GREENVILLE UTILITIES COMMISSION

of

THE CITY OF GREENVILLE, NORTH CAROLINA

Request for Proposals

for the

Compressed Natural Gas Vehicle Refueling Station

Phase 1 – Design/Build

&

Phase 2 – Operating, Maintaining, Monitoring, and Fuel Accounting

Issued

August 1, 2014

RK&K

Engineers | Construction Managers | Planners | Scientists

Richmond, Virginia

MARATHON

REQUEST FOR PROPOSALS
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Section A

Advertisement for Proposals

ADVERTISEMENT FOR PROPOSALS

by

Greenville Utilities Commission of the City of Greenville, NC

for

The Greenville Utilities Commission
Compressed Natural Gas Vehicle Refueling Station
Greenville, North Carolina

Sealed Proposals for **Phase 1 - the Design and Construction of a Compressed Natural Gas Vehicle Refueling Station** and **Phase 2 – Operations, Maintenance, Monitoring, and Fuel Accounting Services for the Compressed Natural Gas Refueling Station** will be received by the Greenville Utilities Commission in the Engineering Center Conference Room at 801 Mumford Road, P. O. Box 1847, Greenville, NC 27835 until 4:00 p.m. on **Friday, August 29, 2014**.

Proposals may be submitted for Phase 1, or for both Phase 1 and Phase 2. Proposals will not be accepted for Phase 2 alone. Proposals must be enclosed in a sealed envelope, addressed to the Greenville Utilities Commission and the outside of the envelope must be marked **PROPOSAL FOR THE GUC CNG VEHICLE REFUELING STATION**. All Technical Proposals must include the information specified in the format specified in the Instructions to Proposers, and all Price Proposals must be made on blank forms provided with and included in the bound document. The name, address, and license number of the Proposer must be plainly marked thereon. Oral or faxed Proposals are invalid and will be rejected.

Each proposal submitted must be accompanied by cash or a certified check, drawn on a bank or trust company authorized to do business in North Carolina, payable to the Greenville Utilities Commission in an amount at least equal to five percent (5%) of the total amount of the Phase 1 Item 1 Price Proposal, as a guarantee that a contract will be entered into. In lieu of cash or a certified check, the Proposer may submit a bid bond in the form prescribed in G.S. 143-129 as amended by Chapter 1104 of the Public Laws of 1951. The bid security amount shall be based on five percent (5%) of the amount bid for Phase 1, Item 1; which does not include a Phase 2 award.

Contractors are notified that legislative acts relating to licensing of engineers and contractors will be observed in receiving proposals and awarding contracts. It is the Proposer's responsibility to ensure and to provide proof of compliance with all applicable licensing requirements.

The major items of Phase 1 Work include:

- Designing a compressed natural gas vehicle fueling station;
- Constructing the compressed natural gas vehicle fueling station on a site provided by the GUC;

- Providing all permitting required to construct and operate the station;
- Testing and commissioning the station; and
- Providing training in vehicle fueling, operating safety, and emergency procedures.

The major items of Phase 2 Work include:

- Operating and remotely monitoring the station for the GUC – the Owner;
- Maintaining the station in efficient and safe operating conditions; and
- Providing fuel accounting services for the station.

The complete RFP Package will be posted and available at http://www.guc.com/doing-business-with-us for download.

The right is reserved to reject any or all Proposals, to waive informalities, and to award Contract or Contracts which, in the opinion of the Owner, appear to be in its best interest. The right is reserved to hold any or all Proposals for a period of sixty (60) days from the due date thereof.

Other critical dates:

- Anticipated RFP release date: Friday, August 1, 2014
- Deadline for submitting Intent to Respond: Friday, August 8, 2014
- Deadline for submitting Inquiries: Friday, August 15, 2014
- Deadline for submitting Proposals: Friday, August 29,2014
- Anticipated Notice of Intent to Award: Friday, September 19, 2014
- Anticipated Notice to Proceed: Friday, October 17, 2014
- Substantial Completion: Friday August 7, 2015
- Commissioning: Friday, August 14, 2015

GREENVILLE UTILITIES COMMISSION
(Owner)

Mr. Anthony C. Cannon
(General Manager/CEO)

Rummel, Klepper and Kahl, LLP
2100 East Cary Street, Suite 309
Richmond, Virginia 23223
(804) 782-1903
(804) 782-2142 (FAX)

Section B

Background Information

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INTRODUCTION

The Greenville Utilities Commission (GUC) is requesting Proposals for the design, permitting, construction, testing, and commissioning of a 'turn-key' Compressed Natural Gas Refueling Station (Station) in the City of Greenville, North Carolina. The site of the proposed Station will be located **between Easy Street and Belvoir Highway (NC Hwy 33), Greenville, NC 27835** (as shown in Exhibit 1). The GUC will own the Station.

PROJECT STRUCTURE

The proposed Work consists of two (2) Phases. Phase 1 includes the design, furnishing of equipment and materials, permitting, construction, testing, and commissioning of the Station. It also includes conducting training in fueling operations, safety procedures and emergency procedures. Phase 1 Work is to be awarded as a Design/Build Contract. Phase 2 includes monitoring, operating, and maintaining the Station. It also includes providing fuel accounting services for the Station. Phase 2 Work will be awarded under a separate maintenance agreement. The maintenance agreement will be awarded as a three (3) year contract with options to renew on a yearly basis through year five (5).

Proposers must submit Proposals on Phase 1 and may submit proposals on Phase 2. Both Phase 1 and Phase 2 may be awarded to the same Contractor at the GUC's discretion. Should Phase 2 not be awarded in conjunction with Phase 1, Phase 2 may be re-advertised for Proposals at the GUC's discretion. The Price Proposal Form is structured with Phase 1, Item 1 pricing including a separate award of Phase 1 Work, and Phase 1, Item 2 pricing including a Phase 1 awarded in conjunction with an award of Phase 2 Work.

GENERAL REQUIREMENTS

Contractors proposing on Phase 1 Work shall as a minimum requirement, have designed and built a minimum of five (5) CNG stations with capacities of 75 to 500 standard cubic feet per minute (SCFM) or greater within the last three (3) years.

Contractors proposing on Phase 2 Work shall have provided O&M services for a minimum of five (5) CNG stations with capacities in the range of 75 to 500 standard cubic feet per minute (SCFM) or greater within the last three (3) years. Also, the Contractor must have O&M contracts for at least five (5) CNG stations of comparable size and throughput. Experience in North Carolina is preferred.

GRANT PROCUREMENT

Contractors proposing on Phase 1 Work shall investigate all available Grant Funding resources and determine the availability of Guaranteed Grand Funds for Phase 1 Work. The Guaranteed Grant Funds are to be included as Item 3 in the Phase 1 Price Proposal. The Contractor that is awarded the Phase 1 Work shall procure the Grant Funding included in the Contractor's Price Proposal.

SITE CONDITIONS

The project is located at parcel number 35916, and is located between Easy Street and Belvoir Highway in Greenville, Pitt County, North Carolina, 27834. The project site includes the area required for the dispensing islands and a remote location for natural gas compression, conditioning and storage equipment. The area of the site is approximately 124,000 square feet, approximately 2.85 acres, with 120 feet of road frontage along Easy Street and 650 feet of road frontage along Belvoir Highway. Proposers should minimize the space used in designing the Station layout, but should provide sufficient room for easy access by station users, emergency vehicles and allow for future expandability. The final layout of the station will be determined by the Contractor, subject to approval by the GUC. The station shall be designed to best utilize the site, serve the intended use of the Station and comply with all permit, code, and other applicable requirements.

The site elevation is between approximately 24 to 28 feet ASL. The Contractor shall incorporate measures in their design to ensure that the compressor and dryer units are protected from flooding. The Contractor shall verify flood elevations at the equipment site.

The compressor compound, inclusive of compressors, gas dryer, storage vessels, etc., shall be secured and located inside a security fence surrounded by vehicle protection devices to be constructed as part of Work under the Phase 1 Contract.

The Contractor shall provide all surveying required to design and construct the Station and produce record drawings, both hard copy and electronic. The survey shall be performed under the direction of and be stamped by an approved Professional Land Surveyor registered in the State of North Carolina. Results of the survey shall be incorporated into the final as-built record drawings.

Actual site improvements including grading, drainage, pavement and curbing, striping, lighting, landscaping, walls, signage, etc. will be provided by the Contractor, based on the best design layout determined by the CNG Station provider as noted above. Proposers should familiarize themselves with the local topography including flood level elevations, and the site subsurface soil conditions; as this will require consideration in the design of the site and placement of the CNG equipment.

BRIEF PHASE 1 PROJECT DESCRIPTION

The proposed CNG fueling station shall be a commercial, fast-fill facility. The contractor will design and construct the Station beginning at the outlet of the GUC meter station to be located at the site. Specific requirements for station design are included in the project Technical Specifications included in Section O of the Contract Documents.

The base design criteria for the CNG fueling station include the following:

1. Station must be capable of fueling heavy duty and light duty commercial vehicles and passenger cars. This includes trash trucks, tractor-trailers, buses, pickup trucks, and cars.

2. Site shall be designed to allow for vehicle turning radii, queuing, entry and exit; providing maximum utilization of the available space.
3. Pavement design shall be based on the site subsurface soil conditions and intended vehicle use.
4. Fuel islands shall be covered with a canopy or canopies of sufficient height to allow clear passage of all vehicles intended to fuel at the islands.
5. **Minimum** primary fueling station requirements include:
    a. One (1) single tower dryer with 4-inch piping and manual regeneration package. The dryer capacity shall be 1000 SCFM at 45 psig and the unit design pressure shall be 200 psig. The dryer shall have a capacity of 21 MMSCF between regenerations.
    b. One (1) duplex compressor package with 200 Hp main drivers, with an option of 250 Hp main drivers. Compressors shall be designed to operate with 30 to 60 psig suction pressure.
    c. One (1) 35,000 SCF storage pack with an option to add a second pack. Design shall include installation of up to four (4) storage packs, and construction shall include rough-in of conduits to support up to four (4) storage packs.
    d. Two (2) high flow 1-inch single-hose cascaded dispensers with one (1) dispenser per fuel island.
    e. One (1) dual-hose NGV1 ½-inch cascaded dispenser.
    f. Three (3) fuel islands with room provided for addition of two (2) additional future islands.
    g. All fuel islands shall be entered from the same direction.
    h. Fuel islands shall be covered with a canopy or canopies.
    i. The station shall have a fuel management system; however, this will be specified by the Phase 2 service/billing provider.
    j. The station shall have all required station controls for gas and electric and signaling/communications including SCADA interface with the GUC's SCADA system.
    k. One (1) natural gas powered generator set sized to power one (1) compressor and power requirements necessary to keep the station in service during a power outage.
    l. One (1) automatic transfer switch (ATS) sized for the station service.
    m. One (1) illuminated pricing sign.
6. The compressor compound shall be fenced and gated, and the site shall include all required safety signage, and have lighting and security?

PROVIDED BY GUC

The following items and/or services shall be provided by the GUC:

1. The Station site;
   (Refer to **Exhibit 1** for Station site location map.)
2. Natural gas, water, electric and telecommunications services to the Station Site;
3. All information available from the GUC regarding the site; and
4. Project administration and inspection services.

BRIEF DESCRIPTION OF PHASE 1 – DESIGN/BUILD SCOPE OF WORK

The Contractor's responsibilities, which are covered in greater detail in the Proposal Document Package, consist of the following:

1. Performing all related engineering design functions including Surveying, Civil, Site, Mechanical, Electrical, and Instrumentation and Control for a new state-of-the-art, fully functional, 24/7, self-serve CNG vehicle refueling station; including a fully integrated fuel conditioning, compression, storage, and fast-fill dispensing system;
2. Identify and obtain Phase 1 Grant Funding;
3. Prepare detailed project plans and specifications;
4. Prepare and acquire all necessary permits;
5. Procure equipment and materials;
6. Develop the site:
7. Perform all construction, testing, commissioning, start-up, and all activities and tasks necessary to deliver the turn-key fueling Station;
8. Provide as-built record drawings in digital and hard-copy format;
9. Provide complete documentation for all major Station equipment; and
10. Provide training in CHG vehicle fueling, safety and emergency procedures, and train emergency response personnel.

BRIEF DESCRIPTION OF PHASE 2 – OPERATIONS AND MAINTENANCE, MONITORING AND FUEL ACCOUNTING SERVICES (O&MMA)

The Contractor's responsibilities, which are covered in greater detail in the Proposal Document Package, consist of the following:

1. Provide a three (3) year O&MMA services contract (renewable thereafter) with Contractor's personnel for all operating services and scheduled and unscheduled maintenance to begin immediately following commissioning of the Station. This includes all daily, weekly, monthly, annual, and any necessary recurring preventative or emergency maintenance to ensure that the Station is functioning properly with no involvement of the GUC. Routine maintenance shall include any and all maintenance required by the equipment manufacturers, by codes and regulations, and by current industry best practices.
2. The contractor is responsible for proper disposal of any and all hazardous materials resulting from the CNG station operation during the period of the maintenance contract.
3. A proposed maintenance schedule indicating frequency and duration of scheduled site visits and tasks performed shall be provided with the technical proposal.
4. Contractor service personnel must reside within a two (2) hour driving distance of the Station and be available for callout every day;
5. Remotely monitor the Station operations and respond to alarms;
6. Maintain an inventory of parts and materials required for normal routine maintenance, with critical emergency spare parts located within 100 miles of the Station;

7. The Contractor shall respond within a two (2) hour period if either the Station or both compressors are shutdown and not capable of fueling. In the case of a single compressor shutdown, a 24 hour response is required;
8. Keep the GUC appraised on the condition of the Station, including scheduled and/or anticipated maintenance and/or repairs;
9. The cost of maintenance service (if proposed) shall include all labor and expenses, including routine maintenance parts and freight. Parts and labor, that are not part of scheduled or routine maintenance, required to repair or replace any equipment that wears out or fails during the life of the maintenance contract shall be invoiced separately to the Owner; and
10. Maintain and manage the Station fuel accounting system.

PHASE 1 PROJECT SCHEDULE

The Proposer shall provide a detailed project schedule for completing Phase 1 Work with an in-service date on or before August 28, 2015. The project milestones include:

1.	Contractor Proposals due to GUC :	4:00 pm, Friday, August 29, 2014
2.	Contractor Selection:	Thursday, September 18, 2014
3.	Notice of Intent to Award:	Friday, September 19, 2014
4.	Contract Execution:	Thursday, October 16, 2014
5.	Notice to Proceed:	Friday, October 17, 2014
6.	Authorization to Procure Equipment:	Friday, November 21, 2014
7.	Preliminary Design to GUC:	Wednesday, December 17, 2014
8.	GUC Approval of Preliminary Design:	Tuesday, December 23, 2014
9.	GUC Authorization to Begin Final Design:	Tuesday, December 23, 2014
10.	Final Design to GUC:	Friday, January 30, 2015
11.	Begin Construction with Permit Acquisition:	Friday, February 6, 2015
12.	GUC Approval of Final Design:	Friday, February 6, 2015
13.	Anticipated Equipment Arrival:	June, 2015
14.	Substantial Completion	Friday, August 7, 2015
15.	Commissioning:	Friday, August 14, 2015
16.	Training:	August 17 – 21, 2015

PHASE 2 PROJECT SCHEDULE

1.	Phase 2 services to begin:	Friday, August 17, 2015

INTENT TO PROPOSE

on the

Greenville Utilities Commission of the City of Greenville, NC

Compressed Natural Gas Vehicle Refueling Station

Please submit the following information to the Greenville Utilities Commission by August 8, 2014. Any questions shall be submitted to the below designee by August 15, 2014.

