Sewer, Restrained Joint Ductile Iron, PC 350 | 65       | LF |               |                |
| 29   | 1510        | 6" Water Main, Restrained Joint Ductile Iron, PC 350     | 560      | LF |               |                |
| 30   | 1510        | 4" Water Main, Restrained Joint Ductile Iron, PC 350     | 535      | LF |               |                |
| 31   | 1540        | 12" Encasement Pipe, Steel (0.25" Thick)                 | 150      | LF |               |                |

**Project Title: Zemosa Acres Culvert Replacement Project #: 2014-027  
(Chadbourne Avenue, Chelwood Avenue, and Channing Circle)**

| ITEM | SECT  | DESCRIPTION                               | QUANTITY |    | UNIT | TOTAL |
|------|-------|---|----------|----|------|-------|
| 32   | 1540  | 18" Encasement Pipe, Steel (0.313" Thick) | 50       | LF |      |       |
| 33   | SP-14 | 6" Gate Valve                             | 6        | EA |      |       |
| 34   | SP-14 | 4" Gate Valve                             | 6        | EA |      |       |

\* Section Number NCDOT Standard Specification unless otherwise noted

**FORM A-2**  
**ADDITIVE ALTERNATE BID**

| Project Title: Zemoso Acres Culvert Replacement Project #: 2014-027<br>(Hanover Drive) |             |  |          |    |               |                |
|--|-------------|--|----------|----|---------------|----------------|
| ITEM   | SECT<br>NO* | DESCRIPTION  | QUANTITY |    | UNIT<br>PRICE | TOTAL<br>PRICE |
| <b>GENERAL WORK ITEMS</b>  |             |  |          |    |               |                |
| 1  | 800         | Mobilization   | 1        | LS |               |                |
| 2  | 801         | Construction Stakes, Lines and Grades                    | 1        | LS |               |                |
| 3  | SP-1        | Comprehensive Grading                                    | 1        | LS |               |                |
| 4  | SP-2        | Traffic Control  | 1        | LS |               |                |
| <b>ROADWAY/DRAINAGE ITEMS</b>  |             |  |          |    |               |                |
| 5  | 230         | Borrow Excavation  | 1,500    | CY |               |                |
| 6  | 400         | Foundation Conditioning Material, Minor Structures       | 570      | TN |               |                |
| 7  | 305         | 15" Reinf. Concrete Pipe, Cl. III, Drainage Pipe         | 20       | LF |               |                |
| 8  | 305         | 24" Reinf. Concrete Pipe, Cl. III, Drainage Pipe         | 8        | LF |               |                |
| 9  | SP-4        | 9'x8' Reinf. Concrete Box Culvert, Cl. III               | 57       | LF |               |                |
| 10   | SP-4        | 10'x8' Reinf. Concrete Box Culvert, Cl. III              | 57       | LF |               |                |
| 11   | 610         | Asphalt Concrete Base Course, B25.0B                     | 60       | TN |               |                |
| 12   | 610         | Asphalt Concrete Intermediate Course, I19.0B             | 25       | TN |               |                |
| 13   | 610         | Asphalt Concrete Surface Course, SF9.5A                  | 20       | TN |               |                |
| 14   | 620         | Asphalt Binder for Plant Mix                             | 6        | TN |               |                |
| 15   | 838         | Reinforced Endwalls                                      | 110      | CY |               |                |
| 16   | 840         | Masonry Drainage Structure, Manhole (NCDOT STD 840.51)   | 2        | EA |               |                |
| 17   | 840         | Masonry Drainage Structure, Manhole, Additional Depth    | 4        | VF |               |                |
| 18   | 840         | Frame with Cover, (NCDOT STD. 840.54)                    | 2        | EA |               |                |
| 19   | 876         | Rip Rap, CL. I   | 30       | TN |               |                |
| 20   | 876         | Rip Rap, CL. A   | 30       | TN |               |                |
| 21   | 876         | Rip Rap, CL. B   | 15       | TN |               |                |
| 22   | 1005        | Aggregate No. 57   | 20       | TN |               |                |
| 23   | 1056        | Geotextile Fabric, NCDOT Type 2                          | 800      | SY |               |                |
| 24   | SP-6        | Coir Fiber Matting                                       | 500      | SY |               |                |
| <b>UTILITY ITEMS</b>   |             |  |          |    |               |                |
| 25   | SP-8        | 4' Sanitary Manhole, incl. Frame & Cover                 | 1        | EA |               |                |
| 26   | SP-8        | 4' Sanitary Manhole, Additional Depth                    | 4        | VF |               |                |
| 27   | SP-8        | 5' Sanitary Manhole (w/ Inside Drop) incl. Frame & Cover | 1        | EA |               |                |
| 28   | SP-8        | 5' Sanitary Manhole (w/ Inside Drop) Additional Depth    | 7        | VF |               |                |
| 29   | SP-8        | 5' Sanitary Manhole, incl. Frame & Cover                 | 1        | EA |               |                |
| 30   | SP-8        | 5' Sanitary Manhole, Additional Depth                    | 6        | VF |               |                |

**Project Title: Zemoso Acres Culvert Replacement Project #: 2014-027  
(Hanover Drive)**

| ITEM | SECT<br>NO* | DESCRIPTION  | QUANTITY |    | UNIT | TOTAL |
|------|-------------|--|----------|----|------|-------|
| 31   | SP-9        | 8" Sanitary Sewer, Restrained Joint Ductile Iron, PC 350 | 110      | LF |      |       |
| 32   | 1510        | 6" Water Main, Restrained Joint Ductile Iron, PC 350     | 70       | LF |      |       |
| 33   | 1510        | 4" Water Main, Restrained Joint Ductile Iron, PC 350     | 60       | LF |      |       |
| 34   | 1540        | 18" Encasement Pipe, Steel (0.313" Thick)                | 40       | LF |      |       |
| 35   | SP-14       | 6" Gate Valve  | 2        | EA |      |       |
| 36   | SP-14       | 4" Gate Valve  | 2        | EA |      |       |

\* Section Number NCDOT Standard Specification unless otherwise noted

|   |          |
|---|----------|
| <b>A. ESTIMATED BASE BID</b>                | \$ _____ |
| <b>B. 5% CONTINGENCY BASE BID</b>           | \$ _____ |
| <b>C. ADDITIVE ALTERNATE BID</b>            | \$ _____ |
| <b>D. 5% CONTINGENCY ALTERNATE BID</b>      | \$ _____ |
| <b>E. TOTAL ESTIMATED COST (E= A+B+C+D)</b> | \$ _____ |

5. Bidder agrees that all excavation is UNCLASSIFIED.

6. Bidder agrees that all work will be completed and ready for final payment in accordance with Paragraph 14.13 of the General Conditions within 270 calendar days from the date of notice to proceed (or 365 calendar days if the additive alternate for Hanover Drive is also awarded).

7. Communications concerning this Bid shall be sent to Bid at the following address:

NAME: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_  
P.O. BOX: \_\_\_\_\_  
CITY: \_\_\_\_\_  
STATE: \_\_\_\_\_  
ZIP: \_\_\_\_\_

8. The terms used in this BID, which are defined in the General Conditions (Section 2), have the meanings assigned to them in the General Conditions.

SIGNATURE OF BIDDER: \_\_\_\_\_

Contractor's License Number \_\_\_\_\_

License Expiration Date \_\_\_\_\_

If an Individual

By \_\_\_\_\_  
(signature of individual)

doing business as \_\_\_\_\_

Business address \_\_\_\_\_

Phone No. \_\_\_\_\_

Date \_\_\_\_\_, 20\_\_\_\_

ATTEST \_\_\_\_\_ TITLE

If a Partnership

By \_\_\_\_\_  
(firm name)

\_\_\_\_\_  
(signature of general partner)

Business address \_\_\_\_\_

Phone No. \_\_\_\_\_

Date \_\_\_\_\_, 20\_\_\_\_

ATTEST \_\_\_\_\_ TITLE \_\_\_\_\_

If a Corporation

By \_\_\_\_\_  
(corporation name)

By \_\_\_\_\_  
(signature of authorized person) (title) \_\_\_\_\_

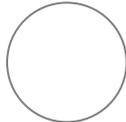
Business address \_\_\_\_\_

Phone No. \_\_\_\_\_

Date \_\_\_\_\_, 20\_\_\_\_

ATTEST \_\_\_\_\_ TITLE \_\_\_\_\_

(Seal)



If a Joint Venture (Other party must sign below.)

By (name) \_\_\_\_\_

Contractor's License Number \_\_\_\_\_

License Expiration Date \_\_\_\_\_

If an Individual

By \_\_\_\_\_  
(signature of individual)

doing business as \_\_\_\_\_

Business address \_\_\_\_\_

Phone No. \_\_\_\_\_

Date \_\_\_\_\_, 20\_\_\_\_

ATTEST \_\_\_\_\_ TITLE \_\_\_\_\_

If a Partnership

By \_\_\_\_\_  
(firm name)

\_\_\_\_\_  
(signature of general partner)

Business address \_\_\_\_\_

Phone No. \_\_\_\_\_

Date \_\_\_\_\_, 20\_\_\_\_

ATTEST \_\_\_\_\_ TITLE \_\_\_\_\_

If a Corporation

By \_\_\_\_\_  
(corporation name)

By \_\_\_\_\_  
(signature of authorized person)(title) \_\_\_\_\_

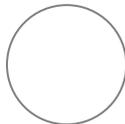
Business address \_\_\_\_\_

Phone No. \_\_\_\_\_

Date \_\_\_\_\_, 20\_\_\_\_

ATTEST \_\_\_\_\_ TITLE \_\_\_\_\_

(Seal)



**FORM B**  
**PERFORMANCE BOND**

Date of Execution of this Bond \_\_\_\_\_

Name and Address of  
Principal (Contractor) \_\_\_\_\_  
\_\_\_\_\_

Name and Address  
of Surety \_\_\_\_\_  
\_\_\_\_\_

Name and Address of  
Contracting Body \_\_\_\_\_  
\_\_\_\_\_

Amount of Bond \_\_\_\_\_  
\_\_\_\_\_

Contract That certain contract by and between the Principal and the Contracting Body above named dated  
\_\_\_\_\_ for \_\_\_\_\_  
\_\_\_\_\_

KNOW ALL MEN BY THESE PRESENTS, that we, the PRINCIPAL and SURETY above named, are held and firmly bound unto the above-named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal entered into a certain contract with the Contracting Body, identified as shown above and hereto attached;

NOW THEREFORE, if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the Contracting Body, with or without notice to the Surety, and during the life of any guaranty required under the contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of the contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, then, this obligation to be void; otherwise, to remain in full force and virtue.

**PERFORMANCE BOND: (Continued)**

THIS PERFORMANCE BOND is made and given pursuant to the requirements and provisions of Section 129 of Chapter 143 of the General Statutes of North Carolina and pursuant to Article 3 of Chapter 44-A of the General Statutes of North Carolina, and each and every provision set forth and contained in Section 129 of Chapter 143 and in Article 3 of Chapter 44-A of the General Statutes of North Carolina is incorporated herein, made a part hereof, and deemed to be conclusively written into this Bond.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their several seals as of the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned and representative, pursuant to authority of its governing body.

WITNESS:

\_\_\_\_\_  
Principal (Name of individual and trade name, partnership, corporation, or joint venture)

\_\_\_\_\_  
(Proprietorship or Partnership)  
Printed Name \_\_\_\_\_

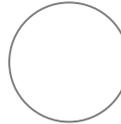
BY \_\_\_\_\_ (SEAL)  
Printed Name \_\_\_\_\_

TITLE \_\_\_\_\_  
(Owner, Partner, Office held in corporation, joint venture)

ATTEST: (Corporation)

**(Corporate Seal of Principal)**

BY \_\_\_\_\_  
Printed Name \_\_\_\_\_



TITLE \_\_\_\_\_  
(Corporation Secretary or Assistant Secretary Only)

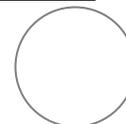
\_\_\_\_\_  
Surety (Name of Surety Company)

WITNESS:

BY \_\_\_\_\_  
Printed Name \_\_\_\_\_

TITLE \_\_\_\_\_ Attorney in Fact

**(Corporate Seal of Surety)**



COUNTERSIGNED:

\_\_\_\_\_  
(Address of Attorney in Fact)

\_\_\_\_\_  
N.C. Licensed Resident Agent

## SPECIAL PROVISIONS

Project Title:       **Zemosa Acres Culvert Replacements**

Project #: 2014-27

### General

- 1) Contractor shall utilize the latest edition of NCDOT Standard Specifications & Standard Drawings for drainage, roadway, and utility items unless otherwise noted; and additionally for utility items, the City of Concord technical standards, Water & Sewer Authority of Cabarrus County Technical Standard specification (included herein), and additional project specifications where provided, the most restrictive requirement shall apply unless otherwise noted. Additional project specifications are provided in Section III - Project Special Specifications.

Whenever the following terms are used in the NCDOT Standard Specifications, in any of the Contract Documents, or in the plans, the intended meaning of such terms shall be as follows:

- a. **“Administrator”**, **“Chief Engineer”**, or **“State Highway Administrator”** shall mean the **“City Engineer”**
  - b. **“Alternate”** or **“Alternate Bid”** shall mean the amount stated in the Bid which may be added to or subtracted from the Base Bid amount if such Alternate(s) are accepted by the City.
  - c. **“Total Amount Bid”** or **“Total Base Bid”** shall mean the correct sum total obtained by adding together the amounts bid for every item in the proposal including contingencies or allowances, but excluding Alternates.
  - d. **“Board of Transportation”** shall mean **“City Council”**
  - e. **“City”** shall mean the **“City of Concord, North Carolina”**; the City is the Project Owner
  - f. **“Construction Manager”**, **“Engineer”**, or **“Resident Engineer”** shall mean the City’s duly authorized Construction Manager to oversee the construction of the project
  - g. **“Contract”** shall mean the reciprocal undertakings, obligations, and rights of the City and the Contractor evidenced by the executed agreement and other Contract Documents between the City and the Contractor, covering the performance of and compensation of the Work.
  - h. **“Contract Amount”**, **“Total Contract Amount”** or **“Contract Sum”** shall mean the Total Base Bid plus Alternates accepted by the City.
  - i. **“Contract Documents”** shall consist of the Project Manual, the Contractor’s executed bid and forms, Acceptance by the City, and any change orders issued after execution of the contract.
  - j. **“Date of Availability”** shall mean **“Notice to Proceed Date”**
  - k. **“Department”**, **“Department of Transportation”**, **“Division of Highways”**, and **“Raleigh Central Office”** shall all mean **“City of Concord Water Resources - Stormwater Services”**
  - l. **“Project Manual”** shall mean the complete set of bidding documents issued by the City of Concord or its authorized representatives, to include the Invitation to Bid, Instructions to Bidders, Bid Forms, sample project forms, conditions and special provisions of the contract, addenda issued prior to the execution of the contract, and drawings.
  - m. **“State”** shall mean **“City of Concord”**
  - n. **“Supplemental Agreements”** shall mean **“Change Orders”**
- 2) The Contractor shall adhere to the provisions of the 1985 Underground Damage Prevention Act , North Carolina General Statutes 887, Chapter 785, Senate Bill 168, Article 3. To assist the Contractor and utility owners in meeting the requirements of this law, there is a service provider called “NC811.” Most major utilities with underground facilities in the State subscribe to this service.

From within North Carolina, dial 811. For calls originating outside (or inside) of North Carolina, the toll free number (800) 632-4949 may be used. NC811 can also be accessed via the Internet at <http://nc811.org/homepage.htm>.

The Contractor shall include the cost of any coordination and cooperation of utilities in his bid. No additional compensation shall be allowed for delays or inconvenience sustained by the Contractor due to utility relocation or adjustments. No additional payment will be made for re-mobilization required by the utility's failure to relocate a utility at the request of the Contractor.

Where changes to utility facilities are to be made solely for the convenience of the Contractor, it shall be the Contractor's responsibility to arrange for such changes, and the Contractor shall bear all costs of such changes.

- 3) All concrete used on City projects will be required to meet the NCDOT Standard Specifications for Roadways and Structures unless otherwise specified.
- 4) All excavation shall be considered unclassified as it relates to material composition. There will be no separate measurement or payment for the removal of rock.
- 5) No excavation shall remain open overnight for any reason; the site must be secure at the end of each day.
- 6) The Contractor shall follow the construction sequencing, schedules for activities, periods of notifications and exemptions to order of culvert replacement found on Sheet 00C-07 in the plans. The Contractor's bid should factor in the prescribed sequencing and order for replacement.
- 7) The Contractor shall follow the Traffic Control Plans found in the plans for any proposed roadway closure. The Contractor must provide 48hour advance notice to the local affected residences of any roadway closure. The contractor shall provide and maintain all necessary signs and traffic controls, according to the approved traffic control plans and to NCDOT and City standards. The contractor shall maintain access for the local residences, City personnel and emergency personnel at all times.
- 8) Maintenance of the Project shall be in accordance with Section 104-10 of the NCDOT Standard Specifications.

The Contractor shall furnish and erect, at no additional cost to the City, whatever sidewalks, bridges, culverts, or other works as may be necessary for the protection of the public, including, but not limited to, barricades, fences, etc. and for the safe and proper execution of other public utility lines so as not to interfere therewith or damage or cause damage thereto. The Contractor shall be responsible for all damages to persons or property that occur as a result of his fault, omission, or negligence in connection with the prosecution of the work and shall be responsible for the proper care and protection of all work performed hereunder until completion and final acceptance, whether or not the same has been covered in whole or in part by payments made by the City.

- 9) The Contractor shall be responsible for locating and providing storage areas for construction materials and equipment. The material and equipment storage shall comply with all local and state ordinances throughout the construction period. The Contractor shall restore the storage area to its original condition upon completion of the Project or upon such time as directed by the Engineer. Such restoration shall be at no additional cost to the City.

The Contractor shall be responsible for the safeguarding of materials and equipment against fire, theft and vandalism and shall not hold the City responsible in any way for the occurrences of same. The Contractor shall furnish and erect, at no additional cost, whatever works may be necessary for the protection of the public, including but not limited to barricades, fences, etc. Prior to final payment being made, the Contractor shall obtain a release from the property owner of the storage area utilized for the Project.

- 10) All quantity tickets for items not measurable in place shall be submitted in duplicate to the Project Inspector within seventy-two (72) hours after receipt of the material on the job. Each ticket shall indicate the date, contractor, job location and name, type of material, quantity of material, truck number and signature of the Contractor or his authorized representative.

No tickets will be accepted after seventy-two (72) hours have elapsed between the time of delivery and the submittal of tickets to the Engineer.

- 11) Geotechnical investigation has been performed. A copy of the Engineer's Geotechnical Report is provided in Section IV of the bid document.
- 12) 401 and 404 Permits have been obtained to perform work shown in Contract Documents and consistent with permit conditions. It is the Bidder's responsibility to comply with the permits and their conditions. The Bidder should consult the Engineer if clarification on conditions is sought. A copy of the permits and coverage verification area provided in Section IV of the bid document.
- 13) Measurement and Payment of the Pay Items shall follow the instructions in Section III - Project Special Specifications.
- 14) Mobilization should not exceed 5% of the Total Estimated Cost.
- 15) The Contractor shall guarantee all materials and workmanship for a period of one (1) year from the date of acceptance by the City and shall replace any portions that fail because of faulty materials or workmanship at no additional cost to the City. An eleven (11) month inspection will be held during the warranty period. The Contractor shall immediately repair all defective items upon notification. Items repaired under the provisions shall have an extended warranty period of twelve (12) months from the date of repair of the item.
- 16) The Contractor shall be responsible for maintaining a set of as-built drawings and surveyed location of constructed infrastructure (i.e. water, sewer, and stormwater) in accordance with the City of Concord Ordinance Section 62-88 As-Built Drawings. These drawings shall at a minimum contain all the information required in the aforementioned section of the City's Ordinance. The as-built drawings shall be signed and sealed by a North Carolina Registered Land Surveyor in accordance with Section 62-89 of the Ordinance. They shall be submitted to the Engineer for preparation of the record drawings.

### **Utility**

- 1) The Engineer's geotechnical report is included in this package however, subsurface investigations and soil test boring information does not guarantee the presence or absence of rock or any other adverse conditions that may be encountered during construction. All excavation is considered UNCLASSIFIED. Any preliminary geotechnical information should not be considered exhaustive, and the contractor may perform its own investigation before bidding the job.

- 2) The Contractor must contact the City of Concord Engineering Construction Manager at 704-920-5425 at least 24-hours prior to initiating any construction activity.
- 3) All sanitary sewer removal, relocation, and installation shall be unclassified by depth.
- 4) No excavation subject to vehicular and pedestrian traffic shall remain open overnight or unsupervised for any reason, the site and materials must be secure at the end of each day.
- 5) Per City of Concord Code of Ordinance Chapter 62, Article 3, Section 62-98 (2) All materials, equipment, labor, and workmanship associated with public water and /or sewer extension and/or modification shall be in accordance with and subject to the Water and Sewer Authority of Cabarrus County's standard specifications; the City of Concord's ordinances, policies, and standard specifications, and the North Carolina Administrative Code for wastewater collection and water distribution systems. In the event of conflict between the Water and Sewer Authority of Cabarrus County's standard specifications; the City of Concord's ordinances, policies, and standard specifications, or the North Carolina Administrative Code, the more restrictive requirements shall apply.
- 6) The existing water main valve rims and stems and the existing sewer main manholes rims are to be raised or lowered to final grade, as applicable and at least 3-ft of ground cover is to be maintained over the existing utilities at all times per the City of Concord Code of Ordinance Chapter 62, Article 3, Section 62-98.
- 7) Per the City of Concord Code of Ordinance Chapter 62, Article 3, Section 62-98- the following minimum separations must be indicated, unless otherwise approved by the City.
  - a. A minimum horizontal separation of five feet shall be maintained between any type of maintenance obstruction and the city's water distribution lines, wastewater collection lines, and associated appurtenances, unless an exception is granted. Greater separation distances may be required as specified by federal, state, or local regulations.
  - b. A minimum vertical separation of two feet shall be maintained between any type of maintenance obstruction, including but not limited to any other utility provider's lines or equipment, and the city water distribution lines, wastewater collection lines, and associated appurtenances, unless an exception is granted. If an exception is granted, a minimum vertical separation of one foot must be maintained and the city water distribution lines, wastewater collection lines, and associated appurtenances shall be constructed of ductile iron pipe or an approved ferrous material with joints that are equivalent to potable water main standards for a distance of ten feet on either side of the point of crossing. Greater separation distances may be required as specified by federal, state, or local regulations.
  - c. A minimum horizontal separation of ten feet shall be maintained between the city water distribution system and wastewater collection lines, and associated appurtenances, unless an exception is granted.
- 8) Contractor to ensure the City of Concord Electric, PSNC Energy, Utilities, Inc, and the communication companies (Windstream, Time Warner, and City of Concord) have access to the site and can install and activate their complete systems and abandon the existing above ground utilities prior to the Contractor initiating the utility abandonments and the culvert replacement construction activities.
- 9) After the City of Concord Electric and Windstream have deactivated the existing underground utility systems proposed for abandonment and established activation of their relocated systems,

the contractor can abandon the deactivated, existing underground City of Concord Electric and Windstream utilities as needed.

- 10) The Contractor shall ensure the newly activated overhead City of Concord Electric and communications systems are adequately protected from damage during all construction activities.
- 11) The Contractor shall make every effort to minimize the duration of any water supply disruption and/or loss to the existing Utilities, Inc and City of Concord customers. The Contractor must notify the assigned City of Concord Construction Inspector at least 48 hours in advance of any scheduled water service loss or disruption, and provide written notification on a City approved form to each City of Concord customers that specifies the day and duration of any scheduled water service loss or disruption and include the appropriate City contact numbers.
- 12) The Contractor shall be responsible for providing temporary potable water supplies to any customer upon request by the City and/or when the duration of the water service loss or disruption exceeds 4 hours.
- 13) The Contractor shall be responsible for complying with the current plumbing requirements associated with re-establishing the water service connection and obtaining all necessary plumbing permits, in accordance with the most current version of the North Carolina Plumbing Code. The plumbing requirements shall include, but not be limited to, the materials, equipment, labor, and workmanship associated with the installation of a shut-off valve, and a water pressure reducing valve (PRV) with associated appurtenances on the private homeowners plumbing, in accordance with the most current version of the North Carolina Plumbing Code.

**NOTICE OF AWARD**

TO:

FROM: City of Concord City Council (OWNER)  
P.O. Box 308  
26 Union Street, South  
Concord, North Carolina 28026-0308

Project Title: **Zemosa Acres Culvert Replacements**

**Project #: 2014-27**

You are hereby notified that the bid submitted by you for the above named project in response to the City of Concord's Invitation to Bid dated **October 6, 2016** in the amount of

\_\_\_\_\_ and \_\_\_\_\_/100 DOLLARS

(\$\_\_\_\_\_) has been accepted.

You are hereby required to execute the formal AGREEMENT with the City of Concord City Council and to furnish any and all Contractor's Bond(s), Certificate of Insurance and Power of Attorney(s) along with other documents pertaining to the work as designated by the City of Concord.

If you fail to execute said AGREEMENT and to furnish this and any other required documents pertaining to the work within ten (10) days from the date of delivery of this NOTICE OF AWARD, said Owner will be entitled to consider all your rights arising out of the Owner's acceptance of your bid as abandoned and to award the work covered by your proposal to another, or to re-bid the work or otherwise dispose thereof as the Owner may see fit.

**Dated this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_**

City of Concord, North Carolina

CONTRACTOR

By: \_\_\_\_\_

By: \_\_\_\_\_

Title: City Manager

Title: \_\_\_\_\_

*ACCEPTANCE OF NOTICE OF AWARD*

Receipt of the above NOTICE OF AWARD is hereby acknowledged this the \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

**NOTICE TO PROCEED**

TO:

FROM: City of Concord City Council (OWNER)  
P.O. Box 308  
26 Union Street, South  
Concord, North Carolina 28026-0308

Project Title: **Zemosa Acres Culvert Replacements**

**Project #: 2014-027**

Contract Amount: \_\_\_\_\_ and \_\_\_\_/100 DOLLARS

(\$ \_\_\_\_\_).

You are hereby notified to commence work on or before the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, pending acceptance of your Certificate of Insurance and any other required documents, and are to fully complete the work by the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Your project final completion date is therefore the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, and as set forth in the above named project's schedule unless an extension is granted by the City of Concord Director of Engineering in writing.

City of Concord, North Carolina

By: \_\_\_\_\_

Title: City Manager

**Dated this the \_\_\_\_\_ day of \_\_\_\_\_, 20 .**

## STANDARD FORM CONSTRUCTION CONTRACT

This contract (together with all exhibits and valid amendments, the “Agreement” or the “Contract”) is made and entered into as of the \_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by the City of CONCORD (“City”) and \_\_\_\_\_ (“Contractor”), ( ) a corporation, ( ) a professional corporation, ( ) a professional association, ( ) a limited partnership, ( ) a sole proprietorship, or ( ) a general partnership; organized and existing under the laws of the State of \_\_\_\_\_.

### **Sec. 1. Background and Purpose.**

The **Zemosa Acres Culvert Replacements** project includes the removal of four existing culverts, the construction of four multi-barrel culverts, and associated services that will include relocation of gravity sanitary sewer mains, relocation of water mains, coordination with utility agencies on other utility adjustments by others, roadway pavement reconstruction, and other appurtenances along and Chadbourne Avenue, Chelwood Drive, Channing Circle, and Hannover Drive.

**Sec. 2. Services and Scope to be Performed.** The Contractor shall provide the services at the charges set forth either in this paragraph or in Exhibit “A” – Bid Form. Additional exhibits may be used to further define this Agreement when the Contractor and City so agree. Any additional exhibits shall be designated as exhibits to the Agreement with capitalized, sequential letters of the alphabet, shall be attached hereto and incorporated herein by reference as if the same were fully recited, and shall become terms of this Agreement upon execution by both parties.

In this Contract, “services” means the services that the Contractor is required to perform pursuant to this Contract and all of the Contractor’s duties to the City that arise out of this Contract. Any amendments, corrections, or change orders by either party must be made in writing signed in the same manner as the original. (This form may be used for amendments and change orders.) The City reserves the right to refuse payment for any work outside that authorized herein or pursuant to a duly approved amendment or change order.

**Sec. 3. Complete Work without Extra Cost.** Unless otherwise provided, the Contractor shall obtain and provide, without additional cost to the City, all labor, materials, equipment, transportation, facilities, services, permits, and licenses necessary to perform the Work.

**Sec. 4. Compensation.** The City shall pay the Contractor for the Work as described in this paragraph below OR as described in Exhibit “A” – Bid Form attached. In the event of a conflict, the provisions of this paragraph shall control. Any additional expenses or charges shall only be paid after both the City and the Contractor agree to and execute a written change order. The City shall not be obligated to pay the Contractor any fees, payments, expenses or compensation other than those authorized in this Contract or in a duly-approved change order. All payments shall be deemed inclusive of tax and other obligations.

**Sec. 4a. Retainage.** The City shall withhold no retainage on Contracts having a “total project cost” of less than \$100,000.00. The City may withhold retainage on contracts having a total project cost between \$100,000 and \$200,000. The City shall withhold retainage on contracts whose total project cost exceeds \$300,000. When withheld, retainage shall equal no more than five percent of each progress payment. When the project is fifty per cent complete, the City shall not retain anything from future project payments provided that (i) the surety concurs in writing, (ii) the Contractor continues to perform satisfactorily, (iii) any non-conforming work identified in writing by the architect, engineer(s) or City has been corrected by

the Contractor and accepted by the architect, engineer(s) or City. However, if the City determines that the Contractor's performance is unsatisfactory, the City may withhold up to five percent retainage from each project payment. The City may withhold additional amounts above five percent for unsatisfactory job progress, defective construction not remedied, disputed work, third party claims filed against the owner or reasonable evidence that a third-party claim will be filed.

Definitions:

**“Total Project Cost”**: Total value of the Contract and any approved change orders or amendments.

**“Project is Fifty Percent Complete”**: When the Contractor's validly-issued gross project invoices (excluding the value of the materials stored off-site) equal or exceed fifty percent of the value of the Contract, except that the value of materials stored on-site shall not exceed twenty percent of the Contractor's gross project invoices for the purpose of determining whether the project is fifty percent complete.

**Sec. 5. Term.** The Contractor shall commence work within ten (10) working days of the date of its receipt of written Notice to Proceed from the City. The date that is ten (10) working days from the date of the Contractor's receipt of the Notice to Proceed shall be the “Commencement Date.” All work as set forth in the Scope of Services in Exhibit “A” – Bid Form shall be completed within two hundred and seventy (270) calendar days of the Commencement Date or three hundred and sixty five (365) calendar days if the additive alternate for Hannover Drive is also awarded. The date that is two hundred and seventy (270) calendar days from the Commencement Date shall be the “Completion Date.” If the additive alternate for Hannover Drive is awarded then the date three hundred and sixty five (365) calendar days from the Commencement Date shall be the “Completion Date”. Time is of the essence with regard to this Project. If Contractor's obligations are not completed by the Completion Date, the City reserves the right to nullify this Agreement, order the Contractor to immediately cease all work under this Agreement and vacate the premises, and to seek professional services equivalent to those outlined in Exhibit “A” – Bid Form. The Contractor shall be held accountable for all damages incurred by the City as a consequence of the missed Completion Date. The exercise of any of these rights by the City shall not be interpreted to prejudice any other rights the City may have under this Agreement or in law or equity. This Contract shall not be automatically extended unless agreed to in writing by the City or as provided in Exhibit “A” – Bid Form.

**Sec. 6. Contractor's Billings to City.** Payments will be made in accordance with the schedule found in this section below OR attached at Exhibit “A” – Bid Form. Contractor shall submit an original pay request (invoice) to the City Purchasing Agent by the first of each month in order to expedite payment. Upon receipt of the request the City Purchasing Agent shall verify the amounts and if correct forward the request to the Accounts Receivable Division of the Finance Dept. Final payment on the Contract shall be made in 45 days, except in the case of retainage. Within 60 days after the submission of the final pay request, the City (with the written consent of the surety) shall release to the Contractor all retainage payments IF the City receives a certificate of substantial completion from the architect, engineer or designer-in-charge of the project OR the City receives beneficial occupancy and use of the project. In either case, the City may retain up to 2.5 times the estimated value of the work to be completed or corrected.

**Sec. 7. Insurance.** Contractor shall maintain and cause all sub-contractors to maintain insurance policies at all times with minimum limits as follows:

| <u>Coverage</u>       | <u>Minimum Limits</u>  |
|-----------------------|--|
| Workers' Compensation | \$100,000 each accident, \$100,000 bodily injury by disease each employee, \$500,000 bodily injury by disease policy limit |

|                      |  |
|----------------------|--|
| General Liability    | \$1,000,000 per occurrence regardless of the contract size   |
| Automobile Liability | \$1,000,000 per occurrence regardless of the contract size   |
| Umbrella             | <input type="checkbox"/> \$1,000,000 per occurrence if contract does not exceed 180 days and does not exceed \$500,000; otherwise, |
|                      | <input type="checkbox"/> \$2,000,000 per occurrence  |

Contractor shall provide a Certificate of Insurance to the City listing the City as an additional insured. Such Certificate shall be in a form acceptable to the City.

**Sec. 8. Documentation Requirements:**

A. Contractor shall provide the City with a **Certificate of Insurance** for review prior to the issuance of any contract or Purchase Order. All Certificates of Insurance will require written notice by the insurer or Contractor’s agent in the event of cancellation, reduction or other modifications of coverage by the insurer. Such notice shall be not less than 30 days for nonrenewal by the insurer, not less than 10 days for cancellation due to nonpayment of the premium and as soon as possible for all other types of modifications. In addition to the notice requirement above, Contractor shall provide the City with written notice of cancellation, reduction, or other modification of coverage of insurance whether instigated by the insurer or by the Contractor immediately upon Contractor’s receipt of knowledge of such modifications. Upon failure of the Contractor to provide such notice, Contractor assumes sole responsibility for all losses incurred by the City for which insurance would have provided coverage. The insurance certificate shall be for the insured period in which the initial contract period begins and shall be renewed by the Contractor for each subsequent renewal period of the insurance for so long as the contract remains in effect.

The City shall be named as an **additional insured** on all policies except Workers’ Compensation and it is required that coverage be placed with “A” rated insurance companies acceptable to the City. Statement should read, “City of Concord is added as an additional insured as evidenced by an endorsement attached to this certificate.” Failure to maintain the required insurance in force may be cause for termination of this Agreement. In the event that the Contractor fails to maintain and keep in force the insurance herein required, the City has the right to cancel and terminate the Agreement without notice.

B. Contractor shall provide a completed W-9 form to the City prior to execution by the City of this Agreement.

**Sec. 9. Performance of Work by Contractor.**

(a) The Contractor warrants that all work performed under this Contract conforms to the Contract requirements and is free of any defect in equipment, material, or design furnished, or workmanship performed by the Contractor or any subcontractor or supplier at any tier. This warranty shall continue for a period of 1 year from the date of issuance by the City of written final completion of the work.

(b) The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to City - owned or controlled real or personal property, when that damage is the result of--

- (1) The Contractor's failure to conform to contract requirements; or
- (2) Any defect of equipment, material, workmanship, or design furnished.

(c) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for 1 year from the date of repair or replacement.

(d) The City shall notify the Contractor, in writing, within a reasonable time, not to exceed 30 days, after the discovery of any failure, defect, or damage.

(e) If the Contractor fails to remedy any failure, defect, or damage within a reasonable time, not to exceed 30 days unless otherwise agreed in writing and signed by the City Manager or his designee, after receipt of notice, the City shall have the right to replace repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

(f) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this Contract, the Contractor shall--

- (1) Obtain all warranties that would be given in normal commercial practice,
- (2) Require all warranties to be executed, in writing, for the benefit of the City, if directed to do so by the City; and
- (3) Enforce all warranties for the benefit of the City, if directed to do so by the City

(g) In the event the Contractor's warranty has expired, the City may bring suit at its expense to enforce a subcontractor's, manufacturer's, or supplier's warranty.

(h) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material or design furnished by the City nor for the repair of any damage that results from any defect in City-furnished material or design.

**Sec. 10. Performance of Work by City.** If the Contractor fails to perform the Work in accordance with the schedule referred to in Exhibit "A" – Bid Form, the City may, in its discretion, perform or cause to be performed some or all of the Work, and doing so shall not waive any of the City's rights and remedies. Before doing so, the City shall give the Contractor reasonable notice of its intention. The Contractor shall reimburse the City for all costs incurred by the City in exercising its right to perform or cause to be performed some or all of the Work pursuant to this section.

**Sec. 11. Attachments.** Additional exhibits may be used to further define this Agreement when the Contractor and City so agree. Any additional exhibits shall be designated as exhibits to the Agreement with capitalized, sequential letters of the alphabet, shall be attached hereto and incorporated herein by reference as if the same were fully recited, and shall become terms of this Agreement upon execution by both parties.

*The following attachments are made a part of this Contract and incorporated herein by reference:*

- (a) Exhibit "A" – Bid Form
- (b) Exhibit "B" - Contractor must execute the Affidavit attached as Exhibit "B", attesting to compliance with state and federal laws related to E-Verify.
- (c) Exhibit "C" – Tax Form(s).
- (d) Exhibit "D" - Certificate of Insurance.
- (e) Exhibit "E" – Construction Plans/Specifications.

In case of conflict between an attachment and the text of this contract excluding the attachment, the text of this contract shall control. Any attachment that materially alters the standard terms contained herein must be reviewed by the City Attorney and approved by the City in writing.

**Sec. 12. Notice.** (a) All notices and other communications required or permitted by this Contract shall be in writing and shall be given either by personal delivery, fax, or certified United States mail, return receipt requested, addressed as follows:

To the City:  
Sue Hyde, Director of Engineering  
City of Concord  
P.O. Box 308  
Concord, NC 28026  
Fax Number: (704) 786-4521

To the Contractor:  
VaLerie Kolczynski, Esq.  
City Attorney  
PO Box 308  
Concord, NC 28026  
Fax Number: (704) 784-1791

(b) **Change of Address, Date Notice Deemed Given:** A change of address, fax number, or person to receive notice may be made by either party by notice given to the other party. Any notice or other communication under this Contract shall be deemed given at the time of actual delivery, if it is personally delivered or sent by fax. If the notice or other communication is sent by US Mail, it shall be deemed given upon the third calendar day following the day on which such notice or other communication is deposited with the US Postal Service or upon actual delivery, whichever first occurs.

**Sec. 13. Indemnification.** To the maximum extent allowed by law, the Contractor shall defend, indemnify, and save harmless the City of Concord, its agents, officers, and employees, from and against all charges that arise in any manner from, in connection with, or out of this Contract as a result of the acts or omissions of the Contractor or subcontractors or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable except for damage or injury caused solely by the negligence of the City its agents, officers, or employees. In performing its duties under this section, the Contractor shall at its sole expense defend the City of Concord, its agents, officers, and employees with legal counsel reasonably acceptable to City. As used in this subsection – “Charges” means claims, judgments, costs, damages, losses, demands, liabilities, duties, obligations, fines, penalties, royalties, settlements, expenses, interest, reasonable attorney’s fees, and amounts for alleged violations of sedimentation pollution, erosion control, pollution, or other environmental laws, regulations, ordinances, rules, or orders. Nothing in this section shall affect any warranties in favor of the City that are otherwise provided in or arise out of this Contract. This section is in addition to and shall be construed separately from any other indemnification provisions that may be in this Contract. This section shall remain in force despite termination of this Contract (whether by expiration of the term or otherwise) and termination of the services of the Contractor under this Contract.

**Sec. 14. Corporate Status.** If the Contractor is dissolved or suspended and the Contractor does not notify the City of such dissolution within three (3) business days from date of dissolution or suspension, and/or the corporate status is not reinstated within thirty (30) days, this Contract, at the sole option of the City and without prejudice to City’s other remedies, shall be declared null and void or the Contractor shall execute a new contract showing the Contractor’s correct legal entity.

**Sec. 15. Miscellaneous.**

(a) **Choice of Law and Forum.** This Contract shall be deemed made in Cabarrus County, North Carolina. This Contract shall be governed by and construed in accordance with the laws of North Carolina. The exclusive forum and venue for all actions arising out of this Contract shall be the appropriate division of the North Carolina General Court of Justice, in Cabarrus County. Such actions shall neither be commenced in nor removed to federal court. This section shall not apply to subsequent actions to enforce a judgment entered in actions heard pursuant to this section.

(b) **Waiver.** No action or failure to act by the City shall constitute a waiver of any of its rights or remedies that arise out this Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

(c) Performance of Government Functions. Nothing contained in this Contract shall be deemed or construed so as to in any way estop, limit, or impair the City from exercising or performing any regulatory, policing, legislative, governmental, or other powers or functions.

(d) Severability. If any provision of this Contract shall be unenforceable, the remainder of this Contract shall be enforceable to the extent permitted by law.

(e) Assignment, Successors and Assigns. Without the City's written consent, the Contractor shall not assign (which includes to delegate) any of its rights (including the right to payment) or duties that arise out this Contract. Unless the City otherwise agrees in writing, the Contractor and all assigns shall be subject to all of the City's defenses and shall be liable for all of the Contractor's duties that arise out of this Contract and all of the City's claims that arise out of this Contract. Without granting the Contractor the right to assign, it is agreed that the duties of the Contractor that arise out of this Contract shall be binding upon it and its heirs, personal representatives, successors, and assigns.

(f) Compliance with Law. In performing all of the Work, the Contractor shall comply with all applicable law. Without limitation, Contractor shall comply with the requirements of Article 2, Chapter 64 (Verification of Work Authorization) of the North Carolina General Statutes relating to E-Verify. Further, if Contractor utilizes a subcontractor, Contractor shall require the subcontractor to comply with the requirements of Article 2 of Chapter 64 of the General Statutes.

(g) City Policy. THE CITY OPPOSES DISCRIMINATION ON THE BASIS OF RACE AND SEX AND URGES ALL OF ITS CONTRACTORS TO PROVIDE A FAIR OPPORTUNITY FOR MINORITIES AND WOMEN TO PARTICIPATE IN THEIR WORK FORCE AND AS SUBCONTRACTORS AND VENDORS UNDER CITY CONTRACTS.

(h) EEO Provisions. During the performance of this Contract the Contractor agrees as follows: (1) The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, political affiliation or belief, age, or handicap. The Contractor shall take affirmative action to insure that applicants are employed and that employees are treated equally during employment, without regard to race, color, religion, sex, national origin, political affiliation or belief, age, or handicap. The Contractor shall post in conspicuous places available to employees and applicants for employment, notices setting forth these EEO provisions. (2) The Contractor in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, political affiliation or belief, age, or handicap.

(i) No Third Party Right Created. This Contract is intended for the benefit of the City and the Contractor and not any other person.

(j) Principles of Interpretation. In this Contract, unless the context requires otherwise the singular includes the plural and the plural the singular. The pronouns "it" and "its" include the masculine and feminine. Reference to statutes or regulations include all statutory or regulatory provisions consolidating, amending, or replacing the statute or regulation. References to contracts and agreements shall be deemed to include all amendments to them. The word "person" includes natural persons, firms, companies associations, partnerships, trusts, corporations, governmental agencies and units, and any other legal entities.

(k) Modifications, Entire Agreement. A modification of this Contract is not valid unless signed by both parties and otherwise in accordance with requirements of law. Further, a modification is not enforceable against the City unless the City Manager or other duly authorized official signs it for the City. This Contract contains the entire agreement between the parties pertaining to the subject matter of this Contract. With respect to that subject matter, there are no promises, agreements, conditions, inducements, warranties, or understandings, written or oral, expressed or implied, between the parties, other than as set forth or referenced in this Contract.

(l) Corporate Seal. If a corporate seal is included by any party to this Contract, it is only for authentication purposes. This Contract is not signed under seal.

(m) No Employment Relationship. For all matters relating to this Agreement, Contractor shall be deemed an Independent Contractor. Nothing in this Agreement shall be construed in such a manner as to create an employee-employer relationship between City and Contractor.

**(The following section applies to construction contracts only if amount is over \$50,000)**

**Sec. 16. Bonding.** Both performance and payment bonds for the full amount of this Contract are required to be attached. Instead of bonds, you may submit a deposit of money, certified check or government securities for the full amount of the Contract. The performance bond shall have a value equal to 100% of this Contract. This bond shall be conditioned upon faithful performance of the Contract in accordance with the plans, specifications and conditions of the Contract. The performance bond shall be solely for the protection of the City. The payment bond shall be in an amount equal to 100% of the Contract, and conditioned upon the prompt payment for all labor or materials for which a contractor or subcontractor is liable. The payment bond shall be solely for the protection of the persons furnishing materials or performance labor for which a contractor or subcontractor is liable.

**Sec. 17. Dispute Resolution.** It is understood and agreed that NCGS 143-128(f1-g) requires that disputes arising under an agreement for the erection, construction, alteration or repair of a building be subject to a dispute resolution process specified by the City. The amount in controversy shall be at least \$15,000.00 before this dispute resolution procedure may be used. In compliance with this statutory provision, the City specifies this Section as the dispute resolution process to be used on this Project. It is further understood and agreed that this dispute resolution process is based on non-binding mediation and will only be effective to the extent that the Parties to any mediated dispute participate in the mediation in good faith. It is also understood and agreed that the City is under no obligation under any circumstance to secure or enforce the participation of any other Party in the mediation of any dispute subject to this Section and NCGS 143-128(f1-g).

**This Section 17 does not apply to:**

(a) The purchase and erection of prefabricated or relocatable buildings or portions of such buildings, except that portion of the work that must be performed at the construction site; or

(b) The erection, construction alteration or repair of a building when the cost of such building is \$300,000 or less.

17.1 Any dispute arising between or among the Parties listed in Section 17.3 that arises from an agreement to construct the Project, including without limitation a breach of such agreement, shall be subject to non-binding mediation administered by the American Arbitration Association under its Construction Industry Mediation Rules (“Rules”), except as otherwise expressly set forth in this Section. To the extent any provision of the Rules is inconsistent with the provisions of this Section, the provisions of this Section shall control. The mediation provided in this Section shall be used pursuant to this Agreement and NCGS 143-128(f1-g) and is in lieu of any dispute resolution process adopted by the North Carolina State Building Commission, which process shall not apply to this Project.

17.2 For purposes of this Section the following definitions shall apply:

(a) *Agreement to construct the Project* means an agreement to construct the Project that is subject to the requirements of NCGS 143-128 and does not include any agreement related to the Project that is not subject to said statute.

(b) Construct or construction refers to and includes the erection, construction, alteration or repair of the Project.

(c) Party or Parties refers to the parties listed in Section 16.4.

(d) Project means the building to be erected, constructed, altered or repaired pursuant to this Agreement.

17.3 The City and any Party contracting with the City or with any first-tier or lower-tier subcontractor for the construction of the Project agree to participate in good faith in any mediation of a dispute subject to this Section and NCGS 143-128(f1-g), including without limitation the following Parties (if any): architect(s), engineer(s), surveyor(s), construction manager, construction manager at risk, prime contractor(s), surety(ies), subcontractor(s), and supplier(s).

17.4 In order to facilitate compliance with NCGS 143-128(f1-g), the Contractor and all other Parties shall include this Section 17 in every agreement to which it (any of them) is a Party for the construction of the Project without variation or exception. Failure to do so will constitute a breach of this Agreement, and the Contractor or other Party failing to include this Section in any agreement required by this Section shall indemnify and hold harmless the remaining Parties from and against any and all claims, including without limitation reasonable attorney fees and other costs of litigation, arising in any manner from such breach. Notwithstanding the foregoing provisions of this Section, it is expressly understood and agreed that the Parties are intended to be and shall be third-party beneficiaries of the provisions of this Section and can enforce the provisions hereof.

17.5 The following disputes are not subject to mediation: (i) a dispute seeking a non-monetary recovery; and (ii) a dispute seeking a monetary recovery of \$15,000 or less.

17.6 A dispute seeking the extension of any time limit set forth in an agreement to construct the Project shall be subject to mediation pursuant to this Section and NCGS 143-128(f1-g), but only if the damages which would be suffered by the Party seeking the extension would exceed \$15,000 if the disputed extension is denied. To the extent that liquidated damages are set forth in such agreement as the measurement of damages for failure by such Party to meet such time limit, such liquidated damages shall be the exclusive standard for determining the amount of damages associated with such dispute.

17.7 For purposes of this Section, a dispute is limited to the recovery of monetary damages from the same transaction or occurrence against a single Party or two or more Parties alleged to be liable jointly, severally or in the alternative. Two or more disputes may not be consolidated or otherwise combined without the consent of all Parties to such disputes.

17.8 In addition to such matters as are required by the Rules, a request for mediation shall include the amount of the monetary relief requested.

17.9 Prior to requesting mediation, a Party must form a good faith belief that it is entitled under applicable law to recover the monetary amount to be included in the request from one or more of the remaining Parties. Such belief must be based on a reasonable and prudent investigation into the dispute that is the subject of the request. The request for mediation must be based on such investigation and may not include any amount or the name of any remaining Party, unless supported by such investigation and good faith belief by the Party requesting the mediation.

17.10 If a Party breaches any provision of Section 17.9, it shall indemnify and hold harmless all other Parties from any costs, including reasonable attorney fees and other costs of litigation, and damages incurred by such other Parties that arise from such breach.

17.11 All expenses incurred by a Party to a dispute in preparing and presenting any claim or defense at the mediation shall be paid by the Party. Such expenses include without limitation preparation and production of witnesses and exhibits and attorney fees. All other expenses of the mediation, including filing fees and required traveling and other expenses of the mediator, shall be borne as follows: one half by the Party requesting the mediation, with the remaining parties paying equal shares of the remaining expenses and costs; provided that, if the City is named as a party to the mediation, the City shall pay at least one-third of the mediation expenses and costs divided among the Parties. If more than one Party to a dispute requests a mediation, the mediation expenses and costs to be divided among the Parties shall be borne equally by the Parties to the dispute; provided that, if the City is named as a Party to the mediation, the City shall pay at least one-third of the mediation expenses and costs divided among the Parties.

17.12 The mediation shall be held at a location agreeable to the mediator and all of the Parties; provided that, if no agreement can be reached, the mediation will be held at such location in Cabarrus County as the mediator shall determine.

17.13 The provisions of this Section are subject to any other provision of this Agreement concerning the submission, documentation and/or proof of any claim or dispute. Such other provisions shall apply in full force and shall be satisfied as a condition precedent to mediation pursuant to this Section.

17.14 The Parties understand and agree that mediation in accordance with this Section shall be a condition precedent to institution of any legal or equitable proceeding seeking monetary recovery based on any dispute that is subject to mediation pursuant to this Section.