Submit your response to:

Carl Smith, E.I.
Greenville Utilities Commission
801 Mumford Road
Greenville, NC 27835
Or by FAX to: (252) 551-3303
Or by email to: Smithch@guc.com

Name:	**Title:**	
Organization:		
Address:		
City:	**State:**	**Zip:**
E-mail Address:	**Phone No.: ( ) -**	
WEB Site:	**FAX No.: ( ) -**	
Authorized Signature:		**Date:**

Please complete the following:

Check Phases on which you intend to propose:	**Phase 1** ☐	**Phase 1 and Phase 2** ☐

Section C

Instructions to Proposers

INSTRUCTIONS TO PROPOSERS

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ARTICLE 1 – DEFINED TERMS

1.01 Terms used in these Instructions to Proposers have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Proposers have the meanings indicated below:

A. *Issuing Office* – The office from which the Proposal Documents are to be issued and where the proposing procedures are to be administered. The Issuing Office for this Work is:

The Greenville Utilities Commission
Engineering Center
801 Mumford Road
Greenville, North Carolina 27835

B. *GUC, Owner* - The Greenville Utilities Commission

C. *CNG* – Compressed Natural Gas

D. *Engineer* – Refers to Rummel, Klepper & Kahl, LLP, who is serving as the Owner's Consultant in developing Proposal and Contract Documents

E. *Proposer* – Refers to the party proposing to bid on Services required for the CNG Refueling Station Design/Build and/or the CNG Refueling Station Operations, Maintenance and Fuel Accounting Services

ARTICLE 2 – COPIES OF PROPOSAL DOCUMENTS

2.01 Complete sets of the Proposal Documents may be obtained from the Engineer.

2.02 Complete sets of Proposal Documents shall be used in preparing Proposals; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Proposal Documents.

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

ARTICLE 3 – QUALIFICATIONS OF PROPOSERS

3.01 To demonstrate Proposer's qualifications to perform the Work, within five (5) days of Owner's request, Proposer shall submit written evidence such as financial data, previous experience, present commitments, and such other data as may be called for below.

A. Each Proposal must contain evidence of Proposer's qualification to do business in North Carolina or covenant to obtain such qualifications prior to award of the Contract.

B. Each Proposal must contain evidence of the Proposer's North Carolina Contractor and Engineering licensing required for this project.

3.02 Proposer is advised to carefully review those portions of the Proposal requiring Proposer's representations and certifications.

ARTICLE 4 – EXAMINATION OF PROPOSAL DOCUMENTS, OTHER RELATED DATA, AND SITE

4.01 *Subsurface and Physical Conditions*

A. The Contractor is responsible for obtaining all available information, reports and drawings describing the surface and physical conditions of the Site:

1. Exhibit 1 includes a Location Map.

B. Copies of reports and drawings referenced in Paragraph 4.01.A, if any, will be made available by Owner to any Proposer on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Proposer is entitled to rely as provided in Articles 3 and 4 of the General Conditions. Proposer is responsible for any interpretation or conclusion Proposer draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

1. Cost to Proposer, for obtaining copies of available reports, drawings, maps, and other existing information related to the Site, will be as normally charged for providing such information.

4.02 *Underground Facilities*

A. Information and data shown or indicated in the Proposal Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

4.03 *Hazardous Environmental Condition*

A. The Contractor is responsible for identifying and obtaining any reports and drawings related to any Hazardous Environmental Condition identified at the site. The Owner has not identified any reports and drawings relating to a Hazardous Environmental Condition at the Site.

B. Proposer is responsible for any interpretation or conclusion Proposer draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

1. Cost to Proposer, for obtaining copies of available reports, drawings, maps, and other existing "technical data" related to any known Hazardous Environmental Condition of the Site, will be as normally charged for providing such information.

4.04 Provisions concerning responsibilities for the adequacy of data furnished to prospective Proposers with respect to subsurface conditions, other physical conditions, and Underground Facilities, and possible changes in the Proposal Documents due to differing or unanticipated subsurface or physical conditions appear in Article 4 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Proposers with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental

Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work, appear in Article 4 of the General Conditions.

4.05 On request, Owner will provide Proposer access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Proposer deems necessary for submission of a Proposal. Proposer shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Proposer shall comply with all applicable Laws and Regulations relative to excavation and utility locates.

A. Access to Site must be coordinated with the Owner.

4.06 A. For use by the Contractor in the identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Proposal Documents. On request, Owner will provide to each proposer for examination access to or copies of contract documents (other than portions thereof related to price) for such other work.

B. If an Owner safety program exists, it will be provided to the Contractor to the extent that is effects Contractor's Work under this contract.

4.07 It is the responsibility of each Proposer before submitting a Proposal to:

A. examine and carefully study the Proposal Documents, and the other related data identified in the Proposal Documents;

B. visit the Site and become familiar with and satisfy Proposer as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;

C. become familiar with and satisfy Proposer as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work;

D. carefully study all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) that have been identified and obtained by the Proposer;

E. consider the information known to Proposer; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Proposal Documents; and the Site-related reports and drawings identified in the Proposal Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Proposer, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Proposal Documents; and (3) Proposer's safety precautions and programs;

F. agree at the time of submitting its Proposal that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Proposal for performance of the Work

at the price(s) proposal and within the times required, and in accordance with the other terms and conditions of the Proposal Documents;

G. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Proposal Documents;

H. promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Proposer discovers in the Proposal Documents and confirm that the written resolution thereof by Engineer is acceptable to Proposer; and

I. determine that the Proposal Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

4.08 The submission of a Proposal will constitute an incontrovertible representation by Proposer that Proposer has complied with every requirement of this Article 4, that without exception the Proposal is premised upon performing and furnishing the Work required by the Proposal Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Proposal Documents, that Proposer has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Proposer has discovered in the Proposal Documents and the written resolutions thereof by Engineer are acceptable to Proposer, and that the Proposal Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 – PRE-PROPOSAL CONFERENCE

5.01 **There will not be a Pre-Proposal Conference for this project.**

ARTICLE 6 – SITE AND OTHER AREAS

6.01 The Site is identified in the Proposal Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Proposal Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

6.02 The Owner will provide natural gas, water (if required), and electric service; and internet connection to the Site.

ARTICLE 7 – INTERPRETATIONS AND ADDENDA

7.01 All questions about the meaning or intent of the Proposal Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Proposal Documents. Questions received after August 11, 2014 may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

7.02 No oral interpretations of the Proposal Documents will be made to any Proposer. To be given consideration, requests for interpretation must be received by close of business on August 11, 2014, in time to allow preparation of written response at least three (3) days prior to the date fixed for receipt of Proposals. Interpretations will be issued in the form of a written Addendum (Addenda) to the Proposal Documents and mailed to all parties recorded by the Engineer and/or Owner as having received Proposal Documents, prior to the scheduled receipt of Proposals. Only interpretations by formal written Addenda will be binding.

7.03 Addenda may be issued to clarify, correct, or change the Proposal Documents as deemed advisable by Owner or Engineer.

7.04 All communications regarding the interpretations of any other matters related to this project shall be addressed to the Engineer's Project Manager:

Martin C. Rodgers, P.E.
Rummel, Klepper & Kahl, LLP
801 Ease Main Street, Suite 1000
Richmond, Virginia 23219
FAX: (804) 782-2142
Email: mrodgers@rkk.com

And copied to:

Carl Smith, E.I.
Greenville Utilities Commission
801 Mumford Road
Greenville, North Carolina 27835
FAX: (252) 551-3303
Email: smithch@guc.com

ARTICLE 8 – BID SECURITY

8.01 Bid Security is required with a Phase 1 Proposal.

8.02 A Proposal for Phase 1 must be accompanied by Bid Security made payable to Owner in an amount of **five percent (5%) of Proposer's maximum Phase 1 Price Proposal** and in the form of a certified check or a Bid bond (on the form included) issued by a surety meeting the requirements of Sections 5.4.2 of the General Conditions.

A. *intentionally omitted*

8.03 The Bid security of the Successful Proposer will be retained until such Proposer has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Proposer fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may consider Proposer to be in default, annul the Notice of Award, and the Bid security of that Proposer will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Proposer defaults. The Bid security of other Proposers whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Agreement or 61 days after the Proposal due date, whereupon Bid security furnished by such Proposers will be returned.

8.04 Bid security of other Proposers whom Owner believes do not have a reasonable chance of receiving the award will be returned within seven (7) days after the Proposal due date.

ARTICLE 9 – CONTRACT TIMES

9.01 The times by which Milestones are to be achieved and for Substantial Completion and readiness for final payment are to be set forth by Proposer in the Proposal and will be entered into the Agreement (or incorporated therein by reference to the specific language of the Proposal). Substantial Completion shall be achieved on or before Friday, August 14, 2015, and Commissioning of the Station must occur on or before **Friday, August 14, 2015**. The times will be taken into consideration by Owner during the evaluation of Proposals, and it will be necessary for the apparent Successful Proposer to satisfy Owner that it will be able to achieve Substantial Completion and be ready for final payment within the times designated in the Proposal.

ARTICLE 10 – LIQUIDATED DAMAGES

10.01 Should the Contractor not achieve Substantial Completion within seven (7) days after the date scheduled for Substantial Completion, and the Owner reasonably considers that Liquidated Damages are applicable, Liquidated Damages of Five Hundred ($500.) per day shall apply.

ARTICLE 11 – SUBSTITUTE AND "OR-EQUAL" ITEMS

11.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Proposal Documents. All specifications provided in the Proposal Documents are performance specifications, and no preference for a particular manufacturer or supplier is stated. The Proposer shall include proposed materials and equipment preferences within the Phase 1 Technical Proposal. The materials and equipment proposed by the Proposer in the Phase 1 Technical Proposal shall be of the standard of required type, function and quality capable of serving the function intended in the performance specifications of the Proposal Documents. The burden of proof of the merit of the proposed items of equipment and materials is upon Proposer. Engineer's decision of approval or disapproval of a proposed item will be final.

11.02 If Proposer includes materials and/or equipment that in Owner's or Engineer's opinion does not satisfy the performance specifications in the Proposal Documents, the Owner may:

A. Reject the Proposal, or

B. Negotiate with the selected Proposer for replacement of disapproved materials and/or equipment with materials and/or equipment that is deemed satisfactory by the Owner and/or Engineer.

11.03 After award of the Phase 1 Contract, any substitutions of materials and/or equipment requested by the Contractor, who is the successful Proposer, shall require approval by the Owner and/or Engineer. All proof of the suitability of any proposed substitutions is the burden of the Contractor and all substitutions must meet the performance specifications of the Proposal Documents.

ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS AND OTHERS

12.01 A part of the Proposer's Technical Proposal, the Proposer must identify the proposed Subcontractors, Suppliers, individuals, or entities to be included on the Contract. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Proposer to submit a substitute, in which case apparent Successful Proposer shall submit an acceptable substitute, Proposer's Phase 1 Price Proposal will be increased (or decreased) by the reasonable difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Proposals and making the Contract award.

12.02 If apparent Successful Proposer declines to make any such substitution, Owner may award the Contract to the second most qualified responsive Proposer that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer.

12.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

ARTICLE 13 – PREPARATION OF PROPOSAL

13.01 A responsive Proposal for the Work shall consist of two (2) parts. The first part of the Proposal shall consist of the **Proposer's Technical Proposal(s)** for pursuing the Work. The second part of the Proposal shall consist of the **Proposer's Price Proposal(s)**.

13.02 The Work will be awarded as two (2) separate phases. **Phase 1** includes all Work required to design, permit, furnish equipment, construct, commission, and provide training for a fully operational turn-key CNG Refueling Station. Phase 1 will be awarded as a Design/Build Contract. **Phase 2** includes all Work required to operate, maintain, monitor and provide fuel accounting services for the CNG Refueling Station. Phase 2 will be awarded as a separate Contract.

13.03 Proposers may submit Proposals for either Phase 1 and Phase 2 Work, or for only Phase 1 Work. When Proposer Proposes on Phase 1 and Phase 2 Work, Proposer shall include Price Proposals for each Phase as if Phase 1 and Phase 2 were to be awarded together.

13.04 The Proposer's **Technical Proposal for Phase 1 Work** shall consist of the following sections:

A. Signed and completed Phase 1 Technical Proposal transmittal letter;

B. Acknowledgement of Addenda issued and received and referenced in the Price Proposal;

C. Exceptions taken to the requirements of the Request for Proposals;

1. The Proposer shall indicate the specification(s), term(s) or condition(s) for which exception is being taken,

2. Provide replacement specification(s), term(s) and/or condition(s), and

3. Provide supporting documentation to justify.

D. Executive Summary;

E. Experience and Qualifications;

1. For key staff members who will be managing Phase 1 Work,

2. The staff who will be performing the Phase 1 Work,

3. At a minimum, provide a list of similar recent projects, and

4. Provide references for similar projects including design/build clients.

F. Project team organization;

1. Include Project team members and their locations,

2. Including proposed subcontractors and their designated tasks if known, and

3. Include tasks that will be subcontracted if subcontractors are not known.

G. CNG Fueling Station Technical Specifications shall include;

1. Specifications for all major equipment items,

2. Proposed major equipment and vendors,

3. Specifications for all major material items, and

4. Proposed major equipment items.

5. Items 1 through 4 above are to be addressed on the Technical Equipment Forms to be included with the Proposer's Technical Proposal for Phase 1. The intent of these forms is to ensure that all major equipment items are addressed in the Proposals. The forms are in Microsoft Excel 1997-2003 version. Proposers shall complete the Excel Spreadsheets that are available for downloading at http://www.guc.com/doing-business-with-us/. Exhibit 2 in Section P of this RFP includes reference copies of the Technical Equipment Forms.

H. Include Proposer's conceptual design of Station

1. Can be in the form of a P&ID or conceptual plans

I. Project Implementation and Management Plan;

1. Inclusive of proposed project schedule that meets the specified commissioning date for the Station,

2. Inclusive of the following major milestones:

a. Completion of preliminary engineering and design,

b. Date for ordering major equipment and materials,

c. Date all permits will be acquired,

d. Date construction will begin,

e. Completion of final engineering and detail design,

f. Major equipment and materials delivery dates,

g. Scheduled completion of construction,

h. Scheduled completion of commissioning,

i. Scheduled training period, and

j. Scheduled in-service date for Station.

J. Training Plan

1. Include a detailed training plan for training users in safety, vehicle fueling operations, and emergency operations, and

2. Include a detailed training plan for emergency responders such as fire and hazmat department personnel, police personnel, and GUC operating personnel.

K. Grant Funds

1. Include a listing of all identified sources of available Grant Funds that are included in the Phase 1, Item 3 Price Proposal.

2. Included abbreviated terms and conditions for acquiring the identified Grant Funds.

3. The successful Proposer shall be responsible for identifying and obtaining available Grant Funds and should include the cost of obtaining the funds in Proposer's Price Proposal for Phase 1, Proposal Item 3.

13.05 The Proposer's optional **Technical Proposal for Phase 2 Work** shall consist of the following sections:

A. Signed and completed Phase 2 Technical Proposal transmittal letter;

B. Acknowledgement of Addenda issued and received and referenced in the Price Proposal;

C. Exceptions taken to the requirements of the Request for Proposals;

1. The Proposer shall indicate the specification(s), term(s) or condition(s) for which exception is being taken,

2. Provide replacement specification(s), term(s) and/or condition(s), and

3. Provide supporting documentation to justify.

D. Executive Summary

E. Experience and Qualifications;

1. For key staff members who will be managing Phase 2 Work,

2. The staff who will be performing the Phase 2 Work, and

3. The location of the staff that will be performing the Phase 2 Work.

F. Proposed methods for providing monitoring, operations and maintenance services for the Station;

1. This will become part of the basis for Work under a separate operating and maintenance agreement, and

2. Provide a proposed maintenance schedule for all major equipment as advised by the manufacturers.

G. Proposed methods for providing fuel accounting services for the Station; and

1. This will become part of the basis for Work under a separate operating and maintenance agreement.

H. Proposed agreement for providing monitoring, operations, maintenance and fuel accounting services for the Station.

13.06 The Proposer's **Price Proposals** for Phase 1 or for Phase 1 and Phase 2 Work shall be prepared on the Price Proposal Forms, which are included with the Proposal Documents. Additional copies may be downloaded from http://www.guc.com/doing-business-with-us/. Proposers are **required** to complete the ***GUC CNG Station Equipment Bid Form***, a digital Microsoft Excel spreadsheet included with the digital RFP, and submit it with their Phase 1 Price Proposal. Completed Price Proposal Forms shall be submitted with a cover letter including any information the Proposer feels that is necessary for the Owner to interpret the Price Proposal(s).

13.07 All blanks on the Price Proposal Forms shall be completed in ink and the Price Proposal Forms signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Price Proposal Forms. A price shall be indicated for each item listed therein. **Proposer shall enter "No Bid" by items excluded from Proposer's Price Proposal.**

13.08 A Proposal by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown. Signature requirements apply to both the Technical Proposal and the Price Proposal, which together comprise the Proposer's complete Proposal.

13.09 A Proposal by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown. Signature requirements apply to both the Technical Proposal and the Price Proposal, which together comprise the Proposer's complete Proposal.

13.10 A Proposal by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown. Signature requirements apply to both the Technical Proposal and the Price Proposal, which together comprise the Proposer's complete Proposal.

13.11 A Proposal by an individual shall show the Proposer's name and official address. Signature requirements apply to both the Technical Proposal and the Price Proposal, which together comprise the Proposer's complete Proposal.

13.12 A Proposal by a joint venture shall be executed by each joint venture party in the manner indicated on the Price Proposal Form. The official address of the joint venture shall be shown. Signature requirements apply to both the Technical Proposal and the Price Proposal, which together comprise the Proposer's complete Proposal.

13.13 All names shall be printed in ink below the signatures**.** Signature requirements apply to both the Technical Proposal and the Price Proposal, which together comprise the Proposer's complete Proposal.

13.14 The Proposal shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Price Proposal Form and referenced in the Technical Proposal.

13.15 Postal and e-mail addresses and telephone number for communications regarding the Proposal shall be shown.

13.16 The Proposal shall contain evidence of Proposer's authority and qualification to do business in the state where the Project is located, or Proposer shall covenant in writing to obtain such authority and qualification prior to award of the Contract and attach such covenant to the Proposal. Proposer's state contractor license number, if any, shall also be shown on the Bid Form.

ARTICLE 14 – BASIS OF PROPOSAL; COMPARISON OF PROPOSALS

14.01 *Lump Sum*

A. Proposers shall submit a lump sum Bid on Phase 1 or on Phase 1 and Phase 2 as set forth in the Price Proposal (Bid) Forms.

1. All Phase 1, Item 1 Price Proposals shall be considered as "stand-alone" proposals, and not affected by the award or lack of award to Proposer of Phase 2.

2. All Proposers submitting on Phase 1 Work must include Bids for Alternate Items A-1 and A-2, and Item 3.

3. Proposers may submit a Proposal for Phase 2 if submitting a Proposal for Phase 1. The Phase 2 Proposal will be considered only under the condition of the Proposer being awarded Phase 1 Work. Submission of a Proposal on any Phase signifies Proposer's willingness to enter into a Contract for that Phase at the price offered.

4. Proposers submitting a Price Proposal on Phase 2 work are provided the opportunity under Phase 1, Bid Item 2 in the Price Proposal to tender a Price Proposal for Phase 1 Work including the award of Phase 2 Work.

5. The Proposers offering a Bid on one or both Phases shall be capable of completing the Work within the time period stated in the Agreement.

6. No Proposals will be accepted for Phase 2 without Proposer's submission of a Proposal on Phase 1.

14.02 *Allowances*

A. For cash allowances the Proposer's price shall include such amounts as the Proposer deems proper for Contractor's overhead, costs, profit, and other expenses on account of cash allowances, if any, named in the Contract Documents.

14.03 *Completion Time Comparisons*

A. Proposal prices will be compared with consideration of differences in the time designated by Proposers for Substantial Completion and commissioning.

ARTICLE 15 – SUBMITTAL OF PROPOSAL

15.01 With each digital copy of the Proposal Documents, a Proposer is furnished a digital copy of the Price Proposal Forms, and, if required, the Bid Bond Form. The digital copy of the Price Proposal Forms is to be printed, completed and submitted with the Bid security and the following documents:

A. Signed Cover Letter including any information that the Proposer feels will help the Owner interpret the Proposal.

B. Proposer's Technical Proposal.

C. Documents within Special Instructions to Bidders (Proposers) indicated to be "Attached to Bid".

15.02 A Proposal shall be submitted no later than the date and time prescribed and at the place indicated in the advertisement or request for proposals and shall be enclosed in a plainly marked package with the Project title (and, the designated phases of the Project for which the Proposal is submitted), the name and address of Proposer, and shall be accompanied by the Bid security and other required documents. If a Proposal is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "PROPOSAL ENCLOSED." A mailed Proposal shall be addressed to:

Carl Smith, E.I.
Greenville Utilities Commission
801 Mumford Road
Greenville, North Carolina 27835

ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF PROPOSAL

16.01 A Proposal may be modified or withdrawn by an appropriate document duly executed in the same manner that a Proposal must be executed and delivered to the place where Proposals are to be submitted prior to the date and time for the due date of the Proposals.

16.02 If within 72 hours after Proposals are received any Proposer 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 Proposal, that Proposer may withdraw its Proposal, and the Bid security will be returned. Thereafter, if the Work is re-advertised, that Proposer will be disqualified from further proposing on the Work.

ARTICLE 17 – PROPOSALS

17.01 Proposals are due 4:00PM ESDT Friday, August 29, 2014.

ARTICLE 18 – PROPOSALS TO REMAIN SUBJECT TO ACCEPTANCE

18.01 All Proposals will remain subject to acceptance for the period of time stated in the Price Proposal Form, but Owner may, in its sole discretion, release any Proposal and return the Bid security prior to the end of this period.

ARTICLE 19 – EVALUATION OF PROPOSALS AND AWARD OF CONTRACTS

19.01 Owner reserves the right to reject any or all Proposals, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Proposals; or to accept such proposals, as appears in its own best interest, and to waive technicalities or irregularities of any kind in the proposal. Owner further reserves the right to reject the Proposal of any Proposer whom it finds, after reasonable inquiry and evaluation, to not be responsible. Owner may also reject the Proposal of any Proposer if Owner believes that it would not be in the best interest of the Project to make an award to that Proposer. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Proposer.

19.02 More than one Proposal for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Proposer has an interest in more than one Proposal for the Work may be cause for disqualification of that Proposer and the rejection of all Proposals in which that Proposer has an interest.

A. The same equipment and materials suppliers may be included on Proposals from multiple Proposers.

19.03 In evaluating Proposals, Owner will consider whether or not the Proposals comply with the prescribed requirements, and such alternates, prices and other data, as may be requested in the Technical Proposal and/or Price Proposal Form or prior to the Notice of Award. Owner is not obligated to accept the lowest Price Proposal. If a Proposal is to be awarded, it is to be awarded to the responsible, responsive respondent whose evaluation by Owner indicates that the award will be in Owner's best interest.

19.04 In evaluating Proposers, Owner will consider the qualifications of Proposers and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work. **Vendor Selection shall be based on evaluation and rating of Proposer's demonstrated competence and qualifications/performance for the type of services/products to be offered. The following guidelines will be used as minimum criteria for rating the Vendor:**

A. The quality of references from past customers of Vendor,

B. Quality of approach and methodology that demonstrates an understanding of the requirements,

C. Quality, extent and relevance of Vendor's staff / experience in conducting service(s),

D. Vendor's response time for service(s), and

E. Overall cost.

19.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Proposers, proposed Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work in accordance with the Contract Documents.

19.06 If the Contract(s) is to be awarded, Owner will award the Contract(s) to the Proposer(s) whose Proposal(s) is in the best interests of the Project, Contract Security and Insurance.

19.07 Article 5 of the General Conditions and Article 10 of the Agreement set forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Proposer delivers the executed Agreement to Owner, it shall be accompanied by such bonds.

ARTICLE 20 – SIGNING OF AGREEMENT

20.01 **Phase 1** - When Owner issues a Notice of Award to the Successful Phase 1 Proposer, it shall be accompanied by the required number of unsigned counterparts of the Agreement along with the other Contract Documents which are identified in the Agreement as attached thereto. Within fifteen (15) days thereafter, Successful Proposer shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within sixteen (16) days thereafter, Owner shall deliver one fully signed counterpart to Successful Proposer.

20.02 **Phase 2** - When and if Owner issues a Notice of Award to the Successful Phase 2 Proposer, it shall be accompanied by the required number of unsigned counterparts of the Contractor Provided Agreement along with the other Contract Documents which are identified in the Agreement as attached thereto. Within fifteen (15) days thereafter, Successful Proposer shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within sixteen (16) days thereafter, Owner shall deliver one fully signed counterpart to Successful Proposer.

ARTICLE 21 – SALES AND USE TAXES

21.01 The Contractor shall prepare and provide to the Owner a sales tax report for all equipment and material purchases for the project with the Contractor's final invoice.

ARTICLE 22 – RETAINAGE

22.01 Provisions concerning Contractor's rights to deposit securities in lieu of retainage are set forth in the Agreement.

ARTICLE 23 – CONTRACTS TO BE ASSIGNED

23.01 No separate contracts for equipment or material procurement will be executed by the Owner. All materials and equipment shall be furnished by the Contractor awarded the Work.

ARTICLE 24 – PARTNERING

24.01 Owner does not intend to participate in a partnering process with Contractor(s).

ARTICLE 25 – EQUAL OPPORTUNITY EMPLOYMENT

25.01 The Contractor's employment practices shall be in accordance with North Carolina G.S. 168, and the North Carolina Civil Rights Act of 1964.

25.02 Greenville Utilities Commission's policy requires its contractors to document that sufficient good faith efforts have been made to provide equal opportunity for Minority and Women's Business Enterprises

(M/WBE) to participate in the subcontracting and material supplier opportunities available under this contract.

25.03 The Contractor shall review the requirements and guidelines, and complete the Affidavits set forth in the Special Instructions to Bidders. The Special Instructions to Bidders must be completed and submitted with the Contractor's Proposal.

ARTICLE 26 – GENERAL REQUIREMENTS

26.01 GUC reserves the right to reject all proposals or accept such proposals, as appears in it own best interest, and to waive technicalities or irregularities of any kind in the proposal. GUC is not obligated to accept the lowest cost proposal.

26.02 All costs that may be incurred to prepare proposals, attend meetings, attend site inspections, provide requested follow-up information, make formal and informal presentations, and for the entire contract negotiations process if applicable, shall be the sole responsibility of each vendor. GUC is not responsible under any circumstances for reimbursement of any costs that may be incurred by vendors during the proposal preparation, subsequent selection or negotiation stages.

26.03 GUC has adopted an Affirmative Action and Minority and Women Business Enterprise Plan(M/WBE) Program. Firms submitting a proposal are attesting that they also have taken affirmative action to ensure equality of opportunity in all aspects of employment, and to utilize M/WBE suppliers of materials and/or labor.

26.04 The Provider will take affirmative action in complying with all Federal and State requirements concerning fair employment and employment of the handicapped, and concerning the treatment of all employees, without discrimination by reason of race, color, religion, sex, national origin, or physical handicap.

26.05 All contracts, transactions, agreements, etc., are made under and shall be governed by and construed in accordance with the laws of the State of North Carolina.

26.06 Bids, proposals, and awards are subject to applicable provisions of the North Carolina Administrative Code.

Section D

Special Instructions to Bidders (Proposers)

Special Instructions to Bidders*

City of Greenville/Greenville Utilities Commission
Minority and/or Women Business Enterprise (M/WBE) Program

GUC
Construction Guidelines and Affidavits
$100,000 and above

***The terms Bidders and Proposers are interchangeable in this document.**

These instructions shall be included with each bid solicitation.

City of Greenville/Greenville Utilities Commission

Minority and/or Women Business Enterprise Program

$100,000 and Construction Guidelines for M/WBE Participants

Policy Statement

It is the policy of the City of Greenville and Greenville Utilities Commission to provide minorities and women equal opportunity for participating in all aspects of the City's and Utilities' contracting and procurement programs, including but not limited to, construction projects, supplies and materials purchases, and professional and personal service contracts.

Goals and Good Faith Efforts

Bidders responding to this solicitation shall comply with the M/WBE program by making Good Faith Efforts to achieve the following aspiration goals for participation.

	GUC	
	MBE	**WBE**
Construction This goal includes Construction Manager at Risk.	7%	4%

Bidders shall submit M/WBE information with their bids on the forms provided. This information will be subject to verification by GUC prior to contract award. **As of July 1, 2009, contractors, subcontractors, suppliers, service providers, or M/WBE members of joint ventures intended to satisfy GUC M/WBE goals shall be certified by the NC Office of Historically Underutilized Businesses (NC HUB) only.** Firms qualifying as "WBE" for GUC's goals must be designated as a "women-owned business" by the HUB Office. Firms qualifying as "MBE" for the GUC's goals must be certified in one of the other categories (i.e.: Black, Hispanic, Asian American, American Indian, Disabled, or Socially and Economically Disadvantaged). Those firms who are certified as both a "WBE" and "MBE" may only satisfy the "MBE" requirement. A complete database of NC HUB certified firms may be found at http://www.doa.nc.gov/hub/. An internal database of firms who have expressed interest to do business with the City and GUC is available at www.greenvillencmwbe.org. However, the HUB status of these firms must be verified by the HUB database. GUC shall accept NCDOT certified firms on federally funded projects only. Please note: A contractor may utilize any firm desired. However, for participation purposes, all M/WBE vendors who wish to do business *as a minority or a female* must be certified by NC HUB.

The Bidder shall make good faith efforts to encourage participation of M/WBEs prior to submission of bids in order to be considered as a responsive bidder. Bidders are cautioned that even though their submittal indicates they will meet the M/WBE goal, they should document their good faith efforts and be prepared to submit this information, if requested.

The M/WBE's listed by the Contractor on the **Identification of Minority/Women Business Participation** which are determined by the GUC to be certified shall perform the work and supply the materials for which they are listed unless the Contractors receive prior authorization from the GUC to perform the work with other forces or to obtain materials from other sources. If a contractor is proposing to perform all elements of the work with his own forces, he must be prepared to document evidence satisfactory to the owner of similar government contracts where he has self-performed.

The Contractor shall enter into and supply copies of fully executed subcontracts with each M/WBE or supply signed Letter(s) of Intent to the Project Manager after award of contract and prior to Notice to Proceed. Any amendments to subcontracts shall be submitted to the Project Manager prior to execution.