**Sec. 18. Breach.** In the event of a violation of any material term of this Agreement, the non-violating party may terminate the Agreement upon written notice. Such notice shall state the violation with specificity and shall give ten (10) days to cure the violation. The cure period shall be measured as ten (10) days from the date of receipt of notice by the violating party, or, if the date is not known, then thirteen (13) days from the date the notice is placed in the United States Post. If the violation remains uncorrected at the end of the cure period, the Agreement shall be terminated without any further action by the non-violating party. Any remaining disputes shall be subject to the dispute resolution procedure set forth above, if applicable.

[Signature Page to Follow]

IN WITNESS WHEREOF, the City of Concord and the Contractor have caused this Contract to be executed by their respective duly authorized agents or officers.

CITY OF CONCORD:

(Typed or Printed Legal Name of Contractor)

By: \_\_\_\_\_  
City Manager

By: \_\_\_\_\_  
Signature of President/Vice President/Manager/Partner

Date: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

ATTEST BY:

Date: \_\_\_\_\_

\_\_\_\_\_  
City Clerk

ATTEST:

BY: \_\_\_\_\_  
Signature of Vice President, Secretary, or other officer

Printed Name: \_\_\_\_\_

Title \_\_\_\_\_

APPROVED AS TO FORM:

\_\_\_\_\_  
Attorney for the City of Concord

SEAL

**APPROVAL BY CITY FINANCE OFFICER**

This instrument has been pre-audited in the manner required by the Local Government Budget and Fiscal Control Act.

\_\_\_\_\_  
Signature

**CONTRACT EXHIBIT "B"**  
**AFFIDAVIT**

STATE OF NORTH CAROLINA

AFFIDAVIT

COUNTY OF CABARRUS

\*\*\*\*\*

I, \_\_\_\_\_ (the individual signing below), being duly authorized by and on behalf of \_\_\_\_\_ (the legal name of the entity entering the contract, "Employer") after first being duly sworn hereby swears or affirms as follows:

1. Employer understands that E-Verify is the federal E-Verify program operated by the United States Department of Homeland Security and other federal agencies, or any successor or equivalent program used to verify the work authorization of newly hired employees pursuant to federal law in accordance with NCGS §64-26.
2. Employer understands that Employers Must Use E-Verify. Each employer (as such term is defined in NCGS § 64-25), after hiring an employee (as such term is defined in NCGS § 64-25) to work in the United States, shall verify the work authorization of the employee through E-Verify in accordance with NCGS§64-26(a). Employer attests that Employer is in compliance with the requirements of the federal and state laws relevant to E-verify.
3. Employer is a person, business entity, or other organization that transacts business in the State of North Carolina. Employer employs 25 or more employees in this State. (mark Yes or No)  
a. YES \_\_\_\_\_, or b. NO \_\_\_\_\_.
4. Employer attests that all subcontractors employed by it as part of this contract comply with the requirements of E-Verify, and Employer will ensure compliance with E-Verify by any subcontractors subsequently hired by Employer as part of any contract with the City of Concord.
5. Employer shall have a continuing duty to inform the City of Concord of any changes to this sworn information.

This \_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
Signature of Affiant  
Print or Type Name: \_\_\_\_\_

---

State of North Carolina County of Cabarrus

Signed and sworn to (or affirmed) before me, this the \_\_\_\_\_  
day of \_\_\_\_\_, 20\_\_.

My Commission Expires:

\_\_\_\_\_

Notary Public

\_\_\_\_\_

(Affix Official/Notarial Seal)

**CONTRACT EXHIBIT "C"**  
**TAX FORM(S)**

**CONTRACT EXHIBIT "D"**  
**CERTIFICATE OF INSURANCE**

4824-4465-9749, v. 1

**PAY REQUEST FORM**

City of Concord  
Post Office Box 308  
Concord, North Carolina 28026-0308

---

For Office Use Only:  
Charge to P.O. # \_\_\_\_\_  
Due \_\_\_\_\_

---

**PROJECT: #** \_\_\_\_\_ **DESCRIPTION:** \_\_\_\_\_  
Date Notice to Proceed: \_\_\_\_\_  
Completion Date: \_\_\_\_\_  
Days Remaining in Contract: \_\_\_\_\_  
Percent Work Complete: \_\_\_\_\_  
Percent Time Complete: \_\_\_\_\_  
Percent Payment Complete: \_\_\_\_\_

**APPLICATION FOR PAYMENT NO. \_\_\_\_\_ SHEET NO. \_\_\_\_\_ OF**  
**PERIOD FROM: \_\_\_\_\_ TO: \_\_\_\_\_**

**CERTIFICATE OF THE CONTRACTOR**

To the best of my knowledge and belief, I certify that this periodical estimate is correct and all work has been performed and materials supplied in full accordance with the terms and conditions of the contract documents between the undersigned contractor and the City of Concord.

**GROSS AMOUNT OF PARTIAL PAYMENT -----\$ \_\_\_\_\_**  
**LESS: RETAINAGE AT \_\_\_\_\_ PERCENT ---- \$ \_\_\_\_\_**  
**PREVIOUS PAYMENT ----- \$ \_\_\_\_\_**  
**LIQUIDATION DAMAGES**  
**\_\_\_\_\_ DAYS @ \$ \_\_\_\_\_ -----\$ \_\_\_\_\_**  
**OTHER DEDUCTIONS:**  
\_\_\_\_\_ -----\$ \_\_\_\_\_  
\_\_\_\_\_ -----\$ \_\_\_\_\_  
**TOTAL DEDUCTIONS ----- \$ \_\_\_\_\_**  
**NET AMOUNT DUE THIS ESTIMATE ----- \$ \_\_\_\_\_**

Name of Contractor: \_\_\_\_\_ Address: \_\_\_\_\_

Signed: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

**CERTIFICATE OF CONSTRUCTION ADMINISTRATOR/ENGINEER**

I certify that I have verified this periodical estimate and that to the best of my knowledge and belief, it is a true and correct statement of work performed and materials supplied under the contract.

Consultant Engineer: \_\_\_\_\_ Date: \_\_\_\_\_

Construction Administrator: \_\_\_\_\_ Date: \_\_\_\_\_

**APPROVED AND PAYMENT RECOMMENDED:**

**CITY OF CONCORD**

Signed: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

FN/AP/31  
Revised 03/14/07

**ENGINEERING'S APPLICATION FOR PAYMENT FORM FOR BASE BID**

| PROJECT TITLE:                |  | Zemosa Acres Culvert Replacement (Chadbourne Avenue, Chelwood Drive, and Channing Circle) |    |       |       |           |           |            | Project #: 2014-027 |         |         |        |       |
|-------------------------------|--|---|----|-------|-------|-----------|-----------|------------|---------------------|---------|---------|--------|-------|
| ITEM                          | DESCRIPTION  | QUANTITY  |    | UNIT  | TOTAL | QUANT.    | TOTAL     | QUANT.     | TOTAL               | QUANT.  | TOTAL   | QUANT. | TOTAL |
|                               |  |   |    | PRICE | PRICE | THIS EST. | THIS EST. | PREV. EST. | PREV                | TO DATE | TO DATE | DIFF.  | DIFF. |
| <b>GENERAL WORK ITEMS</b>     |  |   |    |       |       |           |           |            |                     |         |         |        |       |
| 1                             | Mobilization   | 1   | LS |       |       |           |           |            |                     |         |         |        |       |
| 2                             | Construction Stakes, Lines and Grades                | 1   | LS |       |       |           |           |            |                     |         |         |        |       |
| 3                             | Comprehensive Grading                                | 1   | LS |       |       |           |           |            |                     |         |         |        |       |
| 4                             | Traffic Control                                      | 1   | LS |       |       |           |           |            |                     |         |         |        |       |
| <b>ROADWAY/DRAINAGE ITEMS</b> |  |   |    |       |       |           |           |            |                     |         |         |        |       |
| 5                             | Borrow Excavation                                    | 5,700   | CY |       |       |           |           |            |                     |         |         |        |       |
| 6                             | Foundation Conditioning Material                     | 2,790   | TN |       |       |           |           |            |                     |         |         |        |       |
| 7                             | 10'x9' Reinf. Concrete Box Culvert, Cl. III          | 177   | LF |       |       |           |           |            |                     |         |         |        |       |
| 8                             | 11'x9' Reinf. Concrete Box Culvert, Cl. III          | 96  | LF |       |       |           |           |            |                     |         |         |        |       |
| 9                             | 12'x9' Reinf. Concrete Box Culvert, Cl. III          | 238   | LF |       |       |           |           |            |                     |         |         |        |       |
| 10                            | Asphalt Concrete Base Course, B25.0B                 | 270   | TN |       |       |           |           |            |                     |         |         |        |       |
| 11                            | Asphalt Concrete Intermediate Course, I19.0B         | 110   | TN |       |       |           |           |            |                     |         |         |        |       |
| 12                            | Asphalt Concrete Surface Course, SF9.5A              | 90  | TN |       |       |           |           |            |                     |         |         |        |       |
| 13                            | Asphalt Binder for Plant Mix                         | 29  | TN |       |       |           |           |            |                     |         |         |        |       |
| 14                            | Reinforced Endwalls                                  | 300   | CY |       |       |           |           |            |                     |         |         |        |       |
| 15                            | Rip Rap, CL. I                                       | 25  | TN |       |       |           |           |            |                     |         |         |        |       |
| 16                            | Rip Rap, CL. A                                       | 25  | TN |       |       |           |           |            |                     |         |         |        |       |
| 17                            | Rip Rap, CL. B                                       | 56  | TN |       |       |           |           |            |                     |         |         |        |       |
| 18                            | Guardrail (NCDOT STD.862.01), including anchor units | 285   | LF |       |       |           |           |            |                     |         |         |        |       |
| 19                            | Aggregate No. 57                                     | 46  | TN |       |       |           |           |            |                     |         |         |        |       |
| 20                            | Geotextile Fabric, NCDOT Type 2                      | 3,000   | SY |       |       |           |           |            |                     |         |         |        |       |
| 21                            | Rock Sill  | 100   | LF |       |       |           |           |            |                     |         |         |        |       |
| 22                            | Coir Fiber Matting                                   | 1,500   | SY |       |       |           |           |            |                     |         |         |        |       |

**ENGINEERING'S APPLICATION FOR PAYMENT FORM (continued)**

| PROJECT TITLE:       |  | Zemosa Acres Culvert Replacement (Chadbourne Avenue, Chelwood Drive, and Channing Circle) |    |       |       |           |           |            | Project #: 2014-027 |         |         |        |       |
|----------------------|--|---|----|-------|-------|-----------|-----------|------------|---------------------|---------|---------|--------|-------|
| ITEM                 | DESCRIPTION  | QUANTITY  |    | UNIT  | TOTAL | QUANT.    | TOTAL     | QUANT.     | TOTAL               | QUANT.  | TOTAL   | QUANT. | TOTAL |
|                      |  |   |    | PRICE | PRICE | THIS EST. | THIS EST. | PREV. EST. | PREVIOUS            | TO DATE | TO DATE | DIFF.  | DIFF. |
| <b>UTILITY ITEMS</b> |  |   |    |       |       |           |           |            |                     |         |         |        |       |
| 23                   | 5' Sanitary Manhole (w/ Inside Drop) incl. Frame & Cover | 1   | EA |       |       |           |           |            |                     |         |         |        |       |
| 24                   | 5' Sanitary Manhole (w/ Inside Drop) Additional Depth    | 8   | VF |       |       |           |           |            |                     |         |         |        |       |
| 25                   | 5' Sanitary Manhole, including Frame & Cover             | 3   | EA |       |       |           |           |            |                     |         |         |        |       |
| 26                   | 5' Sanitary Manhole, Additional Depth                    | 16  | VF |       |       |           |           |            |                     |         |         |        |       |
| 27                   | 24" Sanitary Sewer, PVC, DR 35                           | 135   | LF |       |       |           |           |            |                     |         |         |        |       |
| 28                   | 8" Sanitary Sewer, Restrained Joint Ductile Iron, PC 350 | 65  | LF |       |       |           |           |            |                     |         |         |        |       |
| 29                   | 6" Water Main, Restrained Joint Ductile Iron, PC 350     | 560   | LF |       |       |           |           |            |                     |         |         |        |       |
| 30                   | 4" Water Main, Restrained Joint Ductile Iron, PC 350     | 535   | LF |       |       |           |           |            |                     |         |         |        |       |
| 31                   | 12" Encasement Pipe, Steel (0.25" Thick)                 | 150   | LF |       |       |           |           |            |                     |         |         |        |       |
| 32                   | 18" Encasement Pipe, Steel (0.313" Thick)                | 50  | LF |       |       |           |           |            |                     |         |         |        |       |
| 33                   | 6" Gate Valve  | 6   | EA |       |       |           |           |            |                     |         |         |        |       |
| 34                   | 4" Gate Valve  | 6   | EA |       |       |           |           |            |                     |         |         |        |       |
|                      |  |   |    |       |       |           |           |            |                     |         |         |        |       |
|                      | <b>Base Bid</b>  |   |    |       | \$    |           |           |            |                     |         |         |        |       |
|                      | <b>5 % Contingency</b>                                   |   |    |       | \$    |           |           |            |                     |         |         |        |       |
|                      | <b>Total Base Bid</b>                                    |   |    |       | \$    |           |           |            |                     |         |         |        |       |

**ENGINEERING'S APPLICATION FOR PAYMENT FORM FOR ADDITIVE ALTERNATE BID**

| PROJECT TITLE:                |  | Zemosa Acres Culvert Replacement (Hanover) |    |       |       |           |           |            |       |         |         | Project #: 2014-027 |       |
|-------------------------------|--|--|----|-------|-------|-----------|-----------|------------|-------|---------|---------|---------------------|-------|
| ITEM                          | DESCRIPTION  | QUANTITY                                   |    | UNIT  | TOTAL | QUANT.    | TOTAL     | QUANT.     | TOTAL | QUANT.  | TOTAL   | QUANT.              | TOTAL |
|                               |  |  |    | PRICE | PRICE | THIS EST. | THIS EST. | PREV. EST. | PREV  | TO DATE | TO DATE | DIFF.               | DIFF. |
| <b>GENERAL WORK ITEMS</b>     |  |  |    |       |       |           |           |            |       |         |         |                     |       |
| 1                             | Mobilization   | 1  | LS |       |       |           |           |            |       |         |         |                     |       |
| 2                             | Construction Stakes, Lines and Grades                  | 1  | LS |       |       |           |           |            |       |         |         |                     |       |
| 3                             | Comprehensive Grading                                  | 1  | LS |       |       |           |           |            |       |         |         |                     |       |
| 4                             | Traffic Control  | 1  | LS |       |       |           |           |            |       |         |         |                     |       |
| <b>ROADWAY/DRAINAGE ITEMS</b> |  |  |    |       |       |           |           |            |       |         |         |                     |       |
| 5                             | Borrow Excavation                                      | 1,500                                      | CY |       |       |           |           |            |       |         |         |                     |       |
| 6                             | Foundation Conditioning Material, Minor Structures     | 570  | TN |       |       |           |           |            |       |         |         |                     |       |
| 7                             | 15" Reinf. Concrete Pipe, Cl. III, Drainage Pipe       | 20   | LF |       |       |           |           |            |       |         |         |                     |       |
| 8                             | 24" Reinf. Concrete Pipe, Cl. III, Drainage Pipe       | 8  | LF |       |       |           |           |            |       |         |         |                     |       |
| 9                             | 9'x8' Reinf. Concrete Box Culvert, Cl. III             | 57   | LF |       |       |           |           |            |       |         |         |                     |       |
| 10                            | 10'x8' Reinf. Concrete Box Culvert, Cl. III            | 57   | LF |       |       |           |           |            |       |         |         |                     |       |
| 11                            | Asphalt Concrete Base Course, B25.0B                   | 60   | TN |       |       |           |           |            |       |         |         |                     |       |
| 12                            | Asphalt Concrete Intermediate Course, I19.0B           | 25   | TN |       |       |           |           |            |       |         |         |                     |       |
| 13                            | Asphalt Concrete Surface Course, SF9.5A                | 20   | TN |       |       |           |           |            |       |         |         |                     |       |
| 14                            | Asphalt Binder for Plant Mix                           | 6  | TN |       |       |           |           |            |       |         |         |                     |       |
| 15                            | Reinforced Endwalls                                    | 110  | CY |       |       |           |           |            |       |         |         |                     |       |
| 16                            | Masonry Drainage Structure, Manhole (NCDOT STD 840.51) | 2  | EA |       |       |           |           |            |       |         |         |                     |       |
| 17                            | Masonry Drainage Structure, Manhole, Additional Depth  | 4  | VF |       |       |           |           |            |       |         |         |                     |       |
| 18                            | Frame with Cover, (NCDOT STD. 840.54)                  | 2  | EA |       |       |           |           |            |       |         |         |                     |       |
| 19                            | Rip Rap, CL. I   | 30   | TN |       |       |           |           |            |       |         |         |                     |       |
| 20                            | Rip Rap, CL. A   | 30   | TN |       |       |           |           |            |       |         |         |                     |       |
| 21                            | Rip Rap, CL. B   | 15   | TN |       |       |           |           |            |       |         |         |                     |       |

**ENGINEERING'S APPLICATION FOR PAYMENT FORM (continued)**

| PROJECT TITLE:       |  | Zemosa Acres Culvert Replacement (Hanover) |    |       |       |           |           |            |          |         |         | Project #: 2014-027 |       |
|----------------------|--|--|----|-------|-------|-----------|-----------|------------|----------|---------|---------|---------------------|-------|
| ITEM                 | DESCRIPTION  | QUANTITY                                   |    | UNIT  | TOTAL | QUANT.    | TOTAL     | QUANT.     | TOTAL    | QUANT.  | TOTAL   | QUANT.              | TOTAL |
|                      |  |  |    | PRICE | PRICE | THIS EST. | THIS EST. | PREV. EST. | PREVIOUS | TO DATE | TO DATE | DIFF.               | DIFF. |
| 22                   | Aggregate No. 57   | 20   | TN |       |       |           |           |            |          |         |         |                     |       |
| 23                   | Geotextile Fabric, NCDOT Type 2                          | 800  | SY |       |       |           |           |            |          |         |         |                     |       |
| 24                   | Coir Fiber Matting                                       | 500  | SY |       |       |           |           |            |          |         |         |                     |       |
| <b>UTILITY ITEMS</b> |  |  |    |       |       |           |           |            |          |         |         |                     |       |
| 25                   | 4' Sanitary Manhole, incl. Frame & Cover                 | 1  | EA |       |       |           |           |            |          |         |         |                     |       |
| 26                   | 4' Sanitary Manhole, Additional Depth                    | 4  | VF |       |       |           |           |            |          |         |         |                     |       |
| 27                   | 5' Sanitary Manhole (w/ Inside Drop) incl. Frame & Cover | 1  | EA |       |       |           |           |            |          |         |         |                     |       |
| 28                   | 5' Sanitary Manhole (w/ Inside Drop) Additional Depth    | 7  | VF |       |       |           |           |            |          |         |         |                     |       |
| 29                   | 5' Sanitary Manhole, incl. Frame & Cover                 | 1  | EA |       |       |           |           |            |          |         |         |                     |       |
| 30                   | 5' Sanitary Manhole, Additional Depth                    | 6  | VF |       |       |           |           |            |          |         |         |                     |       |
| 31                   | 8" Sanitary Sewer, Restrained Joint Ductile Iron, PC 350 | 110  | LF |       |       |           |           |            |          |         |         |                     |       |
| 32                   | 6" Water Main, Restrained Joint Ductile Iron, PC 350     | 70   | LF |       |       |           |           |            |          |         |         |                     |       |
| 33                   | 4" Water Main, Restrained Joint Ductile Iron, PC 350     | 60   | LF |       |       |           |           |            |          |         |         |                     |       |
| 34                   | 18" Encasement Pipe, Steel (0.313" Thick)                | 40   | LF |       |       |           |           |            |          |         |         |                     |       |
| 35                   | 6" Gate Valve  | 2  | EA |       |       |           |           |            |          |         |         |                     |       |
| 36                   | 4" Gate Valve  | 2  | EA |       |       |           |           |            |          |         |         |                     |       |
|                      | <b>Additive Alternate Bid</b>                            |  |    |       |       |           |           |            |          |         |         |                     |       |
|                      | <b>5 % Contingency</b>                                   |  |    |       |       |           |           |            |          |         |         |                     |       |
|                      | <b>Total Additive Alternate Bid</b>                      |  |    |       |       |           |           |            |          |         |         |                     |       |

**CITY OF CONCORD  
CONCORD, NORTH CAROLINA  
CONTRACT CHANGE ORDER**

Date: \_\_\_\_\_

Project Title: **Zemosa Acres Culvert Replacements**

Project #:  
**2014-027**

Owner: **City of Concord**

Change  
Order No.

To: **(CONTRACTOR)**

Account No.  
Purchase Order No.

You are hereby requested to make the following changes in this Contract to comply with the provisions of the attached and/or the original Contract Documents.

| Item No.                                     | Description of Changes | Additions | Deductions |
|--|------------------------|-----------|------------|
|  |                        | \$0.00    | \$0.00     |
| <b>Original Contract Amount</b>              |                        |           |            |
| <b>Net Changes by Previous Change Orders</b> |                        |           |            |
| <b>Net Changes this Change Order</b>         |                        |           |            |
|  |                        |           | \$0.00     |
| <b>New Contract Amount</b>                   |                        |           |            |
|  |                        |           | \$0.00     |

The Contract Time will be \_\_\_\_\_ by \_\_\_\_\_ calendar days.

The Completion Date as of this Change Order is:

Accepted: **(Contractor)**

By: \_\_\_\_\_ Date: \_\_\_\_\_

Accepted: **CITY OF CONCORD**

By: \_\_\_\_\_ Date: \_\_\_\_\_

This instrument has been pre-audited in the manner required by Local Government Budget and Fiscal Control Act.

By: \_\_\_\_\_ Date: \_\_\_\_\_

**Finance Director**

**CERTIFICATE OF INFRASTRUCTURE COMPLETION**

|  |                                  |
|--|----------------------------------|
| <b>Project Title:</b><br>Zemosa Acres Culvert Replacements |                                  |
| <b>Project #:</b> 2014-027                                 |                                  |
| <b>CONTRACTOR NAME &amp; ADDRESS:</b>                      | <b>OWNER NAME &amp; ADDRESS:</b> |
| <b>MISCELLANEOUS INFORMATION:</b>                          |                                  |
| <b>INSPECTOR:</b>  |                                  |

The following items have been inspected, reviewed and found to be complete in substantial accordance with the approved plans and specifications. The dates of completion are those agreed upon by the City of Concord when all construction work and testing was completed. These dates DO NOT initiate the start of any warranty periods of said items(s). Warranty periods shall begin as specified on the CERTIFICATE OF FINAL COMPLETION.

|                   |                                |
|-------------------|--------------------------------|
| Stormwater System | Approved: _____<br>Date: _____ |
| Curb & Gutters    | Approved: _____<br>Date: _____ |
| Sanitary Sewer    | Approved: _____<br>Date: _____ |
| Potable Water     | Approved: _____<br>Date: _____ |
| Street Paving     | Approved: _____<br>Date: _____ |
| Sidewalks         | Approved: _____<br>Date: _____ |
| Other             | Approved: _____<br>Date: _____ |

**FIELD ORDER**

**CITY OF CONCORD**  
**ENGINEERING DEPARTMENT**  
Post Office Box 308  
Concord, North Carolina 28026-0308

Project Title: **Zemosa Acres Culvert Replacements**

**Project #: 2014-027**

**FIELD ORDER NO** \_\_\_\_\_ **CONTRACT** \_\_\_\_\_ **DATE** \_\_\_\_\_

**PROJECT** \_\_\_\_\_

**LOCATION** \_\_\_\_\_

TO: \_\_\_\_\_

\_\_\_\_\_

---

---

THIS ORDER AUTHORIZES YOU TO PROCEED WITH THE ALTERATIONS AND/OR ADDITIONS TO THE WORK AS DESCRIBED HEREIN, IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF OUR STANDARD FORM OF CONTRACT.

**DESCRIPTION OF WORK:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- QUOTATION RECEIVED AND APPROVED BY THE CITY OF CONCORD.
- QUOTATION NOT RECEIVED. PLEASE FURNISH QUOTATION IMMEDIATELY TO THE CITY OF CONCORD FOR CHECK AND APPROVAL.
- TIME AND MATERIAL BASIS. FURNISH TIME AND MATERIAL REPORTS DAILY TO THE CITY OF CONCORD FOR VERIFICATION AND SIGNATURE.
- OTHER \_\_\_\_\_

AUTHORIZED BY: \_\_\_\_\_

**NORTH CAROLINA SALES TAX REPORT**

OWNER: \_\_\_\_\_  
 Project Title: Zemosa Acres Culvert Replacements  
 Project #: 2014-027

CONTRACTOR: \_\_\_\_\_

PURCHASE ORDER: \_\_\_\_\_

| DATE  | VENDOR NAME | INVOICE NO. | NET INVOICE AMOUNT | STATE TAX AMOUNT | COUNTY TAX AMOUNT | SPECIAL COUNTY TAX | COUNTY PAID |
|-------|-------------|-------------|--------------------|------------------|-------------------|--------------------|-------------|
|       |             |             |                    |                  |                   |                    |             |
|       |             |             |                    |                  |                   |                    |             |
|       |             |             |                    |                  |                   |                    |             |
|       |             |             |                    |                  |                   |                    |             |
|       |             |             |                    |                  |                   |                    |             |
|       |             |             |                    |                  |                   |                    |             |
|       |             |             |                    |                  |                   |                    |             |
|       |             |             |                    |                  |                   |                    |             |
|       |             |             |                    |                  |                   |                    |             |
|       |             |             |                    |                  |                   |                    |             |
|       |             |             |                    |                  |                   |                    |             |
|       |             |             |                    |                  |                   |                    |             |
|       |             |             |                    |                  |                   |                    |             |
|       |             |             |                    |                  |                   |                    |             |
| TOTAL |             |             |                    |                  |                   |                    |             |

I certify that the above listed vendors were paid sales tax upon purchases of materials during the period covered by the Construction Estimate, and the property upon which such taxes were paid with or will be used in the performance of this contract. No tax on purchases or rentals of tools and/or equipment is included in the above list. All of the materials above became a part of or is annexed to the building or structure being erected, altered or repaired.

\_\_\_\_\_  
 Contractor or Subcontractor Name  
 (PRINT)  
 Signature  
 : \_\_\_\_\_  
 Name  
 (print): \_\_\_\_\_  
 Title: \_\_\_\_\_

SWORN AND SUBSCRIBED BEFORE

ME THIS \_\_\_\_ DAY OF \_\_\_\_\_, \_\_\_\_.

\_\_\_\_\_  
 NOTARY  
 PUBLIC

MY COMMISSON EXPIRES ON : \_\_\_\_\_

**NORTH CAROLINA ONE CALL CENTER, INC.**

North Carolina One Call Center, Inc., a non-profit organization funded by participating utility companies and municipalities in the interest of community and job safety and improved service through damage reduction to the utilities.

**A ONE CALL TOLL FREE TELEPHONE NUMBER, 811 or 1-800-632-4949, PROVIDES AN AVENUE TO ALL OF THE PARTICIPATING MEMBERS FROM ANY POINT WITHIN THE STATE OF NORTH CAROLINA.**

Anyone proposing to excavate, dig, bore, tunnel, blast or disturb the earth in any manner in which buried utilities may be damaged is requested to call the toll-free number between the hours of 6:00 a.m. and 10:00 p.m., Monday through Friday, forty-eight hours before starting the proposed work.

Within minutes of your telephone call, the participating members will be made aware of your plans and will be given pertinent information that has been provided by you about your planned work. You will be told the names of the participating members from whom you can expect a response - if there are buried facilities in the path of your activity, the route of the utilities will be staked and/or marked at no expense to you. If there are no facilities in the area of the planned work, you will be called or notified by a representative of a participating company accordingly.

Should a non-participating utility operator be serving your area, we recommend that you call them on an individual basis. All utility operators, whether company or municipality, will be provided an opportunity to become a member of North Carolina One Call Center, Inc.

Naturally, knowing the route of utilities, the excavator is expected to exercise caution and to avoid damage as the project progresses.

Damage prevention does not just happen – it is a planned and orderly process through which each of us can participate - **YES, WE CAN AND WE WILL DRAMATICALLY REDUCE DAMAGES TO THE UTILITIES IN THE STATE OF NORTH CAROLINA!! THANKS FOR YOUR HELP.**

**BEFORE YOU DIG**

**IN THE INTEREST OF COMMUNITY AND JOB SAFETY AND IMPROVED SERVICE**

**CALL NORTH CAROLINA ONE CALL CENTER, INC.**

**811 or 1-800-632-4949**

**North Carolina One Call Center, Inc  
2300 West Meadowview Rd., Suite 227  
Greensboro, NC 27407  
[www.nc811.org](http://www.nc811.org)**

**PART A - SECTION II**  
**GENERAL CONDITIONS**

## GENERAL CONDITIONS

### ARTICLE 1.0 – DEFINITIONS

#### 1.1 Defined Terms:

Wherever used in the Contract Documents and printed with initial or all capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof.

- 1.1.1 **Acceptance** - By the OWNER of the Work as being fully complete in accordance with the Contract Documents subject to waiver of claims.
- 1.1.2 **Addenda** - Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the Contract Documents.
- 1.1.3 **Agreement** - The written instrument which is evidence of the agreement between OWNER and CONTRACTOR covering the work.
- 1.1.4 **Application for Payment** - The form acceptable to ENGINEER which is to be used by CONTRACTOR during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
- 1.1.5 **Asbestos** - Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
- 1.1.6 **Bid** - The offer or proposal of a bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
- 1.1.7 **Bidder** – The one who submits a Bid directly to Owner, as distinct from a sub-bidder who submits a bid directly to a Bidder.
- 1.1.8 **Bidding Documents** - The Bidding Requirements and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).
- 1.1.9 **Bidding Requirements** - The Advertisement or Invitation to Bid, Instructions to Bidders, Bid security form, if any, and the Bid form with any supplements
- 1.1.10 **Bonds** - Performance and payment bonds and other instruments of security.
- 1.1.11 **Change Order** - A document recommended by ENGINEER which is signed by CONTRACTOR and OWNER and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
- 1.1.12 **Claim** - A demand or assertion by OWNER or CONTRACTOR seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
- 1.1.13 **Contract** – Executed agreement between the OWNER and the successful bidder, covering the performance of the WORK and the compensation therefore. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.
- 1.1.14 **Contract Documents** – The definition of the Contract Documents shall be as set forth in the Agreement. Approved Shop Drawings and the reports and drawings of subsurface and physical conditions are not Contract Documents. Files in electronic media format of text, data, graphics, and the like that may be furnished by OWNER to CONTRACTOR are not Contract Documents.
- 1.1.15 **Contract Price** - The moneys payable by OWNER to CONTRACTOR for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of paragraph 11.3 in the case of Unit Price Work).
- 1.1.16 **Contract Times** - The number of days or the dates stated in the Agreement to complete the Work so that it is ready for final payment as evidenced by ENGINEER's written recommendation of final payment.
- 1.1.17 **CONTRACTOR** - The individual or entity with whom OWNER has entered into the Agreement.
- 1.1.18 **Cost of the Work** - See paragraph 11.1.1 for definition.

- 1.1.19 **Drawings** - That part of the Contract Documents prepared approved by ENGINEER which graphically shows the scope, extent, and character of the Work to be performed by CONTRACTOR. Shop Drawings and other CONTRACTOR submittals are not Drawings as so defined.
- 1.1.20 **Effective Date of the Agreement** - The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
- 1.1.21 **ENGINEER** – Director of Engineering, City of Concord.
- 1.1.22 **ENGINEER's Consultant** – An individual or entity having a contract with ENGINEER to furnish services as ENGINEER, independent professional associate or consultant with respect to the Project.
- 1.1.23 **Field Order** - A written order issued by ENGINEER which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
- 1.1.24 **General Requirements** - Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.
- 1.1.25 **Hazardous Environmental Condition** - The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.
- 1.1.26 **Hazardous Waste** - The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
- 1.1.27 **Laws and Regulations; Laws or Regulations** - Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
- 1.1.28 **Liens** - Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
- 1.1.29 **Milestone** - A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.
- 1.1.30 **Notice of Award**- The written notice by OWNER to the apparent successful bidder stating that upon timely compliance by the apparent successful bidder with the conditions precedent listed therein, OWNER will sign and deliver the Agreement.
- 1.1.31 **Notice to Proceed** - A written notice given by OWNER to CONTRACTOR fixing the date on which the Contract Times will commence to run and on which CONTRACTOR shall start to perform the Work under the Contract Documents.
- 1.1.32 **OWNER** – City of Concord, North Carolina.
- 1.1.33 **Partial Utilization** - Use by OWNER of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work.
- 1.1.34 **PCB's** – Polychlorinated biphenyls
- 1.1.35 **Petroleum** - Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
- 1.1.36 **Project** - The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part as may be indicated elsewhere in the Contract Documents.
- 1.1.37 **Project Manual** - The bound documentary information prepared for bidding and construction the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
- 1.1.38 **Radioactive Material** - Source, special nuclear, or byproduct material as defined by the atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
- 1.1.39 **Resident Project Representative** - The authorized representative of ENGINEER who may be assigned to the Site or any part thereof.
- 1.1.40 **Samples** - Physical examples of materials, equipment, or workmanship that are

representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

- 1.1.41 **Shop Drawings** - All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for CONTRACTOR and submitted by CONTRACTOR to illustrate some portion of the Work.
- 1.1.42 **Site** - Lands or areas indicated in the Contract Documents as being furnished by OWNER upon which the Work is to be performed, including right-of-way and easements for access thereto, and such other lands furnished by OWNER which are designated for the use of CONTRACTOR. .
- 1.1.43 **Specifications** - That part of the Contract Documents consisting of written technical descriptions of materials, equipment, systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto.
- 1.1.44 **Subcontractor** - An individual or entity having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the Site.
- 1.1.45 **Substantial Completion** - The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of ENGINEER, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.
- 1.1.46 **Supplementary Condition** - That part of the Contract Documents which amends or supplements these General Conditions.
- 1.1.47 **Supplier** - A manufacturer, fabricator, supplier, distributor, material man, or vendor having a direct contract with CONTRACTOR or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by CONTRACTOR or any Subcontractor.
- 1.1.48 **Underground Facilities** - All underground pipeline, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic of other control systems.
- 1.1.49 **Unit Price Work** - Work to be paid for on the basis of unit prices.
- 1.1.50 **Work** - The entire completed construction OR the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.
- 1.1.51 **Work Change Directive** - A written statement to CONTRACTOR issued on or after the Effective Date of the Agreement and signed by OWNER and recommended by ENGINEER ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.
- 1.1.51 **Written Amendment** - A written statement modifying the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the non-engineering or non-technical rather than strictly construction-related aspects of the Contract Documents.
- 1.1.53 **Resident Observer** - Shall have the same definition as "Resident Project Representative" when referred to in these documents or during the duration of the Project.
- 1.1.54 **Written Notice** - The "Notice" as used herein shall mean and include all written notices, demands, instruction, claims, approvals, and disapprovals required to obtain compliance with Contract requirements. Written notice shall be deemed to have been duly served if

delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or to an authorized representative of such individual, firm or corporation, or if delivered at or sent by registered mail to the last business address known to him who gives the notice. Unless otherwise stated in writing, any notice to or demand upon the OWNER under this Contract shall be delivered to the OWNER through the ENGINEER.

## 1.2 Terminology

### 1.2.4 Intent of Certain Terms or Adjectives

1.2.1.1 Whenever in the Contract Documents the terms "as allowed", "as approved", or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper", "satisfactory", or adjectives of like effect or import are used to describe an action or determination of ENGINEER as to the Work, it is intended that such action or determination will be solely to evaluate, in general, the completed Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of section 9.9 or any other provision of the Contract Documents.

### 1.2.2 Day

1.2.2.1 The work "day" shall constitute a calendar day or 24 hours measured from midnight to the next midnight.

### 1.2.3 Defective

1.2.3.1 The word "defective", when modifying the work "Work", refers to Work that is unsatisfactory, faulty, or deficient in that it does not conform to the Contract Documents or does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents, or has been damaged prior to ENGINEER's recommendation of final payment (unless responsibility for the protection thereof has been assumed by OWNER at Substantial Completion in accordance with paragraph 14.4 or 14.5).

### 1.2.4 Furnish, Install, Perform, Provide

1.2.4.1 The word "furnish", when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

1.2.4.2 The word "install", when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

1.2.4.3 The words "perform" or "provide", when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

1.2.4.4 When "furnish", "install", "perform", or "provide" is not used in connection with

services, materials, or equipment in a context clearly requiring an obligation of CONTRACTOR, "provide" is implied.

- 1.2.5 Unless stated otherwise in the Contract Documents, words or phrases which have a well known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

## **ARTICLE 2.0 – PRELIMINARY MATTERS**

### 2.1 Delivery of Bonds

- 2.1.1 When CONTRACTOR delivers the executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER such Bonds as CONTRACTOR may be required to furnish.

### 2.2 Copies of Documents

- 2.2.1 The CONTRACTOR will be furnished without charge up to **five** sets of specifications and full size drawings. Additional sets of drawings and specifications requested by the CONTRACTOR will be furnished at the cost of reproduction, plus handling.

### 2.3 Commencement of Contract Times: Notice to Proceed

- 2.3.1 The Contract Time will commence to run on the day indicated in the Notice to Proceed.

### 2.4 Starting the Work

- 2.4.1 CONTRACTOR shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

### 2.5 Before Starting Construction

- 2.5.1 CONTRACTOR's Review of Contract Documents: Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error, ambiguity, or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby; however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless CONTRACTOR knew or reasonably should have known thereof.

- 2.5.2 Preliminary Schedules: Within ten days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for its timely review:

- 2.5.2.1 a preliminary progress schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;
- 2.5.2.2 a preliminary schedule of Shop Drawing and Sample submittals which will list each required submittal and the times for submitting, reviewing, and processing such submittal; and
- 2.5.2.3 a preliminary schedule of values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis

for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.5.3 Evidence of Insurance: The CONTACTOR shall submit three copies of his insurance certificate with submittal of his executed Contract Documents. The CONTRACTOR may use the "Accord Form" for the Certificate of Insurance, but the form shall be modified to state that the described insurance policies shall not be canceled without 30 days prior written notice to the OWNER and the ENGINEER by registered mail. CONTRACTOR shall review "Accord Form" before forwarding to the ENGINEER.

## 2.6 Pre-Construction Conference

2.6.1. Before any Work at the Site is started, a conference attended by CONTRACTOR, ENGINEER, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in paragraph 2.5.2, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

## 2.7 Initial Acceptance of Schedules

2.7.1 Unless otherwise provided in the Contract Documents, at least ten days before submission of the first Application for Payment a conference attended by CONTRACTOR, ENGINEER, and others as appropriate will be held to review for acceptability to ENGINEER as provided below the schedules submitted in accordance with paragraph 2.5.2. CONTRACTOR shall have an additional ten days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to CONTRACTOR until acceptable schedules are submitted to ENGINEER.

2.7.1.1. The progress schedule will be acceptable to ENGINEER if it provides an orderly progression of the Work to completion within any specified Milestones and the Contract Times. Such acceptance will not impose on ENGINEER responsibility for the progress schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve CONTRACTOR from CONTRACTOR's full responsibility therefore.

2.7.1.2 CONTRACTOR's schedule of Shop Drawing and Sample submittals will be acceptable to ENGINEER if it provides a workable arrangement for reviewing and processing the required submittals.

2.7.1.3 CONTRACTOR's schedule of values will be acceptable to ENGINEER as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

## 2.8 Award

2.8.1 The award of the Contract, if it is awarded, will be to the lowest responsive, responsible Bidder whose qualifications indicate the award will be in the best interest of the OWNER and whose Bid complies with all the prescribed requirements. Notice of Award will not be given until the OWNER has concluded such investigations as he deems necessary to establish the responsibility, qualifications, and financial ability of the Bidders to do the Work in accordance with the Contract Documents to the satisfaction of the OWNER within the time prescribed. The OWNER reserves the right to reject the Bid of any Bidder who does not pass such investigation to the OWNER'S satisfaction. In analyzing Bids, the OWNER may take into consideration alternates and unit prices, if requested by the Bid forms. If the Contract is awarded, the OWNER will give the successful Bidder a Notice of Award within 90 days after the opening of Bids.

## **ARTICLE 3.0 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE**

### 3.1 Intent

- 3.1.1 The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
- 3.1.2 It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to OWNER.
- 3.1.3 Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided in Article 9.0.

### 3.2 Reference Standards

- 3.2.1 Standards, Specifications, and Codes.
  - 3.2.1.1 Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, whether such reference be specific or by implication, shall mean the standard, specification, manual, or code in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
  - 3.2.1.2 No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of OWNER, CONTRACTOR, or ENGINEER, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents, nor shall any such provision or instruction be effective to assign to OWNER, ENGINEER, or any of ENGINEER's Consultants, agents, or employees any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

### 3.3 Reporting and Resolving Discrepancies

- 3.3.1 Reporting Discrepancies
  - 3.3.1.1 If, during the performance of the Work, CONTRACTOR discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, CONTRACTOR shall report it to ENGINEER in writing at once. CONTRACTOR shall not proceed with the Work affected thereby (except in an emergency as required by paragraph 6.16.1) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in paragraph 3.4; provided, however, that CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any such conflict, error, ambiguity, or discrepancy unless CONTRACTOR knew or

reasonably should have know thereof.

### 3.3.2 Resolving Discrepancies

3.3.2.1 Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

3.3.2.1.1 the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents)

### 3.4 Amending and Supplementing Contract Documents

3.4.1 The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways: (i) a Written Amendment; (ii) a Change Order; or (iii) a Work Change Directive.

3.4.2 The requirements of the Contract Documents may be supplemented and minor variations and deviations in the Work may be authorized, by one or more of the following ways: (i) a Field Order; (ii) ENGINEER's approval of a Shop Drawing or Sample; or (iii) ENGINEER's written interpretation or clarification.

### 3.5 Reuse of Documents

3.5.1 CONTRACTOR and any Subcontractor or supplier or other individual or entity performing or furnishing any of the Work under a direct or indirect contract with OWNER: (i) shall not have or acquire any title in or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of ENGINEER or ENGINEER's Consultant, including electronic media editions; and (ii) shall not reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of OWNER and ENGINEER and specific written verification or adoption by ENGINEER. This prohibition will survive final payment, completion, and acceptance of the Work, or termination or completion of the Contract. Nothing herein shall preclude CONTRACTOR from retaining copies of the Contract Documents for record purposes.

## **ARTICLE 4.0 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; REFERENCE POINTS**

### 4.1 Availability of Lands

4.1.1 OWNER shall furnish the Site. OWNER shall notify CONTRACTOR of any encumbrances or restrictions not of general application but specifically related to use of the Site with which CONTRACTOR must comply in performing the Work. OWNER will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If CONTRACTOR and OWNER are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in OWNER's furnishing the Site, CONTRACTOR may make a Claim therefore as provided in paragraph 10.5.

4.1.2 CONTRACTOR shall provide for all additional lands and access thereto that may be

required for temporary construction facilities or storage of materials and equipment.

#### 4.2 Subsurface and Physical Conditions

4.2.1 Any testing, reports or drawings which are available or have been relied upon for this project are identified or included in the Special Provisions.

4.2.2 Limited Reliance by CONTRACTOR on Technical Data Authorized: CONTRACTOR may rely upon the general accuracy of the technical data. Except for such reliance on such technical data, CONTRACTOR may not rely upon or make any Claim against OWNER, ENGINEER, or any of ENGINEER's Consultants with respect to:

4.2.2.1 the completeness of such reports and drawings for CONTRACTOR's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by CONTRACTOR, and safety precautions and programs incident thereto; or

4.2.2.2 other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

4.2.2.3 any CONTRACTOR interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinion, or information.

#### 4.3 Differing Subsurface or Physical Conditions

4.3.1 Notice: If CONTRACTOR believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either:

4.3.1.1 is of such a nature as to establish that any "technical data" on which CONTRACTOR is entitled to rely as provided in paragraph 4.2 is materially inaccurate; or

4.3.1.2 is of such a nature as to require a change in the Contract Documents; or

4.3.1.3 differs materially from that shown or indicated in the Contract Documents; or

4.3.1.4 is of an unusual nature, and differs materially from condition ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents:

Then CONTRACTOR shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by paragraph 6.16.1), notify OWNER and ENGINEER in writing about such condition. CONTRACTOR shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

4.3.2 ENGINEER's Review: After receipt of written notice as required by paragraph 4.3.1, ENGINEER will promptly review the pertinent condition, determine the necessity of OWNER's obtaining additional exploration or tests with respect thereto, and advise OWNER in writing (with a copy to CONTRACTOR) of ENGINEER's findings and conclusions.

#### 4.3.3 Possible Price and Times Adjustments

4.3.3.1 The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in CONTRACTOR's cost of, or time required for, performance of the Work; subject, however, to the following:

- 4.3.3.1.1 such condition must meet anyone or more of the categories described in paragraph 4.3.1; and
- 4.3.3.1.2 with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of paragraphs 9.8 and 11.3.
- 4.3.3.2 CONTRACTOR shall not be entitled to any adjustment in the Contract Price or Contract Times if:
  - 4.3.3.2.1 CONTRACTOR knew of the existence of such conditions at the time CONTRACTOR made a final commitment to OWNER in respect of Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
  - 4.3.3.2.2 the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for CONTRACTOR prior to CONTRACTOR's making such final commitment; or
  - 4.3.3.2.3 CONTRACTOR failed to give the written notice within the time and as required by paragraph 4.3.1.
- 4.3.3.3 If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefore as provided in paragraph 10.5. However, OWNER, ENGINEER, and ENGINEER's consultants shall not be liable to CONTRACTOR for any claims, costs, losses, or damages (including but not limited to all fees and charges of ENGINEERS, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by CONTRACTOR on or in connection with any other project or anticipated project.

#### 4.4 Underground Facilities

- 4.4.1 Shown or Indicated: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to OWNER or ENGINEER by the OWNERS of such Underground Facilities, including OWNER, or by others.
  - 4.4.1.1 OWNER and ENGINEER shall not be responsible for the accuracy or completeness of any such information or data; and
  - 4.4.1.2 the cost of all of the following will be included in the Contract Price, and CONTRACTOR shall have full responsibility for:
    - 4.4.1.2.1 reviewing and checking all such information and data.
    - 4.4.1.2.2 locating all Underground Facilities shown or indicated in the Contract Documents.
    - 4.4.1.2.3 coordination of the Work with the OWNERS of such Underground Facilities, including OWNER, during construction and
    - 4.4.1.2.4 the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.
- 4.4.2 Not Shown or Indicated
  - 4.4.2.1 If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated reasonable accuracy in the Contract Documents, CONTRACTOR shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as

required by paragraph 6.16.1), identify the OWNER of such Underground Facility and give written notice to that OWNER and to OWNER and ENGINEER. ENGINEER will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility.

- 4.4.2.2 If ENGINEER concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that CONTRACTOR did not know of and could not reasonably have been expected to be aware of or to have anticipated. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, OWNER or CONTRACTOR may make a Claim therefore as provided in paragraph 10.5.

#### 4.5 Reference Points

- 4.5.1 OWNER shall provide engineering surveys to establish reference points for construction which in ENGINEER's judgment are necessary to enable CONTRACTOR to proceed with the Work. CONTRACTOR shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of OWNER. CONTRACTOR shall report to ENGINEER whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

#### 4.6 Hazardous Environmental Condition at Site

- 4.6.1 Reports and Drawings: Reference is made to these General Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the site, if any, that have been utilized by the ENGINEER in the preparation of the Contract Documents.
- 4.6.2 Limited Reliance by CONTRACTOR on Technical Data Authorized: CONTRACTOR may rely upon the general accuracy of the technical data contained in such reports and drawings, but such reports and drawings are not Contract Documents. Except for such reliance on such "technical data", CONTRACTOR may not rely upon or make any Claim against OWNER, ENGINEER or any of ENGINEER's Consultants with respect to:
- 4.6.2.1 the completeness of such reports and drawings for CONTRACTOR's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by CONTRACTOR and safety precautions and programs incident thereto; or
- 4.6.2.2 other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
- 4.6.2.3 any CONTRACTOR interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.
- 4.6.3 CONTRACTOR shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. CONTRACTOR shall be responsible for a Hazardous Environmental Condition

created with any materials brought to the Site by CONTRACTOR, Subcontractors, Suppliers, or anyone else for whom CONTRACTOR is responsible.

- 4.6.4 If CONTRACTOR encounters a Hazardous Environmental Condition or if CONTRACTOR or anyone for whom CONTRACTOR is responsible creates a Hazardous Environmental Condition, CONTRACTOR shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by paragraph 6.16); and (iii) notify OWNER and ENGINEER (and promptly thereafter confirm such notice in writing). OWNER shall promptly consult with ENGINEER concerning the necessity for OWNER to retain a qualified expert to evaluate such condition or take corrective action, if any.
- 4.6.5 CONTRACTOR shall not be required to resume Work in connection with such condition or in any affected area until after OWNER has obtained any required permits related thereto and delivered to CONTRACTOR written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If OWNER and CONTRACTOR cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by CONTRACTOR, either party may make a Claim therefore as provided in paragraph 10.5.
- 4.6.6 If after receipt of such written notice CONTRACTOR does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then OWNER may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If OWNER and CONTRACTOR cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefore as provided in paragraph 10.5. OWNER may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.0.
- 4.6.7 To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, Engineer's Consultants, and the officers, directors, partners, employees, agents, other consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of Engineers, architects, attorneys, and other professionals and all court of arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by CONTRACTOR or by anyone for whom CONTRACTOR is responsible. Nothing in this paragraph 4.6.6 shall obligate CONTRACTOR to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

4.6.7.1 The provisions of paragraphs 4.2, 4.3, and 4.4 are not intended to apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

## **ARTICLE 5.0 – BONDS AND INSURANCE**

### **5.1 Performance and Payment Bonds**

- 5.1.1 Concurrent with execution of the Agreement and within ten days of the Notice of Award, the successful CONTRACTOR shall procure, execute, and deliver to the OWNER and maintain, at his own cost and expense, the following bonds, in the forms attached, of a surety company approved by the state in which the Work is being performed as a Surety:

- 5.1.1.1 Performance Bond - in an amount not less than 100% of the total amount payable to the CONTRACTOR by the terms of the Contract as security for the faithful performance of the Work. Bond must be valid until one year after the date of issuance of the Certificate of Substantial Completion.
- 5.1.1.2 Payment Bond - in an amount not less than 100% of the total amount payable to the CONTRACTOR by the terms of the Contract as security for the payment of all persons performing labor and furnishing material in connection with the Work. Bond must be valid until one year after the date of issuance of the Certificate of Substantial Completion.
- 5.1.2 All Bonds signed by an agent must be accompanied by a certified copy of the authority to act. Bonds shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department.
- 5.1.3 If the Surety on any Bond furnished by the CONTRACTOR is declared bankrupt or becomes insolvent or its right to do business in the state in which the Work is being performed is revoked, the CONTRACTOR shall, within ten days thereafter, substitute another Bond or Surety, both of which shall be acceptable to the OWNER.