Instructions

The Bidder shall provide with the bid the following documentation:

☐ Identification of Minority/Women Business Participation
(if participation is zero, please mark zero—Blank forms will be considered nonresponsive)

☐ Affidavit A (if subcontracting)

OR

☐ Identification of Minority/Women Business Participation
(if participation is zero, please mark zero—Blank forms will be considered nonresponsive)

☐ Affidavit B (if self-performing; must attest that bidder does not customarily subcontract work on this type of project—includes supplies and materials)

Within 72 hours or 3 business days after notification of being the apparent low bidder who is subcontracting anything must provide the following information:

☐ Affidavit C (if aspirational goals are met or are exceeded)

OR

☐ Affidavit D (if aspirational goals are not met)

After award of contract and prior to issuance of notice to proceed:

☐ Letter(s) of Intent or Executed Contracts

****With each pay request, the prime contractors will submit the Proof of Payment Certification, listing payments made to M/WBE subcontractors.**

*****If a change is needed in M/WBE Participation, submit a Request to Change M/WBE Participation Form. Good Faith Efforts to substitute with another M/WBE contractor must be demonstrated.**

Minimum Compliance Requirements:

All written statements, affidavits, or intentions made by the Bidder shall become a part of the agreement between the Contractor and the GUC for performance of contracts. Failure to comply with any of these statements, affidavits or intentions or with the minority business guidelines shall constitute a breach of the contract. A finding by the GUC that any information submitted (either prior to award of the contract or during the performance of the contract) is inaccurate, false, or incomplete, shall also constitute a breach of the contract. Any such breach may result in termination of the contract in accordance with the termination provisions contained in the contract. It shall be solely at the option of the GUC whether to terminate the contract for breach or not. In determining whether a contractor has made Good Faith Efforts, the GUC will evaluate all efforts made by the Contractor and will determine compliance in regard to quantity, intensity, and results of these efforts.

Identification of Minority/Women Business Participation

I,_____,
(Name of Bidder)

do hereby certify that on this project, we will use the following minority/women business enterprises as construction subcontractors, vendors, suppliers or providers of professional services.

Firm Name, Address and Phone #	Work type	*M/WBE Category

*M/WBE categories: Black, African American (**B**), Hispanic, Latino (**L**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**S**) Disabled (**D**)

If you will not be utilizing M/WBE contractors, please certify by entering zero "0"

The total value of MBE business contracting will be ($)_____.

The total value of WBE business contracting will be ($)_____.

Greenville Utilities Commission AFFIDAVIT A – Listing of Good Faith Efforts

County of _____

(Name of Bidder)

Affidavit of_____

I have made a good faith effort to comply under the following areas checked:

Bidders must earn at least 50 points from the good faith efforts listed for their bid to be considered responsive. (1 NC Administrative Code 30 I.0101)

- ❑ **1 – (10 pts)** Contacted minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor, or available on State or local government maintained lists, at least 10 days before the bid date and notified them of the nature and scope of the work to be performed.
- ❑ **2 --(10 pts)** Made the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bids are due.
- ❑ **3** – **(15 pts)** Broken down or combined elements of work into economically feasible units to facilitate minority participation.
- ❑ **4 – (10 pts)** Worked with minority trade, community, or contractor organizations identified by the Office of Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.
- ❑ **5** – **(10 pts)** Attended prebid meetings scheduled by the public owner.
- ❑ **6** – **(20 pts)** Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors.
- ❑ **7 – (15 pts)** Negotiated in good faith with interested minority businesses and did not reject them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.
- ❑ **8** – **(25 pts)** Provided assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisted minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.
- ❑ **9** – **(20 pts)** Negotiated joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.
- ❑ **10** - **(20 pts)** Provided quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

The undersigned, if apparent low bidder, will enter into a formal agreement with the firms listed in the Identification of Minority/Women Business Participation schedule conditional upon scope of contract to be executed with the Owner. Substitution of contractors must be in accordance with GS143-128.2(d) Failure to abide by this statutory provision will constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of the minority/women business commitment and is authorized to bind the bidder to the commitment herein set forth.

Date:_____ Name of Authorized Officer:_____

Signature:_____

Title:_____

SEAL

State of_____, County of_____

Subscribed and sworn to before me this _____day of _____20____

Notary Public_____

My commission expires _____

Greenville Utilities Commission --AFFIDAVIT B-- Intent to Perform Contract with Own Workforce.

County of _____

Affidavit of _____
(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for the _____

_____ contract.
(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type project, and normally performs and has the capability to perform and will perform all elements of the work on this project with his/her own current work forces; and

The Bidder agrees to provide any additional information or documentation requested by the owner in support of the above statement.

The undersigned hereby certifies that he or she has read this certification and is authorized to bind the Bidder to the commitments herein contained.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____

SEAL

State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20___

Notary Public _____

My commission expires _____

Greenville Utilities Commission - AFFIDAVIT C - Portion of the Work to be Performed by M/WBE Firms

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the portion of the work to be executed by M/WBE businesses as defined in GS143-128.2(g) and the COG/GUC M/WBE Plan sec. III is equal to or greater than 11% of the bidders total contract price, then the bidder must complete this affidavit. This affidavit shall be provided by the apparent lowest responsible, responsive bidder within **72 hours** after notification of being low bidder.

Affidavit of _____ (Name of Bidder) I do hereby certify that on the

_____ (Project Name)

Project ID# _____ Amount of Bid $ _____

I will expend a minimum of _____% of the total dollar amount of the contract with minority business enterprises and a minimum of _____% of the total dollar amount of the contract with women business enterprises. Minority/women businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. Attach additional sheets if required

Name and Phone Number	*M/WBE Category	Work description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic or Latino (**L**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**S**) Disabled (**D**)

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with M/WBE Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____

SEAL

State of _____, County of _____

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

Notary Public _____

My commission expires _____

Greenville Utilities Commission AFFIDAVIT D – Good Faith Efforts

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the goal of 11% participation by minority/women business **is not** achieved, the Bidder shall provide the following documentation to the Owner of his good faith efforts:

Affidavit of _____ I do hereby certify that on the
(Name of Bidder)

_____
(Project Name)

Project ID#_____ Amount of Bid $_____

I will expend a minimum of _____% of the total dollar amount of the contract with minority business enterprises and a minimum of _____% of the total dollar amount of the contract with women business enterprises. Minority/women businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. (Attach additional sheets if required)

Name and Phone Number	*M/WBE Category	Work description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic or Latino (**L**), Asian American (**A**) American Indian (**I**),Female (**F**) Socially and Economically Disadvantaged (**S**) Disabled (**D**)

Examples of documentation required to demonstrate the Bidder's good faith efforts to meet the goals set forth in these provisions include, but are not necessarily limited to, the following:

A. Copies of solicitations for quotes to at least three (3) minority business firms from the source list provided by the State for each subcontract to be let under this contract (if 3 or more firms are shown on the source list). Each solicitation shall contain a specific description of the work to be subcontracted, location where bid documents can be reviewed, representative of the Prime Bidder to contact, and location, date and time when quotes must be received.

B. Copies of quotes or responses received from each firm responding to the solicitation.

C. A telephone log of follow-up calls to each firm sent a solicitation.

D. For subcontracts where a minority business firm is not considered the lowest responsible sub-bidder, copies of quotes received from all firms submitting quotes for that particular subcontract.

E. Documentation of any contacts or correspondence to minority business, community, or contractor organizations in an attempt to meet the goal.

F. Copy of pre-bid roster.

G. Letter documenting efforts to provide assistance in obtaining required bonding or insurance for minority business.

H. Letter detailing reasons for rejection of minority business due to lack of qualification.

I. Letter documenting proposed assistance offered to minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letter of credit, including waiving credit that is ordinarily required.

Failure to provide the documentation as listed in these provisions may result in rejection of the bid and award to the next lowest responsible and responsive bidder.

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with M/WBE Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date:_____ Name of Authorized Officer:_____

Signature:_____

Title:_____

SEAL

State of _____, County of _____

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

Notary Public_____

My commission expires _____

LETTER OF INTENT
M/WBE Subcontractor Performance

Please submit this form or executed subcontracts with M/WBE firms after award of contract and prior to issuance of notice to proceed.

PROJECT: _____
(Project Name)

TO: _____
(Name of Prime Bidder/Architect)

The undersigned intends to perform work in connection with the above project as a:

____Minority Business Enterprise _____Women Business Enterprise

The M/WBE status of the undersigned is certified the NC Office of Historically Underutilized Businesses (required). ___ Yes ___ No

The undersigned is prepared to perform the following described work or provide materials or services in connection with the above project at the following dollar amount:

Work/Materials/Service Provided	Dollar Amount of Contract	Projected Start Date	Projected End Date

_____
(Date)

_____ _____
(Address) (Name & Phone No. of M/WBE Firm)

_____ _____
(Name & Title of Authorized Representative of M/WBE) (Signature of Authorized Representative of M/WBE)

REQUEST TO CHANGE M/WBE PARTICIPATION

(Submit changes only if notified as apparent lowest bidder, continuing through project completion)

Project: _____

Bidder or Prime Contractor: _____

Name & Title of Authorized Representative: _____

Address: _____ **Phone #:** _____

_____ **Email Address:** _____

Total Contract Amount (including approved change orders or amendments): $_____

Name of subcontractor: _____

Good or service provided: _____

Proposed Action:

___Replace subcontractor
___Perform work with own forces

For the above actions, you must provide one of the following reasons (Please check applicable reason):

___ The listed MBE/WBE, after having had a reasonable opportunity to do so, fails or refuses to execute a written contract.

___The listed MBE/WBE is bankrupt or insolvent.

___The listed MBE/WBE fails or refuses to perform his/her subcontract or furnish the listed materials.

___The work performed by the listed subcontractor is unsatisfactory according to industry standards and is not in accordance with the plans and specifications; or the subcontractor is substantially delaying or disrupting the progress of the work.

If <u>replacing</u> subcontractor:

Name of replacement subcontractor: _____

The M/WBE status of the contractor is certified by the NC Office of Historically Underutilized Businesses (required). ___Yes ___No

Dollar amount of original contract $_____

Dollar amount of amended contract $ _____

Other Proposed Action:

___Increase total dollar amount of work
___Decrease total dollar amount of work
___Add additional subcontractor
___Other

Please describe reason for requested action: _____

_____

If <u>adding</u> additional subcontractor:*

The M/WBE status of the contractor is certified by the NC Office of Historically Underutilized Businesses (required).___Yes ___No

**Please attach Letter of Intent or executed contract document*

Dollar amount of original contract $_____

Dollar amount of amended contract $ _____

Interoffice Use Only:

Approval __Y __N

Date_____

Signature_____

Pay Application No. _____

Purchase Order No. _____

Proof of Payment Certification

M/WBE Contractors, Suppliers, Service Providers

Project Name: _____

Prime Contractor: _____

Current Contract Amount (including change orders): $_____

Requested Payment Amount for this Period: $_____

Is this the final payment? ___Yes ___No

Firm Name	M/WBE Category*	Total Amount Paid from this Pay Request	Total Contract Amount (including changes)	Total Amount Remaining

*Minority categories: Black, African American (**B**), Hispanic or Latino (**L**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**S**) Disabled (**D**)

Date:_____

Certified By: _____
Name

_____
Title

_____
Signature

Section E

Price Proposal

PRICE PROPOSAL

The undersigned, as Proposer, hereby declares that He, or He and His associates are the only person or persons interested in the proposal as principal or principals; that this proposal is made without connection with any other person, company, or parties making a proposal; and that it is in all respects fair and in good faith without collusion or fraud.

The Proposer further declares that he has examined the site of the Work and informed himself fully in regard to all conditions pertaining to the place where the Work is to be done; that he has examined the Specifications for the Work and all contractual documents relative thereto, and has read all special provisions furnished prior to the Proposal opening; that he has satisfied himself relative to the Work to be performed, and materials and equipment to be furnished.

The Proposer proposes and agrees, if this proposal is accepted, to contract with the Greenville Utilities Commission in the form of contract specified, to furnish all necessary engineering, materials, equipment, machinery, tools, apparatus, means of transportation, and labor necessary to perform in full and complete the requirements of the Specifications and Contract Documents, to the full and entire satisfaction of the Greenville Utilities Commission with definite understanding that no money will be allowed for extra work except as set forth in the attached General Conditions and Contract Documents.

Final payment shall be made at the Prices listed below. All items necessary to complete the Work as described in the Contract Documents shall be included in the Prices listed below and no other claim shall be made for payment. The Prices shall include all required sales tax, freight charges, and all other applicable taxes and fees.

NOTE TO PROPOSERS: This document(s) is an RFP (Request for Proposals). The terms "Price" and "Bid" are used interchangeably in this document. The "Price Proposal" includes the total of all "Prices" or "Bids" for the individual Items for which "Prices" or "Bids" are required.

The Proposer must submit bid prices for the equipment and scopes of service included in Phase 1, Item 1 , Item 3, and Phase 1 Alternate Bid Items A-1 and A-2. The Proposer may also submit bid prices for Phase 2 provided the Proposer submits bids for Phase 1. The Price Proposal is structured to allow the Proposer to provide bids for Phase 1 of the Work as if the Work were awarded either separately from the Phase 2 Work or together with the Phase 2 Work. Proposers bidding on Phase 2 Work must provide a price for Phase 1, Item 2 in addition to Phase 1, Item 1, Item 3, and Alternate Bid Items A-1 and A-2. Proposers not providing a Proposal for Phase 2 of the Work shall enter *"No Bid"* under the Total Price for Phase 2 and shall not provide a price for Phase 1, Item 2.

Price Proposals shall be considered valid for a period of 60 days from Proposal due date.

PHASE 1 BASE BID – DESIGN/BUILD PRICE PROPOSAL for the GUC CNG VEHICLE REFUELING STATION

This Price Proposal shall be accompanied by a signed cover letter including any information the Proposer feels will help the Owner to interpret the Price Proposal. In addition to the Price Proposal, the Bidder shall submit a Technical Proposal for Phase 1 Services.

The Contractor proposes the price(s) for Items 1 and 2 below inclusive of designing, constructing and commissioning a turn-key compressed natural gas, fast-fill vehicle refueling station on the site provided by the GUC in accordance with the Project Specifications and Contract Documents. **Refer to Design/Build Base Technical Specification Section 18000, Part 1, Section 1.01 C for the equipment and scope of services**

included in the Phase 1 Base Bid and refer to Section 1.01 D for the equipment and scope of services included in the Phase 1 Alternate Bid Items.

In addition to and in support of the Proposer's Phase 1 Base Price Proposal, the Proposer must submit the completed "GUC CNG Station Equipment Bid Form", a Microsoft Excel Spreadsheet, included in Section E of the Request for Proposals (RFP) along with this Price Proposal Form and received digitally by the Proposer with the digital RFP. It is preferred that the Proposer completes the 'GUC CNG Station Equipment Bid Form" digitally in Excel and prints it out to include with Proposer's Price Proposal.

The amount of the Phase 1 Bid Security shall be based on five percent (5%) of the Proposer's maximum Base Phase 1 Total Price for Item 1 without deducting the amount of any Grant Funding.

Item	DESCRIPTION OF WORK	Phase	Award Option	TOTAL PRICE (Dollars)
1	**Base Design/Build** Design, permit, provide all equipment and materials, construct, and commission a turn-key compressed natural gas vehicle refueling station – inclusive of identifying and obtaining Grant Funding if available, training users in vehicle fueling and safety procedures and training GUC personnel and emergency personnel in emergency procedures	1	Awarded separately from Phase 2	$ _____

Item	DESCRIPTION OF WORK	Phase	Award Option	TOTAL PRICE (Dollars)
2	**Base Design/Build** Design, permit, provide all equipment and materials, construct, and commission a turn-**key** compressed natural gas vehicle refueling station – inclusive of identifying and obtaining Grant Funding if available, training users in vehicle fueling and safety procedures and training GUC personnel and emergency personnel in emergency procedures	1	Awarded with Phase 2	$ _____

The Contractor proposes to guarantee procurement of the Total Amount of Grant Funding included for Item 3 below. The proposed sources of the Grant Funding shall be identified and the terms and conditions included in the Phase 1 Technical Proposal.

Item	DESCRIPTION OF WORK	Phase	TOTAL AMOUNT (Dollars)
3	**Base Grant Funds** Guaranteed Grant Funds, if any	1	$ _____

NOTE: Attach completed GUC CNG Station Equipment Bid Form spreadsheet to Price Proposal between pages E-2 and E-3 before submitting.