## 5.2 Insurance Requirements

- 5.2.1 Wherever in this Article the terms "The Insured" and "OWNER" occur with respect to coverage in a policy, it shall mean the OWNER and its agent and agencies, all municipalities where Work is being performed under the Contract, the ENGINEER, and any other parties specifically designated herein, who shall be named as insured in each policy issued. The insurance policies required herein shall not contain any Third Party Beneficiary Exclusion.

The CONTRACTOR shall not commence Work under the Contract until he has obtained all insurance required under this Article and such insurance has been approved by the OWNER, nor shall the CONTRACTOR allow any Subcontractor to commence Work on his subcontract until all similar insurance required of the Subcontractor has been so obtained and approved.

Provision of some types of insurance by a Subcontractor may be waived, at the option of the OWNER, where it is deemed that adequate coverage is provided by the CONTRACTOR's insurance. Subcontractors must, in all cases, provide Workmen's Compensation and Employer's Liability Insurance and Motor Vehicle Liability Insurance.

One copy of each such insurance policy and certificates indicating each type of coverage mentioned, and the correlation between the insurance furnished and that required, shall be filed with each of The Insured.

All policies relating to this Contract shall be so written that each of The Insured shall be notified by the carrier of cancellation or change at least 30 days prior to the effective date of such cancellation or change. Renewal certificates covering the renewal of all policies expiring during the life of the Contract shall be filed with each of The Insured not less than 30 days before the expiration of such policies.

Contractor shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and furnished. The insurance shall provide protection from claims set forth herein which may arise out of or result from Contractor's performance and furnishing of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed or furnished by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform or furnish any of the Work, or by anyone for whose acts any of them may be liable:

- a. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
- b. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
- c. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
- d. claims for damages insured by personal injury liability coverage which are sustained: (1) by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or (2) by any other person for any other reason;
- e. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting there from; and
- f. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle.

### 5.3 General Insurance Requirements

#### 5.3.1 The insurance required to be purchased and maintained by Contractor shall

- a. include at least the specific coverages and be written for not less than the limits of liability specified herein or required by Laws or Regulations, whichever is greater;
- b. include completed operations insurance;
- c. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.12, 6.16, and 6.31 through 6.33 of the General Conditions;
- d. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 30 days' prior written notice has been given to Owner and Engineer;
- e. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work;

- f. with respect to completed operations insurance, and any other insurance coverage written on a claims-made basis, remain in effect for at least 2 years after final payment (and Contractor shall furnish Owner and Engineer evidence satisfactory to Owner of continuation of such insurance at final payment and one year thereafter);
- g. contain a cross liability or severability of interest clause or endorsement. Insurance covering the specified additional insured shall be primary insurance, and all other insurance carried by the additional insured shall be excess insurance; and
- h. with respect to workers' compensation and employers' liability, comprehensive automobile liability, commercial general liability, and umbrella liability insurance, Contractor shall require its insurance carriers to waive all rights of subrogation against Owner, Engineer, and their respective officers, directors, partners, employees, and agents.

5.3.2 Workers' Compensation and Employers' Liability Insurance. This insurance shall protect Contractor against all claims under applicable state workers' compensation laws. Contractor shall also be protected against claims for injury, disease, or death of employees which, for any reason, may not fall within the provisions of a workers' compensation law. This policy shall include an "all states" or "other states" endorsement. The liability limits shall be not less than:

|                       |                             |
|-----------------------|-----------------------------|
| Workers' compensation | Statutory                   |
| Employers' liability  | \$1,000,000 each occurrence |

5.3.3 Comprehensive Automobile Liability Insurance. This insurance shall be occurrence type written in comprehensive form and shall protect Contractor, and Owner, and Engineer as additional insured, against all claims for injuries to members of the public and damage to property of others arising from the use of motor vehicles, either on or off the project site whether they are owned, non-owned, or hired. The liability limits shall be not less than:

|                                   |   |
|-----------------------------------|---|
| Bodily injury and property damage | \$1,000,000 combined single limit for each occurrence |
|-----------------------------------|---|

5.3.4 Commercial General Liability Insurance. This insurance shall be occurrence type written in comprehensive form and shall protect Contractor, and Owner, and Engineer as additional insured, against claims arising from injuries, sickness, disease, or death of any person or damage to property arising out of performance of the Work. The policy shall also include personal injury liability coverage, contractual liability coverage, completed operations and products liability coverage, and coverage for blasting, explosion, collapse of buildings, and damage to underground property. The liability limits shall be not less than:

|                                   |  |
|-----------------------------------|--|
| Bodily injury and property damage | \$1,000,000 combined single limit for each occurrence<br>\$1,000,000 general aggregate |
|-----------------------------------|--|

5.3.5 **Umbrella Liability Insurance.** This insurance shall protect Contractor, and Owner, and Engineer as additional insured, against claims in excess of the limits provided under workers' compensation and employers' liability, comprehensive automobile liability, and commercial general liability policies. The umbrella policy shall follow the form of the primary insurance, including the application of the primary limits. The liability limits shall be not less than:

|                                   |  |
|-----------------------------------|--|
| Bodily injury and property damage | \$4,000,000 combined single limit for each occurrence<br>\$4,000,000 general aggregate |
|-----------------------------------|--|

5.3.6 **Owner's Protective Liability Insurance.** This insurance shall be issued in the name of Owner and shall protect and defend Owner against claims arising as a result of the operations of Contractor or Contractor's Subcontractors. The liability limits shall be not less than:

|                                   |  |
|-----------------------------------|--|
| Bodily injury and property damage | \$1,000,000 combined single limit for each occurrence<br>\$1,000,000 general aggregate |
|-----------------------------------|--|

5.37 **Property Insurance.** Contractor shall purchase and maintain property insurance coverage for the Work at the site in the amount of the full replacement cost thereof. This insurance shall:

- a. include the interests of Owner, Contractor, Subcontractors, Engineer, and Engineer's Consultants, each of whom is deemed to have an insurable interest and shall be listed as a named insured;
- b. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false-work, Work in transit including ocean transit, and Work in storage at the project site or at another location acceptable to Owner, and shall insure against at least the following perils: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, and damage caused by frost and freezing;
- c. cover, in an amount not less than \$100,000, the Owner-furnished equipment and materials to be erected or installed by Contractor;
- d. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects); and
- e. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer, with 30 days' written notice to each other insured.

If Owner requests in writing that other special insurance be included in the property insurance provided by Contractor, Contractor shall, if possible, include such insurance, and the cost thereof will be charged to Owner by appropriate Change Order or Written Amendment. Prior to

commencement of the Work at the site, Contractor shall in writing advise Owner whether or not such other special insurance has been procured by Contractor.

#### 5.4 Other Insurance Requirements

- 5.4.1 If any of the property and casualty insurance requirements are not complied with at their renewal dates, payments to the CONTRACTOR will be withheld until these requirements have been met, or at the option of the OWNER, the OWNER may pay the renewal premiums and withhold such payments from any monies due to the CONTRACTOR.
- 5.4.2 In the event that claims in excess of the insured amounts provided herein are filed by reason of any operations under the Contract, the amount of excess of such claims, or any portion thereof, may be withheld from payment due or to become due the CONTRACTOR until such time as the CONTRACTOR shall furnish such additional security covering such claims as may be determined by the OWNER.
- 5.4.3 All policies and certificates of insurance of the CONTRACTOR shall contain the following clauses:
  - 5.4.3.1 insurers shall have no right of recovery or subrogation against the OWNER and its agents and agencies and the ENGINEER, it being the intention of the parties that the insurance policies so effected shall protect both parties and be primary coverage for any and all losses covered by the above-described insurance.
  - 5.4.3.2 the clause "other insurance provisions" in a policy in which the OWNER and its agents and agencies and the ENGINEER is named as an insured, shall not apply to these parties.
  - 5.4.3.3 the insurance companies issuing the policy or policies shall have no recourse against the OWNER and its agents and agencies and the ENGINEER, for the payment of any premiums or for assessments under any form of policy.
  - 5.4.3.4 any and all deductibles in the above-described insurance policies shall be assumed by and be for the amount of, and at the sole risk of the CONTRACTOR.

### **ARTICLE 6.0 - CONTRACTOR'S RESPONSIBILITIES**

#### 6.1 Supervision and Superintendence

- 6.1.1 CONTRACTOR shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction, but CONTRACTOR shall not be responsible for the negligence of OWNER or ENGINEER in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents. CONTRACTOR shall be responsible to see that the complete Work complies accurately with the Contract Documents.
- 6.1.2 At all times during the progress of the Work, CONTRACTOR shall assign a competent resident superintendent thereto who shall not be replaced without written notice to OWNER and ENGINEER except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the Site and shall have authority to act on behalf of CONTRACTOR. All communications given to or received from the superintendent shall be binding on CONTRACTOR.

## 6.2 Labor; Working Hours

- 6.2.1 CONTRACTOR shall provide competent, suitably qualified personnel to survey, layout, and construct the Work as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the Site.
- 6.2.2 Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, and CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday, or any legal holiday without OWNER's written consent (which will not be unreasonably withheld) given after prior written notice to ENGINEER.

## 6.3 Services, Materials, and Equipment

- 6.3.1 Unless otherwise specified in the General Requirements, CONTRACTOR shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing start-up, and completion of the Work.
- 6.3.2 All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for by the Specifications shall expressly run to the benefit of OWNER. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

## 6.4 Progress Schedule

- 6.4.1 CONTRACTOR shall adhere to the progress schedule established in accordance with paragraph 2.7 as it may be adjusted from time to time as provided below.
  - 6.4.1.1 CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in paragraph 2.7) proposed adjustments in the progress schedule that will not result in changing the Contract Times (or Milestones). Such adjustments will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.
  - 6.4.1.2 Proposed adjustments in the progress schedule that will change the Contract Times (or Milestones) shall be submitted in accordance with the requirements of Article 12.0. Such adjustments may only be made by a Change Order or Written Amendment in accordance with Article 12.0.

## 6.5 Substitutes and "Or-Equals"

- 6.5.1 Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item equipment or material or equipment of other Suppliers may be submitted to ENGINEER for review under the circumstances

described below.

6.5.1.1 "Or-Equal" Items: If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by ENGINEER as an "or-equal" item, in which case review and approval of the proposed item may, in ENGINEER's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this paragraph 6.5.1.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

- 6.5.1.1.1 in the exercise of reasonable judgment ENGINEER determines that:
  - (i) it is at least equal in quality, durability, appearance, strength, and design characteristics; (ii) it will reliably perform at least equally well the function imposed by the design concept of the completed Project as a functioning whole, and;
- 6.5.1.1.2 CONTRACTOR certifies that: (i) there is no increase in cost to the OWNER; and (ii) it will conform substantially, even with deviations, to the detailed requirements of the item named in the Contract Documents.

#### 6.5.1.2 Substitute Items

- 6.5.1.2.1. If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR does not qualify as an "or-equal" item under paragraph 6.5.1.1, it will be considered a proposed substitute item.
- 6.5.1.2.2 CONTRACTOR shall submit sufficient information as provided below to allow ENGINEER to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute. Such information on items of material or equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR.
- 6.5.1.2.3 The procedure for review by ENGINEER will be as set forth in paragraph 6.5.1.2.4, as supplemented in the General Requirements and as ENGINEER may decide is appropriate under the circumstances.
- 6.5.1.2.4 CONTRACTOR shall first make written application to ENGINEER for review of a proposed substitute item of material or equipment that CONTRACTOR seeks to furnish or use. The application shall certify that the proposed substitute item will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified, and be suited to the same use as that specified. The application will state the extent, if any, to which the use of the proposed substitute item will prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not use of a proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) to adapt the design to the proposed substitute item and whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute item from that specified will be identified in the application, and available engineering, sales, maintenance, repair, and replacement services will be indicated. The application will also contain an itemized

estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other CONTRACTORS affected by any resulting change, all of which will be considered by ENGINEER in evaluating the proposed substitute item. ENGINEER may require CONTRACTOR to furnish additional data about the proposed substitute item.

- 6.5.2 Substitute Construction Methods or Procedures: If a specific means, method, technique, sequence, or procedure of construction is shown or indicated in and expressly required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by ENGINEER. CONTRACTOR shall submit sufficient information to allow ENGINEER, in ENGINEER's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The procedure for review by ENGINEER will be similar to that provided in subparagraph 6.5.1.2.
  - 6.5.3 ENGINEER's Evaluation: ENGINEER will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to paragraphs 6.5.1 and 6.5.2. ENGINEER will be the sole judge of acceptability. No "or-equal" or substitute will be ordered, installed or utilized until ENGINEER's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or equal". ENGINEER will advise CONTRACTOR in writing of any negative determination.
  - 6.5.4 Special Guarantee: OWNER may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety with respect to any substitute.
  - 6.5.5 CONTRACTOR's Expense: CONTRACTOR shall provide all data in support of any proposed substitute for "or-equal" at CONTRACTOR's expense.
- 6.6 Concerning Subcontractors, Suppliers, and Others
- 6.6.1 CONTRACTOR shall not employ any Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, against whom OWNER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.
  - 6.6.2 Within ten days after Notice of Award has been issued, the CONTRACTOR shall furnish to the ENGINEER a list of subcontractors, suppliers, or other persons or organizations who will participate in the Work or furnish principal items of materials and equipment to be utilized in the Work. The list shall include the subcontractors, suppliers, or other persons or organizations indicated on the Bid Form. Within ten days after receipt of the list but prior to the Effective Date of the Agreement, the ENGINEER shall notify the CONTRACTOR in writing if the ENGINEER (or OWNER) has reasonable objection to any subcontractor, suppliers, or other person or organization on the list. Failure by the ENGINEER to object to anyone on the list within the specified time shall constitute acceptance of the subcontractor, supplier, or other person or organization. Acceptance of a subcontractor, supplier, other person or organization named shall not constitute a waiver of the requirements of the contract specifications or the right of the OWNER or ENGINEER to reject defective work. If the ENGINEER (or OWNER) has a reasonable objection as described above, the CONTRACTOR may either (1) submit an acceptable substitute without an increase in his Bid price, or (2) withdraw his Bid without forfeiting his Bid security.

- 6.6.3 CONTRACTOR shall be fully responsible to OWNER and ENGINEER for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between OWNER or ENGINEER and any such Subcontractor, Supplier or other individual or entity, nor shall it create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations. OWNER or ENGINEER may furnish to any such Subcontractor, Supplier, or other individual or entity to the extent practicable, information about amounts paid to CONTRACTOR on account of Work performed for CONTRACTOR by a particular Subcontractor, Supplier, or other individual or entity.
- 6.6.4 CONTRACTOR shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR.
- 6.6.5 CONTRACTOR shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with ENGINEER through CONTRACTOR.
- 6.6.6 The divisions and sections of the Specifications and the identifications of any Drawings shall not control CONTRACTOR in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- 6.6.7 All Work performed for CONTRACTOR by a Subcontractor shall be pursuant to an appropriate agreement between the CONTRACTOR and Subcontractor. The Subcontractor shall not commence Work until the CONTRACTOR has obtained all insurance as required by Article 5.0, inclusive.
- 6.6.8 The CONTRACTOR shall not subcontract more than 50 percent of the Contract price without prior written approval of the OWNER.
- 6.7 Patent Fees and Royalties
- 6.7.1 CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of OWNER or ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by OWNER in the Contract Documents. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees or agents, and other consultants of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of ENGINEERS, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

## 6.8 Permits

- 6.8.1 CONTRACTOR shall obtain and pay for all construction permits and licenses. OWNER shall assist CONTRACTOR, when necessary, in obtaining such permits and licenses. CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. CONTRACTOR shall pay all charges of utility OWNERS for connection to the Work.

## 6.9 Laws and Regulations

- 6.9.1 CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither OWNER nor ENGINEER shall be responsible for monitoring CONTRACTOR's compliance with any Laws or Regulations.
- 6.9.2 If CONTRACTOR observes that the Specifications or Drawings are at variance with any Laws or Regulations, he shall give ENGINEER prompt written notice thereof. If CONTRACTOR performs any Work knowing it to be contrary to such Laws or Regulations, and without such notice to ENGINEER, he shall bear all costs arising there from. The CONTRACTOR shall, at all times, observe and comply with and shall cause all his agents and employees and all his Subcontractors to observe and comply with all such existing Laws or Regulations, and shall protect and indemnify the OWNER and the ENGINEER and the municipalities in which Work is being performed, and their officers and agents against any claim or liability arising from or based on the violation of any such Law or Regulation, whether by himself or his employees or any of his Subcontractors.
- 6.9.3 Changes in Laws or Regulations not adopted or in effect at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work may be the subject of an adjustment in Contract Price or Contract Times. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefore as provided in paragraph 10.5.

## 6.10 Taxes

- 6.10.1 CONTRACTOR shall pay all sales, consumer, use, and other similar taxes required to be paid by CONTRACTOR in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work. A listing of sales tax paid for the period shall be submitted with each Progress Payment

## 6.11 Use of Site and Other Areas

- 6.11.1 Limitation on Use of Site and Other Areas
- 6.11.1.1 CONTRACTOR shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
- 6.11.1.2 Should any claim be made by any such owner or occupant because of the performance of the work, CONTRACTOR shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or

- other dispute resolution proceeding or at law.
- 6.11.1.3 To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultant, and the officers, directors, partners, employees, agents, and other consultants of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of ENGINEER's, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such OWNER or occupant against OWNER, ENGINEER, or any other party indemnified hereunder to the extent caused by or based upon CONTRACTOR's performance of the Work.
- 6.11.2 Removal of Debris During Performance of the Work: During the progress of the Work CONTRACTOR shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris, Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
- 6.11.3 Cleaning: Prior to Substantial Completion of the Work CONTRACTOR shall clean the Site and make it ready for utilization by OWNER. At the completion of the Work CONTRACTOR shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus material and shall restore to original condition all property not designated for alteration by the Contract Documents.
- 6.11.4 Loading Structures: CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall CONTRACTOR subject any part of the Work or adjacent property to stresses or pressures that will endanger it.
- 6.12 Record Documents
- 6.12.1 CONTRACTOR shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to ENGINEER for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to ENGINEER for OWNER. CONTRACTOR is advised that failure to furnish the ENGINEER with accurate and detailed record drawings shall be reason for withholding final payment.
- 6.13 Safety and Protection
- 6.13.1 CONTRACTOR shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
- 6.13.1.1 all persons on the Site or who may be affected by the Work;
- 6.13.1.2 all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
- 6.13.1.3 other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

- 6.13.2 CONTRACTOR shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property. All damage, injury, or loss to any property referred to in paragraph 6.13.1.2 or 6.13.1.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of OWNER or ENGINEER or ENGINEER's Consultant, or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable directly or indirectly, in whole or in part, to the fault or negligence of CONTRACTOR or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them). CONTRACTOR's duties and responsibilities for safety and for protection of the work shall continue until such time as all the Work is completed and ENGINEER has issued a notice to OWNER and CONTRACTOR in accordance with paragraph 14.7.2 that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).
- 6.14 Safety Representative
- 6.14.1 CONTRACTOR shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.
- 6.15 Hazard Communication Programs
- 6.15.1 CONTRACTOR shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.
- 6.16 Emergencies
- 6.16.1 In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, CONTRACTOR is obligated to act to prevent threatened damage, injury, or loss. CONTRACTOR shall give ENGINEER prompt written notice if CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If ENGINEER determines that a change in the Contract Documents is required because of the action taken by CONTRACTOR in response to such an emergency, a Work Change Directive or Change Order will be issued.
- 6.17 Shop Drawings and Samples
- 6.17.1 CONTRACTOR shall submit Shop Drawings to ENGINEER for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals. CONTRACTOR shall submit four copies of all shop drawings plus the number required for use by the ENGINEER. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show ENGINEER the services, materials, and equipment

CONTRACTOR proposes to provide and to enable ENGINEER to review the information for the limited purposes required by paragraph 6.17.5.

- 6.17.2 CONTRACTOR shall also submit Samples to ENGINEER for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals. Each Sample will be identified clearly as to material, Supplier, pertinent data such as catalog numbers, and the use for which intended and otherwise as ENGINEER may require to enable ENGINEER to review the submittal for the limited purposes required by paragraph 6.17.5. CONTRACTOR shall submit three samples plus the number required to be returned to the CONTRACTOR for each sample required.
- 6.17.3 Where a Shop Drawing or Sample is required by the Contract Documents or the schedule of Shop Drawings and Sample submittals acceptable to ENGINEER as required by paragraph 2.7, any related Work performed prior to ENGINEER's review and approval of the pertinent submittal will be at the sole expense and responsibility of CONTRACTOR

#### 6.17.4 Submittal Procedures

- 6.17.4.1 Before submitting each Shop Drawing or Sample, CONTRACTOR shall have determined and verified:
- 6.17.4.1.1 all field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
  - 6.17.4.1.2 all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;
  - 6.17.4.1.3 all information relative to means, methods, techniques, sequences, and procedures of construction and safety precautions and programs incident thereto; and
  - 6.17.4.1.4 CONTRACTOR shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
  - 6.17.4.1.5 each Shop Drawing submitted to the ENGINEER must be accompanied by a transmittal which references the applicable section(s) of the specifications. In addition, each Shop Drawing shall be numbered in the order of submittal sequence. All submittals called for in the specifications shall be submitted in the number of copies as indicated in the Contract Documents.
- 6.17.4.2 Each submittal shall bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's obligations under the Contract Documents with respect to CONTRACTOR's review and approval of that submittal.
- 6.17.4.3 At the time of each submittal, CONTRACTOR shall give ENGINEER specific written notice of such variations, if any, that the Shop Drawing or Sample submitted may have from the requirements of the Contract Documents, such notice to be in a written communication separate from the submittal; and, in addition, shall cause a specific notation to be made on each Shop Drawing and Sample submitted to ENGINEER for review and approval of each such variation.

#### 6.17.5 ENGINEER's Review

- 6.17.5.1 ENGINEER will timely review and approve Shop Drawings and Samples in accordance with the schedule of Shop Drawings and Sample submittals acceptable to ENGINEER. ENGINEER's review and approval will be only to

- determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
- 6.17.5.2 ENGINEER's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
- 6.17.5.3 ENGINEER's review and approval of Shop Drawings or Samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of each submittal as required by paragraph 6.17.4.3 and ENGINEER, has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for complying with the requirements of paragraph 6.17.4.1.
- 6.17.6 Resubmittal Procedures
- 6.17.6.1 CONTRACTOR shall make corrections required by ENGINEER and shall return the required number of corrected copies of Shop Drawings and submit as required new Samples for review and approval. CONTRACTOR shall direct specific attention in writing to revision other than the corrections called for by ENGINEER on previous submittals.
- 6.18 Continuing the Work
- 6.18.1 CONTRACTOR shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with OWNER. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by paragraph 15.4 or as OWNER and CONTRACTOR may otherwise agree in writing.
- 6.19 CONTRACTOR's General Warranty and Guarantee
- 6.19.1 CONTRACTOR warrants and guarantees to OWNER, ENGINEER, and ENGINEER's Consultants that all Work will be in accordance with the Contract Documents and will not be defective. CONTRACTOR's warranty and guarantee hereunder excludes defects or damage caused by:
- 6.19.1.1 abuse, modification, or improper maintenance or operation by persons other than CONTRACTOR, Subcontractors, Suppliers, or any other individual or entity for whom CONTRACTOR is responsible; or
- 6.19.1.2 normal wear and tear under normal usage.
- 6.19.2 CONTRACTOR's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents:
- 6.19.2.1 observations by ENGINEER;

- 6.19.2.2 recommendation by ENGINEER or payment by OWNER of any progress or final payment;
- 6.19.2.3 the issuance of a certificate of Substantial Completion by ENGINEER or any payment related thereto by OWNER;
- 6.19.2.4 use or occupancy of the Work or any part thereof by OWNER;
- 6.19.2.5 any acceptance by OWNER or any failure to do so;
- 6.19.2.6 any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by ENGINEER;
- 6.19.2.7 any inspection, test, or approval by others; or
- 6.19.2.8 any correction of defective Work by OWNER.

## 6.20 Indemnification

- 6.20.1 To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of ENGINEER's, architects, attorneys, and other professionals and all court of arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage:
  - 6.20.1.1 is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting there from; and
  - 6.20.1.2 is caused in whole or in part by any negligent act or omission of CONTRACTOR, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not caused in part by any negligence or omission of an individual or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws and Regulations regardless of the negligence of any such individual or entity.
- 6.20.2 In any and all claims against OWNER or ENGINEER or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of CONTRACTOR, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 6.20.1 shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for CONTRACTOR or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- 6.20.3 Nothing in the Contract Documents shall create or give to third parties any claim or right of action against the CONTRACTOR, the OWNER or the ENGINEER beyond such as may legally exist irrespective of the Contract.

## 6.21 Operation and Maintenance Manuals

- 6.21.1 CONTRACTOR shall submit two copies of Operation and Maintenance Manuals for all equipment for review. Upon receipt of approval, six complete sets must be provided. No equipment may be placed into service until the approved manuals are received by the ENGINEER. Instruction manuals shall list all of the equipment specified in this and other sections of the Specifications and shall include equipment serial numbers, design data,

operating instructions, maintenance instructions, lubrication instructions, piping, wiring and control diagrams, assembly drawings showing location of parts, part numbers and spare parts list.

## **ARTICLE 7.0 - OTHER WORK**

### **7.1 Related Work at Site**

7.1.1 OWNER may perform other work related to the Project at the Site by OWNER's employees, or let other direct contracts therefore, or have other work performance by utility owner. If such other work is not noted in the Contract Documents, then:

7.1.1.1 written notice thereof will be given to CONTRACTOR prior to starting any such other work; and

7.1.1.2 if OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefore as provided in paragraph 10.5.

7.1.2 CONTRACTOR shall afford each other CONTRACTOR who is a party to such a direct contract and each utility owner (and OWNER, if OWNER is performing the other work with OWNER's employees) proper and safe access to the Site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work and shall properly coordinate the Work with theirs. Unless otherwise provided in the Contract Documents, CONTRACTOR shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. CONTRACTOR shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of ENGINEER and the others whose work will be affected. The duties and responsibility of CONTRACTOR under this paragraph are for the benefit of such utility owners and other CONTRACTORS to the extent that there are comparable provisions for the benefit of CONTRACTOR in said direct contracts between OWNER and such utility owners and other CONTRACTORS.

7.1.3 If the proper execution or results of any part of CONTRACTOR's Work depends upon work performed by others under this Article 7.0, CONTRACTOR shall inspect such other work and promptly report to ENGINEER in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of CONTRACTOR's Work. CONTRACTOR's failure to so report will constitute an acceptance of such other work as fit and proper for integration with CONTRACTOR's Work except for latent defects and deficiencies in such other work.

### **7.2 Coordination**

7.2.1 If OWNER intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth:

7.2.1.1 the individual or entity who will have authority and responsibility for coordination of the activities between the various CONTRACTORS will be identified;

7.2.1.2 the specific matters to be covered by such authority and responsibility will be itemized; and

7.2.1.3 the extent of such authority and responsibilities will be provided.

7.2.2 OWNER shall have sole authority and responsibility for such coordination.

## **ARTICLE 8.0 - OWNER'S RESPONSIBILITIES**

### **8.1 Communications to CONTRACTOR**

8.1.1 Except as otherwise provided in these General Conditions, OWNER shall issue all communications to CONTRACTOR through ENGINEER. .

### **8.2 Replacement of ENGINEER**

8.2.1 In case of termination of the employment of ENGINEER, OWNER shall appoint an ENGINEER to whom CONTRACTOR makes no reasonable objection, whose status under the Contract Documents shall be that of the former ENGINEER.

### **8.3 Furnish Data**

8.3.1 OWNER shall promptly furnish the data required of OWNER under the Contract Documents.

### **8.4 Pay Promptly When Due**

8.4.1 OWNER shall make payments to CONTRACTOR promptly when they are due as provided in paragraphs 14.2.3. and 14.7.3.

### **8.5 Lands and Easements; Reports and Tests**

8.5.1 OWNER's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.1 and 4.5. Paragraph 4.2 refers to OWNER identifying and making available to CONTRACTOR copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by ENGINEER in preparing the Contract Documents.

### **8.6 Insurance**

8.6.1 OWNER's responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.0.

### **8.7 Change Orders**

8.7.1 OWNER is obligated to execute Change Orders as indicated in paragraph 10.3.

### **8.8 Inspections, Tests, and Approvals**

8.8.1 OWNER's responsibility in respect to certain inspections, tests, and approvals is set forth in paragraph 13.3.2.

### **8.9 Limitations on OWNER's Responsibilities**

8.9.1 The OWNER shall not supervise, direct, or have control or authority over, nor be responsible for CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the performance

of the work. OWNER will not be responsible for CONTRACTOR's failure to perform the Work in accordance with the Contract Documents.

8.10 Undisclosed Hazardous Environmental Condition

8.10.1 OWNER's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in paragraph 4.6.

8.11 Evidence of Financial Arrangements

8.11.1 If and to the extent OWNER has agreed to furnish CONTRACTOR reasonable evidence that financial arrangements have been made to satisfy OWNER's obligations under the contract Documents, OWNER's responsibility in respect thereof will be as set forth in these General Conditions.

**ARTICLE 9.0 - ENGINEER'S STATUS DURING CONSTRUCTION**

9.1 OWNER's Representative

9.1.1 ENGINEER will be OWNER's representative during the construction period and his instructions shall be carried into effect promptly and efficiently.

9.2 Project Representative

9.2.1 ENGINEER will furnish a Resident Project Representative to assist ENGINEER in providing more extensive observation of the Work. The responsibilities and authority and limitations thereon of any such Resident Project Representative and assistants will be as provided in section 9.9.

9.3 Clarifications and Interpretations

9.3.1 The ENGINEER will furnish a Resident Project Representative (and assistants) to assist the ENGINEER in observing the performance of the Work. The Resident Project Representative will serve as the ENGINEER's liaison with the CONTRACTOR, working principally through the CONTRACTOR's superintendent to assist him in understanding the intent of the Contract Documents.

9.3.2 The Resident Project Representative shall conduct on-site observations of the Work in progress to confirm that the Work is proceeding in accordance with the Contract Documents. He will verify that tests, equipment and systems start-ups and operating and maintenance instructions are conducted as required by the Contract Documents. He will have the authority to disapprove or reject defective Work in accordance with Article 13.0.

9.3.3 Except upon written instruction of the ENGINEER, the Resident Project Representative:

9.3.3.1 Shall not authorize any deviation from the Contract Documents or approve any substitute materials or equipment.

9.3.3.2 Shall not exceed limitation of ENGINEER's authority as set forth in the Contract Documents.

9.3.3.3 Shall not undertake any of the responsibilities of CONTRACTOR, Subcontractors, or CONTRACTOR's superintendent, or expedite the Work.

9.3.3.4 Shall not advise on or issue directions relative to any aspect of the means, methods, techniques, sequences or procedures of construction unless such is specifically called for in the Contract.

9.3.3.5 shall not advise on or issue directions as to safety precautions and programs in connection with the Work.

#### 9.4 Authorized Variations in Work

9.4.1 ENGINEER may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on OWNER and also on CONTRACTOR, who shall perform the Work involved promptly. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of a Field Order, a Claim may be made therefore as provided in paragraph 10.5.

#### 9.5 Rejecting Defective Work

9.5.1 ENGINEER will have authority to disapprove or reject Work which ENGINEER believes to be defective, or that ENGINEER believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. ENGINEER will also have authority to require special inspection or testing of the Works provided in paragraph 13.4, whether or not the Work is fabricated, installed, or completed.

#### 9.6 Shop Drawings, Change Orders and Payments

9.6.1 In connection with ENGINEER's authority as to Shop Drawings and Samples, see paragraph 6.17.

9.6.2 In connection with ENGINEER's authority as to Change Orders, see Articles 10.0, 11.0, and 12.0.

9.6.3 In connection with ENGINEER's authorities to Applications for Payment, see Article 14.0.

#### 9.7 Determinations for Unit Price Work

9.7.1 ENGINEER will determine the actual quantities and classifications of Unit Price Work performed by CONTRACTOR. ENGINEER will review with CONTRACTOR the ENGINEER's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). ENGINEER's written decision thereon will be final and binding (except as modified by ENGINEER to reflect changed factual conditions or more accurate data) upon OWNER and CONTRACTOR, subject to the provisions of paragraph 10.5.

#### 9.8 Decisions on Requirements of Contract Documents and Acceptability of Work

9.8.1 ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work there under. Claims, disputes and other matters relating to the acceptability of the Work, the quantities and classifications of Unit Price Work, the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, and Claims seeking changes in the Contract Price or Contract

Times will be referred to ENGINEER in writing, in accordance with the provisions of paragraph 10.5, with a request for a formal decision.

- 9.8.2 The rendering of a decision by ENGINEER pursuant to this paragraph 9.8 with respect to any such Claim, dispute, or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.7) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such Claim, dispute, or other matter.

## 9.9 Limitations on ENGINEER's Authority and Responsibilities

- 9.9.1 Neither ENGINEER's authority or responsibility under this Article 9.0 or under any other provision of the Contract Documents nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by ENGINEER shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.
- 9.9.2 ENGINEER will not supervise, direct, contract, or have authority over or be responsible for CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the performance of the Work. ENGINEER will not be responsible for CONTRACTOR's failure to perform the Work in accordance with the Contract Documents.
- 9.9.3 ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- 9.9.4 ENGINEER's review of the final Application for Payment and accompanying documentation and all maintenance and operating instruction, schedules, guarantees, Bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by paragraph 14.7.1 will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with the Contract Documents
- 9.9.5 The limitations upon authority and responsibility set forth in this section 9.9 shall also apply to ENGINEER's Consultants, Resident Project Representative, and assistants.

## 10.1 Authorized Changes in the Work

- 10.1.1 Without invalidating the Agreement and without notice to any surety, OWNER may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Written Amendment, a Change Order, or a Work Change Directive. Upon receipt of any such document, CONTRACTOR shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- 10.1.2 If OWNER and CONTRACTOR are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefore as provided in paragraph 10.5.

## 10.2 Unauthorized Change in the Work

10.2.1 CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in paragraph 3.4, except in the case of an emergency as provided in paragraph 6.16 or in the case of uncovering Work as provided in paragraph 13.4.2.

## 10.3 Execution of Change Orders

10.3.1 OWNER and CONTRACTOR shall execute appropriate Change Orders recommended by ENGINEER (or Written Amendments) covering:

10.3.1.1 changes in the Work which are: (i) ordered by OWNER pursuant to paragraph 10.1.1, (ii) required because of acceptance of defective Work under paragraph 13.8.1 or OWNER's correction of defective Work under paragraph 13.9, or (iii) agreed to by the parties;

10.3.1.2 changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

10.3.1.3 changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 10.5; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, CONTRACTOR shall carry on the Work and adhere to the progress schedule as provided in paragraph 6.18.1.

## 10.4 Notification to Surety

10.4.1 If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be CONTRACTOR's responsibility. The amount of each applicable Bond will be adjusted to reflect the effect of any such change.

## 10.5 Claims and Disputes

10.5.1 Notice: Written notice stating the general nature of each Claim, dispute, or other matter shall be delivered by the claimant to ENGINEER promptly (but in no event later than 30 days) after the start of the event giving rise thereto. Notice of the amount or extent of the Claim, dispute, or other matter with supporting data shall be delivered to the ENGINEER within 60 days after the start of such event (unless ENGINEER allows additional time for claimant to submit additional or more accurate data in support of such Claim, dispute, or other matter). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of paragraph 12.1.2. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of paragraph 12.2.2. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to ENGINEER and the claimant within 30 days after receipt of the claimant's last submittal (unless ENGINEER allows additional time).

10.5.2 ENGINEER's Decision: ENGINEER will render a formal decision in writing within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing

party, if any. ENGINEER's written decision on such Claim, dispute, or other matter will be final and binding upon OWNER and CONTRACTOR unless:

- 10.5.2.1 an appeal from ENGINEER's decision is taken within the time limits and in accordance with the dispute resolution procedures set forth in Article 16.0; or
  - 10.5.2.2 if no such dispute resolution procedures have been set forth in Article 16, a written notice of intention to appeal from ENGINEER's written decision is delivered by OWNER or CONTRACTOR to the other and to ENGINEER within 30 days after the date of such decision, and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction within 60 days after the date of such decision or within 60 days after Substantial Completion, whichever is later (unless otherwise agreed in writing by OWNER and CONTRACTOR), to exercise such rights or remedies as the appealing party may have with respect to such Claim, dispute, or other matter in accordance with applicable Laws and Regulations.
- 10.5.3 If ENGINEER does not render a formal decision in writing within the time stated in paragraph 10.5.2, a decision denying the claim in its entirety shall be deemed to have been issued 31 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any.
- 10.5.4 No Claim for an adjustment in Contract Price or Contract Times (or Milestones) will be valid if not submitted in accordance with this paragraph 10.5.

## **ARTICLE 11.0 - COST OF THE WORK; UNIT PRICE WORK**

### **11.1 Cost of the Work**

11.1.1 **Costs Included:** The term Cost of the Work means the sum of all costs necessarily incurred and paid by CONTRACTOR in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to CONTRACTOR will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by OWNER, such costs shall be in the amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in paragraph 11.1.2.

- 11.1.1.1 Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the Work under schedules of job classifications agreed upon by OWNER and CONTRACTOR. Such employees shall include without limitation superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, worker' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by OWNER.
- 11.1.1.2 cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to CONTRACTOR unless OWNER deposits funds with CONTRACTOR with

- which to make payments, in which case the cash discounts shall accrue to OWNER. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to OWNER, and CONTRACTOR shall make provisions so that they may be obtained.
- 11.1.1.3 Payments made by CONTRACTOR to Subcontractors for Work performed by Subcontractors and all subcontracts shall be subject to the provisions of the Contract Documents.
  - 11.1.1.4 Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
  - 11.1.1.5 Supplemental costs including the following:
    - 11.1.1.5.1 the proportion of necessary transportation, travel, and subsistence expenses of CONTRACTORS's employees incurred in discharge of duties connected with the Work.
    - 11.1.1.5.2 cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the OWNER, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of the CONTRACTOR.
    - 11.1.1.5.3 rentals of all construction equipment and machinery, whether rented from CONTRACTOR or others, shall be negotiated between the ENGINEER and the CONTRACTOR. These rates shall include all fuel, lubricants, insurance, etc. Equipment rental charges shall not exceed the prorated monthly rental rates listed in the current edition of the "Compilation of Rental Rates for Construction Equipment," as published by the Associated Equipment Distributors. Charges per hour shall be determined by dividing the monthly rates by 176. The rental of any such equipment and machinery shall close when the use thereof is no longer necessary for the Work.
    - 11.1.1.5.4 sales, consumer, use, and other similar taxes related to the Work, and for which CONTRACTOR is liable, imposed by Laws and Regulations.
    - 11.1.1.5.5 deposits lost for causes other than negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
    - 11.1.1.5.6 losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance of otherwise, sustained by CONTRACTOR in connection with the performance of the Work (except losses and damages with the deductible amounts of property insurance established in accordance with paragraph 5.6.4), provided such losses and damages have resulted from causes other than the negligence of CONTRACTOR, and Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of OWNER. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining CONTRACTOR's fee.
    - 11.1.1.5.7 the cost of utilities, fuel, and sanitary facilities at the Site.
    - 11.1.1.5.8 minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expressage, and similar petty cash items in connection with the Work.

- 11.1.1.5.9 when the Cost of the Work is used to determine the value of a Change Order or of a Claim, the cost of premiums for additional Bonds and insurance required because of the changes in the Work or caused by the event giving rise to the Claim.
- 11.1.1.5.10 when all the Work is performed on the basis of cost-plus, the costs of premiums for all Bonds and insurance CONTRACTOR is required by the Contract Documents to purchase and maintain.

11.1.2 Costs Excluded: The term Cost of the Work shall not include any of the following items:

- 11.1.2.1 Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnerships and sole proprietorships), general managers, engineers, architects, estimators, attorney, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed CONTRACTOR, whether at the Site or in CONTRACTOR's principal or branch office for general administration of the work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 11.1.1.1 or specifically covered by paragraph 11.1.1.4, all of which are to be considered administrative costs covered by the CONTRACTOR's fee.
- 11.1.2.2 Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the Site.
- 11.1.2.3 Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the Work and charges against CONTRACTOR for delinquent payments.
- 11.1.2.4 Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
- 11.1.2.5 Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraph 11.1.1 and 11.1.2.

11.1.3 CONTRACTOR's Fee: When all the Work is performed on the basis of cost-plus, CONTRACTOR's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, CONTRACTOR's fee shall be determined as set forth in paragraph 12.1.3.

11.1.4 Documentation: Whenever the Cost of the Work for any purpose is to be determined pursuant to paragraphs 11.1.1 and 11.1.2, CONTRACTOR will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

11.3 Unit Price Work

11.3.1 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 unit price 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 CONTRACTOR will be made by ENGINEER subject to the provisions of paragraph 9.8.

- 11.3.2 Each unit price will be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR's overhead and profit for each separately identified item.
- 11.3.3 OWNER or CONTRACTOR may make a Claim for an adjustment in the Contract Price in accordance with paragraph 10.5 if:
  - 11.3.3.1 the quantity of any item of Unit Price Work performed by CONTRACTOR differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
  - 11.3.3.2 there is no corresponding adjustment with respect any other item of Work; and
  - 11.3.3.3 if CONTRACTOR believes that CONTRACTOR is entitled to an increase in Contract Price as a result of having incurred additional expense or OWNER believes that OWNER is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

**ARTICLE 12.0 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES**

12.1 Change of Contract Price

- 12.1.1 The Contract Price may only be changed by a Changed Order or by a Written Amendment. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the ENGINEER and the other party to the Contract in accordance with provisions of paragraph 10.5.
- 12.1.2 The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:
  - 12.1.2.1 where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit price to the quantities of the items involved (subject to the provisions of paragraph 11.2); or
  - 12.1.2.2 where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with paragraph 12.1.3.2); or
  - 12.1.2.3 where the Work involved is not covered by unit price contained in the Contract Documents and agreement to a lump sum is not reached under paragraph 12.1.2.2, on the basis of the Cost of the Work (determined as provided in paragraph 11.1) plus a CONTRACTOR's fee for overhead and profit (determined a provided in paragraph 12.1.3).
- 12.1.3 CONTRACTOR's Fee; The CONTRACTOR's fee for overhead and profit shall be determined as follows:
  - 12.1.3.1 a mutually acceptable fixed fee; or
  - 12.1.3.2 if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
    - 12.1.3.2.1 for costs incurred under paragraphs 11.1.1.1 and 11.1.1.2, the CONTRACTOR's fee shall be 15 percent;
    - 12.1.3.2.2 for costs incurred under paragraph 11.1.1.3, the CONTRACTOR's fee shall be five percent;
    - 12.1.3.2.3 where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent

of paragraph 12.1.3.2. is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under paragraphs 11.1.1.1 and a11.1.1.2 and that any higher tier Subcontractor and CONTRACTOR will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

12.1.3.2.4 no fee shall be payable on the basis of costs itemized under paragraphs 11.1.1.4, 11.1.1.5, and 11.1.2;

12.1.3.2.5 the amount of credit to be allowed by CONTRACTOR to OWNER for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in CONTRACTOR's fee by an amount equal to five percent of such net decrease; and

12.1.3.2.6 when both additions and credit are involved in any one change; the adjustment in CONTRACTOR's fee shall be computed on the basis of the net change in accordance with paragraphs 12.1.3.2.1 through 12.1.3.2.5, inclusive.

## 12.2 Change of Contract Times

12.2.1 The Contract Times (or Milestones) may only be changed by a Change Order or by a Written Amendment. Any Claim for an adjustment in the Contract Times (or Milestones) shall be based on written notice submitted by the party making the claim to the ENGINEER and the other party to the Contract in accordance with the provisions of paragraph 10.5.

12.2.2 Any adjustment of the Contract Times (or Milestones) covered by a Change Order or of any Claim for an adjustment in the Contract Times (or Milestones) will be determined in accordance with the provisions of this Article 12.0.

## 12.3 Delays Beyond CONTRACTOR's Control

12.3.1 Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to the time lost due to such delay if a Claim is made therefore as provided in paragraph 12.2.1. Delays beyond the control of CONTRACTOR shall include, but not be limited to, acts or neglect by OWNER, acts or neglect of utility owners or other CONTRACTOR's performing work as contemplated by Article 7.0, fires, floods, epidemics, abnormal weather conditions, or acts of God.

## 12.4 Delays Within CONTRACTOR's Control

12.4.1 The Contract Times (or Milestones) will not be extended due to delays within the control of CONTRACTOR. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of CONTRACTOR.

## 12.5 Delays Beyond OWNER's and CONTRACTORS's Control

12.5.1 Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract Times (or Milestones) in an amount equal

to the time lost due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay.

## 12.6 Delay Damages

12.6.1 In no event shall OWNER or ENGINEER be liable to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from:

12.6.1.1 delays caused by or within the control of CONTRACTOR; or

12.6.1.2 delays beyond the control of both OWNER and CONTRACTOR including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God, or acts or neglect by utility OWNER's or other CONTRACTOR's performing other work as contemplated by Article 7.0.

12.6.2 Nothing in this paragraph 12.6 bars a change in Contract Price pursuant to this Article 12.0 to compensate CONTRACTOR due to delay, interference, or disruption directly attributable to actions or inactions of OWNER or anyone for whom OWNER is responsible.

## 12.7 Abnormal Weather Conditions

12.7.1 Abnormal Weather Conditions for rain shall be derived from the most recent 20-year (minimum) average for the nearest NOAA weather reporting station. The mean number of days of precipitation per month of 0.10 inch or more shall establish the mean number of weather days for the period.

## 12.8 Liquidated Damages

12.8.1 The required completion time for the Project is as set forth in the Agreement. The CONTRACTOR is advised that the Contract times stated in the Bid Form are of the essence of the Contract. For each and every day in excess of each Contract time stated in the Bid Form that the CONTRACTOR fails to complete the Work indicated, the CONTRACTOR shall pay to the OWNER the sum stated in the Bid Form as liquidated damages. The said amounts are fixed and agreed upon by and between the CONTRACTOR and the OWNER as an estimate of the actual damages which would be incurred by the OWNER.

## **ARTICLE 13.0 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK**

### 13.1 Notice of Defects

13.1.1 Prompt notice of all defective Work of which OWNER or ENGINEER has actual knowledge will be given to CONTRACTOR. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.0.

### 13.2 Access to Work

13.2.1 OWNER, ENGINEER, ENGINEER's Consultants, other representative and personnel of OWNER, independent testing laboratories, and governmental agencies with jurisdictional interest will have access to the Site and the Work at reasonable times for their observation inspecting, and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR's Site safety procedures and programs so that they may comply therewith as applicable.

### 13.3 Tests and Inspections

- 13.3.1 CONTRACTOR shall give ENGINEER timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- 13.3.2 OWNER shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
- 13.3.2.1 for inspections, tests, or approvals covered by paragraphs 13.3.3 and 13.3.4 below;
  - 13.3.2.2 that costs incurred in connection with tests or inspections conducted pursuant to paragraph 13.4.2 shall be paid as provided in said paragraph 13.4.2; and
  - 13.3.2.3 as otherwise specifically provided in the Contract Documents.
- 13.3.3 If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any Work to be specifically inspected, tested, or approved by some public body, CONTRACTOR shall assume full responsibility therefore, pay all costs in connection therewith and furnish ENGINEER the required certificates of inspection, testing or approval.
- 13.3.4 The OWNER reserves the right to independently perform at its own expense, laboratory tests on random samples of material or performance tests on equipment delivered to the site. These tests, if made, will be conducted in accordance with the appropriate referenced standards or specification requirements. The entire shipment represented by a given sample, samples or piece of equipment may be rejected on the basis of the failure of samples or pieces of equipment to meet specified test requirements. All rejected materials or equipment shall be removed from the site, whether stored or installed in the Work, and the required replacement shall be made, all at no additional cost to the OWNER.
- 13.3.5 If any Work (or the work of others) that is to be inspected, tested, or approved is covered by CONTRACTOR without written concurrence of ENGINEER, it must, if requested by ENGINEER, be uncovered for observation.
- 13.3.6 Uncovering Work as provided in paragraph 13.3.5 shall be at CONTRACTOR's expense unless CONTRACTOR has given ENGINEER timely notice of CONTRACTOR's intention to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

### 13.4 Uncovering Work

- 13.4.1 If any Work is covered contrary to the written request of ENGINEER, it must, if requested by ENGINEER, be uncovered for ENGINEER's observation and replaced at CONTRACTOR's expense.
- 13.4.2 If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by other, CONTRACTOR, at ENGINEER's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as ENGINEER may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment. If it is found that such work is defective, CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory

replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and OWNER shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, OWNER may make a Claim therefore as provided in paragraph 10.5. If, however, such Work is not found to be defective, CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Times (or Milestones), or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a Claim therefore as provided in paragraph 10.05.

### 13.5 OWNER May Stop the Work

13.5.1 If the Work is defective, or CONTRACTOR fails to supply sufficient skilled workmen 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, or if the Work interferes with the operation of the existing facility, the OWNER may order CONTRACTOR to stop, by a written order any Work, or any portion thereof, until the cause for such order has been eliminated.

### 13.6 Correction or Removal of Defective Work

13.6.1 CONTRACTOR shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by ENGINEER, remove it from the Project and replace it with Work that is not defective. CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

### 13.7 Correction Period

13.7.1 If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for CONTRACTOR's use by OWNER or permitted by Laws and Regulations as contemplated in paragraph 6.11.1 is found to be defective, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instruction: (i) repair such defective land or areas, or (ii) correct such defective Work or, if the defective Work has been rejected by OWNER, remove it from the Project and replace it with Work that is not defective, and (iii) satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting there from. If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the defective Work corrected or repaired or may have the rejected Work removed and replaced, and all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by CONTRACTOR.