PHASE 1 ALTERNATE BIDS – DESIGN/BUILD PRICE PROPOSAL for the GUC CNG VEHICLE REFUELING STATION OPTIONS

This Phase 1 Alternate Bids shall accompany the Phase 1 Base Bid and the Phase 1 Base Bid Cover Letter should include any information the Proposer feels will help the Owner to interpret the Alternate Bids. Items included in the Alternate Bid Price Proposal, shall be included in the Technical Proposal for Phase 1 Services.

The Contractor proposes the price(s) for Alternate Bid Optional Items A-1 and A-2 below inclusive of designing, permitting, furnishing, constructing and commissioning not included in the Phase 1 Base Bid for a turn-key compressed natural gas, fast-fill vehicle refueling station on the site provided by the GUC in accordance with the Project Specifications and Contract Documents. **Refer to Design/Build Base Technical Specification Section 18000, Part 1, Section 1.01 D for the equipment and scope of services in the Phase 1 Alternate Bid Items.**

Phase 1 Alternate Bid Optional Items

The Alternate Bid Optional Items may or may not be selected by the Owner.

The prices provided for the Alternate Bid Optional Items shall be the same for both Phase 1 Base Bid Items 1 and 2; independent of award of Phase 2 Work.

The amount of the Phase 1 Bid Security will not be increased or decreased as a result of the Phase 1 Alternate Bid Optional Item Bids.

Item	DESCRIPTION OF OPTION	Phase	OPTION PRICE (Dollars)
A-1	**ASME Natural Gas Cascade Storage System** Include the price for the equipment, materials, construction, installation, and commissioning of one (1) 35,000 SCF, 5500 psig ASME natural gas cascade storage system. If installed, the storage system would be in addition to the storage system included in the Phase 1 Base Bid.	1	$ _____

Item	DESCRIPTION OF OPTION	Phase	OPTION PRICE (Dollars)
A-2	**SCADA System** Provide the price for one (1) CNG Station SCADA system, inclusive of all hardware, software, installation, interfacing, programming, commissioning, and training. Provide the specification for the SCADA System and also the computer hardware and software requirements for running the SCADA software as part of Proposer's Technical Proposal. Assume that the SCADA software will be installed on an existing Greenville Utilities Commission computer located at their Mumford Road Operations Center.	1	$ _____

PHASE 2 – OPERATIONS AND MAINTENANCE, MONITORING, AND FUEL ACCOUNTING

This Price Proposal shall be accompanied by a signed cover letter including any information the Proposer feels will help the Owner to interpret the Price Proposal. In addition to the Price Proposal, the Bidder shall submit a Technical Proposal for Phase 2 Services.

The Contractor proposes the prices for Items 4 through 6 below inclusive of providing three (3) years of Operation and Maintenance, Remote Monitoring, and Fuel Accounting (O&MMA) Services for the CNG vehicle fueling station with Contractor's personnel according to the Project Specifications and Contract Documents.

Proposers submitting on Phase 2 Work shall submit a Phase 2 Technical Proposal which shall include a draft O&MMA Services Agreement. Proposers that are not proposing on Phase 2 Work shall return the form with ***"No Bid"*** entered for the Total Price.

The Contractor should propose any alternate price models or payment terms that would lower the GUC's overall cost for the 3 year O&MMA contract Period, and subsequent periods thereafter.

ITEM	DESCRIPTION OF ITEM	Phase	Award Option	TOTAL PRICE (Dollars)
4	Provide the first year of three (3) years monitoring, operating, maintaining and providing fuel accounting services for the CNG vehicle refueling station.	2	Awarded with Phase 1	$ _____

ITEM	DESCRIPTION OF ITEM	Escalation Factor
5	Provide the proposed annual Escalation Factor for Operation, Maintenance and Fuel Accounting Services for the CNG vehicle fueling station. Factor shall be applied each year beginning at year two (2) of operations to the previous year's Contract cost of services, and be applied each year through year three (3) of operations.	_____ % per Year

In addition to the price of O&MMA services the contractor shall provide a price breakdown of the monthly O&MMA services. The price breakdown should include the cost of incidental materials used in routine maintenance such as filters, oil, etc. Replacement parts due to failure will be billed separately. The Contractor proposes the following O&MMA average monthly price break down:

ITEM 6	DESCRIPTION	PRICE PER MONTH
A	Compressor Maintenance	$
B	Dispenser maintenance	$
C	Record Keeping	$
D	System Monitoring	$
E	Routine Station Up-Keep	$
F	Certification/Permit Maintenance	$
G	Accounting and Billing	$
	Total Monthly O&MMA Price	**$**

In submitting the above proposed prices, We represent and warrant that the prices for all items listed above represent Our proposal and price for the Work herein described.

We understand that the execution of this Proposal Contract does not limit the Greenville Utilities Commission in the access and use of Its own CNG fueling facility.

The Proposal further agrees that:

a) The Greenville Utilities Commission, in protecting its best interest, reserves the right to reject any or all Proposals or waive any defects in favor of the Greenville Utilities Commission. Any changes, erasures, deletions in the Lump Sum prices above, modifications in the Price Proposal Form, or alternate proposals not specified in the Price Proposal shall make the proposal irregular and subject to rejection;

b) In case of failure on his part to execute the said agreement within fifteen (15) consecutive calendar days after written notice being given on the award of the Contract, the monies payable by the Securities accompanying this bid shall be paid to the Greenville Utilities Commission, as liquidated damages for such failure; otherwise, the Securities accompanying this bid shall be returned to the undersigned;

c) That the Work under this Contract will commence not later than ten (10) consecutive calendar days after the date of a written "Notice to Proceed" given by the Greenville Utilities Commission to the Contractor.

d) If awarded, It will supply the Greenville Utilities Commission with background checks for employees that will Work on the project site.

BID SECURITY

Enclosed herewith is the following Security made payable to the Owner, offered as evidence that the undersigned will enter into agreement for the execution and completion of the Phase 1 Work in accordance with the Project Specifications and Contract Documents. Bidder certifies that this Proposal is made in good faith and without collusion or connection with any other person submitting a Proposal on these services. Bidder also certifies that this proposal is made in good faith and without collusion or connection with any Greenville Utility Commission Employee(s).

Bidder's Bond or Certified Check in the amount of: $_____ . If

Bond, Name of Surety: _____. If

Check, Name of Bank: _____.

This bid is subject to acceptance within a period of sixty (60) days from the date of this bid proposal.

The undersigned agrees to substantially complete the Phase 1 Work included in the Proposal – GUC CNG VEHICLE REFUELING STATION within **294** consecutive calendar days from the Notice to Proceed and to complete all work within **308** consecutive calendar days from the Notice to Proceed.

ACKNOWLEDGEMENT OF ADDENDA

The undersigned Bidder acknowledges receipt of the following Addenda, which have been considered in preparation of this Bid:

No. _____Dated _____ No. _____Dated _____

No. _____Dated _____ No. _____Dated _____

No. _____Dated _____ No. _____Dated _____

No. _____Dated _____ No. _____Dated _____

No. _____Dated _____ No. _____Dated _____

BIDDER'S AUTHORIZED SIGNATURE

CONTRACTOR: _____ SIGNATURE: _____

ADDRESS: _____ SIGNATURE: _____
(printed)

_____ TITLE: _____

_____ PHONE: _____

DATE: _____ FAX: _____

FEDERAL TAX ID #_____ EMAIL:_____

E-VERIFY:

The below Affidavit must be completed and returned with the proposal submission.

AFFIDAVIT

STATE OF NORTH CAROLINA

GREENVILLE UTILITIES COMMISSION

NOW COMES Affiant, first being sworn, deposes and says as follows:

1. I have submitted a bid for contract or desire to enter into a contract with the Greenville Utilities Commission;

2. As part of my duties and responsibilities pursuant to said bid and/or contract, I attest that I am aware of and in compliance with the requirements of E-Verify, Article 2 of Chapter 64 of the North Carolina General Statutes, to include (mark which applies):

___ After hiring an employee to work in the United States I verify the work authorization of said employee through E-Verify and retain the record of the verification of work authorization while the employee is employed and for one year thereafter; or

___ I employ less than twenty-five (25) employees in the State of North Carolina.

3. As part of my duties and responsibilities pursuant to said bid and/or contract, I attest that to the best of my knowledge any subcontractors employed as a part of this bid and/or contract are in compliance with the requirements of E-Verify, Article 2 of Chapter 64 of the North Carolina General Statutes, to include (mark which applies):

___ After hiring an employee to work in the United States the subcontractor verifies the work authorization of said employee through E-Verify and retains the record of the verification of work authorization while the employee is employed and for one year thereafter; or

___ Employ less than twenty-five (25) employees in the State of North Carolina.
Specify subcontractor: _____

This the _____ day of _____, 2014

_____
Affiant

Sworn to and subscribed before me, this the _____ day of _____, 2014

_____
[OFFICIAL SEAL] _____, Notary Public

My Commission Expires: _____

Doc# Fin-E-Verify-13-0000

Additional Information

To assist the Proposer in considering the project scheduled times, the Greenville Utilities Commission has included its 2014 Holiday Schedule. The 2015 schedule can be expected to be similar.

MEMORANDUM

TO: All Employees

DATE: August 23, 2013

SUBJECT: 2014 HOLIDAY SCHEDULE

The following holidays will be observed by the City of Greenville and Greenville Utilities Commission during 2014:

New Year's	Wednesday, January 1, 2014
Martin Luther King, Jr. Day	Monday, January 20, 2014
Good Friday	Friday, April 18, 2014
Memorial Day	Monday, May 26, 2014
Independence Day	Friday, July 4, 2014
Labor Day	Monday, September 1, 2014
Veterans Day	Tuesday, November 11, 2014
Thanksgiving	Thursday, November 27, 2014 Friday, November 28, 2014
Christmas	Wednesday, December 24, 2014 Thursday, December 25, 2014 Friday, December 26, 2014
New Year's (2015)	Thursday, January 1, 2015

This information is being provided now in order to allow you to make personal plans for the use of the holidays.

dr

Barbara Lipscomb
City Manager

Anthony C. Cannon
GUC General Manager/CEO

GUC CNG Station Equipment Bid Forms

The spreadsheets on the following five (5) pages represent the GUC CNG Equipment Bid Form Spreadsheets that the Proposer shall obtain in Microsoft Excel Format with the bid package. These sheets are to be completed digitally in Excel, and the resultant sheets along with tabulations are to be printed out and submitted with the Price Proposal between Sheets E-2 and E-3 of the Price Proposal.

GUC CNG Station Equipment Bid Forms

This Form is Considered to be a Part of the Price Proposal and Contract Documents
2014 07 21

Quote Date:		**Bidders are required to insert information into the bright green filled cells. (as applicable)** **Bidders must check all quantities and calculations to ensure that all pricing is accurate and complete.** **The Owner reserves the right to use either lump sum or per item pricing in the event of a discrepancy.** **The Owner reserves the right to modify quantities and eliminate items without affecting the price of the remaining items.**
Shipping Date:		

Item #	General Description	Additional Description (filled in By Bidder)	Cost per Unit (filled in by Bidder)	Number of Units	Extended Cost
	CNG Dryer				
1.0	Single Tower CNG Dryer			1	$ -
1.1	Option 1- (Describe)				$ -
1.2	Option 2- (Describe)				$ -
	CNG Compressor(s)				
2.0	Fully Packaged Duplex **CNG Compressor** complete with Enclosure and Electrical Control Panels			1	$ -
2.1	Option 1- (Describe)				$ -
2.2	Option 2- (Describe)				$ -
	CNG Storage				
3.0	Minimum capacity to be total of 35,000 scf at 4500 psig with a pressure rating of 5500 psig. Tubes to be arranged one wide x 3 high. Price for complete assembly.			1	$ -
3.1	Option 1- (Describe)			0	$ -
3.2	Option 2- (Describe)			0	$ -

Item #		General Description	Additional Description (filled in By Bidder)		Cost per Unit (filled in by Bidder)	Number of Units	Extended Cost
	CNG Storage--Alternate						
3.5		Minimum capacity to be total of 35,000 scf at 4500 psig with a pressure rating of 5500 psig. Tubes to be arranged one wide x 3 high. Price for complete assembly.				0	$ -
3.6		Option 1- (Describe)				0	$ -
3.7		Option 2- (Describe)				0	$ -
	ESD and Priority Fill Systems						
4.0		Electronic Priority Fill System controlled by master PLC complete with Storage ESD Valves mounted, tubed and wired to common compressor skid.				1	$ -
4.1		Option 1- (Describe)					$ -
4.2		Option 2- (Describe)					$ -
	CNG Dispensers--1/2" Light Vehicle						
5.0		Dual Hose CNG Cascaded Fast Fill Dispenser				2	$ -
5.1		Option 1- (Describe)					$ -
5.2		Option 2- (Describe)					$ -
5.5		Prefabricated dispenser Pit as specified				2	$ -
	CNG Dispensers--3/4" High Flow						
5.30		Single Hose CNG Cascaded Fast Fill Dispenser				0	$ -
5.31		Option 1- (Describe)					$ -
5.32		Option 2- (Describe)					$ -
5.33		Prefabricated dispenser Pit as specified				1	$ -

Item #		General Description	Additional Description (filled in By Bidder)		Cost per Unit (filled in by Bidder)	Number of Units	Extended Cost
	Controls						
6.0		Motor Control and Master PLC Panel: Including all 480 VAC distribution, breakers, motor control, capacitors, control transformer, PLCs and UPS				1	$ -
6.1		Option 1- (Describe)					$ -
6.2		Option 2- (Describe)					$ -
6.3							$ -
6.4		**Alternative- SCADA system**including computer, Windows 7 Pro and Office 2010 Pro, SCADA runtime and SCADA development software and all programming.					$ -
6.5		Option 2- (Describe)					$ -
	Miscellaneous Station Components						
7.0		ANSI 150 two or three piece station inlet lockable manual API 607 ball valve, and flanged, wafer style bubble tight check valve.				1	$ -
7.1		ANSI 150 two or three piece station inlet automatic fail closed API 607 ball valve. This valve must be controlled by the master PLC and must close on any ESD and when no compressors(s) are operating.				1	$ -
7.2		Wafer Style Suction Check Valves				2	$ -
7.3		Flexible Connectors-Dryer				2	$ -
7.4		Flexible Connectors-Compressors				2	$ -
7.5		Other-describe					$ -
7.6		Other-describe					$ -
7.7		Other-describe					$ -
7.8		Other-describe					$ -
7.9		Other-describe					$ -
	Air Compressor System--Not Applicable						
8.0						0	$ -
8.1		60 gallon 200 psig vertical air receiver to be installed on the equipment pads. Receiver to include ASME relief valve with lockable isolation valve, air connection locable isloation valve and lockable manual drain valve.				0	$ -
8.2		1/2" Pressure regulator, relief and gauge assembly. To be installed in the main truck garage if no aircompressor is purchased or installed in the Controls building if an air compressor is purchased.				0	$ -

Item #		General Description	Additional Description (filled in By Bidder)		Cost per Unit (filled in by Bidder)	Number of Units	Extended Cost
		Quality Control Requirements--Itemize Cost of any Special QC Required					
9.0		Describe					$ -
9.1		Describe					$ -
9.2		Describe					$ -
9.3		Describe					$ -
9.4		Describe					$ -
9.5		Describe					$ -
		Documentation--List any Additional Cost of Documentation					
10.0		Describe					$ -
10.1		Describe					$ -
		Describe					$ -
10.2		Describe					$ -
		Describe					$ -
10.3		Describe					$ -
		Equipment Subtotals					
12		Equipment Subtotal					$ -
12.1		Taxes		Rate: (decimal)			$ -
12.2		**Equipment Total**					**$ -**

Item #		General Description	Additional Description (filled in By Bidder)		Cost per Unit (filled in by Bidder)	Number of Units	Extended Cost
	Services						
13.0		Freight to site--off loading by Contractor				1	$ -
13.1		Other freight--describe:					$ -
13.3			**Rate**	**Hours**			
13.4		Station engineering--Indicate cost if not included above			$ -		$ -
13.5		Project Management--Indicate cost if not included above			$ -		$ -
13.7							
13.8							
13.9		Commissioning/Startup					$ -
13.10		Training--indicate nature of training:					$ -
13.11							
13.12		Other Services--describe:					$ -
13.13		Other Services--describe:					$ -
		Total Services					**$ -**
	Project Totals						
		Subtotal Equipment, Installation and Services Cost					**$ -**
		Construction and Installation Costs				1	**$ -**
		Other General Condition Costs				1	**$ -**
		Other Costs				1	**$ -**
		Other Costs				1	**$ -**
		Grand Total Bid					**$ -**

Section F

Bid Bond

BID BOND

KNOW ALL MEN BY THESE PRESENTS: that we, the undersigned, _____ as Principal, and _____ as Surety, are hereby held and firmly bound unto **Greenville Utilities Commission** as OWNER in the penal sum of _____ for payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns. Signed, this _____ day of _____, 2014.

The Condition of the above obligation is such that whereas the Principal has submitted to **Greenville Utilities Commission** a certain Price Proposal (Bid), attached hereto and hereby made a part hereof to enter into a contract in writing, for the **GUC CNG VEHICLE REFUELING FACILITY PHASE 1 – DESIGN/BUILD SERVICES.**

NOW, THEREFORE,

(a) If said BID shall be rejected, or

(b) If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said BID) and shall furnish a BOND for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said BID, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____ (L.S.)
Principal

_____
Surety

By: _____
IMPORTANT – Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State of North Carolina.

Section G

Agreement (*Sample*)

Standard Form of Agreement Between Owner and Design-Builder - Lump Sum

This document has important legal consequences. Consultation with an attorney is recommended with respect to its completion or modification.

This **AGREEMENT** is made as of the _____ day of _____ in the year of 2014, by and between the following parties, for services in connection with the Project identified below.

OWNER: **Greenville Utilities Commission of the City of Greenville, NC**

P.O. Box 1847

Greenville, NC 27835

DESIGN-BUILDER:
(Name and address)

PROJECT: **GUC CNG VEHICLE REFUELING STATION**

In consideration of the mutual covenants and obligations contained herein, Owner and Design-Builder agree as set forth herein.

Article 1
Scope of Work

1.1 Design-Builder shall perform all design and construction services, and provide all material, equipment, tools and labor, necessary to complete the Work described in and reasonably inferable from the Contract Documents.

Article 2
Contract Documents

2.1 The Contract Documents are comprised of the following:

.1 All written modifications, amendments, minor changes and Change Orders to this Agreement issued in accordance with DBIA Document No. 535, *Standard Form of General Conditions of Contract Between Owner and Design-Builder* (2009 Edition) ("General Conditions of Contract");

.2 The Basis of Design Documents, including the Owner's Project Criteria, Design-Builder's Proposal and the Deviation List, if any, contained in the Design-Builder's Proposal, which shall specifically identify any and all deviations from Owner's Project Criteria;

.3 This Agreement, including all exhibits and attachments, executed by Owner and Design-Builder (List for example, performance standard requirements, performance incentive requirements, markup exhibits, allowances, or unit prices);

.4 Written Supplementary Conditions, if any, to the General Conditions of Contract;

.5 The General Conditions of Contract; and

.6 Construction Documents prepared and approved in accordance with Section 2.4 of the General Conditions of Contract

Article 3
Interpretation and Intent

3.1 Design-Builder and Owner, prior to execution of the Agreement, shall carefully review all the Contract Documents, including the various documents comprising the Basis of Design Documents for any conflicts or ambiguities. Design-Builder and Owner will discuss and resolve any identified conflicts or ambiguities prior to execution of the Agreement.

3.2 The Contract Documents are intended to permit the parties to complete the Work and all obligations required by the Contract Documents within the Contract Time(s) for the Contract Price. The Contract Documents are intended to be complementary and interpreted in harmony so as to avoid conflict, with words and phrases interpreted in a manner consistent with construction and design industry standards. In the event inconsistencies, conflicts, or ambiguities between or among the Contract Documents are discovered after execution of the Agreement, Design-Builder and Owner shall

attempt to resolve any ambiguity, conflict or inconsistency informally, recognizing that the Contract Documents shall take precedence in the order in which they are listed in Section 2.1 hereof. Conflicts existing within Section 2.1.2 shall be resolved by giving precedence first to the Deviation List, if any, then the Owner's Project Criteria, and then the Design Builder's Proposal.

3.3 Terms, words and phrases used in the Contract Documents, including this Agreement, shall have the meanings given them in the General Conditions of Contract.

3.4 If Owner's Project Criteria contain prescriptive/design specifications: (a) Design-Builder is entitled to reasonably rely on the accuracy of the information represented in the prescriptive/design specifications and its compatibility with other information set forth in Owner's Project Criteria, including any design performance specifications; and (b) Design-Builder shall be entitled to an adjustment in its Contract Price and/or Contract Time(s) to the extent Design-Builder's cost and/or time of performance have been adversely impacted by such inaccurate prescriptive/design specification.

3.5 The Contract Documents form the entire agreement between Owner and Design-Builder and by incorporation herein are as fully binding on the parties as if repeated herein. No oral representations or other agreements have been made by the parties except as specifically stated in the Contract Documents.

3.6 In the event of an ambiguity in the Contract Documents, the parties shall be deemed to have jointly authored them, and as such, nothing shall be construed against or in favor of one party based on its being deemed the sole author.

Article 4
Ownership of Work Product

4.1 **Work Product**. All drawings, specifications and other documents and electronic data, including such documents identified in the General Conditions of Contract, furnished by Design-Builder to Owner under this Agreement ("Work Product") are deemed to be instruments of service and Design-Builder shall retain the ownership and property interests therein, including but not limited to any intellectual property rights, copyrights and/or patents, subject to the provisions set forth in Sections 4.2 through 4.5 below.

4.2 **Owner's Limited License Upon Project Completion and Payment in Full to Design Builder.** Upon Owner's payment in full for all Work performed under the Contract Documents, Design-Builder shall grant Owner a limited license to use the Work Product in connection with Owner's occupancy of the Project, conditioned on Owner's express understanding that its alteration of the Work Product without the involvement of Design-Builder is at Owner's sole risk and without liability or legal exposure to Design-Builder or anyone working by or through Design-Builder, including Design Consultants of any tier (collectively the "Indemnified Parties"), and on the Owner's obligation to provide the indemnity set forth in Section 4.5 herein.

[At the parties' option, one of the following may be used in lieu of Section 4.2]:

☐ Upon Owner's payment in full for all Work performed under the Contract Documents, Design-Builder: (a) grants Owner a limited license to use the Work Product in connection with Owner's occupancy of the Project; and (b) transfers all ownership and property interests,

including but not limited to any intellectual property rights, copyrights and/or patents, in that portion of the Work Product that consists of architectural and other design elements and specifications that are unique to the Project. The parties shall specifically designate those portions of the Work Product for which ownership in the Work Product shall be transferred. Such grant and transfer are conditioned on Owner's express understanding that its alteration of the Work Product without the involvement of Design Builder is at Owner's sole risk and without liability or legal exposure to Design-Builder or anyone working by or through Design-Builder, including Design Consultants of any tier (collectively the "Indemnified Parties"), and on the Owner's obligation to provide the indemnity set forth in Section 4.5 herein.

or

☒ Upon Owner's payment in full for all Work performed under the Contract Documents, Design-Builder transfers to Owner all ownership and property interests, including but not limited to any intellectual property rights, copyrights and/or patents, in the Work Product. Such transfer is conditioned on Owner's express understanding that its alteration of the Work Product without the involvement of Design Builder is at Owner's sole risk and without liability or legal exposure to Design-Builder or anyone working by or through Design-Builder, including Design Consultants of any tier (collectively the "Indemnified Parties"), and on the Owner's obligations to provide the indemnity set forth in Section 4.5 herein.

4.3 Owner's Limited License upon Owner's Termination for Convenience or Design-Builder's Election to Terminate. If Owner terminates this Agreement for its convenience as set forth in Article 8 hereof, or if Design-Builder elects to terminate this Agreement in accordance with Section 11.4 of the General Conditions of Contract, Design-Builder shall, upon Owner's payment in full of the amounts due Design-Builder under the Contract Documents, grant Owner a limited license to use the Work Product to complete the Project and subsequently occupy the Project, and Owner shall thereafter have the same rights as set forth in Section 4.2 above, conditioned on the following:

.1 Use of the Work Product is at Owner's sole risk without liability or legal exposure to any Indemnified Party and on the Owner's obligation to provide the indemnity set forth in Section 4.5 herein; and

.2 Owner agrees to pay Design-Builder the additional sum of N/A Dollars ($ _____) as compensation for the right to use the Work Product to complete the Project and subsequently use the work Product in accordance with this Section 4.2 if Owner resumes the Project through its employees, agents, or third parties.

4.4 Owner's Limited License upon Design-Builder's Default. If this Agreement is terminated due to Design-Builder's default pursuant to Section 11.2 of the General Conditions of Contract, then Design-Builder grants Owner a limited license to use the Work Product to complete the Project and subsequently occupy the Project, and Owner shall thereafter have the same rights and obligations as set forth in Section 4.2 above. Notwithstanding the preceding sentence, if it is ultimately determined that Design-Builder was not in default, Owner shall be deemed to have terminated the Agreement for convenience, and Design-Builder shall be entitled to the rights and remedies set forth in Section 4.3 above.

4.5 Owner's Indemnification for Use of Work Product. If Owner is required to indemnify any Indemnified Parties based on the use or alteration of the Work Product under any of the circumstances identified in this Article 4, Owner shall defend, indemnify and hold harmless the Indemnified Parties from and against any and all claims, damages, liabilities, losses and expenses, including attorneys' fees, arising out of or resulting from the use or alteration of the Work Product.

Article 5
Contract Time

5.1 Date of Commencement. The Work shall commence within ten (10) days of Design-Builder's receipt of Owner's Notice to Proceed ("Date of Commencement") unless the parties mutually agree otherwise in writing.

5.2 Substantial Completion and Final Completion

5.2.1 Substantial Completion of the entire Work shall be achieved no later than **294** (_____) calendar days after the Date of Commencement ("Scheduled Substantial Completion Date").

[At the parties' option, the following supplemental language may be inserted at the end of Section 5.2.1]

☐ The parties agree that the definition for Substantial Completion set forth in Section 1.2.18 of the General Conditions of Contract is hereby modified to read as follows:

"*Substantial Completion* is the date on which the Work, or an agreed upon portion of the Work, is sufficiently complete in accordance with the Contract Documents so that Owner can occupy and use the Project or a portion thereof for its intended purposes, provided, however, that Substantial Completion shall be deemed to have been achieved no later than the date of issuance of a Temporary Certificate of Occupancy issued by the local building official, if a Temporary Certificate of Occupancy is applicable to the Project."

5.2.2 Interim milestones and/or Substantial Completion of identified portions of the Work shall be achieved as follows: *(Insert any interim milestones("Scheduled Interim Milestone Dates") for portions of the Work with different scheduled dates for Substantial Completion)*

5.2.2.1 Submittal of preliminary plans and specifications to Owner no later than_____ ;
(_____) calendar days after the Date of Commencement.

5.2.2.2 Submittal of pre-final plans and specifications to Owner no later than_____ ;
(_____) calendar days after the Date of Commencement.

5.2.2.3 Acquisition of all required permits by no later than_____ ; (_____) calendar days after the Date of Commencement.

5.2.2.4 All major equipment and materials ordered by no later than
;
( ) calendar days after the Date of Commencement.

5.2.2.5 Site work completed and major equipment and materials delivered to site no later than _____ ; ( ) calendar days after the Date of Commencement.

5.2.3 Final Completion of the Work or identified portions of the Work shall be achieved as expeditiously as reasonably practicable. Final Completion is the date when all Work is complete pursuant to the definition of Final Completion set forth in Section 1.2.7 of the General Conditions of Contract.

5.2.4 All of the dates set forth in this Article 5 ("Contract Time(s)") shall be subject to adjustment in accordance with the General Conditions of Contract.

5.3 Time is of the Essence. Owner and Design-Builder mutually agree that time is of the essence with respect to the dates and times set forth in the Contract Documents.

5.4 Liquidated Damages. Design-Builder understands that if Substantial Completion is not attained by the Scheduled Substantial Completion Date, Owner will suffer damages which are difficult to determine and accurately specify. Design-Builder agrees that if Substantial Completion is not attained by **seven** (**7**) days after the Scheduled Substantial Completion Date (the "LD Date"), Designer-Builder shall pay Owner **Five Hundred Dollars ($ 500)** as liquidated damages for each day that Substantial Completion extends beyond the LD Date.

[The parties may want to consider the following supplemental language within Section 5.4 if they want to assess liquidated damages for failing to meet Final Completion. In this case, the first sentence in Section 5.2.3 should be deleted and replaced with the following language]

☐ Design-Builder understands that if Final Completion is not achieved within _____ days of Substantial Completion Date, Owner will suffer damages which are difficult to determine and accurately specify. Design-Builder agrees that if Final Completion is not achieved within _____days of Substantial Completion, Design-Builder shall pay to Owner _____ _____Dollars ($_____), as liquidated damages for each calendar day that Final Completion is delayed beyond the above-referenced number of days.

[In lieu of the liquidated damages specified in Section 5.4 or the alternate provided herein, the Parties may decide that the Agreement will provide for actual damages in the event of Project delay, with Owner being cautioned that there is a waiver of consequential damages under Section 10.5.1 of the General Conditions of Contract. In this case, delete Sections 5.4 and 5.5 and insert the following]

☐ **5.4** Design-Builder and Owner have agreed not to provide for liquidated damages in this Agreement for failure of Design-Builder to achieve the Contract Time(s) set forth in this Article 5. Design-Builder understands, however, that Owner may suffer actual damages in the event the Contract Time(s) set forth herein are not achieved. Owner shall be able to recover damages from Design-Builder to the extent it can demonstrate that said actual damages have been incurred, are directly related and caused by Design-Builder's failure to meet the Contract Time(s) set forth herein, and are not waived by Section 10.5.1 of the General Conditions of Contract. Notwithstanding the foregoing in no event shall Design-Builder's liability for actual damages for delays exceed _____ Dollars ($_____).

5.5 Any liquidated damages assessed pursuant to this Agreement shall be in lieu of all liability for any and all extra costs, losses, expenses, claims, penalties and any other damages, whether special or consequential, and of whatsoever nature incurred by Owner which are occasioned by any delay in achieving Substantial Completion, Interim Milestone Dates or Final Completion.

[The Parties may also desire to cap the liquidated damages payable under this Agreement, in which case the following language should be included at the end of Section 5.5.]

☐ Owner and Design-Builder agree that the maximum aggregate liability Design-Builder has for any liquidated damages that may be assessed under this Agreement shall be _____ _____ Dollars ($_____).

5.6 Early Completion Bonus. If Substantial Completion is attained on or before _____ (_____) days before the Scheduled Substantial Completion Date (the "Bonus Date"), Owner shall pay Design-Builder at the time of Final Payment under Section 7.3 hereof an early completion bonus of _____ Dollars ($ _____) for each day that Substantial Completion is attained earlier than the Bonus Date. *(If an early completion bonus is applicable to any dates set forth in Section 5.2.2 or 5.2.3 hereof, this Section 5.6 will need to be modified accordingly)*

[The Parties may also desire to cap the early completion bonus payable under Section 5.6 in which case the following language should be included.]