13.7.2 In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications or by Written Amendment.

- 13.7.3 Where defective Work (and damage to other Work resulting there from) has been corrected or removed and replaced under this paragraph 13.7, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed
- 13.7.4 CONTRACTOR's obligations under this paragraph 13.7 are in addition to any other obligation or warranty. The provisions of this paragraph 13.7 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.
- 13.8 Acceptance of Defective Work
- 13.8.1 If, instead of requiring correction or removal and replacement of defective Work, OWNER (and, prior to ENGINEER's recommendation of final payment, ENGINEER) prefers to accept it, OWNER may do so. CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to OWNER's evaluation of and determination to accept such defective Work (such costs to be approved by ENGINEER as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by CONTRACTOR pursuant to this sentence. If any such acceptance occurs prior to ENGINEER's recommendation of 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, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, OWNER may make a Claim therefore as provided in paragraph 10.5. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to OWNER.
- 13.9 OWNER May Correct Defective Work
- 13.9.1 If CONTRACTOR fails within a reasonable time after written notice from ENGINEER to correct defective Work or to remove and replace rejected Work as required by ENGINEER in accordance with paragraph 13.6.1, or if CONTRACTOR fails to perform the Work in accordance with the Contract Documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, OWNER may, after seven days written notice to CONTRACTOR, correct and remedy any such deficiency.
- 13.9.2 In exercising the rights and remedies under this paragraph, OWNER shall proceed expeditiously. In connection with such corrective and remedial action, OWNER may exclude CONTRACTOR from all or part of the Site, take possession of all or part of the Work and suspend CONTRACTOR's services related thereto, incorporate in the Work all materials and equipment stored at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which OWNER has paid CONTRACTOR but which are stored elsewhere. CONTRACTOR shall allow OWNER, OWNER's representatives, agents and employees, OWNER's other CONTRACTOR's, and ENGINEER and ENGINEER's Consultants access to the Site to enable OWNER to exercise the rights and remedies under this paragraph.
- 13.9.3 All Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by OWNER in exercising the rights and remedies under this paragraph 13.9 will be charged against CONTRACTOR, and 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. If the parties are unable to agree as to the amount of the adjustment, OWNER may make a Claim therefore as provided in paragraph 10.5. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of CONTRACTOR's defective Work.

13.9.4 CONTRACTOR shall not be allowed an extension of the Contract Times (or Milestones) because of any delay in the performance of the Work attributable to the exercise by OWNER of OWNER's rights and remedies under this paragraph 13.9.

## **ARTICLE 14.0 - PAYMENTS TO CONTRACTOR AND COMPLETION**

### 14.1 Schedule of Values

14.1.1 The schedule of values established as provided in paragraph 2.5.2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to ENGINEER. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.1.2 With the above submittal, the CONTRACTOR shall submit for the ENGINEER's approval, a complete breakdown of all lump sum items in the Proposal. This breakdown, modified where directed by the ENGINEER, will be used as a basis for preparing partial estimates and establishing progress payments.

14.1.3 A lump sum payment equal to three percent of the total bid price (to include all bonds, insurance, move-on expenses, etc.) will be allowed for 'mobilization' as a progress payment line item. Up to half of the cost for mobilization will be considered in the initial payment request provided that cost documentation suitable to the ENGINEER is furnished by the CONTRACTOR. Any outstanding balance of mobilization line item will be payable when the Project Work is ten percent complete as indicated by the approved progress payments.

### 14.2 Progress Payments

#### 14.2.1 Applications for Payments

14.2.1.1 The effective ending date of all applications for Progress Payments shall be the 25<sup>th</sup> day of each month unless mutually agreed upon otherwise. All applications for Progress Payments will be computer-generated based on the Schedule of Values as provided in paragraph 14.1, and submitted in triplicate. The application will be generated each period by the CONTRACTOR.

14.2.1.2 Prior to final preparation of each Progress Payment, the CONTRACTOR and Resident Project Representative shall mutually measure and agree upon the quality of Work completed each period.

14.2.1.3 Partial payment for materials or equipment properly stored on-site will be made on the basis of the invoice cost of the materials or equipment provided a detailed list of the materials for which partial payment is requested and supporting copies of the invoices is attached to each Application for Progress Payment. As the work progresses, the value of materials not entered into construction will be reduced as materials or equipment are installed. At the completion of the Work, the value of stored materials not entered into construction must be zero.

14.2.1.4 The following paragraphs (i & ii) are for construction projects in North Carolina only:

- 14.2.1.4.1 Sales and Use Tax: With each application for Progress Payment, CONTRACTOR must furnish a certified and notarized statement setting forth the cost of the property purchased from each vendor and the amount of sales and/or use tax paid thereon. The statement shall show both the N.C. Sales Tax and the County Tax paid and shall list any payments made directly to the North Carolina Department of Revenue. Tax statements and certification shall be submitted on the forms provided in the Contract Documents. In the event the CONTRACTOR makes several purchases from the same vendor, such certified statement must indicate the invoice numbers, the inclusive dates of the invoices, the total amount of the invoices, and the sales and use taxes paid thereon. Such statement must include the cost of any tangible personal property withdrawn from the CONTRACTOR's warehouse stock and the amount of sales or use tax paid thereon by the CONTRACTOR. Similar certified statements by his subcontractors must be obtained by the prime CONTRACTOR and furnished with the Application for Progress Payment. If no tax has been paid during the pay request period, "NONE" shall be entered on the tax form.
- 14.2.1.4.2 Use tax may be due on construction equipment brought into North Carolina for use in the performance of contracts (NCGS §105-164.4 and 105-164.6). CONTRACTORS are also liable for payment of applicable privilege licenses (NCGS §105-54) and for payment of applicable franchise, corporate income and withholding taxes (NCGS §105-122, 105-123, 105-134, and 105-163.2).
- 14.2.1.5 Retainage: Retainage shall be as set forth in the Standard Contract Form or otherwise in the Contract Documents and shall be in compliance with the requirements of Laws and Regulations.

14.2.2 Review of Applications:

- 14.2.2.1 ENGINEER will, within 10 days after receipt of each Application for Payment, either indicate in writing his approval of payment or return the Application to CONTRACTOR indicating in writing his reasons for refusing to approve payment. In the latter case, CONTRACTOR may make the necessary correction and resubmit the Application. Within 30 days of receiving the submittal of an approvable Application for Payment, the OWNER will make partial payment to the CONTRACTOR on the basis of a duly certified approved estimate of the Work performed during the preceding period by the CONTRACTOR.
- 14.2.2.2 ENGINEER's recommendation of any payment requested in an Application for Payment will be based on ENGINEER's observations on the Site of the executed Work and on ENGINEER's review of the Application for Payment and the accompanying data and schedules, that to the best of ENGINEER's knowledge, information and belief:
  - 14.2.2.2.1 the Work has progressed to the point indicated;
  - 14.2.2.2.2 the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under paragraph 9.8, and to any other qualifications stated in the recommendation); and
  - 14.2.2.2.3 the conditions precedent to CONTRACTOR's being entitled to

such payment appear to have been fulfilled in so far as it is ENGINEER's responsibility to observe the Work. By recommending any such payment ENGINEER will not thereby be deemed to have represented that: (i) inspections made to check the quality or the quantity of the Work as it have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents; or (ii) that there may not be other matters or issues between the parties that might entitle CONTRACTOR to be paid additionally by OWNER or entitle OWNER to withhold payment to CONTRACTOR;

14.2.2.2.4 neither ENGINEER's review of CONTRACTOR's Work for the purposes of recommending payments nor ENGINEER's recommendation of any payment, including final payment, will impose responsibility on ENGINEER to supervise, direct, or control the Work or for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for CONTRACTOR's failure to comply with Laws and Regulations applicable to CONTRACTOR's performance of the Work;

14.2.2.2.5 ENGINEER may refuse to recommend the whole or any part of any payment if, in ENGINEER's opinion, it would be incorrect to make the representations referred to in paragraph 14.2.2.2. ENGINEER may also refuse to recommend any such payment because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in ENGINEER's opinion to protect OWNER from loss because:

14.2.2.2.5.1 the Work is defective, or completed Work has been damaged, requiring correction or replacement;

14.2.2.2.5.2 the Contract Price has been reduced by Written Amendment or Change Orders;

14.2.2.2.5.3 OWNER has been required to correct defective Work or complete Work in accordance with paragraph 13.9; or

14.2.2.2.5.4 ENGINEER has actual knowledge of the occurrence of any of the events enumerated in paragraph 15.2.1.

#### 14.2.3 Payment Becomes Due

14.2.3.1 Thirty days after presentation of the Application for Payment to OWNER with ENGINEER's recommendation, the amount recommended will (subject to the provisions of paragraph 14.2.4) become due, and when due will be paid by OWNER to CONTRACTOR

#### 14.2.4 Reduction in Payment

14.2.4.1 OWNER may refuse to make payment of the full amount recommended by ENGINEER because:

14.2.4.1.1 claims have been made against OWNER on account of CONTRACTOR's performance or furnishing of the Work;

14.2.4.1.2 Liens have been filed in connection with the Work, except where

- CONTRACTOR has delivered a specific Bond satisfactory to OWNER to secure the satisfaction and discharge of such Liens;
- 14.2.4.1.3 There are other items entitling OWNER to a set-off against the amount recommended; or
  - 14.2.4.1.4 OWNER has actual knowledge of the occurrence of any of the events enumerated in paragraphs 14.2.2.5.1 through 14.2.2.5.3 or paragraph 15.2.1.
- 14.2.4.2 If OWNER refuses to make payment of the full amount recommended by ENGINEER, OWNER must give CONTRACTOR immediate written notice (with a copy to ENGINEER) stating the reasons for such action and promptly pay CONTRACTOR any amount remaining after deduction of the amount so withheld. OWNER shall promptly pay CONTRACTOR the amount so withheld, or any adjustment thereto agreed to by OWNER and CONTRACTOR, when CONTRACTOR corrects to OWNER's satisfaction the reasons for such action.
- 14.2.4.3 If it is subsequently determined that OWNER's refusal of payment was not justified; the amount wrongfully withheld shall be treated as an amount due as determined by paragraph 14.2.3.1.
- 14.3 CONTRACTOR's Warranty of Title
- 14.3.1 CONTRACTOR warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporation in the Project or not, will pass to OWNER no later than the time of payment free and clear of all Liens.
- 14.4 Substantial Completion:
- 14.4.1 CONTRACTOR may, in writing to OWNER and ENGINEER, certify that the entire Project is substantially complete and request that ENGINEER issue a certificate of Substantial Completion. Within a reasonable time thereafter, OWNER, CONTRACTOR and ENGINEER shall make an inspection of the Project to determine the status of completion. If ENGINEER and OWNER do not consider the Project substantially complete, ENGINEER will prepare and deliver to OWNER a tentative certificate of Substantial Completion and the responsibilities between OWNER and CONTRACTOR for maintenance, heat and utilities. There shall be attached to the certificate a tentative list of items to be completed or corrected before Substantial Completion, and the certificate shall fix the time within which such items shall be completed or corrected, said time to be within Contract Time.
  - 14.4.2 OWNER shall have the right to exclude CONTRACTOR from the Site after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.
- 14.5 Partial Utilization:
- 14.5.1 Prior to Substantial Completion of the Project, OWNER may request CONTRACTOR in writing to permit him to use a specified part of the Project which he believes he may use without significant interference with construction of the other parts of the Project. If CONTRACTOR agrees, he will certify to OWNER and ENGINEER that said part of the Project is substantially complete and request the ENGINEER to issue a certificate of Substantial completion for that part of the Project. Within a reasonable time thereafter, OWNER, CONTRACTOR, and ENGINEER shall make an inspection of that part of the Project to determine its status of completion. If ENGINEER and OWNER do not consider that it is substantially complete, ENGINEER will notify CONTRACTOR in writing giving his reasons therefore. If ENGINEER and OWNER consider that part of the Project to be substantially complete, ENGINEER will execute and deliver to OWNER and CONTRACTOR a certificate to that effect, fixing the date of Substantial Completion

as to that part of the Project, attaching thereto a tentative list of items to be completed or corrected before Substantial Completion of the entire Project and fixing the responsibility between OWNER and CONTRACTOR for maintenance, heat, and utilities as to that part of the Project. OWNER shall have the right to exclude CONTRACTOR from any part of the Project which ENGINEER has so certified to be substantially complete, but OWNER shall allow CONTRACTOR reasonable access to complete items on the tentative list.

14.5.2 The CONTRACTOR is specifically advised that payment in full for sections so completed and used by the OWNER will NOT be made until the entire Project has been completed. Partial payments for Work completed and the retainage will be handled on the basis of the ENTIRE Contract Amount as here specified. The CONTRACTOR shall account for this in his Bid and under no circumstances will occupancy and use of completed sections of the Work by the OWNER be considered as grounds for reducing the retainage withheld from the CONTRACTOR's partial payments, or for an increase in the Contract Price.

#### 14.6 Final Inspection

14.6.1 Upon written notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, ENGINEER will promptly make a final inspection with OWNER and CONTRACTOR and will notify CONTRACTOR in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. CONTRACTOR shall immediately take such measure as are necessary to complete such Work or remedy such deficiencies.

#### 14.7 Final Payment

##### 14.7.1 Application for Payment

14.7.1.1 After CONTRACTOR has, in the opinion of ENGINEER, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, Bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents (as provided in paragraph 6.12), and other documents, CONTRACTOR may make application for final payment following the procedure for progress payments.

14.7.1.2 The final Application for Payment shall be accompanied (except as previously delivered) by: (i) all documentation called for in the Contract Documents; (ii) consent of the surety, if any, to final payment; and (iii) complete and legally effective releases or waivers (satisfactory to OWNER) of all Lien rights arising out of or Liens filed in connection with the Work.

14.7.1.3 In lieu of the releases or waivers of Liens specified in paragraph 14.7.1.2 and as approved by OWNER, CONTRACTOR may furnish receipts or releases in full and an affidavit of CONTRACTOR that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which OWNER or OWNER's property might in any way be responsible have been paid or otherwise satisfied.

##### 14.7.2 Review of Application and Acceptance

14.7.2.1 If, on the basis of ENGINEER's observation of the Work during construction and final inspection, and ENGINEER's review of the final Application for

Payment and accompanying documentation as required by the Contract Documents, ENGINEER is satisfied that the Work has been completed and CONTRACTOR's other obligations under the Contract Documents have been fulfilled, ENGINEER will, within ten days after receipt of the final Application for Payment, indicate in writing ENGINEER's recommendation of payment and present the Application for Payment to OWNER for payment. At the same time ENGINEER will also give written notice to OWNER and CONTRACTOR that the Work is acceptable subject to the provisions of paragraph 14.9. Otherwise, ENGINEER will return the Application for Payment to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall make the necessary corrections and resubmit the Application for Payment.

#### 14.7.3 Payment Becomes Due

14.7.3.1 Thirty days after the presentation to OWNER of the Application for Payment and accompanying documentation, the amount recommended by ENGINEER will become due and, when due, will be paid by OWNER to CONTRACTOR.

#### 14.8 Final Completion Delayed

14.8.1 If, through no fault of CONTRACTOR, final completion of the Work is significantly delayed, and if ENGINEER so confirms, OWNER shall, upon receipt of CONTRACTOR's final Application for Payment and recommendation of ENGINEER, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by OWNER for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in paragraph 5.1, the written consent of the surety to the payment of the balance due for that portion of the Work fully complete and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

### **ARTICLE 15.0 - SUSPENSION OF WORK AND TERMINATION**

#### 15.1 OWNER May Suspend Work

15.1.1 At any time and without cause, OWNER may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to CONTRACTOR and ENGINEER which will fix the date on which Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR shall be allowed an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if CONTRACTOR makes a Claim therefore as provided in paragraph 10.5.

#### 15.2 OWNER May Terminate for Cause

15.2.1 The occurrence of any one or more of the following events will justify termination for cause:

- 15.2.1.1 CONTRACTOR's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established under paragraph 2.7 as adjusted from time to time pursuant to paragraph 6.4);
  - 15.2.1.2 CONTRACTOR's disregard of Laws or Regulations of any public body having jurisdiction;
  - 15.2.1.3 CONTRACTOR's disregard of the authority of ENGINEER; or
  - 15.2.1.4 CONTRACTOR's violation in any substantial way of any provisions of the Contract Documents.
- 15.2.2 If one or more of the events identified in paragraph 15.2.1 occur, OWNER may, after giving CONTRACTOR (and the surety, if any) seven days written notice, terminate the services of CONTRACTOR, exclude CONTRACTOR from the Site, and take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which OWNER has paid CONTRACTOR but which are stored elsewhere, and finish the Work as OWNER may deem expedient. In such case, CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by OWNER arising out of or relating to completing the Work, such excess will be paid to CONTRACTOR. If such claims, costs, losses, and damages exceed such unpaid balance, CONTRACTOR shall pay the difference to OWNER. Such claims, costs, losses, and damages incurred by OWNER will be reviewed by ENGINEER as to their reasonableness and, when so approved by ENGINEER, incorporated in a Change Order. When exercising any rights or remedies under this paragraph OWNER shall not be required to obtain the lowest price for the Work performed.
- 15.3 OWNER May Terminate For Convenience
- 15.3.1 Upon seven days written notice to CONTRACTOR, OWNER may, without cause and without prejudice to any other right or remedy of OWNER, elect to terminate the Contract. In such case, CONTRACTOR shall be paid (without duplication of any items):
    - 15.3.1.1 for completed and acceptable Work executed in accordance with the contract Documents prior to the effective date of termination.
  - 15.3.2 CONTRACTOR shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.
- 15.4 CONTRACTOR May Stop Work or Terminate
- 15.4.1 If, through no act or fault of CONTRACTOR, the Work is suspended for more than 90 consecutive days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within 30 days after it is submitted, or OWNER fails for 30 days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon seven days written notice to OWNER and ENGINEER, and provided OWNER or ENGINEER do not remedy such suspension or failure within that time, terminate the Contract and recover from OWNER payment on the same terms as provided in paragraph 15.3. In lieu of terminating the Contract and without prejudice to any other right remedy, if ENGINEER has failed to act on an Application for Payment within 30 days after it is submitted, or OWNER has failed for 30 days after it is submitted, or OWNER has failed for 30 days to pay

CONTRACTOR any sum finally determined to be due, CONTRACTOR may, seven days after written notice to OWNER and ENGINEER, stop the Work until payment is made of all such amounts due CONTRACTOR, including interest thereon. The provisions of this paragraph 15.4 are not intended to preclude CONTRACTOR from making a Claim under paragraph 10.5 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to CONTRACTOR's stopping the Work as permitted by this paragraph.

15.5 Assignment of Contract

15.5.1 CONTRACTOR shall not assign, transfer, convey, or otherwise dispose of the Contract, or of his legal right, title, or interest in or to the same or to any part thereof, without the prior written consent of the OWNER. CONTRACTOR shall not assign by power of attorney or otherwise any monies due him and payable under this Contract without the prior written consent of the OWNER. Such consent, if given, will in no way relieve the CONTRACTOR from any of the obligations of this Contract. OWNER shall not be bound to abide by or observe the requirements of any such assignment.

**ARTICLE 16.0 - DISPUTE RESOLUTION**

16.1 Methods and Procedures

16.1.1 Dispute resolution methods and procedures, if any, shall be as set forth in these General Conditions, in the Standard Form Contract, or otherwise in the Contract Documents. If no method and procedure has been set forth, and subject to the provisions of paragraph 9.9 and 10.5, OWNER and CONTRACTOR may exercise such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any dispute.

# SECTION III – PROJECT SPECIAL SPECIFICATIONS

## GENERAL SPECIFICATIONS

### SP-1 – COMPREHENSIVE GRADING

#### 1.0 DESCRIPTION

This item shall include all elements of work covered by the referenced NCDOT Specifications and the numbered Additional City Specifications provided herein.

#### NCDOT Specifications

200, “Clearing and Grubbing”  
225, “Roadway Excavation”  
235, “Embankments”  
240, “Ditch Excavation”  
250, “Removal of Existing Pavement”  
260, “Proof Rolling”  
402, “Removal of Existing Structures”  
340, “Pipe Removal”  
410, “Foundation Excavation”  
412, “Unclassified Structure Excavation”  
414, “Box Culvert Excavation”  
416, “Channel Excavation”  
500, “Fine Grading, Sub-grade, Shoulders and Ditches”  
560, “Shoulder Construction”  
802, “Disposal of Waste and Debris”  
1530, “Adjust, Abandon or Remove Utilities”  
1660, “Seeding and Mulching”

#### Additional City Specifications

1. Clearing and Grubbing: Clearing on this Project shall be performed to the slope stake line or the right-of-way or easement lines unless directed otherwise. The Contractor shall obtain written permission from the Engineer prior to removing any trees in the easement areas.
2. Erosion Control: includes but is not limited to furnishing, installing, and maintaining, silt fence, diversion ditches, rock inlet sediment traps, rock pipe sediment trap, silt sacks, all stone for erosion control, rock check dams, block and gravel and inlet protection, catch basin inlet protection, temporary rock construction entrances, silt basins, temporary matting, temporary stream crossing and all other erosion control measures required by, the plans, current ordinances, project permitting, and the Contractor’s means and methods. This item includes, but is not limited to, satisfactory removal and area restoration of all erosion control areas and all construction entrance areas.
3. Fence Removal and Disposal and or Fence Relocation: as shown on the plans and any additional removal or relocation identified by the Contractor’s means and methods shall be included in this item.
4. Hedgerow and or Planting Bed Removal and Disposal: as shown on the plans and any additional hedgerow or planting bed removal identified by the Contractor’s means and methods shall be included in this item. Hedgerows to be removed shall be approved by the Engineer prior to removal.

5. Mail Boxes and Site Amenities: remove, protect, and reset mail boxes and site amenities. The Contractor shall keep mailboxes in service at all times and allow / provide for other services, including but not limited to trash pickup.
6. Removal and Disposal of Existing Infrastructure: concrete curb, sidewalk, miscellaneous concrete, concrete channel armoring, asphalt, driveways, pads, slabs, walls, structures (including culverts), catch basins, manholes, driveway pipes and headwalls, etc. within the construction limits as shown on the plans and any additional infrastructure removal identified by the Contractor's means and methods shall be included in this item.
7. Shoring: the Contractor shall be responsible for all shoring to include means, methods, materials and engineering needed to construct the project.
8. Saw Cutting: all saw cutting required to build the Project. Where asphalt or concrete (curb, sidewalk, roadway, driveways, parking lots, etc.) is to be removed, the Contractor shall provide a neat edge along the pavement being retained by sawing the pavement a minimum of 2" deep and 1' wide before breaking and removing adjacent pavement. When the Contractor proposes to saw pavement more than one foot from the proposed pavement (curb, sidewalk, structure, etc.), the Contractor shall obtain approval from the Engineer prior to saw cutting and removing pavement. The cost of sawing asphalt or concrete shall be included in this item.
9. Seeding and Mulching: all temporary and permanent seeding and mulching required to complete the project in accordance with the plans and Section 1660 of the NCDOT Standard Specifications shall be included in this item.
10. Sidewalk and Curb Clean-up: The Contractor shall have all related sidewalk and curb work completed within ten (10) days of placement, including but not limited to 1) removal and disposal of construction debris; 2) related grading to include fine grading; 3) site restoration; 4) seedbed preparation and dress up work; 5) seeding and mulching; and 6) final cleaning.
11. Tree Protection: The Contractor shall provide tree protection as shown on the plans, including any pruning which shall be performed by a certified arborist in accordance with proper arboricultural standards, and any additional Tree Protection identified by the Contractor's means and methods.
12. Tree and/or Stump Removal and Disposal: as shown on the plans and any additional tree and/or stump removal identified by the Contractor's means and methods shall be included in this item. Trees to be removed shall be approved by the Engineer prior to removal.
13. Utility Pipe/Conduit Removal and Disposal: existing public or private utility pipe / conduit, subsurface and shoulder drain pipe removal and disposal as shown on the plans and any additional utility pipe / conduit removal identified by the Contractor's means and methods shall be included in this item.
14. Property Access: all labor and materials required to maintain access to properties during construction as directed by the Engineer.
15. Stream Pump Around: the Contractor shall be responsible for maintaining baseflow downstream of stream, culverts, and pipes as shown on plans or otherwise directed.
16. Backfilling of Culvert Interiors: The Contractor shall be responsible for preparing the material composition for and backfilling interiors of culvert to elevations and dimensions shown on the plans. Backfill for base flow culverts shall be different than storm flow culverts. Backfill material in the storm flow culverts shall be native material that is excavated from the stream bed or floodplain at the project site during culvert construction. Native material is subject to approval by the Engineer and may be subject to permit conditions. If native material is not available, the Engineer shall approve an alternate source of material at no additional cost to the Owner. Backfill for baseflow culverts shall be equal parts mixture of native material, #57 stone, and Class B riprap. The contractor may reuse riprap and stone previously used onsite for an impervious dike or temporary crossing in the stream. No riprap shall be used that projects higher than concrete sill height.

## **SP-2 – TRAFFIC CONTROL**

### **1.0 DESCRIPTION**

Beginning Work and Street Closings: The Contractor is responsible for notifying the Concord Department of Transportation for any work where the number of travel lanes is reduced from normal conditions.

The Contractor shall install advance warning signs for the Project. These signs shall be in place for one week before construction activity begins. The Contractor shall begin construction activity on a street on the scheduled date for the closing of the travel lane.

Traffic Control Plan: Traffic control will be performed by the Contractor based upon the Traffic Control Special Provisions. The Traffic Control Special Provisions may refer to plan sheets for major work items or details, or both.

All traffic control devices and procedures shall conform to the requirements of the current edition of the Federal Highway Administration (FHWA) *Manual on Uniform Traffic Control Devices* (MUTCD), the current edition of the North Carolina Department of Transportation (NCDOT) Supplement to the *Manual on Uniform Traffic Control Devices for Streets and Highways*, the NCDOT Roadway Standard Drawings and the current edition of the NCDOT Standard Specifications for Roads and Structures.

The Contractor shall maintain the traffic control as described herein unless the Contractor submits an alternate traffic control plan to the Engineer and it is approved by the Engineer. The Engineer may direct the Contractor to modify the traffic control if, in the Engineer's opinion, traffic is not moving safely or efficiently.

Traffic Control Phasing for this project shall be in accordance with the Traffic Control Plans. The Contractor shall adhere rigidly to these plans. The standards are the minimum required. Additional signs, cones, drums, barricades and warning devices may be used, but at no time will less than what is specified on the plans or in the standards be acceptable.

Maintenance of Traffic: The Contractor shall maintain all travel lanes in accordance with the Traffic Control Plan sheets.

In areas of drop-offs and low shoulders, the Contractor shall backfill up to the edge and elevation of the existing pavement.

The Contractor will be required to maintain ingress and egress to all businesses and dwellings, and easy access to fire hydrants.

The Contractor shall provide adequate drainage under driveways and within the Project area for the duration of the Project.

The Contractor shall mark all hazards within the Project limits with well-maintained signs, barricades, warning and/or channelizing devices.

Traffic Control Devices: The Contractor shall furnish, install, operate, relocate, maintain and remove all temporary traffic control devices necessary for controlling traffic in accordance with the Traffic Control Plans and standards. The Contractor shall notify Engineer regarding conflicting permanent signs. Only Concord Department of Transportation personnel shall install, remove or relocate any permanent signs

within the right-of-way. All construction signs and barricades shall remain in place until the appropriate permanent signs and pavement markings are installed.

Equipment and Material Storage: During periods of construction inactivity, all construction materials and equipment shall be stored by the Contractor as specified in Section 11, Part D of the WATCH handbook.

Excavation and Trenches: Excavations and trenches that cannot be properly backfilled and patched prior to the end of the workday shall be secured.

### **SP-3 – BYPASS PUMPING PLAN**

#### **1.0 SCOPE.**

- 1) Prior to utility installation, the contractor must attend a pre-construction meeting with the City of Concord Water Resources/Engineering Department staff, City of Concord Electric Department staff, and the City of Concord Engineering Construction Inspection staff.
- 2) The Contractor must attend an on-site meeting with City of Concord personnel to coordinate and review the bypass pumping plan and equipment. The Contractor will be required to provide City of Concord personnel with a detailed bypass pumping plan for the purposes of relocating various sized gravity sewer lines. Refer to construction plans for sizes and locations. This detailed bypass pumping plan will include, but not be limited to, the following items:
  - a. Type/size/design parameters of pumps that will be utilized, including the supplier's name and contact information (note: redundant pumps are required); City of Concord staff to determine projected initial flow.
  - b. General work plan highlighting the different steps required to complete the bypass pumping operation task (i.e. suction/discharge manhole locations, a list of materials/equipment to be used, estimated number of workers and their corresponding job classifications, projected timeframe of operation, summary of typical routine inspections regarding bypass pump system, emergency plan if needed, etc.).
- 3) The Contractor should provide City of Concord personnel with a sequence of construction operations and projected timelines for proposed utility work required on the project (electric, water, sewer). This sequence of operations should include a summary of how existing utilities will be protected during construction operations.
- 4) The contractor shall submit the shop drawings/catalog cuts that relate to proposed sewer facilities that will be operated and maintained by the City of Concord (i.e. piping, manholes, couplings, end connections, etc.) to City of Concord personnel for review and approval prior to construction.
- 5) The contractor shall be responsible for any and/or all associated costs, fines, fees or levies, including but not limited to: City of Concord's labor, equipment, administrative costs, and/or legal fees; fines imposed by any regulatory agencies; and/or any third party claims which might be resultant of sanitary sewer overflows and/or subsequent environmental impacts caused by the contractor during the performance of the construction activities within this contract.

## **SP-4 – REINFORCED CONCRETE BOX CULVERT**

### **1.0 DESCRIPTION**

Work covered by this special provision consists of installation of a precast reinforced concrete culvert or arch culvert (culvert), in accordance with the plans and specifications at locations shown on the plans. The work shall also include the construction of such joints and connections to other culverts, pipes, drainage structures, and steps as may be necessary to complete the work shown on the plans.

### **2.0 MATERIALS AND CONSTRUCTION METHODS**

Installation of the culvert shall conform to Section 414 of the NCDOT Standard Specifications as well as any requirements of this provision.

#### Design and Manufacture

Culvert sections shall conform to ASTM C-1577 or the latest edition of the AASHTO LRFD Bridge Design Specifications. Provide a precast culvert that meets the requirements of Section 1077 and any other applicable parts of the Standard Specifications.

The concrete mixture shall meet the requirements for Single Cell Box Sections shown in Table 1077-1 in Section 1077 of the NCDOT Standard Specifications. Movement of the precast sections should be minimized during the initial curing period. Any damage caused by moving or handling during the initial curing phase will be grounds for rejection of that precast section. Air entrain the concrete in accordance with Section 1077 - 5(A) of the NCDOT Standard Specifications. For dry cast manufacturing, air entrainment is not required.

Handling devices or holes are permitted in each culvert section for the purpose of handling and laying. Submit details of handling devices or holes for approval and do not cast any concrete until approval is granted. Remove all handling devices flush with concrete surfaces as directed. Fill holes in a neat and workmanlike manner with an approved non-metallic non-shrink grout, concrete, or hole plug.

Each culvert section shall be checked at the plant for fitment and numbered which shall correspond to the laying schedule.

All openings shown on the plans in the culvert shall be formed during the manufacturing process.

Culvert minimum waterway area shown on the plans shall be verified with the manufacturer for the culvert sizes due to manufacturing differences.

#### Joints

Produce the precast reinforced concrete culvert section with tongue and groove ends. Design and form these ends of the culvert section so, when the sections are laid together, they make a continuous line of culvert sections with a smooth interior free of appreciable irregularities in the flowline. The internal joint formed at the tongue and groove ends of the precast units shall be sealed with either bitumen/butyl sealant or closed-cell neoprene material conforming to ASTM C990 or C1677. The internal joint material shall be installed in accordance with the manufacturer's recommendations. The material shall be shown on the shop drawings when they are submitted for review.

Seal the external joint with an outside sealer wrap conforming to ASTM C877 that is at least 12 inches wide and covers the joint on both the sides and the top of the box section. Use ConWrap CS-212 from

Concrete Sealants, Inc., EZ-Wrap from Press-Seal Gasket Corporation, Seal Wrap from Mar-Mac Manufacturing Co., Inc., Cadilloc External Pipe Joint from Cadilloc, or an approved equal for the outside sealer wrap. If the outside sealer wrap is not applied in a continuous strip along the entire joint, a 12 inch minimum lap of the outside sealer wrap is permitted. Before placing the outside sealer wrap, clean and prime the area receiving the outside sealer wrap in accordance with the sealer wrap manufacturer recommendations. The joint wrap manufacturer installation recommendations shall be included with shop drawings submitted for review.

Cover the external joint sealer with a 3 foot strip of filter fabric conforming to Type 4 requirements in Section 1056 of the Standard Specifications.

#### Installation

Ensure that equipment of the correct lifting capacity is available to install precast concrete units. Site conditions must be checked well in advance of shipping to ensure proper equipment location and to avoid any lifting restrictions. The lift anchors or holes provided in each section are only means to lift the elements unless otherwise approved by manufacturer.

In no case shall equipment operating in excess of the design load be permitted over the culvert units unless otherwise approved by manufacturer.

No construction equipment shall cross the bare precast concrete unit. The contractor shall refer to the Manufacturers specifications for additional restrictions.

No backfill shall be placed against any structural elements until they have been approved by the Engineer. Complete backfill in accordance with Sections 410-8 and 414-7 of the NCDOT Standard Specifications, Manufacturer's Specifications. Sections 410-10 and 414-9 of the NCDOT Standard Specifications do not apply.

Bedding for precast culvert shall meet the requirements of Section 410 and 414 of the NCDOT Standard Specifications. Excavate 12 inches below the bottom of barrel and footings and backfill with Class VI select material in accordance with Section 1016 of the NCDOT Standard Specifications or as shown on the plans. Bedding shall extend 12 inches outside of the culvert or footings. In addition, bedding material shall be placed on filter fabric conforming to Type 4 requirements in Section 1056 of the NCDOT Standard Specifications. The filter fabric shall be placed perpendicular to the culvert barrel and extend 1 foot vertically onto the culvert wall/footing. Perpendicular sections of fabric shall be continuous. A minimum lap of 2 feet shall be provided between sections of fabric.

Culvert sections shall be placed at the beginning of the outlet end of the culvert with the groove end being laid upgrade. Tongue sections shall be laid into the groove sections. Positive means shall be provided to pull each section firmly into the previously placed section so that the joints are tightly homed. Use a "come-along", box pullers or other approved methods to create a positive means of joining box sections. Construction equipment shall not have direct contact with the culvert section. The load of the culvert sections shall be suspended by a lifting device during joining procedure.

Place multiple, parallel lines of a culvert such that the separation between the lines of culvert has a minimum width of 3 inches. Fill the separation between multiple lines of culvert with non-excavatable flowable fill. Use flowable fill that meets the requirements listed in Section 1000 of the NCDOT Standard Specifications except that Field Compressive Strength Specimens are not required.

### **3.0 SUBMITTALS**

The designs of the precast culverts are the responsibility of the Contractor and are subject to review, comments, and approval. Submit two sets of detailed plans for review. Include all details in the plans, including the size and spacing of the required reinforcement necessary to build the precast culverts and the laying schedule. A North Carolina Registered Professional Engineer shall seal the plans and design calculations. The shop drawings must show the proposed openings (top and sides) and reinforcing for pipe connections, structure openings, and precast holes for steps.

The Contractor shall submit the manufacturer's certification for the culvert sections and those products to be used in the installation.

All submittals shall be made a minimum of two weeks prior to construction or placing an order for materials for review by the Engineer.

### **SP-5 – ROCK SILL**

#### **1.0 SCOPE.**

The work covered by this section consists of furnishing, stockpiling, placing and maintaining approved stone and filter fabric to be utilized to construct the rock sill, as specified in the Contract Document or as directed by the Engineer. Sills are used to provide grade control.

#### **2.0 GENERAL.**

Sills extend perpendicularly across the streambed in a relatively straight line. The structure invert may be set slightly lower, in the center, to provide a thalweg and to match the typical section dimensions.

The quantity of structures to be constructed will be affected by actual conditions that occur during the construction of the project. The type and quantity of this structure may be increased or decreased at the direction of the Engineer. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of the work.

#### **3.0 MATERIALS.**

Boulders shall consist of flat-sided, durable field or quarry stone that is sound, hard, dense, angular, and resistant to the action of air and water, and free of seams, cracks, or other structural defects. The Contractor shall use stone pieces with a "shape factor" greater than two (length and width more than twice the thickness). The Contractor cannot use limestone, cut boulders, or concrete waste for stone. Stone shall be approved by the Engineer.

The size (length, width and depth thickness) of the boulder material shall be as specified on plans. Stone shall be approved by the Engineer.

Boulders for in-stream structures shall conform to their respective specifications as shown on the plans. Coarse Backfill shall meet the material requirements of NCDOT Section 1042

The type, size and gradation of the Coarse Backfill Material shall be as specified on the plans. Coarse backfill material shall meet the material requirements of NCDOT section 1042 Rip Rap Materials.

Filter fabric for sealing structures shall meet the material requirements of NCDOT Section 1056 Geosynthetics.

#### **4.0 METHODS.**

Structure installation and channel grading sequences may vary based on structure function and design. Grade control structures, such as rock sills, shall be installed as grading operations progress downstream.

Establish elevations of the proposed structure. The Contractor may install additional survey control, as needed, to complete the work in accordance with the Quoting Documents.

##### **4.01 Footer Installation**

- a) Over-excavate/trench the stream bed to a depth equal to the total thickness of the header and footer boulders. Bedding for the placement of the footer boulders shall be approved by the Engineer prior to placement.
- b) Place footer boulders in the trench prepared for the sill. Footer boulders shall have direct surface contact with adjacent boulders. Review, survey (measure), and adjust the alignment and/or height of the sill footer boulders, as needed. Selecting boulders with similar thickness for the footers may assist with the ease of construction. The footers shall be reviewed by the Engineer prior to proceeding with the work.
- c) Install filter fabric per the Quoting Documents. Typically the fabric is draped over the top of footers, down the back face of the footer boulders and across the area of over-excavation/trenching. Fabric reaching the excavated stream bed / toe of bank soil face may be folded and/or trimmed, in accordance with the Quoting Documents. The fabric installation shall be reviewed by the Engineer prior to proceeding with the work.
- d) Place Coarse Backfill on top of the filter fabric and between the back of the footer boulders and the excavated steam bed soil face. Coarse Backfill shall be level with the top surface of the footer boulders. The Coarse Backfill shall be reviewed by the Engineer prior to proceeding with the work.

##### **4.02 Header Installation**

- a) Place the header boulders on top of and slightly back from the edge of the footer boulders (such that the header boulders rest partially on top of the Coarse Backfill material). Header boulders shall be placed so that they span the seams of the footer boulders. Header boulders shall have direct surface contact with adjacent boulders, free of gaps. Review, survey (measure), and adjust the alignment and/or height of the vane arm header boulders, as needed. Selecting boulders with similar thickness for the headers may assist with the ease of construction. Installation of header invert boulder first, may help with construction of rock sill.
- b) Place Coarse Backfill between the back of the sill header boulders and the excavated /constructed streambed soil face. Coarse Backfill shall be level with the top surface of the header boulders and the adjacent upstream streambed. The Coarse Backfill shall be reviewed by the Engineer prior to proceeding with the work.
- c) After installing all of the sill boulders, inspect the structure and trim/cut any loose and/or visible fabric.

- d) Finish grade the adjacent streambed and channel banks to provide a smooth even grade transition between project structure components (arms, sills, invert, floodplain sills, etc.) and the existing and/or proposed ground surface.

In locations where exposed bedrock and/or other existing feature extends to and/or within the limits of the proposed work, the rock sill installation shall be field adjusted to incorporate the bedrock/existing feature, into the finished work. The Engineer shall be contacted as soon as the presence of bedrock and/or other existing feature is field identified, to determine the appropriate method of incorporation. Site conditions may require slight deviation from the plan and shall be approved by the Engineer.

**SP-6 – COIR FIBER MATTING**

**1.0 DESCRIPTION**

This work consists of furnishing and installing erosion control matting on the finished grade, as designated on the plans and details, or as directed by the Engineer.

**2.0 MATERIALS**

Coir matting is proposed to be used on stream banks and designated areas within the wetland for the purpose of managing the shear stresses associated with flows through the stream and wetland. Straw matting is to be used on all other areas as directed in the Quoting Documents or required by the conditions of the erosion control permit. The matting shall meet the requirements shown on the plans and conform to the following properties:

| <b>Property</b>                        | <b>Coir Matting</b>       |
|--|---------------------------|
| <b>Matrix</b>                          | 100% Coconut Fiber (Coir) |
| <b>Nettings</b>                        | 100% Biodegradable fiber  |
| <b>Threading</b>                       | 100% Biodegradable        |
| <b>Matting Description</b>             | 100% Biodegradable        |
| <b>Weight (oz/SY)</b>                  | 12-15                     |
| <b>Width (m)</b>                       | 1 - 3                     |
| <b>Length (m)</b>                      | 25- 50                    |
| <b>Open area (calculated)</b>          | 55% - 65%                 |
| <b>Light Penetration</b>               | -                         |
| <b>Tensile Strength (Dry) (lbs/ft)</b> | 400-600                   |
| <b>Elongation (Wet) (%)</b>            | 25 - 35                   |
| <b>Thickness (inch)</b>                | 0.30 – 0.35               |
| <b>Maximum Flow Velocity (fps)</b>     | 8 - 10                    |
| <b>Typical Slope</b>                   | 1V:2H – 1V:1H             |

Certifications from each coir fabric manufacturer that furnished products have specified property values. Certified property values shall be either minimum or maximum average roll values, as appropriate, for fabric furnished.

Stakes shall be of a length shown in the plans. They shall be cut to the appropriate length from untreated boards. In fabricating these units, each board of the selected length shall be cut again diagonally across the face to make two stakes from each length. The diagonal cut will occur 1/2 inch from the edge of the piece so the finished stake will have a 1/2 inch tip. Only new, sound, unused material shall be used. The stakes are to be used to secure erosion control matting in place at the top and toe of the stream bank. Two-foot long, 1/2-inch hooked rebar may be substituted when it is necessary to secure materials in rocky areas.

Use stakes of a size and type(s) as specified by the Manufacturer or as otherwise specified in the Quoting Documents. Wood stakes shall be made of untreated wood. Metal stakes or staples may be used in certain areas of this work pending approval of the City.

### **3.0 METHOD**

Products should be handled in a manner that prevents damage prior to and during installation. Fabric should be stored with suitable wrapping for protection against moisture and ultraviolet exposure prior to installation.

Install erosion control fabric lengthwise (horizontally) along the stream bank in accordance with the plans and as follows.

- a) Excavate a trench along the toe of the stream bank in the location shown on the plans.
- b) Place fabric in the trench, secure the fabric with a dead stout stake, backfill with clean soil, and then the wrap the fabric over the top surface of the trench and be positioned for installation over the stream bank surface.
- c) Prepare, seed, and straw mulch the stream bank surface in accordance with the Quoting Documents prior to the placement of the fabric over the stream bank surface.
- d) Lay fabric over the stream bank surface so as to not be in tension, but be placed neatly and with no gaps or wrinkles. Any fabric overlaps necessary shall be as specified in the plans.
- e) Bring fabric up and over the top of the stream bank and secure it into a trench located as shown on the plans. The trench width and depth shall be per the plans.
- f) Place fabric into the trench, secure the fabric with a dead stout stake, and backfill with clean soil.
- g) Install field stakes of a size, type, in a pattern, and with spacing dimensions as specified by the Manufacturer or as otherwise specified in the Quoting Documents.
- h) Secure erosion control fabric neatly around any project elements, undisturbed trees/shrubs, and existing structures to prevent any loose or frayed edges. There shall be no loose ends or unsecured erosion control fabric on the completed work.
- i) Repeat steps a) through h) until the matting for erosion control installation area is in compliance with the Quoting Documents.

Site conditions may require slight deviation from the planting plan and shall be approved by the City.

## **WATER AND SEWER SPECIFICATIONS**

### **SP-7 – EARTHWORK FOR UTILITIES (ADAPTED FROM WSACC STANDARD SPECIFICATION - SECTION 02200)**

#### **1.0 SCOPE**

This section covers earthwork and shall include the necessary clearing, grubbing, and preparation of the site; removal and disposal of all debris; excavation and trenching as required; the handling, storage, transportation, and disposal of all excavated material; all necessary sheeting, shoring, and protection work; preparation of subgrades; pumping and dewatering as necessary or required; protection of adjacent property; backfilling; pipe embedment; construction of fills and embankments; surfacing and grading; and other appurtenant work.

#### **2.0 GENERAL REQUIREMENTS**

With reference to the terms and conditions of the construction standards for excavations set forth in the OSHA "Safety and Health Regulations for Construction", Chapter XVII of Title 29, CFR, Part 1926, the Contractor shall employ a competent person and, when necessary, a registered professional engineer, to act upon all pertinent matters of the Work of this section.

Excavations shall provide adequate working space and clearances for the Work to be performed therein and for installation and removal of concrete forms. In no case shall excavation faces be undercut for extended footings.

Subgrade surfaces shall be clean and free of loose material of any kind when concrete is placed thereon.

Monolithic concrete manholes and other concrete structures, or parts thereof, which do not have footings that extend beyond the outside face of exterior walls, may be placed directly against excavation faces without the use of outer forms, provided that such faces are stable and also provided that a layer of polyethylene film is placed between the earth and the concrete.

Backfilling and construction of fills and embankments during freezing weather shall not be done except by permission of the Engineer. No backfill, fill, or embankment materials shall be installed on frozen surfaces, nor shall frozen materials, snow, or ice be placed in any backfill, fill, or embankment.

#### **3.0 LATERAL SEPARATION MAINS.**

##### **3.01 Water and Sanitary Sewer Mains.**

Per the City of Concord Code of Ordinance Chapter 62, Article 3, Section 62-98- the following minimum separations must be indicated, unless otherwise approved by the City.

- a) A minimum horizontal separation of five feet shall be maintained between any type of maintenance obstruction and the city's water distribution lines, wastewater collection lines, and associated appurtenances, unless an exception is granted. Greater separation distances may be required as specified by federal, state, or local regulations.
- b) A minimum vertical separation of two feet shall be maintained between any type of maintenance obstruction, including but not limited to any other utility provider's lines or equipment, and the city water distribution lines, wastewater collection lines, and associated appurtenances, unless an exception is granted. If an exception is granted, a minimum vertical separation of one foot must

be maintained and the city water distribution lines, wastewater collection lines, and associated appurtenances shall be constructed of ductile iron pipe or an approved ferrous material with joints that are equivalent to potable water main standards for a distance of ten feet on either side of the point of crossing. Greater separation distances may be required as specified by federal, state, or local regulations.

- c) A minimum horizontal separation of ten feet shall be maintained between the city water distribution system and wastewater collection lines, and associated appurtenances, unless an exception is granted.

### **3.02 Streams and Other Water Bodies and Sanitary Sewer.**

Sewers entering or crossing streams shall be constructed of ferrous material pipe with mechanical joints; otherwise they shall be constructed so they will remain watertight and free from changes in alignment or grade and tested to 150 psi. Material used to backfill the trench shall be of material which will not easily erode, cause siltation, damage pipe during placement, or corrode the pipe.

### **3.03 Minimum Separation.**

Where the required minimum separations cannot be maintained, ferrous sewer pipe with joints equivalent to water main standards must be used. However, minimum separations shall not be less than 25 feet from a private well or 50 feet from a public water supply well in accordance with NCAC 2H .0219(i)(2)(G)(xii).

## **4.0 CLEARING**

All clearing on the temporary and permanent easements shall be performed as necessary for access, stringing of pipeline materials, and construction of the pipeline and appurtenant structures.

The permanent easement or other limits as shown on the Drawings shall be cleared of all logs, trees, roots, brush, tree trimmings, and other objectionable materials and debris. All stumps shall be grubbed. Subgrades for fills and embankments shall be cleaned and stripped of all surface vegetation, sod, and organic topsoil. All waste materials shall be removed from the site and disposed of by and at the expense of the Contractor.

Trees 6 inches in diameter and larger shall only be removed from temporary construction easement when it is necessary for the trenching operation; and only then with permission of the Owner.

## **5.0 BLASTING**

The Contractor shall be responsible for all damage caused by blasting operations. Suitable methods shall be employed to confine all materials lifted by blasting within the limits of the excavation or trench.

The local Fire Authority shall be contacted to obtain blasting permits as may be required.

All rock which cannot be handled and compacted as earth shall be kept separate from other excavated materials and shall not be mixed with backfill or embankment materials except as specified or directed.

Rock shall be removed to provide a minimum clearance of 6 inches below and 8 inches to the sides of the pipe barrel, valves and fittings. Compacted suitable job excavated material shall be used to backfill to the bottom of the appropriate pipe embedment.

#### **6.0 UNAUTHORIZED EXCAVATION.**

Except where otherwise authorized, indicated, or specified, all materials excavated below the bottom of concrete walls, footings, slabs on grade, and foundations shall be replaced, by and at the expense of the Contractor, with concrete placed at the same time and monolithic with the concrete above.

#### **7.0 DEWATERING.**

Dewatering equipment shall be provided to remove and dispose of all surface water and groundwater entering excavations, trenches, or other parts of the Work. Each excavation shall be kept dry during subgrade preparation and continually thereafter until the structure to be built, or the pipe to be installed therein, is completed to the extent that no damage from hydrostatic pressure, flotation, or other cause will result.

All excavations for concrete structures or trenches which extend down to or below groundwater shall be dewatered by lowering and keeping the groundwater level beneath such excavations 12 inches or more below the bottom of the excavation.

Surface water shall be diverted or otherwise prevented from entering excavated areas or trenches to the greatest extent possible without causing damage to adjacent property.

The Contractor shall be responsible for the condition of any pipe or conduit which he may use for drainage purposes, and all such pipe or conduit shall be left clean and free of sediment.

#### **8.0 SHEETING AND SHORING.**

Except where banks are cut back on a stable slope, excavation for structures and trenches shall be sheeted, braced, and shored, as necessary to prevent caving or sliding and to comply with OSHA trenching and excavation regulations as revised in Subpart P of Part 1926 in the Federal Register.

Trench sheeting shall be removed slowly and in a manner not to disturb the pipelines. The pipe shall be backfilled with at least the first lift prior to removing the sheeting. When directed by the Owner, sheeting shall be left permanently in the trench. Payment for the timber portion of the sheeting will be made in accordance with the provisions of the Quoting Documents for changes in the Work and the Contract Price at the local market price for such timber and no allowance being made for any labor used in connection with handling or placing thereof.

Where trench sheeting is left in place, such sheeting shall not be braced against the pipe, but shall be supported in a manner which will preclude concentrated loads or horizontal thrusts on the pipe. Cross braces installed above the pipe to support sheeting may be removed after pipe embedment has been completed.

## **9.0 STABILIZATION.**

Subgrades for concrete structures and trench bottoms shall be firm, dense, and thoroughly compacted and consolidated; shall be free from mud and muck; and shall be sufficiently stable to remain firm and intact under the feet of the workmen.

Subgrades for concrete structures or trench bottoms which are otherwise solid, but which become mucky on top due to construction operations, shall be reinforced with crushed rock or gravel. The stabilizing material shall be spread and compacted to a depth of not more than 4 inches; if the required depth exceeds 4 inches, the material shall be furnished and installed as specified for granular fills. The finished elevation of stabilized subgrades shall not be above subgrade elevations indicated on the Drawings.

## **10.0 TRENCH EXCAVATION.**

No more trench shall be opened in advance of pipe laying than is necessary to expedite the Work. One block or 200 feet (whichever is the shorter) shall be the maximum length of open trench on any line under construction. Failure to comply with this requirement shall be cause for the shutdown of that portion of the project until such backfilling is accomplished.

Except where tunneling is indicated on the Drawings, is specified, or is permitted by the Engineer, all trench excavation shall be open cut from the surface.

### **10.01 Alignment, Grade, and Minimum Cover.**

The alignment and grade or elevation of each pipeline shall be fixed and determined from offset stakes. Vertical and horizontal alignment of pipes, and the maximum joint deflection used in connection therewith, shall be in conformity with requirements of the section covering installation of pipe.

Where pipe grades or elevations are not definitely fixed by the Contract Drawings, trenches shall be excavated to a depth sufficient to provide a minimum depth of backfill cover over the top of the pipe of 36 inches. Greater pipe cover depths may be necessary on vertical curves or to provide necessary clearance beneath existing pipes, conduits, drains, drainage structures, or other obstructions encountered at normal pipe grades. Measurement of pipe cover depth shall be made vertically from the outside top of pipe to finished ground or pavement surface elevation, except where future surface elevations are indicated on the Drawings.

### **10.02 Limiting Trench Widths.**

Trenches shall be excavated to a width which will provide adequate working space and sidewall clearances for proper pipe installation, jointing, and embedment. However, the limiting trench widths from the bottom of the trench to an elevation one foot above the top of installed pipe, and the minimum permissible sidewall clearances between the installed pipe and each trench wall, shall be as follows:

| <u>Nominal<br/>Pipe Size</u><br>Inches | <u>Minimum<br/>Trench Width</u><br>Inches |
|--|---|
| 36 to 6                                | Pipe OD plus 16                           |

Cutting trench banks on slopes to reduce earth load to prevent sliding and caving shall be used only in areas where the increased trench width will not interfere with surface features or encroach on right-of-way limits. Slopes shall not extend lower than one foot above the top of the pipe.

Where, for any reason, the width of the lower portion of the trench, as excavated at any point, exceeds the maximum permitted in the foregoing table, pipe of adequate strength, special pipe embedment, or concrete arch encasement, as required by loading conditions and with the concurrence of the Engineer, shall be furnished and installed by and at the expense of the Contractor.

### **10.03 Mechanical Excavation.**

The use of mechanical equipment will not be permitted in locations where its operation would cause damage to trees, buildings, culverts, or other existing property, utilities, or structures above or below ground. In all such locations, hand excavating methods shall be used.

Mechanical equipment used for trench excavation shall be of a type, design, and construction, and shall be so operated that the rough trench excavation bottom elevation can be controlled, that uniform trench widths and vertical sidewalls are obtained at least from an elevation one foot above the top of the installed pipe to the bottom of the trench, and that trench alignment is such that pipe, when accurately laid to specified alignment, will be centered in the trench with adequate sidewall clearance. Undercutting the trench sidewall to obtain sidewall clearance will not be permitted.

### **10.04 Excavation Below Pipe Subgrade.**

Except where otherwise required, pipe trenches shall be excavated below the underside of the pipe, as indicated on Figure 11 of Standard Details, to provide for the installation of granular embedment.

### **10.05 Stabilization Stone.**

Whenever unsuitable or unstable soil conditions are encountered, trenches shall be excavated below grade and the trench bottom shall be brought to grade with stabilization stone. Stabilization stone shall be No. 467 washed crushed stone having a maximum size of 2 inches. Approval to use stabilization stone shall be specifically obtained from the Owner prior to excavating below the bottom of the required depth for the pipe embedment. In such cases, stabilization stone shall be paid for at the unit price included in the Bid Form. Stabilization stone installed without approval of Owner will not be paid for, and the cost shall be the sole responsibility of the Contractor.

### **10.06 Bell Holes.**

Bell holes shall provide adequate clearance for tools and methods used in installing pipe. No part of any bell or coupling shall be in contact with the trench bottom, trench walls, or granular embedment when the pipe is jointed.

## **11.0 PIPE EMBEDMENT.**

Embedment materials both below and above the bottom of the pipe, classes of embedment to be used, and placement and compaction of embedment materials shall conform to the requirements indicated on the Standard Details and to the following supplementary requirements.

Embedment material shall contain no cinders, clay lumps, or other material which may cause pipe corrosion.

### **11.01 Embedment Classes.**

The following embedment classes shall be used on all pipe. The embedment class selected for a particular installation shall depend on the trench conditions and the type and size of the pipe. The Contractor shall use the embedment class indicated herein or as specified in the Special Conditions.

- a) Class A Arch Encasement. Class A arch encasement shall be used where specified in Special Conditions or on the Drawings.
- b) Class B Bedding. Class B bedding may be used for all steel, ductile iron, concrete, reinforced concrete cylinder, PVC, FRP, and all other pipelines not otherwise specified.
- c) Class C Bedding. Class C bedding may be used for all reinforced concrete, prestressed concrete, steel, PVC, and ductile iron pipelines.
- d) Class D Bedding. Class D bedding may be used for all reinforced concrete, steel, and ductile iron.

11.01.1 Water lines shall be installed using Class D embedment.

11.01.2 PVC sewer lines shall be installed using Class B embedment. DIP sewer lines shall be installed using Class C embedment.

### **11.02 Placement and Compaction.**

Granular embedment material shall be spread and the surface graded to provide a uniform and continuous support beneath the pipe at all points between bell holes or pipe joints. It will be permissible to slightly disturb the finished subgrade surface by withdrawal of pipe slings or other lifting tackle.

After each pipe has been graded, aligned, and placed in final position on the bedding material, and shoved home, sufficient pipe embedment material shall be deposited and compacted under and around each side of the pipe and back of the bell or end thereof to hold the pipe in proper position and alignment during subsequent pipe jointing and embedment operations.

Embedment material shall be deposited and compacted uniformly and simultaneously on each side of the pipe to prevent lateral displacement.

Class C and D embedment shall be compacted to the top of the pipe.

Granular embedment for 20 inch and larger pipe shall be vibrated with a mechanical probe type vibrator during placement to ensure that all spaces beneath the pipe are filled.

### **11.03 Groundwater Barrier.**

Continuity of embedment material shall be interrupted by low permeability groundwater barriers to impede passage of water through the embedment. Groundwater barriers for sewer lines shall be compacted soil, meeting soil classification GC, SC, CL, or ML-CL, compacted to 95 percent of maximum density and spaced not more than 400 feet apart. Material may be finely divided, suitable job excavated material, free from stones, organic matter, and debris.

### **12.0 TRENCH BACKFILL.**

All trench backfill above pipe embedment shall conform to the following requirements.

A layer of backfill material not more than 8 inches deep may be placed over concrete arch encasement or concrete reaction blocking after the concrete has reached its initial set, to aid curing.

#### **12.01 Compacted Backfill.**

Compacted backfill will be required for the full depth of the trench above the embedment in all locations.

The top portion of backfill beneath established lawn areas shall be finished with at least 6 inches of topsoil corresponding to, or better than, that underlying adjoining lawn areas.

At the option of the Contractor, compacted backfill may be (a) suitable job excavated material, or (b) suitable borrow pit material, as described below:

- a) Job Excavated Material. Job excavated material may be used for compacted backfill when the job excavated material is finely divided and free from debris, organic material, cinders or other corrosive material, and stones larger than 3 inches in greatest dimension. Masses of moist, stiff clay shall not be used. Job excavated materials shall be placed in uniform layers not exceeding 8 inches in uncompacted thickness. Each layer of material shall have the best possible moisture content for satisfactory compaction. The material in each layer shall be wetted or dried as required and thoroughly mixed to ensure uniform moisture content and adequate compaction. Increased layer thickness may be permitted for noncohesive material if the Contractor demonstrates to the satisfaction of the Engineer that the specified compacted density will be obtained. The method of compaction and the equipment used shall be appropriate for the material to be compacted and shall not transmit damaging shocks to the pipe. Job excavated material shall be compacted to 95 percent of maximum density at optimum moisture content, as determined by ASTM D698 when that test is appropriate, or to 70 percent relative density, as determined by ASTM D4253 and D4254 when those tests are appropriate.
- b) Suitable Borrow Pit Material. When job excavated material is unsuitable for use as compacted backfill, suitable material shall be delivered to the site from an acceptable borrow pit. Suitable material shall be placed in the same manner as suitable job excavated material.

All permits associated with the borrow pit shall be obtained by the Contractor or borrow pit operator. The Owner accepts no responsibility for the work at the borrow pit.

The material shall be free from large roots, broken pavement, rocks, and stones larger than 6 inches in any dimension, frozen earth, debris, organic material, or other objectionable matter.

No stone larger than 6 inches in any dimension shall be placed in the upper 12 inches of the trench nor shall any stone larger than 6 inches in any dimension be placed within 18 inches of the top of the pipe.

### **13.0 TESTS.**

As stipulated in the quality control section, all tests required for preliminary review of materials shall be made by an acceptable independent testing laboratory at the expense of the Contractor. Two initial gradation tests shall be made for each type of embedment, fill, or backfill material, and one additional gradation test shall be made for each additional 500 tons of each material. Moisture-density (Proctor) tests and relative density tests on the materials, and all in-place field density tests, shall be made at the expense of the Owner.

### **14.0 DRAINAGE MAINTENANCE.**

Trenches across roadways, driveways, walks, or other trafficways adjacent to drainage ditches or watercourses shall not be backfilled prior to completion of backfilling the trench on the upstream side of the trafficway, to prevent impounding water after the pipe has been laid. Bridges and other temporary structures required to maintain traffic across such unfilled trenches shall be constructed and maintained by the Contractor. Backfilling shall be done so that water will not accumulate in unfilled or partially filled trenches. All material deposited in roadway ditches or other watercourses crossed by the line of trench shall be removed immediately after backfilling is completed, and the original section, grades, and contours of ditches or watercourses shall be restored. Surface drainage shall not be obstructed longer than necessary.

### **15.0 PROTECTION OF TRENCH BACKFILL IN DRAINAGE COURSES.**

Where trenches are constructed in ditches or other watercourses, backfill shall be protected from surface erosion. Where the grade of the ditch exceeds one percent, ditch checks shall be installed. Ditch checks shall extend at least 2 feet below the original ditch or watercourse bottom for the full bottom width and at least 18 inches into the side slopes, and shall be at least 12 inches thick.

### **16.0 FINAL GRADING AND PLACEMENT OF TOPSOIL.**

After other outside work has been finished, and backfilling and embankments completed and settled, all areas which are to be graded shall be brought to grade at the indicated elevations, slopes, and contours.

All cuts, fills, embankments, and other areas which have been disturbed or damaged by construction operations shall be surfaced with topsoil to a depth of at least 4 inches. Topsoil shall be of a quality at least equal to the existing topsoil in adjacent areas, free from trash, stones, and debris, and well suited to support plant growth.

Use of graders or other power equipment will be permitted for final grading and dressing of slopes, provided the result is uniform and equivalent to hand work. All surfaces shall be graded to secure effective drainage. Unless otherwise indicated, a slope of at least one percent shall be provided.

Final grading and surfacing shall be smooth, even, and free from clods and stones larger than one inch in greatest dimension, weeds, brush, and other debris.

## **17.0 DISPOSAL OF EXCESS EXCAVATED MATERIALS.**

Except as otherwise permitted, all excess excavated materials shall be disposed of away from the site of the Work.

Broken concrete and other debris resulting from pavement or sidewalk removal, excavated rock in excess of the amount permitted to be installed in trench backfill, debris encountered in excavation work, and other similar waste materials shall be disposed of away from the site of the Work.

Excess earth from excavations located in unimproved property may be distributed directly over the pipe trench and within the pipeline right-of-way to a maximum depth of 6 inches above the original ground surface elevation at and across the trench and sloping uniformly each way. Material thus wasted shall be carefully finished with a drag, blade machine, or other suitable tool to a smooth, uniform surface without obstructing drainage at any point. Wasting of excess excavated material in the above manner will not be permitted where the line of trench crosses or is within a railroad, public road, or highway right-of-way.

The disposal of waste and excess excavated materials, including hauling, handling, grading, and surfacing, shall be a subsidiary obligation of the Contractor and no separate payment will be made therefore.

## **18.0 SETTLEMENT.**

The Contractor shall be responsible for all settlement of backfill, fills, and embankments which may occur within the correction period stipulated in the General Conditions.

The Contractor shall make, or cause to be made, all repairs or replacements made necessary by settlement within 30 days after notice from the Engineer or the Owner.

## **SP-8 – SEWER MANHOLES (ADAPTED FROM WSACC STANDARD SPECIFICATION – SECTION 02605)**

### **1.0 SCOPE.**

This section covers standard and drop sewer manholes. Standard and drop manholes shall be constructed complete with covers, steps, fittings, and other appurtenances specified herein and in accordance with the Standard Details.

### **2.0 GENERAL.**

Manholes shall be constructed with precast concrete bases as indicated in the details.

Only manholes which are required to have inside and outside pipe and fittings for dropping sewage into the lower line will be designated as drop manholes.

Inside drop manholes shall be used for 8-inch to 12-inch diameter sewer unless indicated otherwise on the drawings.

Manhole inside diameters shall generally be as follows, unless otherwise directed by the Engineer or noted on the drawings, according to the largest sewer pipe connected to the manhole:

| <u>PIPE DIAMETER</u><br>(inches) | <u>MANHOLE DIAMETER</u><br>(feet) |
|----------------------------------|-----------------------------------|
| 8 to 16                          | 4                                 |
| 18 to 36                         | 5                                 |
| 39 to 54                         | 6                                 |
| 54 and larger                    | 8                                 |

The minimum diameter of all drop manholes shall be 5 feet.

All manhole components shall be designed to withstand a H-20 loading. All precast manholes installed in the NCDOT right-of-way shall be approved by NCDOT. All design calculations, documentation, and any other information required by NCDOT shall be provided by and at the expense of the Contractor.

The maximum separation between manholes shall be in accordance with NCAC 2H .0219(i)(2)(I).

### **3.0 QUALIFICATIONS**

**3.01** The Precast Manufacturer shall comply with one of the following requirements:

- (1) Retain an independent testing or consulting engineering firm approved by the Engineer for Precast Plant Inspection. The basis for Plant Inspection shall be the National Precast Concrete Association Quality Control Manual or the Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products. The above firm shall inspect the Precast Plant 2 weeks prior to and at 1 week intervals during production of materials for this project and issue a report, certified, by a registered Engineer that materials, methods, products, and quality control meet the requirements of the above quality control manuals.

**3.02** The Precast Manufacturer shall have a recognized Quality Improvement Process installed at the manufacturing facility.

**3.03** Concrete compressive strength testing shall be performed in a laboratory inspected by the CCRL of the National Bureau of Standards or approved NCDOT laboratory.

Testing shall be performed by the Grade I ACI Certified Laboratory Technicians or by Level I PCI Certified Technicians.

### **4.0 MATERIALS.**

|   |  |
|---|--|
| Concrete for Precast Manholes and Inverts | ASTM C478, C890, C891, C923.             |
| Compressive Strength                      | 4,000 psi minimum at 28 days.            |
| Air Content                               | 4 percent minimum.                       |
| Cement                                    | 564 pounds minimum per cubic yard.       |
| Coarse Aggregate                          | ASTM C33, sound, crushed, angular stone. |
| Fine Aggregates                           | ASTM C33, free from organic impurities.  |

|  |  |
|--|--|
| Chemical Admixtures                      | ASTM C494, shall not contain calcium chloride.   |
| Air Entraining Admixtures                | ASTM C260.   |
| Precast Concrete Riser and Base Sections | Circular, uniform outside diameter; ASTM C478, except as modified herein.  |
| Minimum Wall Thickness                   | 1/12 of inside diameter, plus one inch.  |
| Reinforcement                            | ASTM A615 grade 60 deformed bar, ASTM A82 or ASTM A185 welded wire fabric.   |
| Precast Concrete Cone Sections           | Eccentric, ASTM C478; wall thickness and reinforcement as specified for riser sections.  |
| Precast Transition Cone Sections         | Eccentric transition from 60 inch and larger manholes to 48 inch diameter risers cones and flat slab top sections. The minimum transition slope shall be 45 degrees.                           |
| Precast Transition Top Sections          | Eccentric transition from 60 inch and larger manholes to 48 inch diameter risers, cones, and flat top sections   |
| Precast Flat Slab Top Sections           | HS-20 per ASTM 890 with 24 inch opening.   |
| Precast Adjusting Rings                  | Concrete, Circular, ASTM C478.<br>HDPE, Circular, ASTM D-1248  |
| Lift Loops Lifting Device                | ASTM steel strand. Lifting loops made from deformed bars are not acceptable. OSHA 1926.704   |
| Nonshrinking Grout                       | Cormix "Supreme", L&M "Crystex", Master Builders "Masterflow 713 Grout" or "Set-Grout", Sauereisen Cements "F-100 Level Fill Grout", UPCO "Upcon Super Flow", or U.S. Grout "Five Star Grout". |
| Epoxy Grout                              | two components, solvent free, moisture insensitive, high modulus, high strength, ASTM C-881, Type I and II, Grade 3, Class B and C, Epoxy Resin Adhesive.                                      |
| Resilient Manhole/Pipe Connectors        | Flexible watertight, synthetic Rubber sleeves with stainless steel clamp, drawbolt and nut; cast-in-sleeve; or "A" Lok.  |

|                              |  |
|------------------------------|--|
| Mastic                       | Fed Spec SS-S-210A; AASHTO M-198, Type B Butyl rubber and as follows: Cross-sectional area no less than the annular space times the height of the joint. |
| Vent Pipes                   | Grade B, FY = 35,000 psi, 3 inch diameter. Mesh stainless steel screen shall be in the opening.  |
| Steel Straps and Anchors     | ASTM A36, min yield strength 36,000 psi. ASTM A153 galvanized. Coated with Bituminous coating after installation.  |
| Coating, interior & exterior | Bituminous, AASHTO M-190.  |
| Coal Tar Paint               | Koppers 300M or equal 21 mils.   |
| Castings                     | ASTM A48, Class 30 traffic bearing type, machined smooth. All castings shall be American made.   |
| Standard Manhole Rings       | Vulcan Foundry, Inc., "V-B1384", and Covers Neenah "R-1550", U.S. Foundry "USF-669 Vented", or equal.  |
| Watertight Manhole           | Vulcan Foundry, Inc., "V-2328", Rings and Covers Neenah "R-1915H", U.S. Foundry "USF-669 BWT", or equal.   |
| Manhole Steps                | 1/2 inch deformed steel bar, ASTM A615, Grade 60 minimum, totally encapsulated in copolymer polypropylene, ASTM D4101.                                   |

## 5.0 MANUFACTURE.

Precast base sections shall be provided with circular openings with continuous, circular, resilient connectors. For cut-in manholes, horseshoe-shaped boxouts for connecting piping to be grouted in shall be provided. Boxouts shall have surfaces grooved or roughened to improve grout bond.

Pipe to Manhole Connectors shall conform to ASTM C923. The location of the pipe connectors shall vary from the location shown on the Project Plans no more than 1/2 inch vertically and 5 degrees horizontally. Provide for control of the pipe OD to within the tolerances of the connector on flexible pipes larger than 12 inches.

Precast sections shall be provided with lifting holes on the inside or outside faces of walls to facilitate handling. The depth of lifting holes shall not be deeper than 2 inches less than the wall thickness. Lifting holes which penetrate through the wall are not acceptable.

Inverts shall meet the following requirements:

- (a) All inverts shall be made of concrete as specified herein. Brick and mortar inverts are not acceptable.
- (b) Pipe openings shall provide clearance for pipe projecting a minimum of 2 inches inside the manhole. The invert of the pipe shall match the elevation of the trough.
- (c) Invert Troughs shall be formed and finished to provide a consistent slope from the pipe outlet to the inlets. The minimum outside bending radius from influent to effluent shall be 1.5 times the pipe ID. A 1/2 inch radius shall be provided at the intersection of 2 or more channels. The minimum concrete thickness from the bottom of the trough to the bottom of the base shall be 7 inches.
- (d) Invert Benches shall have a float finish with a uniform 2-1/2 inches slope, plus or minus 1 inch, from the high point at the manhole wall to the low point at invert trough. A 1/4 inch radius shall be provided at the edge of the bench and trough.
- (e) Depressions, high spots, voids, chips, or fractures over 1/4 inch in diameter or depth shall be filled with a sand cement paste and finished a texture reasonably consistent with that of the formed surface.

## **6.0 DELIVERY.**

Precast concrete sections shall not be delivered to the job until representative concrete control cylinders have attained a strength of at least 80 percent of the specified minimum.

## **7.0 HANDLING.**

Precast concrete sections shall be handled carefully and shall not be bumped or dropped. Hooks shall not be permitted to come in contact with joint surfaces.

## **8.0 INSPECTION.**

Precast concrete sections shall be inspected when delivered and all cracked or otherwise visibly defective units rejected.

## **9.0 CONSTRUCTION.**

### **9.01 Bases.**

Precast base sections shall be cast monolithically without construction joints or with an approved galvanized or PVC waterstop in the cold joint between the base slab and the walls.

Precast concrete bases shall have the subgrade materials excavated to undisturbed earth and to a uniform elevation which will permit at least 6 inches of granular embedment material, as specified in the earthwork section, to be installed and compacted. The surface of the granular material shall be carefully graded and the base section accurately set so that connecting pipes will be on proper line and grade. The elevation of the granular material shall be adjusted as required until proper grade and alignment of the base section has been attained.

Extended base manholes shall have an extension of the base slab beyond the outside wall a distance of at least the slab thickness (6 inches minimum).

No wedging or blocking under precast concrete bases will be permitted.

In no case shall the invert section through a manhole be greater than that of the outgoing pipe. The shape of the invert shall conform exactly to the lower half of the pipe it connects. Side branches shall be connected with as large radius of curve as practicable. All inverts shall be troweled to a smooth, clean surface.

The number of joints in the manhole shall be minimized.

#### **9.02 Riser and Cone Sections.**

Circular precast sections with a minimum lay length of 16 inches shall be provided with a mastic gasket to seal joints between sections. Mastic gaskets shall be used only at temperature recommended by the manufacturer.

Any precast sections which are damaged shall be repaired with epoxy grout in a manner acceptable to the Owner.

Joints between precast components shall be sealed internally between the tongue and the groove and additionally around the external perimeter as follows:

- (1) External seals shall consist of a polyethylene backed flat butyl rubber sheet no less than 1/16 inches thick and 6 inches wide applied to the outside perimeter of the joint.
- (2) Internal seals shall consist of a plastic or paper-backed butyl rubber rope no less than 14 feet long and having a cross-sectional area no less than the annular space times the height of the joint.

#### **9.03 Transition Top Sections.**

Transition top sections shall be furnished with vents when shown on the drawings or requested by Owner. The maximum amount of fill over the transition top section shall be 20 feet.

#### **9.04 Manhole Steps.**

Manhole steps shall be provided in Bases, Risers, Cones, Transition Cones, and Transition Top sections aligned vertically on 15" centers. Steps shall be secured to the wall with a compression fit in tapered holes or cast in place. Steps shall not be vibrated or driven into freshly cast concrete or grouted in place. Step pull-out strength shall be 1,000 lbs. minimum when tested in accordance with ASTM C478.

The bottom step in base sections shall be a maximum of 26 inches from the top of the base slab.

#### **9.05 Connecting Piping.**

The connecting pipe shall be carefully adjusted to proper line and grade, and the bedding material shall be compacted under the haunches and to the spring line of the pipe for a distance of at least 6 feet from the manhole wall and to at least the minimum trench width. The pipe shall be installed in the resilient connector prior to backfilling outside the manhole and shall be resealed as required after completion of the manhole and backfill. All visible leakage shall be eliminated.

The connecting pipe for installation with resilient connectors shall be plain end, square cut spigots and shall not protrude more than two inches inside the manhole wall.

Manholes at locations connecting with a force main shall be coated with Koppers 300M or equal 21 mils.

#### **9.06 Rings and Covers.**

No more than 12 inches of grade rings shall be installed on one manhole. All joints between cone, adjusting rings, and manhole frame shall be sealed with butyl sealant rope and sheet. In lieu of round concrete rings, all castings may be raised using round high density polyethylene (HDPE) rings or an approved equal. The manhole adjusting rings shall be molded from high density polyethylene as defined in ASTM Specification D-1248.

Frames shall be set in mastic on grade rings. In streets, road shoulders, and road rights-of-way, the covers shall be set to conform to the street or shoulder surface. If using HDPE rings, the contractor shall utilize flat and sloping units to match the required slope and or grade of the structure. In all other locations unless otherwise specified, manholes rim elevations shall be 2.0 feet above existing ground level.

#### **10.0 DAMPPROOFING.**

Before backfilling is started, the outside joints of each manhole shall be wrapped with a polyethylene backed flat butyl rubber sheet no less than 1/16 inches thick and 6 inches wide applied to the outside perimeter of the joint.

#### **11.0 PAINTING.**

Prior to installation, one coat of coal tar paint shall be applied to all castings, vent pipes, and straps. Before painting, surfaces shall be thoroughly cleaned and properly supported. All loose rust shall be removed by wire brushing. Castings, vent pipes, and straps shall not be handled until the paint is dry and hard.

#### **12.0 DRAWINGS AND DATA.**

Drawings and data covering precast concrete sections and castings shall be submitted in accordance with the submittals section.

Data submitted for steel-reinforced plastic manhole steps shall include verification of the type and grade of steel used for reinforcement, typical chemical analysis of the steel, type and classification of the plastic, and reports of acceptance tests performed in accordance with ASTM C478, Section 12.6, and C497, Section 10.

Submit a detail of each Precast Concrete Manhole Section showing the following:

1. Certification that all components meet H-20 wheel load. Certification that all components meet ASTM C478.
2. Inside diameter, wall thickness, and base or top slab thickness.
3. Reinforcing, size, spacing, and location.
4. Step locations.
5. Concrete mix no. and design strength.

Step detail and material specification.

Pipe connector details, material specification and pipe installation procedure.

Joint material details and material specifications.

Submit the following:

All calculations must be sealed by a registered professional engineer registered in North Carolina.

**SP-9 – SEWER PIPE INSTALLATION AND TESTING AND MANHOLE TESTING (ADAPTED FROM WSACC STANDARD SPECIFICATION – SECTION 02702)**

**1.0 SCOPE.**

This section covers installation and testing of all sewer pipe and testing of manholes. Sewer pipe materials are specified in other sections.

Pipe trenching, bedding, and backfill are covered in the earthwork section.

**2.0 HANDLING.**

Pipe, fittings, and appurtenances shall be transported, stored, and handled in a manner which prevents damage. Hooks shall not be permitted to contact joint surfaces. Materials shall be removed from trucks in a careful manner to reduce banging against the truck. In no instances shall materials be dropped from the truck during unloading. Plastic pipe shall be shaded if necessary to prevent curvature due to thermal expansion. Damaged pipe and fittings shall be removed from the site.

**3.0 CLEANING.**

The interior of all pipe and fittings shall be thoroughly cleaned before installation and shall be kept clean until the work has been accepted. All joint contact surfaces shall be kept clean until the joint is completed.

Foreign material shall be prevented from entering the pipe during installation. No debris, tools, clothing, or other materials shall be placed in the pipe.

**4.0 ALIGNMENT.**

Piping shall be laid to the lines and grades indicated on the drawings. Batter boards, laser beam equipment, or surveying instruments shall be used to maintain alignment and grade.

Batter boards, if used, shall be erected at intervals of not more than 25 feet. Batter boards shall be used to determine and check pipe subgrades. Not less than three batter boards shall be maintained in proper position at all times when trench grading is in progress.

If laser beam equipment is used, periodic elevation measurements shall be made with surveying instruments to verify accuracy of grades. If such measurements indicate thermal deflection of the laser beam due to differences between ground temperature and the air temperature within the pipe, precautions shall be taken to prevent or minimize further thermal deflections.

**5.0 LATERAL SEPARATION OF WATER AND SEWER MAINS.**

Separation of water and sewer mains shall be as specified in the Earthwork section and Standard Details.

## **6.0 LAYING PIPE.**

Lateral displacement of the pipe shall be prevented during embedment operations. Pipe shall not be laid in water, nor under unsuitable weather or trench conditions.

Pipe laying shall begin at the lowest elevation with bell ends facing the direction of laying except when reverse laying is permitted by the Engineer. Whenever pipe laying is stopped, the open end of the pipe shall be closed with an end board closely fitting the end of the pipe, to keep sand and earth out of the pipe. The end board shall have several small holes near the center to permit water to enter the pipe and prevent flotation in the event of flooding of the trench.

Core holes and handling holes in concrete pipe shall be repaired by cementing a properly shaped concrete plug in place with epoxy cement or by other methods acceptable to the Engineer.

### **6.01 Creek Crossings.**

For crossings below water level, the top of the pipe (ductile iron pipe) should be located at or below the bottom of the streambed. For crossings above water level, the bottom of the pipe (ductile iron pipe) should be located above the 25-year flood elevation.

## **7.0 JOINTING.**

All joint preparation and jointing operations shall comply with the instructions and recommendations of the pipe manufacturer.

Immediately before rubber gasketed bell-and-spigot type joints are pushed together, all joint surfaces shall be coated with the lubricant furnished with the pipe. The position and condition of each rubber gasket (unbonded gaskets) shall be checked with a feeler after the joint is completed.

## **8.0 CONNECTING TO EXISTING MANHOLES.**

All connections to existing manholes shall be made in accordance with the specifications and standard details for pipe connections to new manholes. All connections to existing manholes shall be cored unless written permission is given by the Engineer to use other means. Resilient connectors conforming to ASTM C923 and as specified in the sewer manhole section shall be provided at all pipe-to-manhole connections.

Connections to existing manholes will not be allowed until the new sewer system has been completely installed, cleaned, tested, and accepted by the Owner. Following acceptance by the Owner, Contractor shall provide 48 hour advance notice of all connections to existing manholes.

## **9.0 SERVICE CONNECTIONS.**

Service connections shall not be installed as vertical risers but shall be laid on a slope not to exceed 2 feet vertical to one foot horizontal. Each service connection pipe shall have a solid bearing on undisturbed earth. Service connections shall be as specified in the Wastewater Service Connections section.

## **10.0 CONCRETE ENCASEMENT.**

Concrete encasement shall be installed where indicated on the drawings. Concrete and reinforcing steel shall be as specified in the cast-in-place concrete section. All pipe which is to be encased shall be suitably supported and blocked in proper position and shall be anchored against flotation.

## **11.0 ACCEPTANCE TESTS.**

Each reach of sewer shall meet the requirements of the following acceptance tests. All defects shall be repaired to the satisfaction of the Engineer.

### **11.01 Lamping.**

Unless otherwise indicated on the drawings, each section of sewer line between manholes shall be straight and uniformly graded. Each such section will be lamped by the Engineer. The Contractor shall furnish suitable assistants to assist the Engineer. The Contractor shall provide all equipment to assure that the manholes are properly ventilated in compliance with confined space requirements prior to any personnel entering the manhole.

### **11.02 Exfiltration.**

For pipe greater than 24 inches in diameter, an exfiltration test shall be conducted on each reach of sewer between manholes. The first line between manholes shall be tested before backfilling and before any sewer pipe is installed in the remainder of the work. Thereafter, exfiltration testing shall be done after backfilling, and individual or multiple reaches may be tested at the option of the Contractor.

Exfiltration tests shall be conducted by blocking off all manhole openings except those connecting with the reach being tested, filling the line, and measuring the water required to maintain a constant level in the manholes. Each manhole shall be subjected to at least one exfiltration test.

During the exfiltration test, the water depth above the pipe invert at the lower end shall be at least to the elevation of the ground surface, unless otherwise specified. The maximum depth at the lower end shall not exceed 25 feet and the minimum depth at the upper end shall be at least 5 feet above the crown of the pipe or 5 feet above groundwater elevation, whichever is higher.

The total exfiltration shall not exceed 100 gallons per inch of nominal diameter per mile of pipe per day for each reach tested. For purposes of determining maximum allowable leakage, nominal diameter and depth of manholes shall be included. The exfiltration tests shall be maintained on each reach for at least 2 hours and as much longer as necessary, in the opinion of the Engineer, to locate all leaks.

The Contractor shall provide, at his own expense, all necessary piping between the reach to be tested and the source of water supply, and all labor, equipment, and materials required for the tests. The methods used and the time of conducting exfiltration tests shall be acceptable to the Engineer.

### **11.03 Low Pressure Air Testing.**

For pipe 24 inches in diameter and less, low pressure air testing shall be used in lieu of exfiltration testing.

Low pressure air testing shall comply with ASTM C828 for PVC pipe, and shall comply with ASTM C924 for concrete pipe. The schedule of testing shall be submitted to the Engineer prior to starting the tests. The time of conducting the tests shall be acceptable to the Engineer.

The time elapsed for a one psi drop in air pressure from 4 psi to 3 psi shall be not less than as shown in the following table:

AIR TEST TABLE  
Based on equations from ASTM C-828  
SPECIFICATION TIME (min. sec.) REQUIRED FOR PRESSURE DROP  
FROM 4 to 3 PSIG  
WHEN TESTING ONE PIPE DIAMETER ONLY

| Length of Line in Feet | 4    | 6    | 8    | 10   | 12   | 15    | 18    | 21    | 24    |
|------------------------|------|------|------|------|------|-------|-------|-------|-------|
| 25                     | 0:04 | 0:10 | 0:18 | 0:28 | 0:40 | 1:02  | 1:29  | 2:01  | 2:38  |
| 50                     | 0:09 | 0:20 | 0:35 | 0:55 | 1:19 | 2:04  | 2:58  | 4:03  | 5:17  |
| 75                     | 0:13 | 0:30 | 0:53 | 1:23 | 1:59 | 3:06  | 4:27  | 6:04  | 7:55  |
| 100                    | 0:18 | 0:40 | 1:10 | 1:50 | 2:38 | 4:08  | 5:56  | 8:05  | 10:34 |
| 125                    | 0:22 | 0:50 | 1:28 | 2:18 | 3:18 | 5:09  | 7:26  | 9:55  | 11:20 |
| 150                    | 0:26 | 0:59 | 1:46 | 2:45 | 3:58 | 6:11  | 8:30  | 9:55  | 11:20 |
| 175                    | 0:31 | 1:09 | 2:03 | 3:13 | 4:37 | 7:05  | 8:30  | 9:55  | 11:20 |
| 200                    | 0:35 | 1:19 | 2:21 | 3:40 | 5:17 | 7:05  | 8:30  | 9:55  | 11:20 |
| 225                    | 0:40 | 1:29 | 2:38 | 4:08 | 5:40 | 7:05  | 8:30  | 10:25 | 13:36 |
| 250                    | 0:44 | 1:39 | 2:56 | 4:35 | 5:40 | 7:05  | 8:31  | 11:35 | 15:07 |
| 275                    | 0:48 | 1:49 | 3:14 | 4:43 | 5:40 | 7:05  | 9:21  | 12:44 | 16:38 |
| 300                    | 0:53 | 1:59 | 3:31 | 4:43 | 5:40 | 7:05  | 10:12 | 13:53 | 18:09 |
| 350                    | 1:02 | 2:19 | 3:47 | 4:43 | 5:40 | 8:16  | 11:54 | 16:12 | 21:10 |
| 400                    | 1:10 | 2:38 | 3:47 | 4:43 | 6:03 | 9:27  | 13:36 | 18:31 | 24:12 |
| 450                    | 1:19 | 2:50 | 3:47 | 4:43 | 6:48 | 10:38 | 15:19 | 20:50 | 27:13 |
| 500                    | 1:28 | 2:50 | 3:47 | 5:15 | 7:34 | 11:49 | 17:01 | 23:09 | 30:14 |

The air test table has been prepared utilizing applicable equations from ASTM C-828. It is based on an allowable air loss of 0.0003 ft/min ft of internal pipe surface, a maximum air loss per test section of 3.5 ft/min and a minimum significant air loss per test section of 2.0 ft/min (test sections of such length that an air loss of 3.5 ft/min would be exceeded using the allowable loss of air per square foot of internal pipe surface may be tested in segments where total air loss would be between 2.0 and 3.5 ft/min). It applies when testing one pipe only.

The air test may be dangerous if a line is improperly prepared. It is extremely important that the various plugs shall be installed and braced in such a way as to prevent blowouts. In so much as a force of 250 LBF (112 N) is exerted on an 8 inch (203 mm) plug by an internal pipe pressure of 5 psi (34 kPa), it should be realized that sudden expulsion of a poorly installed plug or of a plug that is partially deflated

before the pipe pressure is released can be dangerous. As a safety precaution, pressurizing equipment may include a regulator or relief valve set at perhaps 10 psi (69 kPa) to avoid over-pressurizing and damaging an otherwise acceptable line. No one shall be allowed in the manholes during testing.

If the length of sewer to be tested is submerged or partially submerged in groundwater, the test pressure shall be increased as required to overcome the actual static pressure exerted by the groundwater. If a test pressure greater than 8 psi results, air testing shall not be used, and exfiltration testing will be required.

Leaks shall be located by testing short sections of pipe. Leaks shall be repaired and the reach of sewer retested.

#### **11.04 Infiltration.**

All sewer lines below the water table shall be checked for infiltration. If, at any time prior to expiration of the correction period stipulated in the General Conditions, infiltration exceeds 100 gallons per inch of nominal diameter per mile of sewer per day, the Contractor shall locate the leaks and make repairs as necessary to control the infiltration.

All visible leaks in manholes shall be repaired.

#### **11.05 Deflection.**

At least thirty days after backfilling is complete, and prior to acceptance of the Work, each reach of sewer shall be checked for excessive deflection by pulling a mandrel through the pipe, or by other methods acceptable to the Engineer. The mandrel shall be cylindrical in shape and constructed with 9 evenly spaced arms. The critical dimension of the mandrel shall have a +/- 0.01 inch tolerance. Pipe with diametrical deflection exceeding 5 percent of the inside diameter shall be uncovered, and the bedding and backfill replaced to prevent excessive deflection. Repaired pipe shall be retested.

#### **11.06 Television Inspection.**

Prior to final acceptance, each section of sewer line between manholes and all services lines shall be visually inspected by means of a closed-circuit television system.

Contractor shall use a color video camera specifically designed and constructed for internal inspection of gravity sewer lines. The camera shall be equipped with lighting suitable to allow clear picture of the entire periphery of the pipe and capable of operating in conditions of 100 percent humidity. Only high quality cameras, television monitors, recorders, and other components of the video system capable of producing detailed video records of the sewer lines inspected shall be used. The equipment shall be capable of displaying and recording selected digital (manhole numbers) and automatic digit (feet of distance) information. The location accuracy of the equipment shall be within 1 foot for each 1,000 feet inspected.

For each section of line inspected, Contractor shall maintain television inspection logs recording locations, relative to an adjacent manhole, of all points of significance in the line, such as locations of sewer service connections, bends, points of infiltration, broken or damaged pipe sections, or obstructions. Copies of inspection logs shall be provided to the Owner.

Contractor shall produce a high quality color video tape or DVD recording of each line inspected, providing both an audio and visual record of the installed sewer system. All points of significance in the lines shall be identified, including locations of sewer service connections, bends, points of infiltration, broken or damaged pipe sections, or obstructions. Video shall identify location of camera in feet from an

adjacent manhole as the camera travels through pipeline. Contractor shall provide Owner with a copy of all video recording, appropriately labeled, on VHS or DVD format.

Contractor shall repair all defective work identified by the television inspections and the defective lines re-inspected.

## **12.0 MANHOLE TESTING.**

After the manhole is installed and all pipes are tied in, but before backfilling or installing frame and cover, the manhole shall be vacuum tested. All pipes that enter the manhole shall be plugged and properly braced. Then the testing machine shall be installed and a vacuum of 10 inches of mercury shall be placed on the inside of the manhole. Once the 10 inches of mercury vacuum is achieved the vacuum shall be shut-off and the amount of time to drop to 9 inches of mercury shall be recorded. If the vacuum drops from 10 to 9 in less than 60 seconds for a 4-foot manhole, 75 seconds for a 5-foot manhole, 90 seconds for a 6-foot manhole, 105 seconds for a 7-foot manhole, 120 seconds for an 8-foot manhole, and 150 seconds for a 10-foot manhole the manhole fails the vacuum test. If the test fails, Contractor shall determine the location of the leak and make all necessary repairs. Once the repairs are made the manhole shall be retested. This process shall continue until the manhole passes the vacuum test.

## **SP-10 – POLYVINYL CHLORIDE (PVC) SEWER PIPE (ADAPTED FROM WSACC STANDARD SPECIFICATION – SECTION 02628)**

### **1.0 SCOPE.**

This section covers solid wall and profile wall polyvinyl chloride (PVC) gravity sewer pipe and fittings to be furnished and installed complete with all jointing materials and appurtenances.

Pipe shall be installed and tested in accordance with Section 02702— Sewer Pipe Installation and Testing and Manhole Testing.

Pipe trenching, bedding, and backfill are covered in the earthwork section.

### **2.0 MATERIALS.**

#### Pipe and Fittings

4 Inch Through 15 Inch

Solid wall ASTM D3034, SDR 35, Cell Classification 12454-B.

18 Inch Through 48 Inch

Profile wall ASTM F794  
Stiffness PS46.

#### Jointing Materials

Bell-and-Spigot Joints

ASTM D3212, integral bell push-on type elastomeric gasket joints.

Gaskets

ASTM F477, synthetic rubber. Natural rubber will not be acceptable.

Field-Cut Joints and  
Connections to Other Piping

Fernco "Flexible Couplings"  
with stainless steel shear rings, or Harrington  
Corp. C900 x SDR 35 B x B Adapters, or equal

For Grouted Connections to  
Cast-in-Place Concrete  
Manholes

Rubber ring water stop.

Pipe or fittings having spiral external reinforcing ribs will not be acceptable. Pipe or fittings having concentric external reinforcing ribs will not be acceptable in any pipe size less than 24 inch.

### **3.0 DRAWINGS AND DATA.**

Drawings and data shall be submitted in accordance with the submittals section. Drawings and data shall include, but not be limited to, the following:

Details of joints.

Gasket material.

Pipe length.

Certification in accordance with ASTM D3034, Section 11, ASTM F679, Section 10, or ASTM F794.

## **SP-11 – DUCTILE IRON PIPE (ADAPTED FROM WSACC STANDARD SPECIFICATION – SECTION 02620)**

### **1.0 SCOPE.**

This section covers ductile iron pipe. Ductile iron pipe shall be furnished complete with all fittings, jointing materials, blocking, encasement, and other necessary appurtenances.

Piping furnished hereunder shall be complete with all joint gaskets, bolts, and nuts required for installation of valves and equipment furnished by others for installation under this contract.

Pipe shall be tested in accordance with the pipeline pressure and leakage testing section.

Pipe trenching, bedding, and backfill are covered in the earthwork section.

### **2.0 MATERIALS.**

Pipe

Ductile iron, ANSI/AWWA  
C151/A21.51; thickness class as listed in the  
table at the end of this section.

Fittings

|   |   |
|---|---|
| Material, Dimensions,<br>and Manufacture              | Ductile iron, ANSI/AWWA C110/A21.10<br>or ANSI/AWWA C153/A21.53.  |
| Push-on and<br>Mechanical Joint                       |   |
| 24 Inch and<br>Smaller                                | 350 psi pressure rating.  |
| 30 Inch and<br>Larger                                 | 250 psi pressure rating.  |
| Flanged   | 250 psi pressure rating.  |
| Push-on Joints  | ANSI/AWWA C111/A21.11, except gaskets shall be neoprene or other synthetic rubber. Natural rubber will not be acceptable.   |
| Restrained Push-on Joints<br>(4-inch through 12-inch) | American "Fast-Grip" or U.S. Pipe "Field Lok Gasket".   |
| Restrained Push-on Joints<br>(4-inch through 20-inch) | EBAA Iron "Megalug" Series 1700, or U.S. Pipe "Field Lok Gasket" without exception.   |
| Restrained Push-on Joints<br>(4-inch through 64 inch) | American "Flex-Ring", "Lok-Fast", or "Lok-Ring"; Clow "Super-Lock"; U.S. Pipe "TR Flex"; or Griffin "Snap-Lok". Use of setscrews bearing on the pipe wall will not be acceptable. |
| Flanged Joints  | ANSI/AWWA C115/A21.15.  |
| Flanges   | Ductile iron, ANSI/AWWA C115/A21.15, flat faced with shallow serrations.  |
| Bolts   | ASTM A307, chamfered or rounded ends projecting 1/4 to 1/2 inch beyond outer face of nut.   |
| Nuts  | ASTM A307, hexagonal, ANSI/ASME B18.2.2, heavy semi-finished pattern.   |
| Gaskets   | ASTM D1330, Grade I rubber, full face type, 1/8-inch thick.   |
| Mechanical Joints                                     | ANSI/AWWA C111/A21.11, except gaskets shall be neoprene or other synthetic rubber. Natural rubber will not be acceptable. See Push-on Joints for restraining.                     |
| Mechanical Joints with Tie Rods                       | See details at the end of this section.   |

|   |   |
|---|---|
| Tie Rods                                | ASTM A307.  |
| Steel Pipe                              | ASTM A53, standard weight.  |
| Washers                                 | ANSI B18.22.1, plain steel.   |
| Grooved Couplings                       | AWWA C606.  |
| Pipe Ends                               | Grooved, with dimensions conforming to AWWA C606, Table 5, for rigid joints.  |
| Couplings, through 24-inch psi pressure | Victaulic "Style 31".   |
| Threaded Connections                    | ANSI/ASME B1.20.1, NPT; provide boss or tapping saddle wherever wall thickness minus the foundry tolerance at the tapped connection is less than that required for 4-thread engagement as set forth in Table A.1, Appendix A, of ANSI/AWWA C151/A21.51. |
| Mechanical Couplings                    |   |
| Couplings                               | Dresser "Style 53".   |
| Gaskets                                 | Oil-resistant synthetic rubber.   |
| Shop Coating and Lining                 |   |
| Cement Mortar Lining                    | ANSI/AWWA C104/A21.4, and Fed Spec WW-P421-C.   |
| Asphaltic Coating                       | Manufacturer's standard.  |
| Coal Tar Coating                        | Thixotropic coal tar, MIL-C-18480; Kop-Coat "Bitumastic No. 50" or Tnemec "46-450 Heavy Tnemecol".  |
| Conductive Tracer                       | #12 plastic coated solid copper wire connected to the pipe at valves. See standard drawings for installation at valve boxes.  |
| Location Tape                           | Non-Metallic location tape shall be placed 1 foot above mains.  |
| Polyethylene Tube                       | Seamless, ANSI/AWWA C105/A21.5, installation method A if required in Special Conditions.  |

### **3.0 SHOP COATING AND LINING.**

The interior of all pipe and fittings for water service shall be cement mortar lined. The interior of all sewer pipe and fittings shall have 1 mil of asphaltic lining.

Exterior surfaces of all pipe and fittings shall be asphaltic coated.

### **4.0 HANDLING.**

Pipe, fittings, and accessories shall be handled in a manner that will ensure installation in sound, undamaged condition. Equipment, tools, and methods used in handling and installing pipe and fittings shall not damage the pipe and fittings. Hooks inserted in ends of pipe shall have broad, well-padded contact surfaces.

Pipe and fittings in which the lining has been damaged shall be replaced. With the concurrence of the Engineer, small and readily accessible damaged areas may be repaired.

All pipe coating which has been damaged shall be repaired by the Contractor before the pipe is installed.

### **5.0 CUTTING PIPE.**

Cutting shall be done in a neat manner, without damage to the pipe or the lining. Cuts shall be smooth, straight, and at right angles to the pipe axis. After cutting, the end of the pipe shall be dressed with a file or power grinder to remove all roughness and sharp edges. The cut ends of push-on joint pipe shall be suitably beveled.

Ends of ductile iron pipe shall be cut with a portable guillotine saw, abrasive wheel, saw, milling cutter, or oxyacetylene torch. The use of hydraulic squeeze type cutters will not be permitted. Field-cut holes for saddles shall be cut with mechanical cutters; oxyacetylene cutting will not be permitted.

### **6.0 CLEANING.**

The interior of all pipe and fittings shall be thoroughly cleaned of all foreign matter prior to installation and shall be kept clean until the work has been accepted. Before jointing, all joint contact surfaces shall be wire brushed if necessary, wiped clean, and kept clean until jointing is completed.

Precautions shall be taken to prevent foreign material from entering the pipe during installation. Debris, tools, clothing, or other materials shall not be placed in or allowed to enter the pipe.

Whenever pipe laying is stopped, the open end of the pipe shall be sealed with a watertight plug which will prevent trench water from entering the pipe.

### **7.0 INSPECTION.**

Pipe and fittings shall be carefully examined for cracks and other defects immediately before installation; spigot ends shall be examined with particular care. All defective pipe and fittings shall be removed from the site of the work.

## **8.0 ALIGNMENT.**

Piping shall be laid to the lines and grades indicated on the Drawings. Pipelines or runs intended to be straight shall be laid straight. Deflections from a straight line or grade shall not exceed the values stipulated in Table 4 or Table 5 of AWWA C600, unless specially designed bells and spigots are provided.

Either shorter pipe sections or fittings shall be installed where required to conform to the alignment or grade indicated on the Drawings.

If laser beam equipment is used, periodic elevation measurements shall be made with surveying instruments to verify accuracy of grades. If such measurements indicate thermal deflection of the laser beam due to differences between ground temperature and the air temperature within the pipe, precautions shall be taken to prevent or minimize further thermal deflections.

## **9.0 LAYING PIPE.**

Pipe shall be protected from lateral displacement by placing the specified pipe embedment material. Under no circumstances shall pipe be laid in water, and no pipe shall be laid under unsuitable weather or trench conditions.

Pipe shall be laid with the bell ends facing the direction of laying, except when reverse laying is specifically authorized by the Engineer.

Prior to final acceptance by the Owner, Contractor shall perform continuity tests on the conductive tracer to ensure proper installation. All defective areas shall be repaired and the conductive tracer retested.

## **10.0 FIELD JOINTS.**

Joints in buried locations shall be mechanical joint or push-on type unless otherwise indicated on the Drawings. Bells on wall castings and wall sleeves shall be mechanical joint type with tapped holes for tie rods or stud bolts. All other joints shall be flanged unless otherwise indicated on the Drawings.

All push-on and mechanical joint valves, tees, Y-branches, bends, and plugs installed in buried locations shall be restrained by restrained push-on or mechanical joints.

Where permitted by the Engineer, grooved couplings may be used in lieu of flanges, provided rigid grooving is used to preclude longitudinal pipe movement and angular deflection at joints. Fittings, valves, and other items of equipment installed using grooved couplings shall be adequately supported and blocked or restrained as required to prevent rotation.