☐ Owner and Design-Builder agree that the maximum aggregate amount that Design-Builder shall receive as the early Completion Bonus is _____ Dollars ($_____ _____).

5.7 ***[The Parties may also desire to modify Article 8.2.2 of the General Conditions of Contract relative to compensability of delays that would cause the Contract Time(s) to be extended. In such case, the following option can be used.]***

☐ In addition to Design-Builder's right to a time extension for those events set forth in Section 8.2.1 above, Design-Builder shall also be entitled to an appropriate adjustment of the Contract Price for those events set forth in Section 8.2.1 above, provided, however, for Force Majeure Events, Design-Builder shall be entitled to an increase in the Contract Price providing that: (i) said events must exceed _____ cumulative days before Design-Builder is entitled to additional compensation; and (ii) said additional compensation shall be limited to:

[Check one box only]

☐ $ _____ dollars a day for each day work is delayed beyond the Scheduled Substantial Completion Date.

or

☐ the direct costs and expenses Design-Builder can demonstrate it has reasonably actually incurred as a result of such event.

Article 6
Contract Price

6.1 Contract Price. Owner shall pay Design-Builder in accordance with Article 6 of the General Conditions of Contract the sum of _____ Dollars ($ _____) ("Contract Price"), subject to adjustments made in accordance with the General Conditions of Contract. Unless otherwise provided in the Contract Documents, the Contract Price is deemed to include all sales, use, consumer and other taxes mandated by applicable Legal Requirements.

6.2 Markups for Changes. If the Contract Price requires an adjustment due to changes in the Work, and the cost of such changes is determined under Sections 9.4.1.3 or 9.4.1.4 of the General Conditions of Contract, the following markups shall be allowed on such changes:

.1 For additive Change Orders, including additive Change Orders arising from both additive and deductive items, it is agreed that Design Builder shall receive a Fee of _____ _____ percent (_____%) of the additional costs incurred for that Change Order, plus any other markups set forth at Exhibit _____ hereto.

.2 For deductive Change Orders, including deductive Change Orders arising from both additive and deductive items, the deductive amounts shall include:

[Check one box only]

☐ No additional reduction to account for Design-Builder's Fee or any other markup.

or

☐ An amount equal to the sum of: (a) _____ percent (_____%) applied to the direct costs of the net reduction (which amount will account for a reduction associated with Design-Builder's Fee); plus (b) any other markups set forth at Exhibit ___ hereto applied to the direct costs of the net reduction.

6.3 Allowance Items and Allowance Values

.1 Any and all Allowance Items, as well as their corresponding Allowance Values, are set forth in an Exhibit hereto.

.2 Design-Builder and Owner have worked together to review the Allowance Items and Allowance Values based on design information then available to determine that the Allowance Values constitute reasonable estimates for the Allowance Item. Design-Builder and Owner will continue working closely together during the preparation of the design to develop Construction Documents consistent with the Allowance Values. Nothing herein is intended in any way to constitute a guarantee by Design-Builder that the Allowance Item in question can be performed for the Allowance Value.

.3 No work shall be performed on any Allowance Item without Design-Builder first obtaining in writing advanced authorization to proceed from Owner. Owner agrees that if

Design-Builder is not provided written authorization to proceed by the date set forth in the Project schedule, due to no fault of Design-Builder, Design-Builder may be entitled to an adjustment of the Contract Time(s) and Contract Price.

.4 The Allowance Value includes the direct cost of labor, materials, equipment, transportation, taxes and insurance associated with the applicable Allowance Item. All other costs, including design fees, Design-Builder's overall project management and general conditions costs, overhead and fee, are deemed to be included in the original Contract Price, and are not subject to adjustment notwithstanding the actual amount of the Allowance Item.

[In the Alternative, the parties may want to delete Section 6.3.4 and add the following provision.]

☐ In the event the actual direct cost of labor, materials, equipment, transportation, taxes and insurance associated with the applicable Allowance Item is _____ percent (____ %) greater than or less than the Allowance Value, Design-Builder and Owner agree that Design-Builder's right to Fee and markup shall be determined in accordance with Section 6.2.

.5 Whenever the actual costs for an Allowance Item is more than or less than the stated Allowance Value, the Contract Price shall be adjusted accordingly by Change Order, subject to Section 6.3.4. The amount of the Change Order shall reflect the difference between actual costs incurred by Design-Builder for the particular Allowance Item and the Allowance Value.

6.4 Performance Incentives

6.4.1 Intentionally left blank.

[The parties are encouraged to discuss and agree upon performance incentives that will influence project success. These incentives may consist of Award Fees, incentives for safety, personnel retention, client satisfaction and similar items.]

Article 7
Procedure for Payment

7.1 Progress Payments

7.1.1 Design-Builder shall submit to Owner on the **fifteenth (15th**) day of each month, beginning with the first month after the Date of Commencement, Design-Builder's Application for Payment in accordance with Article 6 of the General Conditions of Contract.

7.1.2 Owner shall make payment within **thirty (30)** days after Owner's receipt of each properly submitted and accurate Application for Payment in accordance with Article 6 of the General Conditions of Contract, but in each case less the total of payments previously made, and less amounts properly withheld under Section 6.3 of the General Conditions of Contract.

7.2 Retainage on Progress Payments

7.2.1 Owner will retain **ten percent (10%)** of each Application for Payment provided, however, that when fifty percent (50%) of the Work has been satisfactorily completed by Design-Builder and Design-Builder is otherwise in compliance with its contractual obligations, Owner will not retain any additional retention amounts from Design-Builder's subsequent Applications for Payment. Owner will also reasonably consider reducing retainage for Subcontractors completing their work early in the Project.

[Design-Builder and Owner may want to consider substituting the following retainage provision]

☐ Owner will retain _____ percent (_____%) from Design-Builder's Applications for Payment, exclusive of General Conditions costs, and any amounts paid to Design-Builder's Design Consultant, from each Application for Payment provided, however, that when fifty percent (50%) of the Work has been satisfactorily completed by Design-Builder and Design-Builder is otherwise in compliance with its contractual obligations, Owner will not retain any additional amounts from Design-Builder's subsequent Applications for Payment. Owner will also reasonably consider reducing retainage for Subcontractors completing their work early in the Project.

7.2.2 Within **fifteen (15)** days after Substantial Completion of the entire Work or, if applicable, any portion of the Work, pursuant to Section 6.6 of the General Conditions of Contract, Owner shall release to Design-Builder **ten percent (10%)** of all retained amounts relating, as applicable, to the entire Work or completed portion of the Work, less an amount equal to (a) the reasonable value of all remaining or incomplete items of Work as noted in the Certificate of Substantial Completion and (b) all other amounts Owner is entitled to withhold pursuant to Section 6.3 of the General Conditions of the Contract.

7.3 Final Payment. Design-Builder shall submit its Final Application for Payment to Owner in accordance with Section 6.7 of the General Conditions of Contract. Owner shall make payment on Design-Builder's properly submitted and accurate Final Application for Payment within **thirty (30)** days after Owner's receipt of the Final Application for Payment, provided that Design-Builder has satisfied the requirements for final payment set forth in Section 6.7.2 of the General Conditions of Contract and (b) Owner shall have the right to withhold all amounts to which Owner is entitled to withhold pursuant to Section 6.3 of the General Conditions of Contract.

7.4 Interest. Payments due and unpaid by Owner to Design-Builder, whether progress payments or final payment, shall bear interest commencing five (5) days after payment is due at the rate of one _____percent (1%) per month until paid.

7.5 Record Keeping and Finance Controls. With respect to changes in the Work performed on a cost basis by Design-Builder pursuant to the Contract Documents, Design-Builder shall keep full and detailed accounts and exercise such controls as may be necessary for proper financial management, using accounting and control systems in accordance with generally accepted accounting principles and as may be provided in the Contract Documents. During the performance of the Work and for a period of three (3) years after Final Payment, Owner and Owner's accountants shall be afforded access to, and the right to audit from time to time, upon reasonable notice, Design-Builder's records, books, correspondence, receipts, subcontracts, purchase orders, vouchers, memoranda and other data relating to changes in the Work performed on a cost basis in accordance with the Contract Documents, all of which Design-Builder shall preserve for a period of three (3) years after Final Payment. Such inspection shall take place at Design-Builder's offices during normal business hours unless another location and time is agreed to by the parties. Any multipliers or markups agreed to by the Owner and Design-Builder

as part of this Agreement are only subject to audit to confirm that such multiplier or markup has been charged in accordance with this Agreement, but the composition of such multiplier or markup is not subject to audit.

Article 8
Termination for Convenience

8.1 Upon **ten (10) days'** written notice to Design-Builder, Owner may, for its convenience and without cause, elect to terminate this Agreement. In such event, Owner shall pay Design-Builder for the following:

.1 All Work executed and for proven loss, cost or expense in connection with the Work;

.2 The reasonable costs and expenses attributable to such termination, including demobilization costs and amounts due in settlement of terminated contracts with Subcontractors and Design Consultants; and

.3 ***(Choose one of the following:)***

☒ The fair and reasonable sums for overhead and profit on the sum of items .1 and .2 above.

or

☐ Overhead and profit in the amount of _____ percent (_____ _____%) on the sum of items .1 and .2 above.

8.2 In addition to the amounts set forth in Section 8.1 above, Design-Builder shall be entitled to receive one of the following as applicable:

.1 If Owner terminates this Agreement prior to commencement of construction, Design-Builder shall be paid _____ percent (_____%) of the remaining balance of the Contract Price.

.2 If Owner terminates this Agreement after commencement of construction, Design-Builder shall be paid _____ percent (_____%) of the remaining balance of the Contract Price.

8.3 If Owner terminates this Agreement pursuant to Section 8.1 above and proceeds to design and construct the Project through its employees, agents or third parties, Owner's rights to use the Work Product shall be as set forth in Section 4.3 hereof. Such rights may not be transferred or assigned to others without Design-Builder's express written consent and such third parties' agreement to the terms of Article 4.

(The following Article 9 should be used only if the Owner and Design-Builder agree to establish their respective representatives at the time the Agreement is executed rather than during the performance of the Project.)

Article 9
Representative of the Parties

9.1 Owner's Representatives

9.1.1 Owner designates the individual listed below as its Senior Representative ("Owner's Senior Representative"), which individual has the authority and responsibility for avoiding and resolving disputes under Section 10.2.3 of the General Conditions of Contract: *(Identify individual's name, title, address and telephone numbers)*

Carl H. Smith, E.I.
Gas Distribution Engineer

GREENVILLE UTILITIES
801 Mumford Rd.
Greenville, NC 27835-1847
(252) 551-1492 (office)
(252) 378-5074 (cell)
(252) 551-3303 (fax)
smithch@guc.com

9.1.2 Owner designates the individual listed below as its Owner's Representative, which individual has the authority and responsibility set forth in Section 3.4 of the General Conditions of Contract: *(Identify individual's name, title, address and telephone numbers)*

(designate representative)

9.2 Design-Builder's Representatives

9.2.1 Design-Builder designates the individual listed below as its Senior Representative ("Design-Builder's Senior Representative"), which individual has the authority and responsibility for avoiding and resolving disputes under Section 10.2.3 of the General Conditions of Contract: *(Identify individual's name, title, address and telephone numbers)*

9.2.2 Design-Builder designates the individual listed below as its Design-Builder's Representative, which individual has the authority and responsibility set forth in Section 2.1.1 of the General Conditions of Contract: *(Identify individual's name, title, address and telephone numbers)*

Article 10
Bonds and Insurance

10.1 Insurance. Design-Builder and Owner shall procure the insurance coverages set forth in the Insurance Exhibit attached hereto and in accordance with Article 5 of the General Conditions of Contract.

10.2 Bonds and Other Performance Security. Design-Builder shall provide the following performance bond and labor and material payment bond or other performance security:

Performance Bond – as attached hereto.

(Check one box only. If no box is checked, then no bond is required.)

☒ Required; ☐ Not Required

Payment Bond – as attached hereto.

(Check one box only. If no box is checked, then no bond is required)

☒ Required; ☐ Not Required

Other Performance Security.
(Check one box only. If no box is checked, then no other performance security is required. If the "Required" box is checked, identify below the specific performance security that is being required and all salient commercial terms associated with that security.)

☐ Required; ☒ Not Required

Article 11
Other Provisions

11.1 Other provisions, if any, are as follows: *(Insert any additional provisions)*

[In lieu of Sections 10.3.1 through 10.3.3 of the General Conditions of Contract, the Parties may want to delete such sections and include the following alternative disputes proceeding clause.]

☐ Any claims, disputes, or controversies between the parties arising out of or related to the Agreement, or the breach thereof, which have not been resolved in accordance with the procedures set forth in Section 10.2 and Section 10.3 of the General Conditions of Contract shall be resolved in a court of competent jurisdiction in the state in which the Project is located.

In executing this Agreement, Owner and Design-Builder each individually represents that it has the necessary financial resources to fulfill its obligations under this Agreement, and each has the necessary corporate approvals to execute this Agreement, and perform the services described herein.

OWNER:	**DESIGN-BUILDER:**
Greenville Utilities Commission of the City of Greenville, North Carolina	
_____	_____
(Name of Owner)	*(Name of Design-Builder)*
_____	_____
(Signature)	*(Signature)*
_____	_____
(Printed Name)	*(Printed Name)*
_____	_____
(Title)	*(Title)*
Date: _____	Date: _____

Caution: You should sign an original DBIA document which has this caution printed in blue. An original assures that changes will not be obscured as may occur when documents are reproduced.

Section H

Payment and Performance Bonds

KNOW ALL PERSONS BY THESE PRESENTS: that

_____
(Name of Contractor)

_____
(Address of Contractor)

_____

a _____, hereinafter called (Corporation, Partnership, or Individual)

PRINCIPAL, and _____
(Name of Surety)

_____
(Address of Surety)

hereinafter called SURETY, are held and firmly bound unto _____

_____
(Name of Owner)

_____
(Address of Owner)

hereinafter called OWNER, and unto all persons, firms, and corporations who or which may furnish labor, or who furnish materials to perform as described under the Contract and to their successors and assigns in the total aggregate penal sum of _____ Dollars ($_____) in lawful money of the United States, for the payment of which sum will and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, 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 OWNER, dated the _____ day of _____, 2014, a copy of which is hereto attached and made a part hereof for the design and construction of:

The GUC CNG Vehicle Refueling Station

_____

NOW, THEREFORE, if the PRINCIPAL shall promptly make payment to all persons, firms, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such contract, and any authorized extensions or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and for all labor cost incurred in such WORK

including that by a SUBCONTRACTOR, and to any mechanic or materialman lienholder whether it acquired its lien by operation of State or Federal law; then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, that beneficiaries or claimants hereunder shall be limited to the SUBCONTRACTORS, and persons, firms, and corporations having a direct contract with the PRINCIPAL or its SUBCONTRACTORS.

PROVIDED, FURTHER, that the said SURETY for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any way affect its obligation on the BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of this contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no suit or action shall be commenced hereunder by any claimant; (a) Unless claimant, other than one having a direct contract with the PRINCIPAL, shall have given written notice to any two of the following: The PRINCIPAL, the OWNER, or the SURETY above named within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished or for whom the work or same by registered mail or certified mail, postage prepaid, in an envelope address to the PRINCIPAL, OWNER, or SURETY, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer. (b) After the expiration of one (1) year following the date of which PRINCIPAL ceased work on said CONTRACT, it being understood, however that if any limitation embodied in the BOND is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

PROVIDED, FURTHER, that it is expressly agreed that the BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 25 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the CONTRACT as so amended. The term “Amendment”, wherever used in this BOND, and whether referring to this BOND of the Contract shall include any alteration addition, extension, or modification of any character whatsoever. PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of the other beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in _____ (Number) counterparts, each one of which shall be deemed an original, this the _____ day of _____, 2014.