## **11.0 MECHANICAL JOINTS.**

Mechanical joints shall be carefully assembled in accordance with the manufacturer's recommendations. If effective sealing is not obtained, the joint shall be disassembled, thoroughly cleaned, and reassembled. Bolts shall be uniformly tightened to the torque values listed in Appendix A of ANSI/AWWA C111/A21.11. Overtightening of bolts to compensate for poor installation practice will not be permitted.

The holes in mechanical joints with tie rods shall be carefully aligned to permit installation of the tie rods. In flange and mechanical joint pieces, holes in the mechanical joint bells and the flanges shall straddle the

top (or side for vertical piping) center line. The top (or side) center line shall be marked on each flange and mechanical joint piece at the foundry.

#### **12.0 PUSH-ON JOINTS.**

The pipe manufacturer's instructions and recommendations for proper jointing operations shall be followed. All joint surfaces shall be lubricated with heavy vegetable soap solution immediately before the joint is completed. Lubricant shall be suitable for use in potable water, shall be stored in closed containers, and shall be kept clean. Each spigot end shall be suitably beveled to facilitate assembly.

Pipe ends for restrained joint pipe shall be prepared in accordance with the pipe manufacturer's recommendations.

#### **13.0 FLANGED JOINTS.**

Pipe shall extend completely through screwed-on flanges. The pipe end and flange face shall be finish machined in a single operation. Flange faces shall be flat and perpendicular to the pipe center line.

When bolting flanged joints, care shall be taken to avoid restraint on the opposite end of the pipe or fitting, which would prevent uniform gasket compression or which would cause unnecessary stress in the flanges. One flange shall be free to move in any direction while the flange bolts are being tightened. Bolts shall be tightened gradually and at a uniform rate, to ensure uniform compression of the gasket.

Special care shall be taken when connecting to pumping equipment to ensure that pipe stresses are not transmitted to the pump flanges. All such piping shall be permanently supported so that accurate matching of bolt holes and uniform contact over the entire surface of abutting pump and piping flanges are obtained before installation of any bolts in those flanges. In addition, pump connection piping shall be free to move parallel to its longitudinal center line while the flange bolts are being tightened.

Each pump shall be leveled, aligned, and wedged into position to fit the connecting piping, but shall not be grouted until the initial fitting and alignment of the pipe so that the pump may be shifted on its foundation as necessary. Each pump shall be grouted before final bolting of the connecting piping.

#### **14.0 MECHANICAL COUPLINGS.**

Mechanical couplings shall be carefully installed in accordance with the manufacturer's recommendations. A space of at least 1/4 inch and not more than 1 inch shall be left between the pipe ends. Pipe and coupling surfaces which contact gaskets shall be clean and free from dirt and other foreign matter during assembly. All assembly bolts shall be uniformly tightened so that the coupling is free from leaks and all parts of the coupling are square and symmetrical with the pipe. Following installation of the coupling, damaged areas of shop coatings on the pipe and coupling shall be repaired to the satisfaction of the Engineer.

The interior surfaces of the middle rings shall be prepared for painting in accordance with instructions of the paint manufacturer and shall then be coated with liquid epoxy in accordance with ANSI/AWWA C210. The remaining components shall be cleaned and shop primed with the manufacturer's standard rust-inhibitive primer.

## **15.0 GROOVED END JOINTS.**

Grooved couplings shall be installed in accordance with the coupling manufacturer's recommendations. Completed joints shall be rigid and shall not allow angular deflection or longitudinal movement. Except for closure pieces, field grooving of pipe will not be permitted.

Special care shall be taken when connecting to pumping equipment to avoid transmitting pipe stresses to the pump flanges. Piping shall be permanently supported so that accurate matching of piping and abutting pump flanges is obtained before any bolts are installed in the flanges.

## **16.0 REDUCERS.**

Where indicated on the Drawings, reducers shall be eccentric pattern, installed with the straight side on top so that air traps are not formed. All other reducers shall be concentric pattern.

## **17.0 OUTLETS.**

Where a 12 inch or smaller branch outlet is indicated and the diameter of the line pipe is at least twice the diameter of the branch, either a tee, factory welded-on boss, or a tapping saddle will be acceptable.

Connection of gauges to 6 inch and smaller cast iron pipe shall be made using a tapping saddle, or a tee complete with blind flange drilled and tapped to accept the gauge piping specified. Connection of gauges to 8 inch and larger piping shall be made by means of a factory welded-on boss or a tapping saddle. Drilling and tapping of the pipe wall will also be acceptable provided the wall thickness, minus the foundry tolerance, at the point of connection equals or exceeds the wall thickness required for 4-thread engagement in accordance with Table A.1, Appendix A, of ANSI/AWWA C151/A21.51.

## **18.0 CONNECTIONS WITH EXISTING PIPING.**

Connections between new work and existing piping shall be made using fittings suitable for the conditions encountered. Each connection with an existing pipe shall be made at a time and under conditions which will least interfere with service to customers, and as authorized by the Owner. Facilities shall be provided for proper dewatering and for disposal of all water removed from the dewatered lines and excavations without damage to adjacent property.

Special care shall be taken to prevent contamination when dewatering, cutting into, and making connections with existing potable water piping. Trench water, mud, or other contaminating substances shall not be permitted to enter the lines. The interior of all pipe, fittings, and valves installed in potable water connections shall be thoroughly cleaned and then swabbed with, or dipped in, chlorine solution having a chlorine content of 200 milligrams per liter.

## **19.0 CONCRETE ENCASEMENT.**

Concrete encasement shall be installed as indicated on the details and Drawings. Concrete and reinforcing steel shall be as specified in the cast-in-place concrete section. All pipe to be encased shall be suitably supported and blocked in proper position, and shall be anchored to prevent flotation.

## **20.0 REACTION ANCHORAGE AND BLOCKING.**

All exposed piping with mechanical couplings, push-on or mechanical joints, or similar joints subject to internal pressure shall be blocked, anchored, or harnessed to preclude separation of joints. All push-on

and mechanical joint tees, Y-branches, bends deflecting 22-1/2 degrees or more, and plugs which are installed in buried piping (subjected to internal hydrostatic heads in excess of 30 feet) shall be provided with suitable reaction blocking, anchors, joint harness, or other acceptable means for preventing movement of the pipe caused by internal pressure. Regardless of the restraining system provided, all valves, tees, Y-branches, bends, and plugs shall be restrained with tie rods or by restrained push-on joints.

Concrete blocking shall extend from the fitting to solid undisturbed earth and shall be installed so that all joints are accessible for repair. The dimensions of concrete reaction blocking shall be as indicated on the Drawings or as directed by the Engineer. If adequate support against undisturbed ground cannot be obtained, metal harness anchorages shall be installed to provide the necessary support. Metal harness anchorages shall consist of steel rods extending across the joint and securely anchored to pipe and fitting, or other adequate anchorage facilities shall be installed to provide the necessary support. If the lack of suitable solid vertical excavation face is due to improper trench excavation, metal harness anchorages shall be furnished and installed by and at the expense of the Contractor.

Reaction blocking, anchorages, or other supports for fittings installed in fills or other unstable ground, installed above grade, or exposed within structures shall be provided as required by the Drawings or as directed by the Engineer.

All ferrous metal clamps, rods, bolts, and other components of tapping saddles, reaction anchorages, or joint harness, subject to submergence or contact with earth or other fill material and not encased in concrete, shall be protected from corrosion by two coats of thixotropic coal tar applied in the field to clean, dry metal surfaces. The first coat shall be dry and hard before the second coat is applied. Metal surfaces exposed above grade or within structures shall be painted with one prime coat and two finish coats of a paint acceptable to the Engineer.

**21.0 DIMENSIONS.**

The thickness class for ductile iron pipe shall be as indicated in the following table

| <u>Location</u> | <u>Nominal Size</u><br>inches | <u>ANSI/AWWA</u><br><u>Pressure</u><br><u>Class</u> | <u>Minimum</u><br><u>Thickness</u><br><u>Class</u> |
|-----------------|-------------------------------|---|--|
| Water           | 3 to 12                       | 350   | N/A  |
| Water           | 16 and larger                 | 250 or as<br>otherwise<br>required                  | N/A  |
| Wastewater      | All sizes                     | N/A   | 50   |

Note

The specified pressure class includes corrosion allowance and foundry tolerance.

Pipe wall thickness for threaded pipe shall be increased if necessary to comply with the following minimum thicknesses:

| <u>Pipe Size</u>   | <u>Minimum Thickness Class</u> |                            |
|--------------------|--------------------------------|----------------------------|
|                    | <u>Threaded Ends</u><br>(1)    | <u>Grooved Ends</u><br>(2) |
| 4-16 inch          | 53                             | 53                         |
| 18 inch            | 53                             | 54                         |
| 20 inch            | 53                             | 55                         |
| 24 inch and larger | 53                             | 56                         |

- (1) Complies with ANSI/AWWA C115/A21.15 for minimum pipe wall thickness for threaded flanges.
- (2) Grooved couplings are cataloged through 24 inch; larger sizes require cast-on or threaded-on shoulders.

**22.0 DRAWINGS AND DATA.**

Complete layout drawings, details, and specifications covering all ductile iron piping and accessories shall be submitted in accordance with the submittals section.

Submittal data shall clearly indicate the country of origin of pipe, fittings, restraining devices, and accessories. When requested by the Engineer, certified copies of physical and chemical test results shall be submitted for the materials to be provided.

**SP-12 – PIPELINE PRESSURE AND LEAKAGE TESTING, CLEANING, AND DISINFECTION (ADAPTED FROM WSACC STANDARD SPECIFICATION - SECTION 02704)**

**1.0 SCOPE.**

This section covers field hydrostatic pressure and leakage testing of the pipelines set forth herein. Cleaning of wastewater force mains and cleaning and disinfection of potable water lines are also described in this section.

Testing of sewer systems is covered in the sewer pipe installation and testing section.

**2.0 GENERAL.**

Unless otherwise specified, testing of pipelines shall be completed prior to disinfection and shall be in conformance with AWWA specifications C-600, section 4, latest revision.

The Engineer shall be present during the performance of all testing work and shall be notified of the time and place of testing at least 3 days prior to commencement of the work. All work shall be performed to the satisfaction of the Engineer.

### **2.01 Testing Schedule and Procedure.**

A testing schedule and test procedure shall be submitted to the Engineer for review and acceptance not less than 21 days prior to commencement of testing work. The schedule shall indicate the proposed time and sequence of testing of each pipeline. The testing procedure shall establish the limits of each pipeline to be tested, the position of all valves during testing, the location of temporary bulkheads, and all other procedures to be followed in performing the required testing work.

### **2.02 Special Testing Requirements.**

Unless otherwise permitted, pressure and leakage tests shall be made against closed hydrants.

The maximum length of line to be tested is approximately 5,000 feet. All valves shall be tested with pressure against one side to verify they are operating properly.

### **2.03 Water.**

Water used for testing shall be furnished as stipulated in the temporary facilities section. Water shall be conserved through collection and reuse in subsequent testing work. Following completion of testing work, the water shall be disposed of in a manner acceptable to the Engineer. Unless otherwise permitted, the water shall not be allowed to enter other parts of the system.

### **2.04 Filling and Venting.**

When filling the line with water, care shall be taken to ensure that all air release valves and other venting devices are properly installed and in the open position. Hand-operated vent valves shall not be closed until water flows in an uninterrupted stream from each valve. Care shall be taken to ensure that the rate at which each line is filled with water does not exceed the venting capacity of the installed air vent valves and devices.

In addition to all air release valves shown on the Drawings, the Contractor shall install, at no additional cost to the Owner, air release valves at all high points.

Refer to Standard Details for additional information on connection to existing mains.

If there are highpoints on the line that are not vented, Contractor shall install corporation cocks at such points so that the air can be expelled as the line is filled with water. After the air has been expelled, the corporation cocks shall be closed and the test pressure applied. At the conclusion of the test, the corporation cocks shall be removed and plugged or left in the line at the discretion of the Observer.

### **2.05 Blocking and Backfilling.**

Piping shall be adequately blocked, anchored, and supported before the test pressure is applied.

### **2.06 Test Equipment.**

All necessary piping connections between the line to be tested and the water source, together with pumping equipment, water meter, pressure gauges, and all other equipment, materials, and facilities required to perform the specified tests, shall be provided. All flanges, valves, bulkheads, bracing, blocking, and other sectionalizing devices required shall also be provided. Vents shall be provided in test bulkheads where necessary to expel air from the line to be tested.

Test pressures shall be applied by means of a force pump sized to provide and maintain the required pressure without interruption during the test.

Water meters and pressure gauges shall be accurately calibrated and shall be subject to review and acceptance by the Engineer.

Drilling and tapping of pipe walls will not be permitted. Upon completion of testing work, each gauge connection shall be fitted with a removable plug or cap acceptable to the Engineer.

### **3.0 PRESSURE AND LEAKAGE TESTING.**

After the section of line to be tested has been filled with water, the test pressure shall be applied and maintained without interruption for 2 hours plus any additional time required for the Engineer to examine all piping undergoing the test and for the Contractor to locate all defective joints and pipe materials.

#### **3.01 Test Pressure.**

Unless otherwise noted, each designated piping system shall be subjected to the following test pressure measured at the lowest point in the line:

| <u>Piping System Designation</u> | <u>Test Pressure</u><br>psi  |
|----------------------------------|--|
| New water lines                  | 200  |
| New wastewater force mains       | 1.5 x maximum pump<br>operating head range<br>but not less than 100 psi. |

#### **3.02 Leakage.**

In conjunction with pressure testing and acceptance by the Engineer, each section of the pipeline shall be checked for leakage.

#### **3.03 Leakage Measurement.**

Measurement of leakage shall not be attempted until all trapped air has been vented and a constant test pressure has been established. After the pressure has stabilized, line leakage shall be measured by means of a suitable water meter installed in the pressure supply piping on the pipeline side of the force pump.

#### **3.04 Allowable Leakage.**

The term "leakage", as used herein, shall be the total amount of water which must be introduced into the line at the completion of the test to return the pressure to the initial test pressure.

No pipeline or section thereof will be accepted if and while it exhibits a leakage rate in excess of that determined by the following formula:

$$Q = 0.0075 \text{ DLN}$$

where

Q = allowable leakage in gallons per hour

D = nominal diameter of pipe in inches

L = length of section tested in thousand feet

N = square root of average test pressure in psi

Whenever the pipeline to be tested contains pipe of different diameters, the allowable leakage shall be calculated separately for each diameter and corresponding length of line. The resulting allowable leakage rates shall be added to obtain the total allowable leakage for the entire pipeline.

All joints in piping shall be watertight and free from visible leaks during the leakage test. Each leak which is discovered within the correction period stipulated in the General Conditions shall be repaired by and at the expense of the Contractor regardless of any amount that the total line leakage rate, during the leakage test, may have been below the specified allowable leakage rate.

If the leakage test indicated a line leakage rate exceeding the allowable, the Contractor shall locate and repair leaking joints and other defective items of work to the extent necessary to reduce the line leakage to an acceptable amount.

### **3.05 Cleaning and flushing of Pipelines.**

All water and sewer lines installed under this contract, including all associated valves and fittings, shall be flushed or cleaned to the satisfaction of the Engineer. Cleaning of water lines shall be completed prior to disinfection.

All 12 inch and smaller pipelines shall be flushed with water at the maximum velocity which can be developed, but not less than 2.5 feet per second, unless otherwise permitted by the Engineer. Flushing shall be accomplished through the installed valves or fittings, or through corporation cocks furnished and installed for the purpose.

Booster pumps shall be used if required to obtain the necessary volume or velocity of water.

### **3.06 Disinfection of Mains.**

All of the water mains installed shall be thoroughly flushed and disinfected before being placed in service. All disinfection work shall conform to the requirements of ANSI/AWWA C651-92 and the requirements of the North Carolina Department of Environment, Health, and Natural Resources. This work shall be observed by the Engineer. The Contractor shall supply all labor, equipment, and materials necessary for carrying out this work. After a thorough flushing and cleaning out, sufficient chlorine compounds shall be introduced in the lines to produce a chlorine concentration of at least 50 parts per million. The chlorine solution shall be retained in the lines for at least twenty-four (24) hours. At the end of this period, the chlorine residual shall be at least 20 parts per million. The lines will then be flushed sufficiently to clear them of chlorine exceeding two parts per million. At least two samples of water from the mains will then be taken by the Owner and analyzed for bacteriological purity by a certified testing lab. If the initial bacterial tests fail, Contractor shall reimburse Owner for all additional sampling.

Contractor shall pay for all cost associated with testing. If the mains fail to meet the bacteriological standard for purity, disinfecting and flushing will be repeated until such standards have been met.

Drainage of mains and disposal of chlorinated water shall be in accordance with all Federal, State, and local laws, ordinances, and regulations. Mains shall be drained to sanitary sewers, where available. If highly chlorinated water is discharged to the sanitary sewer, the Contractor shall notify the operations manager at the Rocky River Regional Wastewater Treatment Plant prior to discharging. The chief operator will stipulate time and rate of discharge into the sanitary sewer. Drainage directly to surface waters (creeks, rivers, streams, lakes, ponds, etc.) will not be allowed. Drainage branches, blow-offs, air vents and appurtenances shall be provided with valves and shall be located and installed as shown on the Plans and Standard Details. Drainage of mains will be accomplished in such a manner as to minimize erosion and siltation to adjoining properties. Water velocity from drainage and/or blow-off will be dissipated as necessary to prevent erosion.

Drainage branches or blow-offs shall not be connected to any sewer, submerged in any streams, or installed in any other manner that will permit back siphonage into the distribution system.

### **SP-13 – INCIDENTAL UTILITY CONCRETE (ADAPTED FROM WSACC STANDARD SPECIFICATION - SECTION 03301)**

#### **1.0 SCOPE.**

This section covers all cast-in-place concrete, including reinforcing steel, forms, finishing, curing, and appurtenant work. All concrete shall be air-entrained.

#### **2.0 GENERAL.**

All cast-in-place concrete shall be accurately formed and properly placed and finished, as indicated on the drawings and specified herein.

The Contractor shall inform the Engineer at least 24 hours in advance of the times and places at which he intends to place concrete.

#### **3.0 MATERIALS.**

##### **3.01 Portland Cement**

ASTM C150, Type I, IA, II, IIA, III or IIIA.

##### **3.02 Fine Aggregate**

Clean natural sand, ASTM C33. Artificial or manufactured sand will not be acceptable.

##### **3.03 Coarse Aggregate**

Crushed rock, washed gravel, or other inert granular material conforming to ASTM C33, except that clay and shale particles shall not exceed one percent. Smooth or rounded stone will not be acceptable.

##### **3.04 Water**

Clean and free from deleterious amounts of oil, acids, alkalies, and organic materials.

### **3.05 Admixtures**

- a. Water-Reducing ASTM C494, Type A or D.
- b. Air-Entraining ASTM C260.

### **3.06 Reinforcing Steel**

- a. Bars ASTM A615, Grade 60, deformed in accordance with ASTM A305, except 1/4" bars may be plain.
- b. Welded Wire Fabric ASTM A185.
- c. Bar Supports CRSI Class 1, plastic protected, or Class 2, stainless steel protected.

### **3.07 Forms**

- a. Plywood Product Standard PS1, waterproof, resin bonded, exterior type, Douglas fir.
- b. Lumber Straight, uniform width and thickness, and free from knots, offsets, holes, dents, and other surface defects.
- c. Form Oil Light colored paraffin oil or other acceptable nonstaining material.

### **3.08 Polyethylene Film**

Product Standard PS17, 6 mils or thicker.

### **3.09 Membrane Curing Compound**

ASTM C-309, Type 2.

## **4.0 PRELIMINARY REVIEW.**

The source and quality of concrete materials and the concrete proportions proposed for the work shall be submitted to the Engineer for review at least 48 hours before concrete is placed.

## **5.0 LIMITING REQUIREMENTS.**

Concrete shall be watertight, resistant to freeze-thaw cycles and moderate sulfate attack, abrasion resistant, workable, and finishable. Unless otherwise specified, concrete shall be controlled within the following limiting requirements.

### **5.01 Minimum Cement Factors.**

The quantity of portland cement, expressed in pounds per cubic yard, shall be not less than that indicated in the following table:

Coarse Aggregate Size

| <u>Concrete Slump</u> | <u>from No. 4 Sieve to</u> |               |               |               |
|-----------------------|----------------------------|---------------|---------------|---------------|
|                       | <u>3/8"</u>                | <u>1/2"</u>   | <u>3/4"</u>   | <u>1"</u>     |
|                       | <u>lbs/cy</u>              | <u>lbs/cy</u> | <u>lbs/cy</u> | <u>lbs/cy</u> |
| 3 inches              | 629                        | 592           | 564           | 536           |
| 4 inches              | 639                        | 611           | 583           | 555           |
| 5 inches              | 658                        | 630           | 602           | 573           |

**5.02 Ratio of Fine to Total Aggregates.**

The ratio of fine to total aggregates based on solid volumes (not weights) shall be:

| <u>Coarse Aggregate Size</u> | <u>Minimum Ratio</u> | <u>Maximum Ratio</u> |
|------------------------------|----------------------|----------------------|
| 3/8 inch                     | 0.45                 | 0.60                 |
| 1/2 inch                     | 0.40                 | 0.55                 |
| 3/4 inch                     | 0.35                 | 0.50                 |
| 1 inch                       | 0.30                 | 0.46                 |

**5.03 Total Water Content.**

Total water content of concrete shall not exceed 5.4 gallons of water per hundred pounds of cement in the mix.

**5.04 Slump.**

Concrete slump shall be kept as low as possible consistent with proper handling and thorough compaction. Unless otherwise authorized by the Engineer, slump shall be a minimum of 3 inches and a maximum of 5 inches.

**5.05 Total Air Content.**

The total volumetric air content of concrete after placement shall be a minimum of 4% and a maximum of 6%.

**5.06 Admixtures.**

The admixture content, batching method, and time of introduction to the mix shall be in accordance with the manufacturer's recommendations. A water-reducing admixture and an air-entraining admixture shall be included in all concrete. No calcium chloride or admixture containing chloride from other than impurities from admixture ingredients will be acceptable.

**5.07 Strength.**

The minimum acceptable compressive strength, as determined by ASTM C39, unless otherwise specified shall be:

| <u>Age</u> | <u>Minimum Compressive Strength</u> |
|------------|-------------------------------------|
| 7 days     | 3,000 psi                           |
| 28 days    | 4,000 psi                           |

## **6.0 STORAGE OF MATERIALS.**

Cement shall be stored in suitable moisture-proof enclosures. Cement that has become caked or lumpy shall not be used.

Aggregates shall be stored so that segregation and the inclusion of foreign materials are prevented. The bottom 6 inches of aggregate piles in contact with the ground shall not be used.

Reinforcing steel shall be carefully handled and shall be stored on supports which will keep the steel from contact with the ground.

## **7.0 BATCHING AND MIXING.**

Concrete shall be furnished by an acceptable ready-mixed concrete supplier and shall conform to ASTM C94.

### **7.01 Consistency.**

The consistency of concrete shall be suitable for the placement conditions. Aggregates shall float uniformly throughout the mass, and the concrete shall flow sluggishly when vibrated or spaded. The slump shall be kept uniform.

### **7.02 Delivery Tickets.**

A delivery ticket shall be prepared for each load of ready-mixed concrete. A copy of each ticket shall be handed to the Engineer by the truck operator at the time of delivery. Tickets shall show the quantity delivered, the amount of each material in the batch, the outdoor temperature in the shade, the time at which the cement was added, and the numerical sequence of the delivery.

## **8.0 FORMS.**

Forms shall be designed to produce hardened concrete having the shape, lines, and dimensions indicated on the drawings. Forms shall be substantial and sufficiently tight to prevent leakage of concrete and shall be maintained in proper position and accurate alignment.

Forms for pavement, curbs, or gutters shall be made of steel and shall be supported on thoroughly compacted earth. The top face of pavement forms shall not vary from a true plane more than 1/4 inch in 10 feet.

Forms shall be thoroughly cleaned and oiled before concrete is placed.

Where concrete is placed against gravel or crushed rock which does not contain at least 25 percent material passing a No. 4 sieve, such surfaces shall be covered with polyethylene film to protect the concrete from loss of water. Joints in the film shall be lapped at least 4 inches.

### **8.01 Form Ties.**

Form ties shall be of the removable end, permanently embedded body type, and shall have sufficient strength and rigidity to support and maintain the form in proper position and alignment without the use of auxiliary spreaders.

### **8.02 Edges and Corners.**

Chamfer strips shall be placed in forms to bevel all salient edges and corners, except the top edges of walls and slabs which are to be tooled and edges which are to be buried. Unless otherwise noted, bevels shall be 3/4 inch wide.

### **8.03 Form Removal.**

Forms shall not be removed or disturbed until the concrete has attained sufficient strength to safely support all dead, live, and construction loads. Care shall be taken in form removal to avoid surface gouging, corner or edge breakage, and other damage to the concrete.

## **9.0 REINFORCEMENT.**

Reinforcement shall be accurately formed and positioned, and shall be maintained in proper position while the concrete is being placed and compacted. Unless otherwise indicated on the drawings, the details of fabrication shall conform to ACI 315 and 318. In case of conflict, ACI 318 shall govern. Mechanical connections shall be used only as indicated on the drawings.

All reinforcing bars and supplies shall be stored off the ground, and protected from oil, paint, grease, rusting, or scale. Bending of bars shall be done in accordance with the requirements of ACI 315. All bars shall be bent cold and in the shop.

Steel reinforcing shall be accurately positioned and secured against displacement by using concrete or metal chairs, spacers, or other devices to properly support and fasten the reinforcing. Splices shall not be made at points of maximum stress, nor shall all bars be spliced at the same location. All bars shall have a splice of a minimum 30 bar diameters.

Metal accessories shall include all spacers, ties, chairs, bolsters, and other devices required to support and fasten and hold the reinforcing steel in place, shall meet the requirements of ACI 315.

Wire mesh reinforcing shall have the spacing and gauge shown on the contract drawings. Mesh shall be pulled taut and furnished with sufficient support to hold it in position during placing of the concrete. Mesh shall be lapped one space at all splices and wired together at every other interval.

## **10.0 PLACEMENT.**

Concrete shall be conveyed to the point of final deposit and placed by methods that will prevent segregation or loss of ingredients. During and immediately after placement, concrete shall be thoroughly compacted and worked around all reinforcement and embedments and into the corners of the forms. Concrete shall be compacted by immersion-type vibrators, vibrating screeds, or other suitable mechanical compaction equipment. The use of jitterbug tampers to compact concrete flatwork will not be permitted.

Concrete shall not be placed in any forms until all reinforcing steel, pipes, sleeves, inserts, anchors, and other appurtenances have been installed and inspected.

Concrete that has contained its mixing water for more than 45 minutes shall not be placed. Concrete shall not be placed when the temperature is 40 degrees F and falling or when freezing temperatures are predicted for the next 24 hours. All concrete placed in weather above 90 degrees F shall be covered by shading, sprinkling, or other approved means for a minimum of 24 hours. Construction joints shall be made where shown on the contract drawings. When replacing existing concrete, the concrete shall be sawed, thoroughly cleaned and all laitance removed.

## **11.0 TESTING.**

### **11.01 Air Content.**

An air content test shall be made from each batch of concrete from which concrete compression test cylinders are made. The Contractor shall provide all equipment and supplies necessary for the testing. Air content shall be determined in accordance with ASTM C173 or ASTM C231.

### **11.02 Slump.**

A slump test shall be made from each batch of concrete from which concrete compression test cylinders are made. Slump shall be determined in accordance with ASTM C143.

### **11.03 Test Cylinders.**

Compression test specimens shall be made, cured, stored, and delivered to the laboratory in accordance with ASTM C31 and C39.

One set of concrete test cylinders shall be cast for each concrete pour. A set of test cylinders shall consist of four cylinders, two to be broken and to have compressive strengths averaged at 7 days, and two to be broken and to have compressive strengths averaged at 28 days. All concrete required for testing shall be furnished by the Contractor. No additional compensation will be paid to the Contractor for concrete so used.

Testing of the cured cylinders shall be performed by an independent testing laboratory at the expense of the Owner.

## **12.0 FINISHING.**

Recesses from form ties shall be filled flush with mortar. Fins and other surface projections shall be removed from all formed surfaces, except exterior surfaces that will be in contact with earth backfill.

Unless otherwise specified, unformed surfaces shall be screeded and given an initial float finish as soon as the concrete has stiffened sufficiently for proper working. Any piece of coarse aggregate which is disturbed by the float or which causes a surface irregularity shall be removed and replaced with mortar. Initial floating shall produce a surface of uniform texture and appearance, with no unnecessary working of the surface.

Initial floating shall be followed by a second floating at the time of initial set. The second floating shall produce a finish of uniform texture and color. The completed finish for unformed surfaces shall be the finish produced by the second floating.

### **13.0 CURING.**

Concrete shall be protected from loss of moisture by water saturation or by membrane curing for at least 7 days after placement.

Water saturation of concrete surfaces shall begin as quickly as possible after initial set of the concrete. Unformed surfaces shall be covered with polyethylene film, tarpaulins, or sand to retain the water. Water shall be applied as often as necessary to keep the concrete saturated for the entire curing period.

Membrane curing compound may be used in lieu of water curing on concrete which will not be covered later with mortar or additional concrete. Membrane curing compound shall be spray applied at a coverage of not more than 300 square feet per gallon. Unformed surfaces shall be covered with curing compound within 30 minutes after final finishing. If forms are removed before the end of the specified curing period, curing compound shall be immediately applied to the formed surfaces before they dry out. Curing compound shall be suitably protected against abrasion during the curing period.

Concrete shall be protected against freezing for at least 7 days after placement.

### **14.0 REPAIRING DEFECTIVE CONCRETE.**

Defects in concrete surfaces shall be repaired to the satisfaction of the Engineer. All concrete which is honeycombed or otherwise defective shall be cut out and removed to sound concrete, with edges square cut to avoid feathering.

Concrete repair work shall conform to Chapter 9 of ACI 301 and shall be performed in a manner that will not interfere with thorough curing of surrounding concrete. Repair work shall be adequately cured.

### **15.0 CONCRETE FOR MANHOLES, PIPE BLOCKING, AND PIPE ENCASEMENT.**

Concrete for manholes, buried blocking and encasement of pipe shall conform to the limiting requirements specified herein, except that the cement factor and total water content may be adjusted to provide a minimum compressive strength of 3,000 psi at 28 days. Concrete shall have a slump of not less than 3 inches nor more than 5 inches when placed.

### **16.0 DATA AND DRAWINGS.**

All submittals of data and drawings shall be in accordance with the submittals section, except as noted herein.

End of Section

**SP-14 – RESILIENT-SEATED GATE VALVES (ADAPTED FROM WSACC STANDARD SPECIFICATION– SECTION 15104)**

**1.0 SCOPE.**

This section covers resilient-seated AWWA gate valves for water service. Resilient-seated gate valves shall be used for 12 inch and smaller line valves.

**2.0 GENERAL.**

**2.01 Governing Standard.**

Except as modified or supplemented herein, all resilient-seated gate valves shall conform to the applicable requirements of ANSI/AWWA C-509.

**2.02 General Equipment Stipulations.**

The General Equipment Stipulations shall apply to all equipment furnished under this section.

**2.03 Temporary Number Plates.**

Each gate valve shall be factory tagged or marked to identify the valve by the number indicated in the Gate Valve Schedule.

**2.04 Marking.**

Supplementing the requirements of Section 7.1 of the governing standard, the country of origin of the valve body shall be cast on the exterior of the body. The country of origin of the gate shall be molded into the resilient seat material.

**2.05 Shop Coating.**

All interior and exterior ferrous metal surfaces of valves and accessories shall be shop coated for corrosion protection. The valve manufacturer's standard coating will be acceptable provided it is functionally equivalent to the specified coating and is compatible with the specified field painting.

The following surfaces shall be coated:

|                               |                           |
|-------------------------------|---------------------------|
| Interior Surfaces             | Epoxy.                    |
| Exterior Surfaces of Valves   | Epoxy or coal tar.        |
| Polished or Machined Surfaces | Rust-preventive compound. |

The protective coating on interior surfaces of each valve shall be subjected to a nondestructive holiday test in accordance with ASTM G62, Method A, and shall be electrically void-free.

Exterior surfaces of valves coated with coal tar shall be field painted in accordance with the painting section. Field painting of valves coated with epoxy shall be limited to touchup painting of damaged surfaces. Holiday testing of exterior coatings will not be required.

The total dry film thickness of shop-applied coatings shall be not less than:

| <u>TYPE OF COATING</u> | <u>MINIMUM DRY FILM THICKNESS</u> |
|------------------------|-----------------------------------|
| Coal Tar               | 6 mils                            |
| Epoxy                  | 10 mils                           |
| Rust-Inhibitive Primer | 3 mils                            |

### **2.06 Acceptable Manufacturers.**

The following gate valve manufacturers have been preapproved:

| <u>MANUFACTURER</u>   | <u>MODEL</u> |
|-----------------------|--------------|
| American Flow Control | Series 2500  |
| Clow                  | C 509        |
| Kennedy               | 4067 / 7000  |

### **3.0 MATERIALS.**

Except as modified or supplemented herein, materials used in the manufacture of resilient-seated gate valves shall conform to the requirements of ANSI/AWWA C509.

#### **3.01 Bronze Components.**

All wetted bronze valve components shall be fabricated of bronze containing less than 15 percent zinc. All wetted aluminum bronze components shall be heat treated to inhibit de-aluminization in accordance with Section 2.2 of ANSI/AWWA C504.

#### **3.02 Gaskets.**

Gasket material shall be sheet paper or elastomer, free from asbestos and corrosive ingredients.

#### **3.03 Shop Coatings.**

The following coating materials shall be shop applied. The valve manufacturer's standard coating will be acceptable provided it is functionally equivalent to the products specified herein and is compatible with the specified field painting.

|          |  |
|----------|--|
| Coal Tar | Kop-Coat "Bitumastic Super Service Black", Tnemec "46-449 Heavy Duty Black", or Valspar "35-J-10 Hi-Build Bituminous Coating". |
| Epoxy    | Manufacturer's standard fusion- bonded or liquid epoxy.  |

Rust-Inhibitive Primer

Cook "391-N-167 Barrier Coat",  
Kop-Coat "340 Gold Primer", Tnemec "37-77  
Chem-Prime", or Valspar "13-R-28 Chromox  
Primer".

Rust-Preventive Compound

Houghton "Rust Veto 344",  
Rust-Oleum "R-9", or equal.

#### **4.0 VALVE CONSTRUCTION.**

##### **4.01 Flanges.**

Flanges shall be finished to true plane surfaces within a tolerance limit of 0.005 inch. The finished face shall be normal to the longitudinal valve axis within a maximum angular variation tolerance of 0.001 inch per inch of flange diameter.

##### **4.02 Mechanical Joints.**

Mechanical joint ends of the valves shall conform to ANSI/AWWA C111/A21.11.

##### **4.03 Stem Seals.**

All buried gate valves shall be furnished with non-rising stems. Valves with non-rising stems and all buried valves shall be provided with O-ring stem seals.

##### **4.04 Rotation.**

The direction of rotation of the handwheel or wrench nut to open the valve shall be to the left (counterclockwise).

#### **5.0 EXTENSION STEMS.**

Extension stems shall be furnished and installed where specified, indicated on the drawings, or otherwise required for proper valve operation. Extension stems shall be of solid steel and shall be not smaller in diameter than the valve stem. Extension stems shall be connected to the valve stem by means of a Lovejoy "Type D" single universal joint with grease filled protective boot. All stem connections shall be pinned.

Extension stems shall be provided for buried valves when the valve is 4 feet or more below finished grade. Each extension stem for a buried valve shall extend to within 6 inches of the ground surface, shall be provided with spacers which will center the stem in the valve box, and shall be equipped with a wrench nut.

#### **6.0 FLOOR BOXES.**

Where openings through concrete slabs are provided for key operation of valves with the operating nut being in or below the slab, such openings shall be provided with a cast iron floor box complete with cover. Each floor box shall be of the depth required for installation in the slab indicated on the drawings. Where the operating nut is in the slab, the stem shall have a guide to maintain the nut in the center of the box; where below the slab, the opening in the bottom of the box shall permit passage of the operating key.

Each floor box and cover shall be shop coated by dipping in asphalt varnish.

#### **7.0 VALVE BOXES.**

Each buried valve to a depth of 4 feet or less shall be provided with a Charlotte Foundry valve box. Valve boxes shall be cast iron, extension sleeve type, for the depth of cover required by the drawings. Not more than one extension will be allowed with each slide type valve box. Valve boxes shall be not less than 5 inches in inside diameter, shall have a minimum thickness at any point of 3/16 inch, and shall be provided with suitable cast iron bases and covers.

Each valve buried to a depth greater than 4 feet shall be provided with a valve box consisting of a cast iron cover and a 6 inch cast iron pipe section. The cover shall be Clay & Bailey "No. 2193" or Tyler "Series 6890-A". The pipe shaft shall be sized to extend from the valve to 5 inches inside the valve box cover.

All parts of valve boxes, bases, and covers shall be shop coated by dipping in asphalt varnish.

Valves and valve boxes shall be set plumb. Each valve box shall be placed directly over the valve it serves, with the top of the box brought flush with the finished grade. After being placed in proper position, earthfill shall be placed around each valve box and thoroughly tamped on each side of the box. The top of the box shall be set in a concrete protector ring.

#### **8.0 ENDS.**

Valve ends shall be mechanical joint unless otherwise indicated on the drawings. Flange by mechanical joint ends shall be provided for tapping sleeve and valve installations.

All valves shall be restrained utilizing flanges, tie rods, or restrained push-on joints as specified in the ductile iron pipe section.

Resilient-seated gate valves shall be provided with durable opaque end shields to prevent ultraviolet damage to the rubber discs.

#### **9.0 INSTALLATION.**

Valves shall be handled and installed in accordance with the recommendations set forth in the appendix to ANSI/AWWA C-509 and the recommendations of the manufacturer.

#### **10.0 DRAWINGS AND DATA.**

Complete drawings, details, and specifications covering the valves and their appurtenances shall be submitted in accordance with the submittals section.

Submittal drawings shall clearly indicate the country of origin of all cast gray iron or ductile iron valve components. When requested by the Engineer, certified copies of physical and chemical test results shall be submitted for the materials of construction of valve components.

All valves shall be tested in accordance with Section 6 of ANSI/AWWA C509. Certified copies of the results of all tests, together with an affidavit of compliance as indicated in Section 1.5, shall be furnished to the Engineer before the valves are shipped.

## **MEASUREMENT AND PAYMENT**

### **1.0 SCOPE.**

This section covers methods of measurement and payment for items of work under Bid Schedule.

### **2.0 GENERAL.**

The total bid price shall cover all work required by the Quoting Documents. All costs in connection with the proper and successful completion of the work, including furnishing all materials, equipment, supplies, and appurtenances; providing all construction plans, equipment, and tools; and performing all necessary labor and supervision to fully complete the work, shall be included in the unit and lump sum prices bid. All work not specifically set forth as a pay item in the Bid Form shall be considered subsidiary incidental obligations of Contractor and all costs in connection therewith shall be included in the prices bid.

### **3.0 ESTIMATED QUANTITIES.**

All estimated quantities stipulated in the Bid Form or other Quoting Documents are approximate and are to be used only (a) as a basis for estimating the probable cost of the Work, and (b) for the purpose of comparing the bids submitted for the Work. The actual amounts of work done and materials furnished under unit price items may differ from the estimated quantities. The basis of payment for work and materials will be the actual amount of work done and materials furnished. Contractor agrees that he will make no claim for damages, anticipated profits, or otherwise on account of any difference between the amounts of work actually performed and materials actually furnished and the estimated amounts therefore.

Except where otherwise specified, the unit or lump sum bid price bid for each item of work which involves excavation or trenching shall include all costs for such work. No direct payment shall be made for excavation or trenching unless shown elsewhere.

## **4.0 MEASUREMENT AND PAYMENT**

### **4.01 Part A – General Work Items**

#### **A. Mobilization:**

1. Payment shall be in accordance with Section 800-2 of the NCDOT Standard Specifications.
2. Mobilization shall not exceed 5% of Total Estimated Cost.

#### **B. Construction Stakes, Lines and Grade:**

1. Measurement and payment shall be in accordance with Section 801-3 of the NCDOT Standard Specifications for Construction Surveying. There will be no separate measurement or payment for Supplemental Field Surveying or Supplemental Surveying Office Calculations.

#### **C. Comprehensive Grading:**

1. For the referenced NCDOT sections and numbered Additional City Specifications, there will be no direct.
2. Payment or compensation, all cost incurred to complete the work as specified shall be included in the Lump Sum price bid for “Comprehensive Grading”. Periodic payments will be made to the Contractor based on the percentage of overall work completed.

D. Traffic Control:

1. Measurement for payment will not be used, as this pay item will be compensated on a Lump Sum basis.
2. Periodic payments will be made to the Contractor based on the percentage of overall work completed. Payment will include the installation, maintenance, and removal of controls and signage.

**4.02 Part B – Roadway/Drainage Items**

A. Borrow Excavation:

1. Measurement and payment shall be in accordance with Section 230-5 (b) Truck Measurement of the NCDOT Standard Specifications when utilizing material other than local material.

B. Foundation Conditioning Material:

1. Measurement and payment shall be in accordance with Section 414-9 of the NCDOT Standard Specifications utilizing material other than local material.

C. Reinforced Concrete Class III Drainage Pipe (various sizes):

1. Measurement and payment shall be in accordance with Section 305-4 of the NCDOT Standard Specifications.

D. Reinforced Concrete Pipe Culverts Class III (various sizes):

1. Measurement and payment shall be the actual number of linear feet of precast reinforced concrete culvert which has been installed and accepted. Measurement will be made horizontally along the centerline of the installed culvert. Measurement will not be made across precast bends or other drainage structures.
2. The unit price by linear foot of Reinforced Concrete Culverts all work, but not limited to, furnishing all labor, materials, filter fabric, equipment, bedding, flowable fill, installing culvert, constructing joints and connections, furnishing project submittals and other incidentals necessary to complete this work.
3. There shall be no separate payment for excavation, filter fabric, bedding, or any other items required by Section 410 (Articles 1-9) or 414 (Articles 1-8) of the NCDOT Standard Specifications.

E. Asphalt Concrete Pavement (various types):

1. Measurement and payment shall be in accordance with Section 610-16 of the NCDOT Standard Specifications.

F. Asphalt Binder for Plant Mix:

1. Measurement and payment shall be in accordance with Section 620-4 of the NCDOT Standard Specifications.

G. Reinforced Endwalls:

1. Measurement and payment shall be in accordance with Section 838-4 of the NCDOT Standard Specifications.

H. Masonry Drainage Structure:

2. Measurement and payment shall be in accordance with Section 840-4 of the NCDOT Standard Specifications.

- I. Masonry Drainage Structure, Additional Depth:
  - 3. Measurement and payment shall be in accordance with Section 840-4 of the NCDOT Standard Specifications.
  
- J. Frame and Cover:
  - 4. Measurement and payment shall be in accordance with Section 840-4 of the NCDOT Standard Specifications.
  
- K. Rip Rap (NCDOT various classes):
  - 1. Measurement for payment for Rip Rap will be the actual tonnage of Rip Rap used on the project and accepted for the project. Measurement shall be from collecting truck tickets at the site.
  - 2. The unit price bid for Rip Rap shall include the cost of all material and equipment to install the Rip Rap including the filter fabric under the Rip Rap, excavation for the volume of Rip Rap needed, and proper disposal of excess material.
  
- L. Guardrail (including anchor units):
  - 1. Measurement for payment for Guardrails will be the actual number of linear feet of guard rail completed and accepted into the final work, as measured along the centerline surface of the guardrail and through the terminal section. No separate measurement of materials shall be made under this item for guardrail beams, terminal sections, transition sections, anchor units, posts and delineators.
  - 2. The unit price by liner foot of Guardrail shall include but is not limited to, furnishing and erecting posts, offset blocks, rail, terminal sections, miscellaneous hardware and all other materials; field curving and shop curving of the rail; removing temporary guardrail; excavation; furnishing and installing additional guardrail posts and additional offset blocks; backfilling; fabrication; welding; galvanizing; and furnishing and installing guardrail delineators and end delineation, maintaining the feature through acceptance, and for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work as specified in the Quoting Documents, or as directed by the Engineer.
  
- M. Aggregate, No. 57:
  - 1. Measurement for payment for Aggregate No. 57 will be the actual tonnage of aggregate used on the project not included as incidental to other project components. Measurement shall be from collecting truck tickets at the site.
  - 2. The unit price bid for Aggregate No. 57 shall include the cost of all material and equipment to install the aggregate, excavation for the volume of aggregate needed and proper disposal of excess material.
  
- N. Geotextile Fabric, NCDOT Type 2:
  - 1. Measurement for payment for Geotextile Fabric, Type 2 will be measured in square yards. The measurement will be based on the theoretical calculation using length of feature installed times the average width. No separate measurement will be made for overlapping geotextile or the vertical geotextile dimensions required to encapsulate foundation conditioning material.
  - 2. The unit price bid for Geotextile Fabric, NCDOT Type 2 shall include the cost of all material and equipment to install the filter fabric.

O. Rock Sills:

1. Measurement for payment for Rock Sills will be the actual number of linear feet of rock sill completed and accepted into the final work, as measured along the centerline surface of the sill. No separate measurement of materials shall be made under this item for footer boulders, coarse backfill, fabric, and/or other incidental items.
2. The unit price by linear foot of Rock Sill shall include grading, installation, adjusting, excavating, placing backfill, maintaining the feature through acceptance, and for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the work as specified in the Quoting Documents, or as directed by the Engineer.

P. Coir Fiber Matting

1. Measurement for payment for Coir Fiber Mat will be the actual square yard of matting installed as measured in the field. Overlaps will be measured once to account for the doubling of the material.
2. The unit price bid for Coir Fiber Matting shall include the cost of all material and equipment to install the matting, including any staples/anchors, and mulching as directed by the Engineer.

**4.03 Part C – Utility Items**

A. Sanitary Manholes (various diameters):

1. The measurement for payment for Sanitary Manholes shall be in accordance with Section 1525-4 of the NCDOT Standard Specifications.
2. The unit price for manholes shall be for the manhole complete with top, frame, cover, base section, riser section, steps, invert, vent pipe, stone base, boots, testing, and all other appurtenant items as specified herein and shown on the Drawings and not listed as separate bid items.
3. Where required, when connecting into existing sewers, price shall include bypass pumping, flow diversion, cutting into existing sewer, shaping invert, and all other required work.

B. Sanitary Manholes with Inside Drops:

1. The measurement for payment for Sanitary Manholes shall be in accordance with Section 1525-4 of the NCDOT Standard Specifications
2. The unit price for manholes shall be for the manhole complete with top, frame, cover, base section, riser section, steps, invert, vent pipe, stone base, boots, drop bowls, drop pipe, fasteners, testing, and all other appurtenant items as specified herein and shown on the Drawings and not listed as separate bid items.
3. Where required, when connecting into existing sewers, price shall include bypass pumping, flow diversion, cutting into existing sewer, shaping invert, and all other required work.

C. Sanitary Manholes, Additional Depth (various diameters):

1. The measurement for payment for Sanitary Manholes shall be in accordance with Section 1525-4 of the NCDOT Standard Specifications.

D. Sanitary Sewer (various sizes/materials):

1. Depth will not be measured. Measurement shall be per linear foot measured from centerline of manhole to centerline of manhole regardless of pipe material.

2. The unit price bid per linear foot for the construction of the sewer main shall include all of the Contractor's cost for the complete construction of the sewer main, exclusive of items provided for elsewhere in the Bid Form.
3. Payment for items incidental to the pipe replacement, such as disconnecting and reconnecting existing service connections, public notification, flow control, sheeting and bracing, dewatering, hauling and disposal of excess materials, testing, backfill and compaction, and pre- and post-installation television inspection shall not be paid for directly but shall be included in the cost for excavation and replacement of sewer mains.
4. Depth Pipe – No individual prices based on “depth of bury” will be included in the bid. No additional compensation will be given due to depth of pipe installation.

E. Water Main (various sizes and materials):

1. Measurement for payment for the water main will be the actual number of linear feet of pipe installed by size, complete in-place measured horizontally along the centerline of the pipe.
2. The unit price bid per linear foot for the construction of the water main shall include all of the Contractor's cost for the complete construction of the water main, exclusive of items provided for elsewhere in the Bid Form.
3. The price bid shall include: furnishing, transporting, unloading and temporary storage, and installing all pipe and materials; furnishing and installing fittings or specials including bulkheads and outlets not otherwise provided for in the Bid Form; joints and jointing; exploratory excavation; trench excavation; bracing, shoring, and sheeting; trenching, dewatering as required; bypass pumping; anchoring/blocking, constructing the specified bedding; backfilling (method of backfill and compaction as specified); restoration and all ground surfaces not listed as a separate bid item; legal disposal of spoil; testing; inspection; clean up, and all other related and necessary materials, work, and equipment required to construct a complete operable water main in accordance with the Quoting Documents.
4. Depth Pipe – No individual prices based on “depth of bury” will be included in the bid. No additional compensation will be given due to depth of pipe installation.

F. Encasement Pipe (various sizes and materials):

1. Measurement and payment shall be in accordance with Section 1540-4 of the NCDOT Standard Specifications

G. Gate Valves:

1. Measurement for payment for valves shall be the actual number installed by size.
2. The unit price bid shall include furnishing and installing all materials, labor, and equipment necessary for a complete and operable installation.
3. The unit price for the valves to include valve box with lid and protective ring.

#### **4.04 Work Contingency ALLOWANCE**

- A. Work Contingency Allowance is for exclusive use of Owner and Engineer for changes as a result of design refinements, clarifications, and unanticipated site issues:
1. Not for Contractor's unknown or unanticipated conditions.
  2. Not for use by Contractor as Contractor's construction contingency.
  3. Owner and Engineer's approval of contingency adjustment required.
  4. Contingency adjustments will include Contractor's related costs, and reasonable overhead and profit as stipulated in Quoting Documents.

- B. At Project Closeout and prior to Final Payment, the final Contract Sum shall be adjusted accordingly by Change Order.
  - 1. Amount of the Change Order shall reflect difference between actual costs of all approved contingency adjustments and the Contingency Allowance.

# Geotechnical Engineering Report

**Proposed Zemosa Acres Culverts**

**Concord, North Carolina**

February 19, 2014

Project No. 71145007

**Prepared for:**

HDR, Inc.

Charlotte, North Carolina

**Prepared by:**

Terracon Consultants, Inc.

Charlotte, North Carolina

Offices Nationwide  
Employee-Owned

Established in 1965  
[terracon.com](http://terracon.com)

**Terracon**

Geotechnical ■ Environmental ■ Construction Materials ■ Facilities

February 19, 2014



HDR, Inc.  
440 South Church Street, Suite 1000  
Charlotte, North Carolina 28202-1919

Attn: Mr. Patrick Blandford, P.E.  
P: 704-338-6746  
E: Patrick.Blandford@hdrinc.com

RE: **Geotechnical Engineering Services**  
Zemosa Acres Culverts  
Concord, North Carolina  
Terracon Project No: 71145007

Dear Mr. Blandford:

Terracon Consultants, Inc. (Terracon) has completed the geotechnical engineering services for the above referenced project. This study was performed in general accordance with the Task Order No. 2014-01 issued under the Master Service Agreement (MSA) dated January 10, 2013.

This report presents the findings of the subsurface exploration and provides geotechnical parameters, which will assist in the design and construction of a new storm water alignment in the area. Terracon should be provided the final site plan and proposed grades when available so that we can re-evaluate our recommendations with respect to the final design.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,  
**Terracon Consultants, Inc.**



Christopher R. Briggs, P.E.  
Geotechnical Project Engineer



David J. Corley, P.E.  
Geotechnical Department Manager

Enclosures  
cc: 1 – Client  
1 – File



Terracon Consultants, Inc. 2020 Starita Road, Suite E Charlotte, North Carolina 28273  
NC License No. F-0869 P [704] 509 1777 F [704] 509 1888 terracon.com

## TABLE OF CONTENTS

|   | Page                               |
|---|------------------------------------|
| <b>EXECUTIVE SUMMARY .....</b>                              | <b>i</b>                           |
| <b>1.0 INTRODUCTION.....</b>                                | <b>1</b>                           |
| <b>2.0 PROJECT INFORMATION .....</b>                        | <b>1</b>                           |
| 2.1 Site Location and Description.....                      | 1                                  |
| 2.2 Project Description .....                               | 2                                  |
| <b>3.0 SUBSURFACE CONDITIONS.....</b>                       | <b>2</b>                           |
| 3.1 Geology.....  | 2                                  |
| 3.2 Typical Profile.....                                    | 2                                  |
| 3.3 Groundwater.....  | 4                                  |
| <b>4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION.....</b> | <b>4</b>                           |
| 4.1 General .....   | 4                                  |
| 4.2 Recommendations for Culvert Foundations.....            | 5                                  |
| 4.3 Excavation.....   | 5                                  |
| 4.4 Difficult Excavation.....                               | 6                                  |
| 4.5 Fill Placement.....                                     | 6                                  |
| 4.6 Lateral Earth Pressures .....                           | 7                                  |
| 4.7 Groundwater Considerations .....                        | 9                                  |
| <b>5.0 GENERAL COMMENTS.....</b>                            | <b>9</b>                           |
| <br><b>APPENDIX A – FIELD EXPLORATION</b>                   |                                    |
| Exhibit A-1   | Site Vicinity Plan                 |
| Exhibit A-2 to A-5  | Boring Location Plan               |
| Exhibit A-6   | Field Exploration Description      |
| Exhibits A-7 to A-14  | Boring Logs                        |
| <br><b>APPENDIX B – LABORATORY TESTING</b>                  |                                    |
| Exhibit B-1   | Laboratory Testing                 |
| <br><b>APPENDIX C – SUPPORTING DOCUMENTS</b>                |                                    |
| Exhibit C-1   | General Notes                      |
| Exhibit C-2   | Unified Soil Classification System |

## **EXECUTIVE SUMMARY**

A geotechnical investigation has been performed for the proposed Zemoso Acres Culverts project located in Concord, North Carolina. Eight (8) borings, designated B-01 through B-08, were performed to a depths of approximately 12.5 to 20 feet below the existing ground surface in the proposed culvert areas.

Based on the information obtained from our subsurface exploration, the site can be developed for the proposed project. The following geotechnical considerations were identified:

- The most significant geotechnical concern for this site is the undocumented fill and soft alluvial soils encountered in the borings. If the proposed bottom of culvert elevations are within these soft soils, these soils should be removed to a depth where suitable residual soils are encountered and replaced with No. 57 stone wrapped in a suitable filter fabric (Mirafi 140N or equivalent), flowable fill, or a mud mat of lean concrete. Based on the boring logs and the provided bottom of culvert elevations, we estimate that up to five feet of undercut and replacement of these soft soils may be necessary at some locations.
  
- Based on the results of our subsurface exploration, it is our opinion that the proposed culvert structures may be supported on a shallow foundation with a net allowable bearing pressure of 2,000 psf. Further details and recommendations are provided herein.

This summary should be used in conjunction with the entire report for design purposes. It should be recognized that details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein. The section titled **GENERAL COMMENTS** should be read for an understanding of the report limitations.

# GEOTECHNICAL ENGINEERING REPORT PROPOSED ZEMOSA ACRES CULVERTS CONCORD, NORTH CAROLINA

Project No. 71145007

February 19, 2014

## 1.0 INTRODUCTION

A geotechnical investigation has been performed for the proposed Zemoso Acres Culverts project to be located in Concord, North Carolina. Eight (8) borings, designated B-01 through B-08, were performed to a depth of approximately 12.5 to 20 feet below the existing ground surface in the proposed culvert areas. Logs of the borings along with a *Site Vicinity Plan* and *Boring Location Plan* are included in Appendix A of this report.

The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Foundation design and construction
- Earthwork

## 2.0 PROJECT INFORMATION

### 2.1 Site Location and Description

| ITEM                 | DESCRIPTION   |
|----------------------|---|
| Location             | Four culverts located at Hanover Drive, Channing Drive, Chelwood Drive and Chadbourne Drive in Concord, North Carolina. |
| Existing development | Existing residential street generally with one travel lane in each direction.   |
| Current ground cover | Existing roadway and grassy areas.  |
| Existing topography  | Each culvert location is relatively flat at the roadway crossings.  |

## 2.2 Project Description

| ITEM                                | DESCRIPTION   |
|-------------------------------------|---|
| <b>Structures</b>                   | New culvert structures consisting of double Reinforced Concrete Box Culverts (RCBC) with variable dimensions: 11'x9', 10'x9', 9'x9', 9'x8', and 8'x8'; and associated wing walls. |
| <b>Maximum loads</b>                | Not Known.  |
| <b>Maximum allowable settlement</b> | Not Known.  |
| <b>Grading</b>                      | Variable, depending on each site.   |
| <b>Cut and fill slopes</b>          | Assumed to be no steeper than 3H:1V (Horizontal to Vertical)  |

## 3.0 SUBSURFACE CONDITIONS

### 3.1 Geology

The project site is located in the Piedmont Physiographic Province, an area underlain by ancient igneous and metamorphic rocks. The residual soils in this area are the product of in-place chemical weathering of rock. The typical residual soil profile consists of clayey soils near the surface where soil weathering is more advanced, underlain by sandy silts and silty sands that generally become harder with depth to the top of parent bedrock. Alluvial soils are typically present within floodplain areas along creeks and rivers in the Piedmont. According to the 1985 Geologic Map of North Carolina, the site is within the Charlotte Belt. The bedrock underlying the site generally consists of Metamorphosed Quartz Diorite and Tonalite Rock.

The boundary between soil and rock in the Piedmont is not sharply defined. A transitional zone termed “partially weathered rock” (PWR) is normally found overlying the parent bedrock. PWR is defined for engineering purposes as residual material with standard penetration test resistance’s exceeding 100 blows per foot. The transition between hard/dense residual soils and PWR occurs at irregular depths due to variations in degree of weathering.

Groundwater is typically present in fractures within the PWR or underlying bedrock in upland areas of the Piedmont. Fluctuations in groundwater levels on the order of 2 to 4 feet are typical in the Piedmont, depending on variations in precipitation, evaporation, and surface water runoff. Seasonal high groundwater levels are expected to occur during or just after the typically cooler months of the year (November through April).

### 3.2 Typical Profile

A generalized description of the soils encountered in the borings is provided in the following paragraphs. Specific conditions encountered at the boring locations are indicated on the

boring logs in Appendix A. Stratification boundaries on the boring log represent the approximate location of changes in soil types; in-situ, the transition between materials may be gradual.

All of the borings were generally advanced through approximately 1 to 3 inches of topsoil and/or rootmat. Fill materials were encountered below the surface materials to depths of approximately 4.5 to 8 feet below existing grades in all of the borings. Fill materials encountered consist of elastic silt with sand, silt with sand, sandy silt, sandy lean clay and clayey sand, which visually classify as MH, ML, CL and SC, respectively, in accordance with the Unified Soil Classification System (USCS). Standard penetration test values (N-values) in the silts and clays range from 4 to 11 blows-per-foot (bpf), indicating medium stiff to stiff consistency. N-values of 6 bpf were encountered in the sands, indicating a loose relative density.

Alluvial soils consisting of sandy silt, silt with sand and silty sand was encountered below the fill soils in Borings B-01 through B-08. This alluvial soil visually classifies as ML and SM, respectively. N-values range from WOH (Weight of Hammer) to 7 bpf in the silts, indicating a very soft to medium stiff consistency. N-values range from WOH to 5 bpf in the sands, indicating a very loose to loose relative density.

Residual soil consisting of silty sand and sandy silt was encountered below the alluvial soils in Borings B-01 and B-03 through B-08. These residual soils visually classifies as SM and ML, respectively. N-values range from 13 to 39 bpf in the silts, indicating a stiff to hard consistency. N-values range from 20 to 29 bpf in the sands, indicating a medium dense relative density.

Partially weathered rock (PWR) was encountered below the residual soils in Borings B-04 and B-07 at depths of approximately 19 and 12.9 feet, respectively, below existing grades. The partially weathered rock was sampled as silty sand.

Auger refusal was encountered in Borings B-02 and B-07, at depths of 12.5 and 12.9 feet, respectively, below existing grades. Split spoon refusal was encountered in Boring B-08 at a depth of 13.8 feet below existing grade. It is our opinion that auger and split spoon refusal at boring locations B-02, B-07 and B-08 was on very dense partially weathered rock, or rock-like materials.

The following table is a summary of the information with respect to the eight (8) borings performed for this project.

| Location                                | Boring | Depth (ft) <sup>1</sup> | Fill Material Depth (ft) <sup>1</sup> | Alluvial Soil Depth (ft) <sup>1</sup> | Residual Soil Depth (ft) <sup>1</sup> | Top of PWR Depth (ft) <sup>1</sup> | Auger Refusal (ft) <sup>1</sup> |
|---|--------|-------------------------|---------------------------------------|---------------------------------------|---------------------------------------|------------------------------------|---------------------------------|
| Culvert at Hanover Drive NW (Site 1)    | B-01   | 15                      | 0-5.5                                 | 5.5-12                                | 12-15                                 | NE                                 | NE                              |
|   | B-02   | 12.5                    | 0-5.5                                 | 5.5-12.5                              | NE                                    | NE                                 | 12.5                            |
| Culvert at Channing Circle NW (Site 2)  | B-03   | 20                      | 0-8                                   | 8-17                                  | 17-20                                 | NE                                 | NE                              |
|   | B-04   | 20                      | 0-8                                   | 8-17                                  | 17-19                                 | 19                                 | NE                              |
| Culvert at Chelwood Drive NW (Site 3)   | B-05   | 15                      | 0-4.5                                 | 4.5-12                                | 12-15                                 | NE                                 | NE                              |
|   | B-06   | 15                      | 0-7.5                                 | 7.5-12                                | 12-15                                 | NE                                 | NE                              |
| Culvert at Chadbourne Drive NW (Site 4) | B-07   | 13.3                    | 0-5.5                                 | 5.5-8                                 | 8-12.9                                | 12.9                               | 13.3                            |
|   | B-08   | 13.8                    | 0-8                                   | 8-12                                  | 12-13.8                               | NE                                 | NE                              |

Notes: 1 From the Top of Ground Elevation

NE: Not Encountered

### 3.3 Groundwater

The boreholes were observed while drilling and after completion for the presence and level of groundwater. Groundwater was observed in Boring B-01, B-02, B-03, B-04, B-05, and B-06 immediately after completion at depths of approximately 8.5 to 17 feet below the existing ground surface. Each boring was backfilled with the auger cuttings the day of the borings, making subsequent water level readings unobtainable.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

## 4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

### 4.1 General

Our evaluation and recommendations are based on the project information outlined previously and on the data obtained from the field testing program. If project plans are changed significantly, Terracon requests the opportunity to review our recommendations based on the new information and make necessary changes.

## 4.2 Recommendations for Culvert Foundations

Based on the soil test borings performed and the plans entitled “Recommended Project Improvements – Tributary X05 – Zemosa Acres,” figure 6.1, prepared by HDR, we have estimated the foundation soils for the culverts in each site. The following table summarizes these results.

| Location                                | Estimated Bottom of Proposed Culvert Depth (ft) <sup>1</sup> | Estimated Foundation Soil Type |                                |
|---|--|--------------------------------|--------------------------------|
|   |  | Up Stream                      | Down Stream                    |
| Culvert at Hanover Drive NW (Site 1)    | 11.5-12.5  | Very soft silty materials      | Very dense rock like materials |
| Culvert at Channing Circle NW (Site 2)  | 11-12.5  | Medium stiff silty materials   | Very loose sandy materials     |
| Culvert at Chelwood Drive NW (Site 3)   | 10-11  | Very soft silty materials      | Very loose sandy materials     |
| Culvert at Chadbourne Drive NW (Site 4) | 10.5-11  | Medium dense sandy materials   | Soft silty materials           |

Notes: 1 From the Top of Ground Elevation

In accordance with the above table, an allowable bearing capacity of 2,000 psf can be utilized in foundation design for the culverts. A total settlement of less than one inch and a differential settlement of less than one-half of an inch in 50 feet have been estimated for these structures.

Very soft to soft fine-grained soils or very loose granular soils are expected to be encountered at the bottom of the culvert foundations in some locations. Left in place, these materials may be susceptible to erosion beneath the proposed culvert boxes. These soils should be removed to a depth where suitable residual soils are encountered and replaced with No. 57 stone wrapped in a suitable filter fabric (Mirafi 140N or equivalent), flowable fill, or a mud mat of lean concrete. The designer should make allowance for flow of water through any pervious layers placed below the structure bottom.

## 4.3 Excavation

Vegetation, topsoil, asphalt, and any otherwise unsuitable material should be removed from the construction areas prior to beginning excavations. Excavations for the culverts are

anticipated to encounter groundwater and may require dewatering. Typical dewatering methods include drainage trenches to divert groundwater away from large open excavations and pumping groundwater from a low area within the excavation.

We anticipate that a horizontal to vertical slope of 3:1 for permanent slopes should provide stable excavations. The design for permanent tie-in slopes for the proposed channel excavation / improvements have not been evaluated as part of our scope of services.

Temporary (construction) slopes inclined 1.5:1 are expected to be stable against deep-seated failures, provided they are at least 2 feet above the water table. Where excavations extend below the water table, the excavation sidewalls may slough or flow into the excavation. As such, the excavations may need temporary shoring if sidewalls cannot be sloped back sufficiently enough to provide a stable excavation. All excavations should comply with applicable local, state and federal safety regulations, including the current OSHA Excavation and Trench Safety Standards.

#### **4.4 Difficult Excavation**

Based on the results of our field exploration, difficult excavation in competent rock should be expected along the replacement of the culverts at Hanover Dr. NW and Chadbourne Ave. NW if it becomes necessary to extend the excavation below approximately 12.5 feet from the existing grades. It is our opinion that a clear and appropriate definition of competent rock be included in the project specifications to reduce the potential for misunderstandings. A sample definition of rock for excavation specifications is provided below:

*Competent Rock is defined as any material that cannot be dislodged by a Cat 325 hydraulic backhoe, or equivalent without the use of drilling and blasting. Boulders or masses of rock exceeding ½ cubic yard in volume shall also be considered rock excavation. This classification does not include materials such as loose rock, concrete, or other materials that can be removed by means other than drilling and blasting, but which for any reason, such as economic reasons, the Contractor chooses to remove by drilling and blasting.*

PWR, intermittent rock lenses and boulders may be encountered during site development. The depth and thickness of PWR, boulders, and rock lenses or seams can vary dramatically in short distances and between the testing locations; therefore, soft/hard weathered rock, boulders or bedrock may be encountered during construction.

#### **4.5 Fill Placement**

We recommend that excavation backfill be tested for moisture content and compaction during placement. Should the results of the in-place density tests indicate the specified moisture or compaction limits have not been met, the area represented by the test should be reworked

and retested as required until the specified moisture and compaction requirements are achieved.

Backfill soils should meet the following compaction requirements:

| ITEM   | DESCRIPTION   |
|--|---|
| <b>Fill Lift Thickness</b>                         | 8 to 10 inches or less in loose thickness when heavy, self-propelled compaction equipment is used<br>4 to 6 inches in loose thickness when hand-guided equipment (i.e. jumping jack or plate compactor) is used |
| <b>Minimum Compaction Requirements<sup>1</sup></b> | Minimum 95% of the materials maximum standard Proctor dry density (ASTM D 698)  |
| <b>Moisture Content Requirements</b>               | +/-3% of the optimum moisture content value as determined by the standard Proctor test at the time of placement and compaction  |

1. We recommend that engineered fill be tested for moisture content and compaction during placement. Should the results of the in-place density tests indicate the specified moisture or compaction limits have not been met, the area represented by the test should be reworked and retested as required until the specified moisture and compaction requirements are achieved.

The geotechnical engineer should be retained during the construction phase of the project to observe backfill operations and to perform necessary tests.

#### **4.6 Lateral Earth Pressures**

The following section specifies the lateral earth pressure coefficients to be used for this project. Terracon recommends that the backfill around the new culverts and wing walls be properly drained to allow for the dissipation of hydrostatic pressure behind the wall. A filter fabric such as Mirafi 140N or equivalent is recommended between the culvert and the backfill to minimize clogging of the weepholes.

Reinforced concrete walls with unbalanced backfill levels on opposite sides should be designed for earth pressures at least equal to those indicated in the following table. Earth pressures will be influenced by structural design of the walls, conditions of wall restraint, methods of construction and/or compaction and the strength of the materials being restrained. Active earth pressure is commonly used for design of free-standing cantilever retaining walls and anticipates wall movement. The "at-rest" condition anticipates no wall rotation. The recommended design lateral earth pressures do not include a factor of safety.

**Earth Pressure Coefficients**

| <b>Earth Pressure Conditions</b> | <b>Earth Pressure Coefficient for Backfill Type</b>                | <b>Equivalent Fluid Density (pcf)</b> | <b>Surcharge Pressure, p<sub>1</sub> (psf)</b> | <b>Earth Pressure, p<sub>2</sub> (psf)</b> |
|----------------------------------|--|---------------------------------------|--|--|
| Active (K <sub>a</sub> )         | On-site sandy silt (ML), silty sand (SM) & clayey sand (SC) - 0.36 | 43                                    | (0.36)S  | (43)H                                      |
| At-Rest (K <sub>o</sub> )        | On-site sandy silt (ML), silty sand (SM) & clayey sand (SC) - 0.53 | 64                                    | (0.53)S  | (64)H                                      |
| Passive (K <sub>p</sub> )        | On-site sandy silt (ML), silty sand (SM) & clayey sand (SC) - 2.77 | 332                                   | ---  | ---  |

Applicable conditions to the above include:

- For active earth pressure, wall must rotate about base, with top lateral movements of about 0.002 **H** to 0.004 **H**, where **H** is wall height
- For passive earth pressure to develop, wall must move horizontally to mobilize resistance
- Uniform surcharge, where S is surcharge pressure
- In-situ soil backfill weight a maximum of 120 pcf
- Horizontal backfill, compacted to 95 percent of standard Proctor maximum dry density
- Loading from heavy compaction equipment not included
- No hydrostatic pressures acting on wall
- No dynamic loading
- No safety factor included in soil parameters
- Ignore passive pressure in frost zone

Backfill placed against structures should consist of granular soils or low plasticity cohesive soils. For the granular values to be valid, the granular backfill must extend out from the base of the wall at an angle of at least 45 and 60 degrees from vertical for the active/at-rest and passive cases, respectively. High plasticity clay (CH) and elastic silt (MH) should not be used as backfill.

To minimize the build-up of lateral soil pressures in excess of the recommended design pressures, over-compaction of the fill behind the wall should be avoided; however, a lesser degree of compaction may permit excessive post-construction settlements. In order to limit wall pressures resulting from over-compaction of wall backfill, we recommend that backfill within 5 feet of a wall be compacted by small, hand-operated compaction equipment to 95 percent of the standard Proctor maximum dry density. Remaining backfill should be compacted in accordance with the compaction recommendations provided in the Earthwork section of this report.

## **4.7 Groundwater Considerations**

Because the bearing elevation of the culverts may be below the groundwater level, there is a potential for the groundwater to rise above the bearing elevation and into the excavation during construction. As such, appropriate dewatering measures should be anticipated during construction and the excavation should be opened for a minimal length of time.

Additionally, buoyant forces which can occur from a rising water table level should be considered during both design and construction, especially prior to completion of the placement of the overlying fill material.

## **5.0 GENERAL COMMENTS**

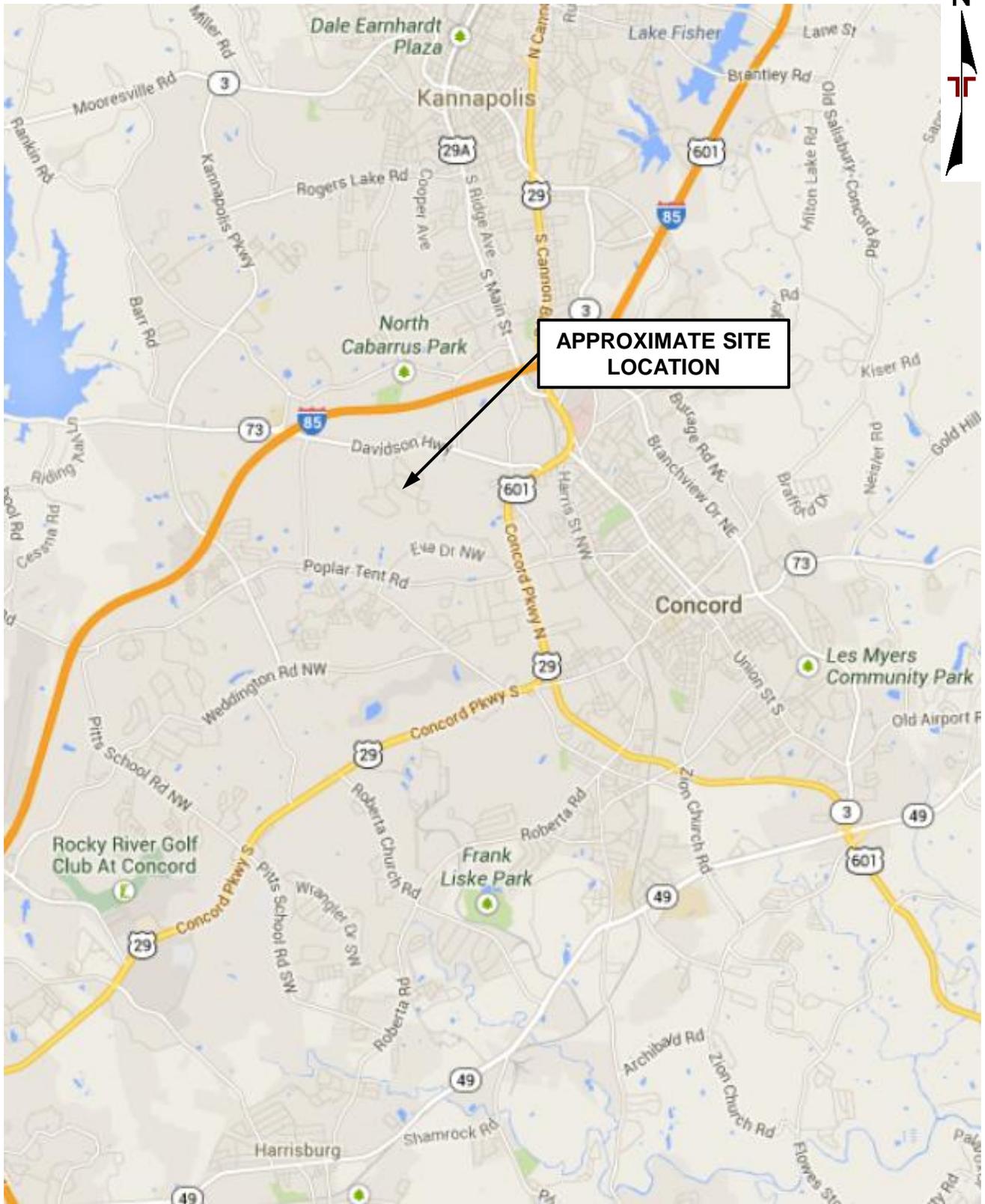
Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide observation and testing services during grading, excavation, foundation construction and other earth-related construction phases of the project.

The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.

**APPENDIX A**  
**FIELD EXPLORATION**



MAP IS FOR GENERAL LOCATION ONLY

|                  |     |             |           |
|------------------|-----|-------------|-----------|
| Project Manager: | CRB | Project No. | 71145007  |
| Drawn by:        | PDM | Scale:      | N.T.S     |
| Checked by:      | CRB | File Name:  | A-1 SVP   |
| Approved by:     | DJC | Date:       | 1/27/2014 |



2020 Starita Road, Suite E Charlotte, North Carolina 28206  
 PH. (704) 509-1777 FAX. (704) 509-1888

|   |
|---|
| <b>SITE VICINITY PLAN</b><br><br><b>PROPOSED ZEMOSA ACRES CULVERTS</b><br>ZEMOSA ACRES<br>CONCORD, SOUTH CAROLINA |
|---|

|         |            |
|---------|------------|
| EXB No. | <b>A-1</b> |
|---------|------------|



**LEGEND:**

 = Approximate Location of Soil Test Borings

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

|                         |                         |  |  |  |         |
|-------------------------|-------------------------|--|--|--|---------|
| Project Manager:<br>CRB | Project No.<br>71145007 | <br>Consulting Engineers & Scientists<br><small>2020 Starita Road, Suite E Charlotte, North Carolina 28206<br/>         PH. (704) 509-1777 FAX. (704) 509-1888</small> | BORING LOCATION PLAN   |  | Exhibit |
| Drawn by:<br>PDM        | Scale:<br>N.T.S.        |  | PROPOSED ZEMOSA ACRES CULVERTS<br>HANOVER DRIVE NORTHWEST<br>CONCORD, NORTH CAROLINA |  | A-2     |
| Checked by:<br>CRB      | File Name:<br>A-2 BLD   |  |  |  |         |
| Approved by:<br>DJC     | Date:<br>1/27/2014      |  |  |  |         |



**LEGEND:**

 = Approximate Location of Soil Test Borings

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

|                         |                         |  |   |  |         |
|-------------------------|-------------------------|--|---|--|---------|
| Project Manager:<br>CRB | Project No.<br>71145007 | <br><small>2020 Starita Road, Suite E Charlotte, North Carolina 28206<br/>PH. (704) 509-1777 FAX. (704) 509-1888</small> | BORING LOCATION PLAN  |  | Exhibit |
| Drawn by:<br>PDM        | Scale:<br>N.T.S.        |  | <b>PROPOSED ZEMOSA ACRES CULVERTS</b><br>CHANNING CIRCLE NORTHWEST<br>CONCORD, NORTH CAROLINA |  | A-3     |
| Checked by:<br>CRB      | File Name:<br>A-3 BLD   |  |   |  |         |
| Approved by:<br>DJC     | Date:<br>1/27/2014      |  |   |  |         |
|                         |                         |  |   |  |         |



**LEGEND:**  
 = Approximate Location of Soil Test Borings

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

|                  |     |             |           |
|------------------|-----|-------------|-----------|
| Project Manager: | CRB | Project No. | 71145007  |
| Drawn by:        | PDM | Scale:      | N.T.S.    |
| Checked by:      | CRB | File Name:  | A-4 BLD   |
| Approved by:     | DJC | Date:       | 1/27/2014 |

**Terracon**  
 Consulting Engineers & Scientists

2020 Starita Road, Suite E Charlotte, North Carolina 28206  
 PH. (704) 509-1777 FAX. (704) 509-1888

|   |
|---|
| BORING LOCATION PLAN  |
| PROPOSED ZEMOSA ACRES CULVERTS<br>CHELWOOD DRIVE NORTHWEST<br>CONCORD, NORTH CAROLINA |

|         |
|---------|
| Exhibit |
| A-4     |



**LEGEND:**  
 = Approximate Location of Soil Test Borings

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

|                  |     |             |           |
|------------------|-----|-------------|-----------|
| Project Manager: | CRB | Project No. | 71145007  |
| Drawn by:        | PDM | Scale:      | N.T.S.    |
| Checked by:      | CRB | File Name:  | A-5 BLD   |
| Approved by:     | DJC | Date:       | 1/27/2014 |

**Terracon**  
 Consulting Engineers & Scientists

2020 Starita Road, Suite E Charlotte, North Carolina 28206  
 PH. (704) 509-1777 FAX. (704) 509-1888

**BORING LOCATION PLAN**

**PROPOSED ZEMOSA ACRES CULVERTS**  
 CHADBOURNE AVENUE NORTHWEST  
 CONCORD, NORTH CAROLINA

Exhibit  
**A-5**

## Geotechnical Engineering Report

Proposed Zemosa Acres Culverts ■ Concord, North Carolina

February 19, 2014 ■ Terracon Project No. 71145007



### Field Exploration Description

The boring locations were laid out on the site by Terracon personnel utilizing a site plan provided and were measured from available site features. Right angles for the boring locations were estimated. The locations of the borings should be considered accurate only to the degree implied by the means and methods used to define them.

The borings were drilled with a truck-mounted rotary drill rig using hollow stem augers to advance the boreholes. Samples of the soil encountered in the borings were obtained using the split-barrel sampling procedure.

In the split barrel sampling procedure, the number of blows required to advance a standard 2 inch O.D. split barrel sampler the last 12 inches of the typical total 18 inch penetration by means of a 140 pound hammer with a free fall of 30 inches, is the standard penetration resistance value (SPT-N). This value is used to estimate the in-situ relative density of cohesionless soils and consistency of cohesive soils.

An automatic SPT hammer was used to advance the split-barrel sampler in the borings performed on this site. A significantly greater efficiency is achieved with the automatic hammer compared to the conventional safety hammer operated with a cathead and rope. This higher efficiency has an appreciable effect on the SPT-N value.

The samples were tagged for identification, sealed to reduce moisture loss, and taken to our laboratory for further examination, testing, and classification. Information provided on the boring logs attached to this report includes soil descriptions, consistency evaluations, boring depths, sampling intervals, and groundwater conditions. The borings were backfilled with auger cuttings prior to the drill crew leaving the site.

A field log of each boring was prepared by the field engineer. These logs included visual classifications of the materials encountered during drilling as well as the field engineer's interpretation of the subsurface conditions between samples. Final boring logs included with this report represent the engineer's interpretation of the field logs and include modifications based on laboratory observation and tests of the samples.

# BORING LOG NO. B-01

**PROJECT: Zemoso Acres Culverts**

**CLIENT: HDR, Inc.  
Charlotte, North Carolina**

**SITE: Zemoso Acres  
Concord, North Carolina**

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO LOG-DEPTH TO BOTTOM OF PAGE. ZEMOSA ACRES CULVERTS - BORING LOGS.GPJ TERRACON STD. TEMPLATE.GDT 2/10/14

| GRAPHIC LOG | LOCATION See Exhibit A-2   | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | RECOVERY (in.) | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS |               |
|-------------|--|-------------|--------------------------|-------------|----------------|--------------------|-------------------|------------------|---------------|
|             | DEPTH  |             |                          |             |                |                    |                   | LL-PL-PI         | PERCENT FINES |
| 0.2         | 0.2' TOPSOIL   |             |                          |             |                |                    |                   |                  |               |
| 5.5         | <b>FILL - ELASTIC SILT WITH SAND (MH)</b> , red, stiff             | 5           |                          | X           | 10             | 3-4-5<br>N=9       | 29                | 60-33-27         | 72            |
| 5.5         |  | 5           |                          | X           | 3              | 3-3-5<br>N=8       |                   |                  |               |
| 12.0        | <b>SANDY SILT (ML)</b> , gray, very soft to medium stiff, alluvium | 10          |                          | X           | 12             | 2-4-3<br>N=7       |                   |                  |               |
| 12.0        |  | 10          |                          | X           | 5              | 0-0-1<br>N=1       |                   |                  |               |
| 15.0        | <b>SILTY SAND (SM)</b> , red and black, medium dense, residuum     | 15          | ▽                        | X           | 4              | 9-5-15<br>N=20     |                   |                  |               |
|             | <b>Boring Terminated at 15 Feet</b>                                | 15          |                          |             |                |                    |                   |                  |               |
|             |  | 20          |                          |             |                |                    |                   |                  |               |
|             |  | 25          |                          |             |                |                    |                   |                  |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Hollow Stem Augers

See Exhibit A-6 for description of field procedures  
See Appendix B for description of laboratory procedures and additional data (if any).  
See Appendix C for explanation of symbols and abbreviations.

Notes:  
Dry Cave In at 10.5'

Abandonment Method:  
Borings backfilled with soil cuttings upon completion.

**WATER LEVEL OBSERVATIONS**

▽ Water Initially Observed



Boring Started: 1/24/2014

Boring Completed: 1/24/2014

Drill Rig: CME-55

Driller: B. Boyce

Project No.: 71145007

Exhibit: A-7

# BORING LOG NO. B-02

**PROJECT: Zemoso Acres Culverts**

**CLIENT: HDR, Inc.  
Charlotte, North Carolina**

**SITE: Zemoso Acres  
Concord, North Carolina**

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO LOG-DEPTH TO BOTTOM OF PAGE\_ZEMOSA ACRES CULVERTS - BORING LOGS.GPJ TERRACON STD. TEMPLATE.GDT 2/10/14

| GRAPHIC LOG | LOCATION See Exhibit A-2   | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | RECOVERY (in.) | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS |  | PERCENT FINES |
|-------------|--|-------------|--------------------------|-------------|----------------|--------------------|-------------------|------------------|--|---------------|
|             |  |             |                          |             |                |                    |                   | LL-PL-PI         |  |               |
|             | DEPTH  |             |                          |             |                |                    |                   |                  |  |               |
| 0.2         | TOPSOIL  |             |                          |             |                |                    |                   |                  |  |               |
| 5.5         | <b>FILL - SANDY SILT (ML)</b> , red and tan, medium stiff to stiff | 5           |                          | X           | 18             | 4-3-3<br>N=6       |                   |                  |  |               |
|             |  |             |                          | X           | 18             | 3-3-5<br>N=8       | 28                |                  |  |               |
| 12.5        | <b>SILTY SAND (SM)</b> , gray, very loose to loose, alluvium       |             |                          | X           | 18             | 2-3-2<br>N=5       |                   |                  |  |               |
|             |  |             |                          | X           | 6              | 2-1-1<br>N=2       |                   |                  |  |               |
|             |  |             | ▽                        |             |                |                    |                   |                  |  |               |
|             | <b>Auger Refusal at 12.5 Feet</b>                                  |             |                          |             | 0              | 50/0"<br>N=50/0"   |                   |                  |  |               |
|             |  | 15          |                          |             |                |                    |                   |                  |  |               |
|             |  | 20          |                          |             |                |                    |                   |                  |  |               |
|             |  | 25          |                          |             |                |                    |                   |                  |  |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Hollow Stem Augers

See Exhibit A-6 for description of field procedures  
See Appendix B for description of laboratory procedures and additional data (if any).

Notes:  
Dry Cave In at 9.5'

Abandonment Method:  
Borings backfilled with soil cuttings upon completion.

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**

▽ Water Initially Observed



Boring Started: 1/24/2014

Boring Completed: 1/24/2014

Drill Rig: CME-55

Driller: B. Boyce

Project No.: 71145007

Exhibit: A-8

# BORING LOG NO. B-03

**PROJECT: Zemoso Acres Culverts**

**CLIENT: HDR, Inc.  
Charlotte, North Carolina**

**SITE: Zemoso Acres  
Concord, North Carolina**

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO LOG-DEPTH TO BOTTOM OF PAGE\_ZEMOSA ACRES CULVERTS - BORING LOGS.GPJ TERRACON STD. TEMPLATE.GDT 2/10/14

| GRAPHIC LOG | LOCATION See Exhibit A-2  | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | RECOVERY (in.) | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS |               |
|-------------|---|-------------|--------------------------|-------------|----------------|--------------------|-------------------|------------------|---------------|
|             | DEPTH   |             |                          |             |                |                    |                   | LL-PL-PI         | PERCENT FINES |
| 0.3         | 3" TOPSOIL  |             |                          |             |                |                    |                   |                  |               |
| 8.0         | <b>FILL - ELASTIC SILT WITH SAND (MH)</b> , dark gray and red, medium stiff | 5           |                          | X           | 18             | 4-3-4<br>N=7       |                   |                  |               |
| 8.0         | <b>SILT WITH SAND (ML)</b> , gray, medium stiff, alluvium                   | 10          |                          | X           | 16             | 3-3-4<br>N=7       | 32                | 53-30-23         | 72            |
| 17.0        | <b>SANDY SILT (ML)</b> , dark gray, hard, residuum                          | 15          | ▽                        | X           | 10             | 3-4-3<br>N=7       |                   |                  |               |
| 20.0        | <b>Boring Terminated at 20 Feet</b>   | 20          |                          | X           | 10             | 1-2-2<br>N=4       |                   |                  |               |
|             |   | 25          |                          | X           | 12             | 0-2-2<br>N=4       |                   |                  |               |
|             |   | 20          |                          | X           | 16             | 5-12-27<br>N=39    |                   |                  |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Hollow Stem Augers

See Exhibit A-6 for description of field procedures  
See Appendix B for description of laboratory procedures and additional data (if any).

Notes:  
Dry Cave In at 5.5'

Abandonment Method:  
Borings backfilled with soil cuttings upon completion.

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**  
▽ Water Initially Observed



Boring Started: 1/24/2014

Boring Completed: 1/24/2014

Drill Rig: CME-55

Driller: B. Boyce

Project No.: 71145007

Exhibit: A-9

# BORING LOG NO. B-04

**PROJECT: Zemoso Acres Culverts**

**CLIENT: HDR, Inc.  
Charlotte, North Carolina**

**SITE: Zemoso Acres  
Concord, North Carolina**

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO LOG-DEPTH TO BOTTOM OF PAGE. ZEMOSA ACRES CULVERTS - BORING LOGS.GPJ TERRACON STD. TEMPLATE.GDT 2/10/14

| GRAPHIC LOG | LOCATION See Exhibit A-2  | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | RECOVERY (in.) | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS |               |
|-------------|---|-------------|--------------------------|-------------|----------------|--------------------|-------------------|------------------|---------------|
|             |   |             |                          |             |                |                    |                   | LL-PL-PI         | PERCENT FINES |
|             | DEPTH   |             |                          |             |                |                    |                   |                  |               |
| 0.2         | 2" TOPSOIL  |             |                          |             |                |                    |                   |                  |               |
|             | <b>FILL - SILT WITH SAND (ML)</b> , red and brown, medium stiff to stiff              |             |                          | X           | 10             | 3-2-3<br>N=5       |                   |                  |               |
|             |   | 5           |                          | X           | 16             | 2-3-2<br>N=5       |                   |                  |               |
|             |   |             |                          | X           | 18             | 3-5-6<br>N=11      | 28                |                  |               |
| 8.0         | <b>SANDY SILT (ML)</b> , gray, medium stiff, alluvium                                 |             |                          | X           | 12             | 3-2-3<br>N=5       |                   |                  |               |
|             |   | 10          |                          |             |                |                    |                   |                  |               |
| 12.0        | <b>SILTY SAND (SM)</b> , gray, very loose, alluvium                                   |             |                          | X           | 12             | 0-0-0<br>N=0       |                   |                  |               |
|             |   | 15          | ▽                        |             |                |                    |                   |                  |               |
| 17.0        | <b>SILTY SAND (SM)</b> , dark gray and red, dense, residuum                           |             |                          | X           | 10             | 19-31-69<br>N=100  |                   |                  |               |
| 19.0        | <b>PARTIALLY WEATHERED ROCK</b> , Sampled as very dense, dark gray and red silty SAND |             |                          | X           |                |                    |                   |                  |               |
| 20.0        | <b>Boring Terminated at 20 Feet</b>   |             |                          |             |                |                    |                   |                  |               |
|             |   | 20          |                          |             |                |                    |                   |                  |               |
|             |   | 25          |                          |             |                |                    |                   |                  |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Hollow Stem Augers

See Exhibit A-6 for description of field procedures  
See Appendix B for description of laboratory procedures and additional data (if any).

Notes:  
Dry Cave In at 9.0'

Abandonment Method:  
Borings backfilled with soil cuttings upon completion.

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**

▽ Water Initially Observed



Boring Started: 1/24/2014

Boring Completed: 1/24/2014

Drill Rig: CME-55

Driller: B. Boyce

Project No.: 71145007

Exhibit: A-10

# BORING LOG NO. B-05

**PROJECT: Zemoso Acres Culverts**

**CLIENT: HDR, Inc.  
Charlotte, North Carolina**

**SITE: Zemoso Acres  
Concord, North Carolina**

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO LOG-DEPTH TO BOTTOM OF PAGE ZEMOSA ACRES CULVERTS - BORING LOGS.GPJ TERRACON STD. TEMPLATE.GDT 2/10/14

| GRAPHIC LOG | LOCATION See Exhibit A-2                                   | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | RECOVERY (in.) | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS |               |
|-------------|--|-------------|--------------------------|-------------|----------------|--------------------|-------------------|------------------|---------------|
|             | DEPTH  |             |                          |             |                |                    |                   | LL-PL-PI         | PERCENT FINES |
| 0.2         | TOPSOIL  |             |                          |             |                |                    |                   |                  |               |
| 4.5         | <b>FILL - SILT WITH SAND (ML)</b> , red, medium stiff      |             |                          | X           | 10             | 3-4-4<br>N=8       | 30                |                  |               |
| 12.0        | <b>SANDY SILT (ML)</b> , gray, very soft to soft, alluvium | 5           |                          | X           | 18             | 3-2-4<br>N=6       |                   |                  |               |
| 15.0        | <b>SANDY SILT (ML)</b> , dark gray, stiff, residuum        | 10          | ▽                        | X           | 12             | 1-2-2<br>N=4       |                   |                  |               |
| 15.0        | <b>Boring Terminated at 15 Feet</b>                        | 15          |                          | X           | 8              | 0-0-0<br>N=0       |                   |                  |               |
|             |  | 6           |                          | X           | 6              | 6-5-8<br>N=13      |                   |                  |               |
|             |  | 20          |                          |             |                |                    |                   |                  |               |
|             |  | 25          |                          |             |                |                    |                   |                  |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Hollow Stem Augers

See Exhibit A-6 for description of field procedures  
See Appendix B for description of laboratory procedures and additional data (if any).  
See Appendix C for explanation of symbols and abbreviations.

Notes:  
Wet Cave In at 9'

Abandonment Method:  
Borings backfilled with soil cuttings upon completion.

**WATER LEVEL OBSERVATIONS**

▽ Water Initially Observed



Boring Started: 1/24/2014

Boring Completed: 1/24/2014

Drill Rig: CME-55

Driller: B. Boyce

Project No.: 71145007

Exhibit: A-11

# BORING LOG NO. B-06

**PROJECT: Zemoso Acres Culverts**

**CLIENT: HDR, Inc.  
Charlotte, North Carolina**

**SITE: Zemoso Acres  
Concord, North Carolina**

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO LOG-DEPTH TO BOTTOM OF PAGE ZEMOSA ACRES CULVERTS - BORING LOGS.GPJ TERRACON STD. TEMPLATE.GDT 2/10/14

| GRAPHIC LOG | LOCATION See Exhibit A-2   | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | RECOVERY (in.) | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS |    | PERCENT FINES |
|-------------|--|-------------|--------------------------|-------------|----------------|--------------------|-------------------|------------------|----|---------------|
|             | DEPTH  |             |                          |             |                |                    |                   | LL-PL-PI         |    |               |
| 0.1         | TOPSOIL  |             |                          |             |                |                    |                   |                  |    |               |
| 0.1 - 1"    | <b>FILL - SANDY LEAN CLAY (CL)</b> , red and brown, medium stiff |             |                          | X           | 16             | 4-5-3<br>N=8       |                   |                  |    |               |
| 5           |  |             |                          | X           | 8              | 3-2-3<br>N=5       |                   |                  |    |               |
| 7.5         |  |             |                          | X           | 18             | 3-2-2<br>N=4       | 30                | 28-20-8          | 55 |               |
| 7.5         | <b>SILTY SAND (SM)</b> , gray, very loose, alluvium              |             | ▽                        |             |                |                    |                   |                  |    |               |
| 10          |  |             |                          | X           | 12             | 0-0-0<br>N=0       |                   |                  |    |               |
| 12.0        | <b>SANDY SILT (ML)</b> , red, tan and dark gray, hard, residuum  |             |                          |             |                |                    |                   |                  |    |               |
| 15.0        |  |             |                          | X           | 12             | 11-13-23<br>N=36   |                   |                  |    |               |
|             | <b>Boring Terminated at 15 Feet</b>                              |             |                          |             |                |                    |                   |                  |    |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Hollow Stem Augers

See Exhibit A-6 for description of field procedures  
See Appendix B for description of laboratory procedures and additional data (if any).  
See Appendix C for explanation of symbols and abbreviations.

Notes:  
Wet Cave In at 8.5'

Abandonment Method:  
Borings backfilled with soil cuttings upon completion.

**WATER LEVEL OBSERVATIONS**

▽ Water Initially Observed



Boring Started: 1/24/2014

Boring Completed: 1/24/2014

Drill Rig: CME-55

Driller: B. Boyce

Project No.: 71145007

Exhibit: A-12

# BORING LOG NO. B-07

**PROJECT: Zemosa Acres Culverts**

**CLIENT: HDR, Inc.  
Charlotte, North Carolina**

**SITE: Zemosa Acres  
Concord, North Carolina**

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO LOG-DEPTH TO BOTTOM OF PAGE. ZEMOSA ACRES CULVERTS - BORING LOGS.GPJ TERRACON STD. TEMPLATE.GDT 2/10/14

| GRAPHIC LOG | LOCATION See Exhibit A-2   | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | RECOVERY (in.) | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS |               |
|-------------|--|-------------|--------------------------|-------------|----------------|--------------------|-------------------|------------------|---------------|
|             |  |             |                          |             |                |                    |                   | LL-PL-PI         | PERCENT FINES |
|             | DEPTH  |             |                          |             |                |                    |                   |                  |               |
| 0.2         | TOPSOIL  |             |                          |             |                |                    |                   |                  |               |
| 5.5         | <b>FILL - SANDY SILT (ML)</b> , red and brown, medium stiff                        | 5           |                          | X           | 10             | 3-3-4<br>N=7       |                   |                  |               |
| 8.0         | <b>SANDY SILT (ML)</b> , gray, medium stiff, alluvium                              | 5           |                          | X           | 16             | 3-2-6<br>N=8       | 26                |                  |               |
| 12.9        | <b>SANDY SILT (ML)</b> , gray, medium stiff, alluvium                              |             |                          | X           | 18             | 3-3-3<br>N=6       |                   |                  |               |
| 13.3        | <b>SILTY SAND (SM)</b> , gray and white, medium dense, residuum                    | 10          |                          | X           | 10             | 10-8-21<br>N=29    |                   |                  |               |
| 13.3        | <b>PARTIALLY WEATHERED ROCK</b> , NO RECOVERY<br><i>Auger Refusal at 13.3 Feet</i> | 15          |                          | X           | 0              | 50/4"<br>N=50/4"   |                   |                  |               |
|             |  | 20          |                          |             |                |                    |                   |                  |               |
|             |  | 25          |                          |             |                |                    |                   |                  |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Hollow Stem Augers

See Exhibit A-6 for description of field procedures  
See Appendix B for description of laboratory procedures and additional data (if any).

Notes:  
Dry Cave In at 9.5'

Abandonment Method:  
Borings backfilled with soil cuttings upon completion.

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**  
*No free water observed*



Boring Started: 1/24/2014

Boring Completed: 1/24/2014

Drill Rig: CME-55

Driller: B. Boyce

Project No.: 71145007

Exhibit: A-13

# BORING LOG NO. B-08

**PROJECT: Zemosa Acres Culverts**

**CLIENT: HDR, Inc.  
Charlotte, North Carolina**

**SITE: Zemosa Acres  
Concord, North Carolina**

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO LOG-DEPTH TO BOTTOM OF PAGE ZEMOSA ACRES CULVERTS - BORING LOGS.GPJ TERRACON STD. TEMPLATE.GDT 2/10/14

| GRAPHIC LOG | LOCATION See Exhibit A-2   | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | RECOVERY (in.) | FIELD TEST RESULTS | WATER CONTENT (%) | ATTERBERG LIMITS |               |
|-------------|--|-------------|--------------------------|-------------|----------------|--------------------|-------------------|------------------|---------------|
|             | DEPTH  |             |                          |             |                |                    |                   | LL-PL-PI         | PERCENT FINES |
| 0.2         | TOPSOIL  |             |                          |             |                |                    |                   |                  |               |
| 0.2         | <b>FILL - CLAYEY SAND (SC)</b> , red and tan, loose  |             |                          | X           | 14             | 4-4-2<br>N=6       | 20                | 45-27-18         | 48            |
| 5           |  |             |                          | X           | 18             | 3-3-3<br>N=6       |                   |                  |               |
| 8.0         |  |             |                          | X           | 18             | 3-3-3<br>N=6       |                   |                  |               |
| 8.0         | <b>SANDY SILT (ML)</b> , gray, soft, alluvium  |             |                          | X           | 18             | 2-1-2<br>N=3       |                   |                  |               |
| 12.0        |  |             |                          | X           | 1              | 50/3"<br>N=50/3"   |                   |                  |               |
| 12.0        | <b>SILTY SAND (SM)</b> , dark gray, residuum, Spoon was driven 3" in 6-7 blows and refused on rock |             |                          |             |                |                    |                   |                  |               |
| 13.8        | <b>Split Spoon Refusal at 13.8 Feet</b>  |             |                          |             |                |                    |                   |                  |               |

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:  
Hollow Stem Augers

See Exhibit A-6 for description of field procedures  
See Appendix B for description of laboratory procedures and additional data (if any).  
See Appendix C for explanation of symbols and abbreviations.

Notes:  
Dry Cave In at 10'

Abandonment Method:  
Borings backfilled with soil cuttings upon completion.

**WATER LEVEL OBSERVATIONS**

No free water observed



Boring Started: 1/24/2014

Boring Completed: 1/24/2014

Drill Rig: CME-55

Driller: B. Boyce

Project No.: 71145007

Exhibit: A-14

**APPENDIX B**  
**LABORATORY TESTING**

## Geotechnical Engineering Report

Proposed Zemosa Acres Culverts ■ Concord, North Carolina

February 19, 2014 ■ Terracon Project No. 71145007



### Laboratory Testing Description and Results

The following laboratory tests were performed on select soil samples for this project: in-situ moisture content, Atterberg Limits and wash no. 200 sieve tests. The results of most of these tests are summarized in the following tables. Some of the laboratory test results are shown on the boring logs at the sample.

The following table summarizes the in-situ moisture content, wash No. 200 sieve tests, and Atterberg Limits test results. These results are also shown on the boring logs in Appendix A.

| Sample Location, Depth | In-situ Moisture Content (%) | % Passing the No. 200 Sieve | Liquid Limit, (%) | Plastic Limit, (%) | Plasticity Index, (%) |
|------------------------|------------------------------|-----------------------------|-------------------|--------------------|-----------------------|
| B-01, 1' – 2.5'        | 29.1                         | 71.9                        | 60                | 33                 | 27                    |
| B-02, 3.5' – 5'        | 28.0                         | --                          | --                | --                 | --                    |
| B-03, 3.5' – 5'        | 32.4                         | 71.5                        | 53                | 30                 | 23                    |
| B-04, 6' – 7.5'        | 28.2                         | --                          | --                | --                 | --                    |
| B-05, 1' – 2.5'        | 30.4                         | --                          | --                | --                 | --                    |
| B-06, 6' – 7.5'        | 29.7                         | 54.7                        | 28                | 20                 | 8                     |
| B-07, 3.5' – 5'        | 26.3                         | --                          | --                | --                 | --                    |
| B-08, 1' – 2.5'        | 20.4                         | 47.9                        | 45                | 27                 | 18                    |

**APPENDIX C**  
**SUPPORTING DOCUMENTS**

## GENERAL NOTES

### DRILLING & SAMPLING SYMBOLS:

|  |                               |
|--|-------------------------------|
| SS: Split Spoon – 1- <sup>3</sup> / <sub>8</sub> " I.D., 2" O.D., unless otherwise noted | HS: Hollow Stem Auger         |
| ST: Thin-Walled Tube - 2" O.D., unless otherwise noted                                   | PA: Power Auger               |
| RS: Ring Sampler - 2.42" I.D., 3" O.D., unless otherwise noted                           | HA: Hand Auger                |
| DB: Diamond Bit Coring - 4", N, B  | RB: Rock Bit                  |
| BS: Bulk Sample or Auger Sample  | WB: Wash Boring or Mud Rotary |

The number of blows required to advance a standard 2-inch O.D. split-spoon sampler (SS) the last 12 inches of the total 18-inch penetration with a 140-pound hammer falling 30 inches is considered the "Standard Penetration" or "N-value".

### WATER LEVEL MEASUREMENT SYMBOLS:

|                  |                            |                      |
|------------------|----------------------------|----------------------|
| WL: Water Level  | WS: While Sampling         | N/E: Not Encountered |
| WCI: Wet Cave in | WD: While Drilling         |                      |
| DCI: Dry Cave in | BCR: Before Casing Removal |                      |
| AB: After Boring | ACR: After Casing Removal  |                      |

Water levels indicated on the boring logs are the levels measured in the borings at the times indicated. Groundwater levels at other times and other locations across the site could vary. In pervious soils, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels may not be possible with only short-term observations.

**DESCRIPTIVE SOIL CLASSIFICATION:** Soil classification is based on the Unified Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

### CONSISTENCY OF FINE-GRAINED SOILS

| <u>Unconfined<br/>Compressive<br/>Strength, Qu, psf</u> | <u>Standard<br/>Penetration or N-<br/>value (SS)<br/>Blows/Ft.</u> | <u>Consistency</u> |
|---|--|--------------------|
| < 500   | 0 – 1  | Very Soft          |
| 500 – 1,000   | 2 – 4  | Soft               |
| 1,001 – 2,000   | 4 – 8  | Medium Stiff       |
| 2,001 – 4,000   | 8 – 15   | Stiff              |
| 4,001 – 8,000   | 15 – 30  | Very Stiff         |
| 8,000+  | > 30   | Hard               |

### RELATIVE DENSITY OF COARSE-GRAINED SOILS

| <u>Standard Penetration<br/>or N-value (SS)<br/>Blows/Ft.</u> | <u>Relative Density</u> |
|---|-------------------------|
| 0 – 3   | Very Loose              |
| 4 – 9   | Loose                   |
| 10 – 29   | Medium Dense            |
| 30 – 49   | Dense                   |
| > 50  | Very Dense              |

### RELATIVE PROPORTIONS OF SAND AND GRAVEL

| <u>Descriptive Term(s) of other<br/>Constituents</u> | <u>Percent of<br/>Dry Weight</u> |
|--|----------------------------------|
| Trace  | < 15                             |
| With   | 15 – 29                          |
| Modifier   | > 30                             |

### GRAIN SIZE TERMINOLOGY

| <u>Major Component<br/>of Sample</u> | <u>Particle Size</u>                 |
|--------------------------------------|--------------------------------------|
| Boulders                             | Over 12 in. (300mm)                  |
| Cobbles                              | 12 in. to 3 in. (300mm to 75 mm)     |
| Gravel                               | 3 in. to #4 sieve (75mm to 4.75 mm)  |
| Sand                                 | #4 to #200 sieve (4.75mm to 0.075mm) |
| Silt or Clay                         | Passing #200 Sieve (0.075mm)         |

### RELATIVE PROPORTIONS OF FINES

| <u>Descriptive Term(s) of other<br/>Constituents</u> | <u>Percent of<br/>Dry Weight</u> |
|--|----------------------------------|
| Trace  | < 5                              |
| With   | 5 – 12                           |
| Modifiers  | > 12                             |

### PLASTICITY DESCRIPTION

| <u>Term</u> | <u>Plasticity<br/>Index</u> |
|-------------|-----------------------------|
| Non-plastic | 0                           |
| Low         | 1 – 10                      |
| Medium      | 11 – 30                     |
| High        | > 30                        |

# UNIFIED SOIL CLASSIFICATION SYSTEM

| Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests <sup>A</sup> |   |  | Soil Classification  |                                   |                                   |                                 |
|--|---|--|--|-----------------------------------|-----------------------------------|---------------------------------|
|  |   |  | Group Symbol   | Group Name <sup>B</sup>           |                                   |                                 |
| <b>Coarse Grained Soils:</b><br>More than 50% retained on No. 200 sieve                  | <b>Gravels:</b><br>More than 50% of coarse fraction retained on No. 4 sieve | <b>Clean Gravels:</b><br>Less than 5% fines <sup>C</sup>       | $Cu \geq 4$ and $1 \leq Cc \leq 3$ <sup>E</sup>                  | GW                                | Well-graded gravel <sup>F</sup>   |                                 |
|  |   | <b>Gravels with Fines:</b><br>More than 12% fines <sup>C</sup> | $Cu < 4$ and/or $1 > Cc > 3$ <sup>E</sup>                        | GP                                | Poorly graded gravel <sup>F</sup> |                                 |
|  | <b>Sands:</b><br>50% or more of coarse fraction passes No. 4 sieve          | <b>Clean Sands:</b><br>Less than 5% fines <sup>D</sup>         | Fines classify as ML or MH                                       | GM                                | Silty gravel <sup>F,G,H</sup>     |                                 |
|  |   | <b>Sands with Fines:</b><br>More than 12% fines <sup>D</sup>   | Fines classify as CL or CH                                       | GC                                | Clayey gravel <sup>F,G,H</sup>    |                                 |
|  | <b>Fine-Grained Soils:</b><br>50% or more passes the No. 200 sieve          | <b>Silts and Clays:</b><br>Liquid limit less than 50           | <b>Inorganic:</b><br>$PI > 7$ and plots on or above "A" line     | CL                                | Lean clay <sup>K,L,M</sup>        |                                 |
|  |   |  | <b>Organic:</b><br>$PI < 4$ or plots below "A" line <sup>J</sup> | ML                                | Silt <sup>K,L,M</sup>             |                                 |
|  |   | <b>Silts and Clays:</b><br>Liquid limit 50 or more             | <b>Inorganic:</b><br>$PI$ plots on or above "A" line             | Liquid limit - oven $< 0.75$      | OL                                | Organic clay <sup>K,L,M,N</sup> |
|  |   |  | <b>Organic:</b><br>$PI$ plots below "A" line                     | Liquid limit - not dried $< 0.75$ | OH                                | Organic silt <sup>K,L,M,O</sup> |
|  |   | <b>Silts and Clays:</b><br>Liquid limit 50 or more             | <b>Inorganic:</b><br>$PI$ plots on or above "A" line             | $PI$ plots on or above "A" line   | CH                                | Fat clay <sup>K,L,M</sup>       |
|  |   |  | <b>Organic:</b><br>$PI$ plots below "A" line                     | Liquid limit - oven $< 0.75$      | MH                                | Elastic Silt <sup>K,L,M</sup>   |
| <b>Highly organic soils:</b>   |   | Primarily organic matter, dark in color, and organic odor      | Liquid limit - oven $< 0.75$                                     | OH                                | Organic clay <sup>K,L,M,P</sup>   |                                 |
|  |   |  | Liquid limit - not dried $< 0.75$                                | PT                                | Peat                              |                                 |

<sup>A</sup> Based on the material passing the 3-in. (75-mm) sieve

<sup>B</sup> If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

<sup>C</sup> Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

<sup>D</sup> Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

$$E \quad Cu = D_{60}/D_{10} \quad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

<sup>F</sup> If soil contains  $\geq 15\%$  sand, add "with sand" to group name.

<sup>G</sup> If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

<sup>H</sup> If fines are organic, add "with organic fines" to group name.

<sup>I</sup> If soil contains  $\geq 15\%$  gravel, add "with gravel" to group name.

<sup>J</sup> If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

<sup>K</sup> If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

<sup>L</sup> If soil contains  $\geq 30\%$  plus No. 200 predominantly sand, add "sandy" to group name.

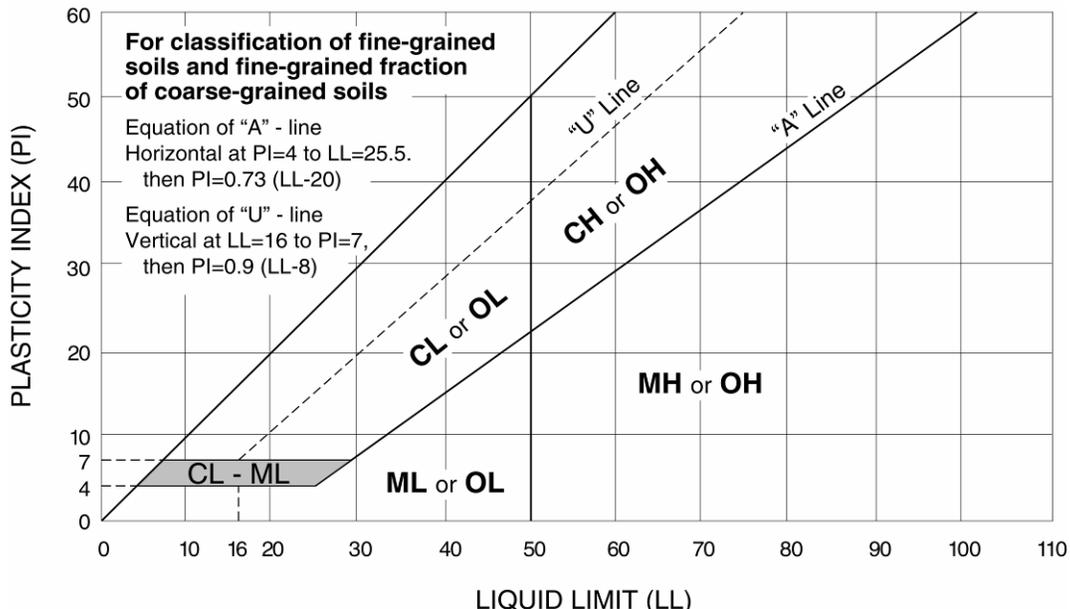
<sup>M</sup> If soil contains  $\geq 30\%$  plus No. 200, predominantly gravel, add "gravelly" to group name.

<sup>N</sup>  $PI \geq 4$  and plots on or above "A" line.

<sup>O</sup>  $PI < 4$  or plots below "A" line.

<sup>P</sup>  $PI$  plots on or above "A" line.

<sup>Q</sup>  $PI$  plots below "A" line.





North Carolina Department of Environment and Natural Resources

Pat McCrory  
Governor

Donald van der Vaart  
Secretary

May 18, 2015  
DWR# 15-0333  
Cabarrus County

HDR Engineering, Inc.  
C/o Mr. Eric Mularski  
440 S. Church Street  
Charlotte, NC 28202-1919

**Subject:** APPROVAL of 401 Water Quality Certification with Additional Conditions  
Zemosa Acres Culvert Replacement

Dear Mr. Mularski:

You have our approval, in accordance with the General Certification and those conditions listed below, for the purpose proposed in your application dated March 31, 2015, and received by the Division of Water Resources (the Division) on April 2, 2015. Subsequent information was submitted on May 15, 2015. After reviewing your application, we have determined that this project is covered by Water Quality General Certification Number 3883 and 3885 which can be viewed on our web site at <http://portal.ncdenr.org/web/wq/swp/ws/401>. The General Certifications allow you to use Nationwide Permit Number 3 and 27 once they are issued to you by the U.S. Army Corps of Engineers (COE). Please note that you should get any other federal, state or local permits before proceeding with your project, including those required by (but not limited to) Sediment and Erosion Control, Non-Discharge, and Water Supply Watershed regulations.

The above noted Certification will expire when the associated 404 permit expires unless otherwise specified in the General Certification. It is advised that all conditions of the Certification be reviewed prior to initiation of the project. In addition to the requirements of the Certification, you must also comply with the following conditions:

1. This approval is only valid for the purpose and design that you described in your application. If you change your project, you must notify us in writing, and you may be required to send us a new application for a new Certification. If the property is sold, the new owner must be given a copy of the Certification and approval letter; and is thereby responsible for complying with all conditions. 15A NCAC 02H .0506 and 15A NCAC 02H .0507(c)
2. The Mooresville Regional Office shall be notified in writing once construction at the approved impact areas has commenced. 15A NCAC 02H .0502 (e)

## 3. Approved Impacts:

| Type of Impact    | Amount Approved Temporary Impact | Amount Approved Permanent Impact |
|-------------------|----------------------------------|----------------------------------|
| Stream relocation | 400 linear ft.                   | 120 linear ft.                   |
| Wetland           | 0 acre                           | 0 acre                           |

4. Diversion Ditches and other storm water conveyances as related to the sediment and erosion control measures shall be matted and/or stabilized to reduce sediment loss and turbidity. This includes interior/exterior slopes of sediment basins. 15A NCAC 02H .0506 (b)(3) and (c)(3)
5. Use of native vegetation and other soft stream bank stabilization techniques is recommended where practicable instead of riprap or other bank hardening methods. If riprap is necessary, it shall not be placed in the streambed, unless approved by DWR
6. Immediately upon completion of the installation of a culvert or removal of a flow restricting device, water flow shall be returned to its natural course. Existing stream dimensions (including the cross section dimensions, pattern, and longitudinal profile) must be maintained (or restored via constructed benches) above and below locations of each culvert. If any of the existing pipes are or become perched, the appropriate stream grade shall be re-established or, if the pipes installed in a perched manner, the pipes shall be removed and re-installed correctly. 15A NCAC 02H.0506(b)(2)
7. During the construction of the project, no staging of equipment of any kind is permitted in waters of the U.S., or protected riparian buffers. 15A NCAC 02H .0506(b)(3)
8. A turbidity curtain, if necessary, will be installed in the stream if driving or drilling activities occur within the stream channel, on the stream bank, or within 5-feet of the top of bank. This condition can be waived with prior approval from the NCDWR. 15A NCAC 02H .0506(b)(3)
9. The Permittee shall ensure that the final design drawings adhere to the permit and to the permit drawings submitted for approval. 15A NCAC 02H .0507 (c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)
10. All mechanized equipment operated near surface waters must be regularly inspected and maintained to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids, or other toxic materials. 15A NCAC 02H.0506(b)(3)
11. No rock, sand or other materials shall be dredged from the stream channel except where authorized by this certification. 15A NCAC 02H.0506(b)(3)
12. The permittee shall report any violations of this Certification to the Division of Water Resources within 24 hours of discovery. . 15A NCAC 02H .0507(c)

This Certification can be contested as provided in Articles 3 and 4 of the General Statute 150B by filing a written petition for an administrative hearing to the Office of the Administrative Hearings (hereby known as OAH). A petition form may be obtained from the OAH at <http://www.ncoah.com/or> by calling the OAH Clerk's Office at (919) 431-3000.

Within sixty (60) calendar days of receipt of this notice, a petition must be filed with the OAH. A petition is considered filed when the original and one (1) copy along with any applicable OAH filing fee is received in the OAH during normal office hours (Monday through Friday, 8:00 am to 5:00 pm, excluding state holidays).

The petitions may be faxed to the OAH at (919) 431-3100, provided the original and one (1) copy of the petition along with any applicable OAH filing fee is received by the OAH within five (5) business days following the faxed transmission. Mailing address for the OAH:

*If sending via US Postal Service:*

Office of Administrative Hearings  
6714 Mail Service Center  
Raleigh, NC 27699-6714

*If sending via delivery service (UPS, FedEx, etc.)*

Office of Administrative Hearings  
1711 New Hope Church Rd.  
Raleigh, NC 27609-6285

One (1) copy of the petition must also be served on DENR as follows:

Mr. Sam M. Hayes, General Counsel  
Department of Environment and Natural Resources  
1601 Mail Service Center  
Raleigh, NC 27699-1601

This letter completes the review by the Division under Section 401 of the Clean Water Act. If you have any questions, please telephone Mr. Alan Johnson in the Mooresville Regional Office at 704-663-1699 or Ms. Karen Higgins in the Central Office in Raleigh 919-807-6360.

Sincerely,



Michael L. Parker, Regional Supervisor  
Water Quality Regional Operations Section  
Mooresville Regional Office, DENR

Attachments

cc: Army Corps of Engineers, Asheville  
Karen Higgins, Wetlands Unit  
MRO, Land Quality

**CERTIFICATE OF COMPLETION**

NCDWR Project No.: \_\_\_\_\_

County: \_\_\_\_\_

Applicant: \_\_\_\_\_

Project Name: \_\_\_\_\_

Date of Issuance of 401 Water Quality Certification: \_\_\_\_\_

**Certificate of Completion**

Upon completion of all work approved within the 401 Water Quality Certification or applicable Buffer Rules, and any subsequent modifications, the applicant is required to return this certificate to the 401 Transportation Permitting Unit, North Carolina Division of Water Resources, 1650 Mail Service Center, Raleigh, NC, 27699-1650. This form may be returned to NCDWR by the applicant, the applicant's authorized agent, or the project engineer. It is not necessary to send certificates from all of these.

***Applicant's Certification***

I, \_\_\_\_\_, hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

***Agent's Certification***

I, \_\_\_\_\_, hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

***Engineer's Certification***

\_\_\_\_\_ Partial \_\_\_\_\_ Final

I, \_\_\_\_\_, as a duly registered Professional Engineer in the State of North Carolina, having been authorized to observe (periodically, weekly, full time) the construction of the project for the Permittee hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature \_\_\_\_\_ Registration No. \_\_\_\_\_

Date \_\_\_\_\_

**Certificate of Completion**

DWR Project No. \_\_\_\_\_ County: \_\_\_\_\_

Applicant: \_\_\_\_\_

Project Name: \_\_\_\_\_

Date of Issuance of 401 Water Quality Certification: \_\_\_\_\_

Upon completion of all work approved within the 401 Water Quality Certification and Buffer Rules, and any subsequent modifications, the applicant is required to return this certificate to the 401/Wetlands Unit, North Carolina Division of Water Resources, 1617 Mail Service Center, Raleigh, NC, 27699-1650. This form may be returned to DWR by the applicant, the applicant's authorized agent, or the project engineer. It is not necessary to send certificates from all of these.

***Applicant's Certification***

I, \_\_\_\_\_, hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

***Agent's Certification***

I, \_\_\_\_\_, hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

***If this project was designed by a Certified Professional***

I, \_\_\_\_\_, as a duly registered Professional \_\_\_\_\_ (i.e., Engineer, Landscape Architect, Surveyor, etc.) in the State of North Carolina, having been authorized to observe (periodically, weekly, full time) the construction of the project, for the Permittee hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature: \_\_\_\_\_ Registration No.: \_\_\_\_\_ Date: \_\_\_\_\_



## Water Quality Certification No. 3883

GENERAL CERTIFICATION FOR PROJECTS ELIGIBLE FOR U.S. ARMY CORPS OF ENGINEERS NATIONWIDE PERMIT NUMBERS: 3 (MAINTENANCE), 4 (FISH AND WILDLIFE HARVESTING, ENHANCEMENT, AND ATTRACTION DEVICES AND ACTIVITIES), 5 (SCIENTIFIC MEASUREMENT DEVICES—25 CUBIC YARDS FOR WEIRS AND FLUMES), 6 (SURVEY ACTIVITIES—25 CUBIC YARDS FOR TEMPORARY PADS), 7 (OUTFALL STRUCTURES AND ASSOCIATED INTAKE STRUCTURES), 19 (MINOR DREDGING), 20 (OIL SPILL CLEANUP), 22 (REMOVAL OF VESSELS), 25 (STRUCTURAL DISCHARGE), 30(MOIST SOIL MANAGEMENT FOR WILDLIFE), 32 (COMPLETED ENFORCEMENT ACTIONS), 36 (BOAT RAMPS [IN NONWETLAND SITES]), AND REGIONAL PERMIT 197800056 (PIERS, DOCKS AND BOATHOUSES), AND REGIONAL PERMIT 197800125 (BOAT RAMPS) AND RIPARIAN AREA PROTECTION RULES (BUFFER RULES)

Water Quality Certification Number 3883 is issued in conformity with the requirements of Section 401, Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Quality (DWQ) Regulations in 15 NCAC 02H .0500 and 15 NCAC 02B .0200 for the discharge of fill material to waters and wetland areas which are waters of the United States as described in 33 CFR 330 Appendix A (B) (3, 4, 5, 6, 7, 19, 20, 22, 25, 30, 32, and 36) and Regional Permits 197800056 and 19780125 and for the Riparian Area Protection Rules (Buffer Rules) in 15A NCAC 02B .0200.

The State of North Carolina certifies that the specified category of activity will not violate applicable portions of Sections 301, 302, 303, 306 and 307 of the Public Laws 92-500 and 95-217 if conducted in accordance with the conditions hereinafter set forth.

**Activities meeting any one (1) of the following thresholds or circumstances require written approval for a 401 Water Quality Certification from the Division of Water Quality (the "Division"):**

- a. Impacts equal to or greater than 40 linear feet of additional permanent stream impact (including stream relocations) at an existing stream impact location; or
- b. Temporary or permanent impacts equal to or greater than one-tenth (1/10) of an acre of wetlands; or
- c. Any impact associated with a Notice of Violation or an enforcement action for violation(s) of DWQ Wetland Rules (15A NCAC 02H .0500), Isolated Wetland Rules (15A NCAC 02H .1300), DWQ Surface Water or Wetland Standards, or Riparian Buffer Rules (15A NCAC 02B .0200); or
- d. Any impacts to streams and/or buffers in the Neuse, Tar-Pamlico, or Catawba River Basins or in the Randleman, Jordan or Goose Creek Watersheds (or any other basin or watershed with Riparian Area Protection Rules [Buffer Rules] in effect at the time of application) *unless* the activities are listed as "EXEMPT" from these rules or a Buffer Authorization Certificate is issued through N.C. Division of Coastal Management (DCM) delegation for "ALLOWABLE" activities.

In accordance with North Carolina General Statute 143-215.3D(e), written approval for a 401 Water Quality General Certification must include the appropriate fee. If a project also requires a CAMA Permit, then one payment to both agencies shall be submitted and will be the higher of the two fees.

**Activities included in this General Certification that do not meet one of the thresholds listed above do not require written approval from the Division as long as they comply with the Conditions of Certification listed below. If any of these Conditions cannot be met, then written approval from the Division is required.**

# Water Quality Certification No. 3883

## Conditions of Certification:

1. No Impacts Beyond those Authorized in the Written Approval or Beyond the Threshold of Use of this Certification

No waste, spoil, solids, or fill of any kind shall occur in wetlands, waters, or riparian areas beyond the footprint of the impacts depicted in the Pre-Construction Notification, as authorized in the written approval from the Division or beyond the thresholds established for use of this Certification without written authorization, including incidental impacts. All construction activities, including the design, installation, operation, and maintenance of sediment and erosion control Best Management Practices shall be performed so that no violations of state water quality standards, statutes, or rules occur. Approved plans and specifications for this project are incorporated by reference and are enforceable parts of this permit.

2. Standard Erosion and Sediment Control Practices

Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices and if applicable, comply with the specific conditions and requirements of the NPDES Construction Stormwater Permit issued to the site:

- a. Design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal or exceed the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.
  - b. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.
  - c. Reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act and the Mining Act of 1971.
  - d. Sufficient materials required for stabilization and/or repair of erosion control measures and stormwater routing and treatment shall be on site at all times.
  - e. If the project occurs in waters or watersheds classified as Primary Nursery Areas (PNAs), SA, WS-I, WS-II, High Quality (HQW), or Outstanding Resource (ORW) waters, then the sedimentation and erosion control designs must comply with the requirements set forth in 15A NCAC 04B .0124, *Design Standards in Sensitive Watersheds*.
3. No Sediment and Erosion Control Measures in Wetlands or Waters

Sediment and erosion control measures shall not be placed in wetlands or waters. Exceptions to this condition require application submittal to and written approval by the Division. If placement of sediment and erosion control devices in wetlands and waters is unavoidable, then design and placement of temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands, stream beds, or banks, adjacent to or upstream and downstream of the above structures. All sediment and erosion control devices shall be removed and the natural grade restored within two (2) months of the date that the Division of Land Resources (DLR) or locally delegated program has released the specific area within the project.

## Water Quality Certification No. 3883

### 4. Construction Stormwater Permit NCG010000

An NPDES Construction Stormwater Permit is required for construction projects that disturb one (1) or more acres of land. This Permit allows stormwater to be discharged during land disturbing construction activities as stipulated in the conditions of the permit. If your project is covered by this permit, full compliance with permit conditions including the erosion & sedimentation control plan, inspections and maintenance, self-monitoring, record keeping and reporting requirements is required. A copy of the general permit (NCG010000), inspection log sheets, and other information may be found at <http://portal.ncdenr.org/web/wq/ws/su/npdessw#tab-w>.

The North Carolina Department of Transportation (NCDOT) shall be required to be in full compliance with the conditions related to construction activities within the most recent version of their individual NPDES (NCS000250) stormwater permit.

### 5. Work in the Dry

All work in or adjacent to stream waters shall be conducted so that the flowing stream does not come in contact with the disturbed area. Approved best management practices from the most current version of the NC Sediment and Erosion Control Manual, or the NC DOT Construction and Maintenance Activities Manual, such as sandbags, rock berms, cofferdams, and other diversion structures shall be used to minimize excavation in flowing water. Exceptions to this condition require application submittal to and written approval by the Division.

### 6. Construction Moratoriums and Coordination

If activities must occur during periods of high biological activity (i.e. sea turtle nesting, fish spawning, or bird nesting), then biological monitoring may be required at the request of other state or federal agencies and coordinated with these activities.

All moratoriums on construction activities established by the NC Wildlife Resources Commission (WRC), US Fish and Wildlife Service (USFWS), NC Division of Marine Fisheries (DMF), or National Marine Fisheries Service (NMFS) to lessen impacts on trout, anadromous fish, larval/post-larval fishes and crustaceans, or other aquatic species of concern shall be implemented. Exceptions to this condition require written approval by the resource agency responsible for the given moratorium.

Work within the twenty-five (25) designated trout counties or identified state or federal endangered or threatened species habitat shall be coordinated with the appropriate WRC, USFWS, NMFS, and/or DMF personnel.

### 7. Riparian Area Protection Rules (Buffer Rules)

Activities located in the protected riparian areas (whether jurisdictional wetlands or not), within the Neuse, Tar-Pamlico, or Catawba River Basins or in the Randleman, Jordan, or Goose Creek Watersheds (or any other basin or watershed with buffer rules) shall be limited to "uses" identified within and constructed in accordance with 15A NCAC 02B .0233, .0259, .0243, .0250, .0267 and .0605, and shall be located, designed, constructed, and maintained to have minimal disturbance to protect water quality to the maximum extent practicable through the use of best management practices. All buffer rule requirements, including diffuse flow requirements, must be met.

## Water Quality Certification No. 3883

### 8. Placement of Culverts and Other Structures in Waters and Wetlands

Culverts required for this project shall be designed and installed in such a manner that the original stream profiles are not altered and allow for aquatic life movement during low flows. Existing stream dimensions (including the cross section dimensions, pattern, and longitudinal profile) must be maintained above and below locations of each culvert.

Placement of culverts and other structures in waters and streams must be below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than or equal to 48 inches, to allow low flow passage of water and aquatic life.

When topographic constraints indicate culvert slopes of greater than 5%, culvert burial is not required, provided that all alternative options for flattening the slope have been investigated and aquatic life movement/ connectivity has been provided when possible (rock ladders, crossvanes, etc). Notification to the Division including supporting documentation to include a location map of the culvert, culvert profile drawings, and slope calculations shall be provided to the Division 60 days prior to the installation of the culvert.

When bedrock is present in culvert locations, culvert burial is not required provided that there is sufficient documentation of the presence of bedrock. Notification to the Division including supporting documentation such as, but not limited to, a location map of the culvert, geotechnical reports, photographs, etc shall be provided to the Division a minimum of 60 days prior to the installation of the culvert. If bedrock is discovered during construction, then the Division shall be notified by phone or email within 24 hours of discovery.

If other site-specific topographic constraints preclude the ability to bury the culverts as described above and/or it can be demonstrated that burying the culvert would result in destabilization of the channel, then exceptions to this condition require application submittal to, and written approval by, the Division of Water Quality, regardless of the total impacts to streams or wetlands from the project.

Installation of culverts in wetlands must ensure continuity of water movement and be designed to adequately accommodate high water or flood conditions. Additionally, when roadways, causeways, or other fill projects are constructed across FEMA-designated floodways or wetlands, openings such as culverts or bridges must be provided to maintain the natural hydrology of the system as well as prevent constriction of the floodway that may result in destabilization of streams or wetlands.

The establishment of native, woody vegetation and other soft stream bank stabilization techniques must be used where practicable instead of riprap or other bank hardening methods.

9. If concrete is used during the construction, then all necessary measures shall be taken to prevent direct contact between uncured or curing concrete and waters of the state. Water that inadvertently contacts uncured concrete shall not be discharged to waters of the state due to the potential for elevated pH and possible aquatic life/ fish kills.
10. Applications for riprap groins proposed in accordance with 15A NCAC 07H .1401 (NC Division of Coastal Management General Permit for construction of Wooden and Riprap Groins in Estuarine and Public Trust Waters) must meet all the specific conditions for design and construction specified in 15A NCAC 07H .1405.

## Water Quality Certification No. 3883

11. Bridge deck drains shall not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means (grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. Please refer to the most current version of *Stormwater Best Management Practices*. Exceptions to this condition require written approval by the Division.

12. Compensatory Mitigation

In accordance with 15A NCAC 02H .0506 (h), compensatory mitigation may be required for losses of equal to or greater than 150 linear feet of streams (intermittent and perennial) and/or equal to or greater than one (1) acre of wetlands. For linear public transportation projects, impacts equal to or exceeding 150 linear feet per stream shall require mitigation.

Buffer mitigation may be required for any project with Buffer Rules in effect at the time of application for activities classified as "Allowable with Mitigation" or "Prohibited" within the Table of Uses.

A determination of buffer, wetland, and stream mitigation requirements shall be made for any General Water Quality Certification for this Nationwide and/or Regional General Permit. Design and monitoring protocols shall follow the US Army Corps of Engineers Wilmington District *Stream Mitigation Guidelines* (April 2003) or its subsequent updates. Compensatory mitigation plans shall be submitted to the Division for written approval as required in those protocols. The mitigation plan must be implemented and/or constructed before any impacts occur on site. Alternatively, the Division will accept payment into an in-lieu fee program or a mitigation bank. In these cases, proof of payment shall be provided to the Division before any impacts occur on site.

13. All temporary fill and culverts shall be removed and the impacted area returned to natural conditions within 60 days of the determination that the temporary impact is no longer necessary. The impacted areas shall be restored to original grade, including each stream's original cross sectional dimensions, plan form pattern, and longitudinal bed and bed profile, and the various sites shall be stabilized with natural woody vegetation (except for the approved maintenance areas) and restored to prevent erosion.
14. All temporary pipes/ culverts/ riprap pads etc, shall be installed in all streams as outlined in the most recent edition of the *North Carolina Sediment and Erosion Control Planning and Design Manual* or the *North Carolina Surface Mining Manual* so as not to restrict stream flow or cause dis-equilibrium during use of this General Certification.
15. Any riprap required for proper culvert placement, stream stabilization, or restoration of temporarily disturbed areas shall be restricted to the area directly impacted by the approved construction activity. All rip-rap shall be buried and/or "keyed in" such that the original stream elevation and streambank contours are restored and maintained. Placement of rip-rap or other approved materials shall not result in de-stabilization of the stream bed or banks upstream or downstream of the area.
16. Any rip-rap used for stream stabilization shall be of a size and density so as not to be able to be carried off by wave, current action, or stream flows and consist of clean rock or masonry material free of debris or toxic pollutants. Rip-rap shall not be installed in the streambed except in specific areas required for velocity control and to ensure structural integrity of bank stabilization measures.
17. A one-time application of fertilizer to re-establish vegetation is allowed in disturbed areas including riparian buffers, but is restricted to no closer than 10 feet from top of bank of streams. Any fertilizer application must comply with all other Federal, State and Local regulations.

## Water Quality Certification No. 3883

18. If an environmental document is required under the National or State Environmental Policy Act (NEPA or SEPA), then this General Certification is not valid until a Finding of No Significant Impact (FONSI) or Record of Decision (ROD) is issued by the State Clearinghouse.
19. In the twenty (20) coastal counties, the appropriate DWQ Regional Office must be contacted to determine if Coastal Stormwater Regulations will be required.
20. This General Certification does not relieve the applicant of the responsibility to obtain all other required Federal, State, or Local approvals.
21. The applicant/permittee and their authorized agents shall conduct all activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act), and any other appropriate requirements of State and Federal Law. If the Division determines that such standards or laws are not being met, including failure to sustain a designated or achieved use, or that State or Federal law is being violated, or that further conditions are necessary to assure compliance, then the Division may reevaluate and modify this General Water Quality Certification.
22. When written authorization is required for use of this certification, upon completion of all permitted impacts included within the approval and any subsequent modifications, the applicant shall be required to return the certificate of completion attached to the approval. One copy of the certificate shall be sent to the DWQ Central Office in Raleigh at 1650 Mail Service Center, Raleigh, NC, 27699-1650.
23. Additional site-specific conditions, including monitoring and/or modeling requirements, may be added to the written approval letter for projects proposed under this Water Quality Certification in order to ensure compliance with all applicable water quality and effluent standards.
24. This certification grants permission to the director, an authorized representative of the Director, or DENR staff, upon the presentation of proper credentials, to enter the property during normal business hours.

This General Certification shall expire on the same day as the expiration date of the corresponding Nationwide and/or Regional General Permit. The conditions in effect on the date of issuance of Certification for a specific project shall remain in effect for the life of the project, regardless of the expiration date of this Certification.

Non-compliance with or violation of the conditions herein set forth by a specific project may result in revocation of this General Certification for the project and may also result in criminal and/or civil penalties.

The Director of the North Carolina Division of Water Quality may require submission of a formal application for Individual Certification for any project in this category of activity if it is determined that the project is likely to have a significant adverse effect upon water quality, including state or federally listed endangered or threatened aquatic species, or degrade the waters so that existing uses of the wetland or downstream waters are precluded.

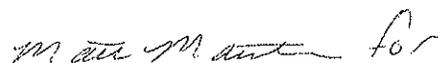
## Water Quality Certification No. 3883

Public hearings may be held for specific applications or group of applications prior to a Certification decision if deemed in the public's best interest by the Director of the North Carolina Division of Water Quality.

Effective date: March 19, 2012

DIVISION OF WATER QUALITY

By

A handwritten signature in black ink, appearing to read "Charles Wakild for".

Charles Wakild, P.E.

Director

*History Note: Water Quality Certification (WQC) Number 3883 issued March 19, 2012 replaces WQC Number 3687 issued November 1, 2007; WQC Number 3624 issued March 19, 2007; WQC Number 3494 issued December 31, 2004; and WQC Number 3376 issued March 18, 2002. This General Certification is rescinded when the Corps of Engineers reauthorizes any of the corresponding Nationwide and/or Regional General Permits or when deemed appropriate by the Director of the Division of Water Quality.*



**U.S. ARMY CORPS OF ENGINEERS  
WILMINGTON DISTRICT**

Action ID. SAW-2015-00722

County: Cabarrus

USGS Quad: NC-KANNAPOLIS

**GENERAL PERMIT (REGIONAL AND NATIONWIDE) VERIFICATION**

Property Owner / Authorized Agent: Tom Bach, City of Concord, Engineering Manager

Address: 850 Warren C Coleman Blvd.

Concord, North Carolina 28025

Telephone No.:

Size and location of property (water body, road name/number, town, etc.): The project is located within the Zemosa Acres neighborhood at Chadbourne Avenue, Chelwood Court, Channing Circle and Hanover Drive in Cabarrus County. Coordinates: 35.427639, -80.63716.

Description of projects area and activity: This permit authorizes excavation and placement of fill material associated with replacing and upgrading existing culvert crossings and appx 580 lf of stream bank stabilization associated with the culverts replacement is authorized.

Applicable Law:  Section 404 (Clean Water Act, 33 USC 1344)  
 Section 10 (Rivers and Harbors Act, 33 USC 403)

Authorization: Regional General Permit Number:  
Nationwide Permit Number: NW3

**Summary of Authorized Impacts and Required Mitigation**

| Impact ID #                           | NWP / GP # | Open Water (ac) |           | Wetland (ac)                          |           | Stream (lf) |           |
|---------------------------------------|------------|-----------------|-----------|---------------------------------------|-----------|-------------|-----------|
|                                       |            | Temporary       | Permanent | Temporary                             | Permanent | Temporary   | Permanent |
| S1                                    |            |                 |           |                                       |           | 100         | 30        |
| S2                                    |            |                 |           |                                       |           | 100         | 30        |
| S3                                    |            |                 |           |                                       |           | 100         | 30        |
| S4                                    |            |                 |           |                                       |           | 100         | 30        |
| Impact Totals                         |            |                 |           |                                       |           | 400         | 120       |
| Total Loss of Waters of the U.S. (ac) |            |                 |           | Total Loss of Waters of the U.S. (lf) |           |             |           |
| Required Wetland Mitigation (ac)      |            |                 |           | Required Stream Mitigation (lf)       |           |             |           |

Additional Remarks and/or Special Permit Conditions

**\*Culverts greater than 48 inches in diameter will be buried at least one foot below the bed of the stream. Culverts 48 inches or less shall be buried at an appropriate depth to maintain aquatic passage as defined in Final Regional Condition 3.6 attached to this NWP.**

**\*ALL constructed areas must be returned to pre-construction contours in impacted wetlands and stream channels. Any impact deviation to the approved plan must be approved by prior notification from the Corps before these impacts can occur.**

Your work is authorized by the above referenced permit provided it is accomplished in strict accordance with the attached conditions and your plans submitted on April 1, 2015. Any violation of the attached conditions or deviation from your submitted plans may subject the permittee to a stop work order, a restoration order and/or appropriate legal action.

This verification will remain valid until the expiration date identified below unless the nationwide authorization is modified, suspended or revoked. If, prior to the expiration date identified below, the nationwide permit authorization is reissued and/or modified, this verification will remain valid until the expiration date identified below, provided it complies with all requirements of the modified nationwide permit. If the nationwide permit

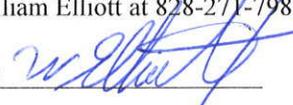
authorization expires or is suspended, revoked, or is modified, such that the activity would no longer comply with the terms and conditions of the nationwide permit, activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon the nationwide permit, will remain authorized provided the activity is completed within twelve months of the date of the nationwide permit's expiration, modification or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend or revoke the authorization.

Activities subject to Section 404 (as indicated above) may also require an individual Section 401 Water Quality Certification. You should contact the NC Division of Water Quality (telephone (919) 807-6300) to determine Section 401 requirements. You may also visit their website at: <http://portal.ncdenr.org/web/wq/swp/ws/webscape>

For activities occurring within the twenty coastal counties subject to regulation under the Coastal Area Management Act (CAMA), prior to beginning work you must contact the N.C. Division of Coastal Management.

This Department of the Army verification does not relieve the permittee of the responsibility to obtain any other required Federal, State or local approvals/permits.

If there are any questions regarding this verification, any of the conditions of the Permit, or the Corps of Engineers regulatory program, please contact William Elliott at 828-271-7980.

Corps Regulatory Official William Elliott  Date: May 22, 2015

Expiration Date of Verification: March 18, 2017

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete the Customer Satisfaction Survey located at our website at <http://per2.nwp.usace.army.mil/survey.html> to complete the survey online.

## Determination of Jurisdiction:

- A.  Based on preliminary information, there appear to be waters of the US including wetlands within the above described project area. This preliminary determination is not an appealable action under the Regulatory Program Administrative Appeal Process ( Reference 33 CFR Part 331).
- B.  There are Navigable Waters of the United States within the above described project area subject to the permit requirements of Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.
- C.  There are waters of the US and/or wetlands within the above described project area subject to the permit requirements of Section 404 of the Clean Water Act (CWA)(33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.
- D.  The jurisdictional areas within the above described project area have been identified under a previous action. Please reference jurisdictional determination issued \_\_\_\_\_. Action ID \_\_\_\_\_

### Basis of Jurisdictional Determination:

There are stream channels located on the property that exhibit indicators of ordinary high water marks. The stream channel on the property is an unnamed tributary to Irish Buffalo Creek which flows into the Rocky River

This jurisdictional determination is valid for the impact areas only.

### Attention USDA Program Participants

This delineation/determination has been conducted to identify the limits of Corps' Clean Water Act jurisdiction for the particular site identified in this request. The delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA Program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

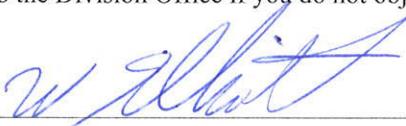
**Appeals Information:** (This information applies only to approved jurisdictional determinations as indicated in B and C above).

This correspondence constitutes an approved jurisdictional determination for the above described site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a request for appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the following address:

US Army Corps of Engineers  
South Atlantic Division  
Attn: Jason Steele, Review Officer  
60 Forsyth Street SW, Room 10M15  
Atlanta, Georgia 30303-8801  
Phone: (404) 562-5137

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address within 60 days from the *Issue Date* below.

\*\*It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this correspondence.\*\*

Corps Regulatory Official: William Elliott 

*Issue Date:* **May 22, 2015**

*Expiration Date:* Five years from *Issue Date*

Copy Furnished:

Eric Mularski, HDR Engineering, Inc. of the Carolinas, 440 S. Church Street, Suite 100, Charlotte, NC  
28202-1919

Permit Number: SAW-2015-00722  
Permit Type: NW3  
Name of County: Cabarrus  
Name of Permittee: Tom Bach, City of Concord, Engineering Manager  
Date of Issuance: May 22, 2015  
Project Manager: William Elliott

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

U.S. Army Corps of Engineers  
Attention: CESAW-RG-A  
151 Patton Avenue, Room 208  
Asheville, North Carolina 28801-5006

Please note that your permitted activity is subject to a compliance inspection by an U.S. Army Corps of Engineers representative. If you fail to comply with this permit you are subject to permit suspension, modification, or revocation.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and conditions of the said permit, and required mitigation was completed in accordance with the permit conditions.

---

Signature of Permittee

---

Date



**NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL**

|   |                             |                    |
|---|-----------------------------|--------------------|
| Applicant: Tom Bach, City of Concord, Engineering Manager | File Number: SAW-2015-00722 | Date: May 22, 2015 |
|---|-----------------------------|--------------------|

|  |                   |
|--|-------------------|
| Attached is:   | See Section below |
| INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission) | A                 |
| PROFFERED PERMIT (Standard Permit or Letter of permission)         | B                 |
| PERMIT DENIAL  | C                 |
| APPROVED JURISDICTIONAL DETERMINATION                              | D                 |
| X PRELIMINARY JURISDICTIONAL DETERMINATION                         | E                 |

**SECTION I -** The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at [http://www.usace.army.mil/CECW/Pages/reg\\_materials.aspx](http://www.usace.army.mil/CECW/Pages/reg_materials.aspx) or Corps regulations at 33 CFR Part 331.

**A: INITIAL PROFFERED PERMIT:** You may accept or object to the permit.

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **OBJECT:** If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

**B: PROFFERED PERMIT:** You may accept or appeal the permit

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **APPEAL:** If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

**C: PERMIT DENIAL:** You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

**D: APPROVED JURISDICTIONAL DETERMINATION:** You may accept or appeal the approved JD or provide new information.

- **ACCEPT:** You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- **APPEAL:** If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

**SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT**

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

**POINT OF CONTACT FOR QUESTIONS OR INFORMATION:**

If you have questions regarding this decision and/or the appeal process you may contact:

William Elliott, Project Manager  
USACE, Asheville Regulatory Field Office  
151 Patton Ave  
RM 208  
Asheville, NC 28801  
828-271-7980

If you only have questions regarding the appeal process you may also contact:

Mr. Jason Steele, Administrative Appeal Review Officer  
CESAD-PDO  
U.S. Army Corps of Engineers, South Atlantic Division  
60 Forsyth Street, Room 10M15  
Atlanta, Georgia 30303-8801  
Phone: (404) 562-5137

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

\_\_\_\_\_  
Signature of appellant or agent.

Date:

Telephone number:

**For appeals on Initial Proffered Permits send this form to:**

**District Engineer, Wilmington Regulatory Division, Attn: William Elliott, 69 Darlington Avenue, Wilmington, North Carolina 28403**

**For Permit denials, Proffered Permits and approved Jurisdictional Determinations send this form to:**

**Division Engineer, Commander, U.S. Army Engineer Division, South Atlantic, Attn: Mr. Jason Steele, Administrative Appeal Officer, CESAD-PDO, 60 Forsyth Street, Room 10M15, Atlanta, Georgia 30303-8801. Phone: (404) 562-5137**

**ATTACHMENT A  
PRELIMINARY JURISDICTIONAL DETERMINATION FORM**

**BACKGROUND INFORMATION**

**A. REPORT COMPLETION DATE FOR PRELIMINARY JURISDICTIONAL DETERMINATION (JD):** March 24, 2015

**B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD:**  
Eric Mularski, PWS - 440 South Church Street Suite 1000, Charlotte, NC 28202  
on behalf of the City of Concord

**C. DISTRICT OFFICE, FILE NAME, AND NUMBER:**  
CE-SAW-R6-A, SAW 2015-00722 CITY of CONCORD

**D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:**  
South of Davidson Hwy (NC 73) between Exit 55 on I-85 and NC 73 intersection at US 601/29 (Concord Pky), See Maps.

**(USE THE ATTACHED TABLE TO DOCUMENT MULTIPLE WATERBODIES AT DIFFERENT SITES)**

State: NC County/parish/borough: Cabarrus City: Concord

Center coordinates of site (lat/long in degree decimal format):  
Lat. 35.427639 °N; Long. -80.637161 °W.

Universal Transverse Mercator: \_\_\_\_\_

Name of nearest waterbody: Irish Buffalo Creek

Identify (estimate) amount of waters in the review area:

Non-wetland waters:  
3,000 linear feet: \_\_\_\_\_ width (ft) and/or \_\_\_\_\_ acres.

Cowardin Class: R3UB2

Stream Flow: Perennial - See attached table

Wetlands: \_\_\_\_\_ acres.

Cowardin Class: \_\_\_\_\_

Name of any water bodies on the site that have been identified as Section 10 waters:

Tidal: N/A

Non-Tidal: None

**E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):**

- Office (Desk) Determination. Date: \_\_\_\_\_
- Field Determination. Date(s): September 2014

**SUPPORTING DATA. Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):**

- Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: HDR for City of Concord
- Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - Office concurs with data sheets/delineation report.
  - Office does not concur with data sheets/delineation report.
- Data sheets prepared by the Corps: \_\_\_\_\_
- Corps navigable waters' study: \_\_\_\_\_
- U.S. Geological Survey Hydrologic Atlas: \_\_\_\_\_
- USGS NHD data
- USGS 8 and 12 digit HUC maps
- U.S. Geological Survey map(s). Cite scale & quad name: Kannapolis
- USDA Natural Resources Conservation Service Soil Survey.  
Citation: Cabarrus County
- National wetlands inventory map(s). Cite name: \_\_\_\_\_
- State/Local wetland inventory map(s): \_\_\_\_\_
- FEMA/FIRM maps: \_\_\_\_\_
- 100-year Floodplain Elevation is: \_\_\_\_\_  
(National Geodetic Vertical Datum of 1929)
- Photographs:  Aerial (Name & Date): \_\_\_\_\_ or  
 Other (Name & Date): See Attached
- Previous determination(s). File no. and date of response letter: \_\_\_\_\_
- Other information (please specify): \_\_\_\_\_

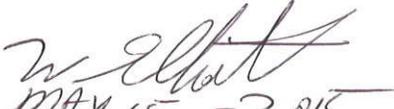


1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.
  
2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.



This preliminary JD finds that there "may be" waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

**IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.**

  
MAY 15 - 2015  
Signature and date of  
Regulatory Project Manager  
(REQUIRED)

  
3/20/15  
Signature and date of  
person requesting preliminary JD  
(REQUIRED, unless obtaining  
the signature is impracticable)

**Zemosa Acres Culvert Replacement Project  
Jurisdictional Resources**

| Site Number or Name        | Latitude  | Longitude  | Cowardin Class | Estimated Amount of Aquatic Resource in Study Area | Class of Aquatic Resource  |
|----------------------------|-----------|------------|----------------|--|----------------------------|
| Chadbourne Ave. Crossing * | 35.426094 | -80.632534 | R3UB2          | 200 linear feet                                    | non section 10 – non-tidal |
| Chelwood Court Crossing *  | 35.427745 | -80.637490 | R3UB2          | 200 linear feet                                    | non section 10 – non-tidal |
| Channing Circle Crossing * | 35.426171 | -80.639246 | R3UB2          | 200 linear feet                                    | non section 10 – non-tidal |
| Hanover Drive Crossing *   | 35.425500 | -80.640911 | R3UB2          | 200 linear feet                                    | non section 10 – non-tidal |

\*All road crossing are over the same unnamed tributary to Irish Buffalo Creek  
Note: Coordinates are in Decimal Degrees