ATTEST:

_____
Principal

_____ BY _____
(Principal Secretary)

_____
(Address)

(SEAL)

_____ _____
(Witness as to Principal)

_____
(Address)

_____ _____
(Surety)

ATTEST:

_____ BY _____
(Witness as to Surety) (Attorney-in-Fact)

_____ _____
(Address) (Address)

_____ _____

NOTE: Date of BOND must not be prior to date of Contract.

If CONTRACTOR is partnership, all partners should execute BOND. IMPORTANT: surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the Project is located.

KNOW ALL PERSONS BY THESE PRESENTS: that

_____
(Name of Contractor)

_____
(Address of Contractor)

_____

a _____, hereinafter called (Corporation, Partnership, or Individual)

PRINCIPAL, AND _____
(Name of Surety)

_____
(Address of Surety)

hereinafter called SURETY, are held and firmly bound unto

_____
(Name of Owner)

_____
(Address of Owner)

hereinafter called OWNER, in the total aggregate penal sum of _____ Dollars ($_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, 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 OWNER, dated the _____ day of _____, 2014, a copy of which is hereto attached and made a part hereof for the design and construction of:

The GUC CNG Vehicle Refueling Station

NOW, THEREFORE, if the PRINCIPAL shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the SURETY and during the one guaranty period and if the PRINCIPAL shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all

outlay and expense which the OWNER may incur in making good any default, this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that it is expressly agreed that the BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the amended. The term "Amendment", wherever used in this BOND, and whether referring to this BOND of the Contract shall include any alteration addition, extension, or modification of any character whatsoever. PROVIDED, FURTHER, that no final settlement between the OWNER and the PRINCIPAL shall abridge the right of the other beneficiary hereunder, whose claim may be unsatisfied. The OWNER is the only beneficiary hereunder.

IN WITNESS WHEREOF, this instrument is executed in _____ (Number) counterparts, each one of which shall be deemed an original, this the _____ day of _____, 2014.

ATTEST:

_____
Principal

_____ BY _____
(Principal Secretary)

_____
(Address)

(SEAL)

_____ _____
(Witness as to Principal)

_____
(Address)

_____ _____
(Surety)

ATTEST:

_____ BY _____
(Witness as to Surety) (Attorney-in-Fact)

_____ _____
(Address) (Address)

_____ _____

NOTE: Date of BOND must not be prior to date of Contract.

If CONTRACTOR is partnership, all partners should execute BOND. IMPORTANT: surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the Project is located.

Section I

Insurance Exhibit

Insurance Exhibit
Design-Builder's Insurance Requirements

(The Parties are strongly encouraged to consult their insurance advisors prior to completing this Exhibit)

1.0 Insurance Types and Limits

1.1 Design-Builder shall purchase and maintain insurance of the types, with limits of liability, containing such endorsements and subject to such terms and conditions, as follows as well as Article 5 of the General Conditions of Contract:

(Specify each type of insurance as applicable, applicable limits and deductible amounts, required endorsements, and other terms and conditions, as applicable.)

1.1.1 Professional Liability Insurance: The Contractor shall maintain during the life of the Contract Professional Liability Insurance. The amount of such insurance shall be not less than a combine single limit of $1,000,000.00 per claim and $1,000,000.00 aggregate.

1.1.2 Worker's Compensation including Occupational Disease and Employer's Liability Insurance: The Contractor shall take out and maintain during the life of the Contract, Worker's Compensation and Employer's Liability Insurance for all of his employees to be engaged in work on the project under this Contract in an amount no less than the minimum allowed by the State Corporation Commission, and in case any such work is sublet, the Contractor shall require the Subcontractor similarly to provide Workers' Compensation and Employer's Liability Insurance for all of the latter's employees to be engaged in such work.

1.1.3 Comprehensive General Liability Insurance: The Contractor shall maintain during the life of the Contract comprehensive general liability insurance as shall protect him and the GUC and its officers, agents, and employees from claims for damages for personal injury, including death, as well as from claims for property damage, which may arise from operations under the Contract, whether such operations be by the Contractor or by any Subcontractor, or by anyone directly or indirectly employed by either of them. The amount of such insurance shall be not less than a combined single limit of $1,000,000.00 per occurrence on bodily injury and property damage and

$1,000,000.00 aggregate on completed operations. (Defense costs shall be in excess of the limit of liability.) The comprehensive general liability insurance shall provide the following coverage:

- Comprehensive
- Premises-Operation
- Products/Completed Operations Hazard
- Contractual Insurance
- Underground Hazard
- Explosion & Collapse Hazard
- Independent Contractor and Subcontractor
- Broad Form Property Damage
- Personal Injury

1.1.4 Automobile Liability Insurance: The Contractor shall maintain during the life of the Contract Automobile Liability Insurance with minimum combined single limits of $1,000,000.00 per occurrence. Such insurance shall cover any vehicle; owned, non-owned and hired.

1.1.5 Umbrella Policy: At the option of the Contractor, primary limits may be less than required, with an umbrella policy providing the additional limits needed. This form of insurance will be acceptable provided that the primary and umbrella policies both provide the insurance coverages herein required. However, any such umbrella policy must have minimum coverage limits of $3,000,000.00.

1.1.6 The Contractor, at his cost, shall effect and maintain in the names of the Owner and the Contractor, fire, vandalism and extended coverage insurance (or all-risk, builder's risk insurance if approved by the GUC) upon the entire structure or structures on which the work of this Contract is to be done and upon all material in or adjacent thereto and intended for use thereon to one hundred percent (100%) of the Contract amount. Such insurance may include a deductible provision if the Owner consents to such provision; however, the Contractor in such case will be liable for paying to the Owner the amount of such deduction whenever a claim arises. The loss, if any, is to be made adjustable with and payable to the Owner as Trustee for whom it may concern. Written evidence of the insurance required herein shall be filed with the Owner not later than thirty (30) days following the date of the award of the Contract. A copy of the evidence of insurance shall be filed with the Owner's Director of Finance.

1.1.7 The insurance required by this Article shall include contractual liability insurance applicable to Contractor's obligations under General Conditions, Article 2.

1.2 The insurance required by this Section 1 shall be written for not less than limits of liability specified above or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Work until date of Final Payment.

1.3 ***Select One*:**

☐ The professional liability policy required pursuant to Section 1.1.6 above shall be written on a Project specific basis and the policy premium shall be paid by Owner.

☒ The requirement for professional liability coverage on this Project shall be the standard form practice policy provided by Design Consultant. Design-Builder shall provide Owner with prior written notice of any cancellation or non-renewal of the Design Consultant's practice policy and shall include in the Design Consultant Agreement a provision requiring the Design Consultant to give the Design-Builder 30 Days written notice of any cancellation, material change or non-renewal. The Design Consultant's practice policy must: (a) permit reporting of circumstances that could give rise to a claim; and (b) provide coverage for post-expiration claims resulting from such circumstances

1.4 Any coverage required to be maintained after Final Payment shall be identified below.

(List here any coverages required to be maintained after Final Payment is made):

2.0 Endorsements and Certificates

2.1 Commercial General Liability Insurance shall be written on an occurrence basis, utilizing standard ISO unmodified coverage form or equivalent. Endorsements excluding, restricting, or limiting coverage may be acceptable under certain circumstances provided the same are agreed upon by Owner and Design-Builder. For example, Nuclear Energy Exclusions and those Exclusionary Endorsements relating to Pollutants, Asbestos, Lead, etc. may be acceptable depending on project parameters and the grant of coverage that is provided for such exposures under the Professional Liability and Contractors Pollution Liability policies.

2.2 General Liability, Automobile Liability, Employers Liability and Umbrella Excess Liability policies shall each include the following endorsements:

.1 Unintentional Errors and Omissions Endorsement
.2 Notice of Occurrence Endorsement
.3 Knowledge of Occurrence Endorsement

2.3 Commercial Automobile Liability coverage shall be provided by standard ISO Commercial Automobile or Truckers Policy covering all Owned, Non-Owned and Hired Vehicles.

2.4 Umbrella/Excess Liability must schedule Commercial General Liability, Automobile/Truckers Liability and Employers Liability as underlying policies. The Umbrella/Excess Liability policies shall be written in accordance with the scheduled underlying policies and must be as broad as the underlying policies.

2.5 Contractors Pollution Liability shall either be written on an occurrence or claims-made basis. If coverage in whole or in part is written on a claims-made basis, the policy must: (a) permit reporting of circumstances that could give rise to a claim; and (b) provide coverage for post-expiration claims resulting from such circumstances.

2.5.1 The policy is to provide coverage for off-site Transportation by all applicable modes of conveyance. When required, coverage is also to be provided for claims involving materials removed from the site and brought to off-site Disposal, Treatment and Storage facilities.

2.5.2 Any restriction, limitation, or exclusion related to Naturally Occurring Substances must be modified so as not to apply to the release of such Naturally Occurring Substances as a result of the performance of Operations.

3.0 Additional Insureds

3.1 Owner and Owner's officers, directors, agents, and employees shall be included as an additional insured on general liability, umbrella and automobile liability policies of insurance of the Design-Builder and its Subcontractors and Design Consultants at any tier. If required, as set forth above, Owner shall also be included as an additional insured on the Design-Builder's Contractor's Pollution Liability policy of insurance. Any coverage granted to an additional insured shall be primary and that coverage independently carried by an additional insured shall not contribute. Design-Builder shall furnish to Owner a copy of all Certificates of Insurance showing the Owner as additional insured as set forth above. Design-Builder shall require Subcontractors and Design Consultants of any tier to furnish such certificates, and upon request of the same will furnish them to the Owner. Owner shall not be an additional insured on any other of Design-Builder's policies except for those which are specifically listed below:

(List here any other policies for which the Owner will be an additional insured, as well as other entities who are to be named an additional insured)

3.2 Additional Insured coverage provided under the Commercial General Liability Umbrella/Excess and, if applicable, Design-Builder's Contractor's Pollution Liability policies, shall cover both the premises/operations and completed operations hazards.

4.0 Terms and Effective Dates

4.1 If the General Liability coverages are provided by a Commercial General Liability Policy on a claims-made basis, the policy date or Retroactive Date shall predate the Agreement. The termination date of the policy or applicable extended reporting period shall be no earlier than the termination date of coverages required to be maintained after Final Payment is made.

4.2 If the Contractor's Pollution Policy is made on a claims-made basis, the policy date or Retroactive Date shall predate the Agreement. The termination date of the policy or applicable extended reporting period shall be no earlier than the termination date of coverages required to be maintained after final payment is made.

4.3 Professional Liability coverage shall be retroactive to the date that professional services first commenced.

4.4 If the Professional Liability coverage is provided on a Project specific basis it shall include an extended reporting period of 3 years beyond the date for Substantial Completion of the Project unless otherwise specified.

4.5 The Contractor shall not commence work under this Agreement until he has obtained all insurance required hereunder and such insurance has been approved by the Owner; nor shall the Contractor allow any Subcontractors to commence work on his subcontract until all similar insurance has been so obtained and approved. Approval of the insurance by the Owner shall not relieve or decrease the liability of the Contractor hereunder.

4.6 Each Certificate of Insurance shall require that notice be given to the Director of Finance thirty (30) days prior to cancellation of material change in the policies.

Insurance Exhibit
Owner's Insurance Requirements

(The Parties are strongly encouraged to consult their insurance advisors prior to completing this Exhibit)

1.0 Insurance Types and Limits

1.1 Owner shall purchase and maintain insurance of the types, with limits of liability, containing such endorsements and subject to such terms and conditions, as follows as well as Article 5 of the General Conditions of Contract:

(Specify each type of insurance as applicable, applicable limits and deductible amounts, required endorsements, and other terms and conditions, as applicable.)

1.2 The insurance required by this Section 1 shall be written for not less than limits of liability specified above or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Work until date of Final Payment.

1.3 Any coverage required to be maintained after Final Payment shall be identified below.

(List here any coverage to be maintained after Final Payment)

1.4 In the event the Owner is providing any design services (either in-house or through a separate designer contracted by Owner), the Owner shall provide to Design-Builder evidence of professional liability coverage for that scope of work.

2.0 Endorsements and Certificates

2.1 Commercial General Liability Insurance shall be written on an occurrence basis, utilizing standard ISO unmodified coverage form or equivalent. Endorsements excluding, restricting, or limiting coverage may be acceptable under certain circumstances provided the same are agreed upon by Owner and Design-Builder. For example, Nuclear Energy Exclusions and those Exclusionary Endorsements relating to Pollutants, Asbestos, Lead, etc. may be acceptable depending on project parameters and the grant of coverage that is provided for such exposures under Owner's or Other Parties Site Pollution Liability policies.

2.2 General Liability, Automobile Liability, Employers Liability and Umbrella Excess Liability policies shall each include the following endorsements:

.1 Unintentional Errors and Omissions Endorsement
.2 Notice of Occurrence Endorsement
.3 Knowledge of Occurrence Endorsement

2.3 Commercial Automobile Liability coverage shall be provided by standard ISO Commercial Automobile or Truckers Policy covering all Owned, Non-Owned and Hired Vehicles.

2.4 Umbrella/Excess Liability must schedule Commercial General Liability, Automobile/Truckers Liability and Employers Liability as underlying policies. The Umbrella/Excess Liability policies shall be written in accordance with the scheduled underlying policies and must be as broad as underlying policies.

3.0 Additional Insureds

3.1 Design-Builder and Design-Builder's officers, directors and employees and Subcontractors and Design Consultants of any tier shall be included as an additional insured on general liability, umbrella liability and automobile liability policies of insurance of the Owner. Any coverage granted to an additional insured shall be primary and that coverage independently carried by an additional insured shall not contribute. Owner shall furnish to Design-Builder a copy of all Certificates of Insurance showing the parties named as an additional insured as set forth above. Design-Builder shall not be an additional insured on any other of Owner's policies except for those which are specifically listed below:

(List here any other policies for which the Design-Builder will be an additional insured, as well as other entities who are to be named as an additional insured on any of the specified policies)

3.1 Additional Insured coverage provided under the Commercial General Liability and Umbrella/Excess policies shall cover both the premises/operations and completed operations hazards.

Section J

Notice of Award (*Sample*)

NOTICE OF PHASE 1 AWARD

TO: _____

_____

_____

_____

PROJECT Description: Phase 1 – Design/Build - Design, obtain grant funding, permit, provide all equipment and materials, construct, and commission a turn-key compressed natural gas vehicle refueling station on Owner's site; train users in vehicle fueling and safety procedures; and train Owner's personnel and emergency personnel in emergency procedures.

The Owner has considered the Proposal submitted by you for the above described Work in response to its Advertisement for Proposals and Instructions to Proposers.

You are hereby notified that your Proposal for Phase 1 has been accepted for Item_____ in the amount of $_____; and for Item 3 in the amount of $ _____.

You are required by the Instructions to Proposers to execute the Agreement and furnish the required Contractor's Performance Bond, Payment Bond, Certificates of Insurance, Certifications, and Department of Transportation (DOT) Anti-Drug and Alcohol Program within ten (10) calendar days from the date of this Notice of Award.

If you fail to execute said Agreement and to furnish said Bonds within ten (10) days from the date of this Notice, said Owner will be entitled to consider all your rights arising out of the Owner's acceptance of your Proposal as abandoned and as a forfeiture of your Bid Bond. The Owner will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this Notice of Award to the Owner; Dated this _____ day of _____, 2014.

GREENVILLE UTILITIES COMMISSION
of the City of Greenville, North Carolina
(Owner)

By: Anthony C. Cannon

Signature: _____

Title: General Manager/CEO

ACCEPTANCE OF NOTICE

Receipt of the above Notice of Phase 1 Award is hereby acknowledged

By: _____

(Contractor)

this the _____ day of _____ , 2014.

By: _____

Signature: _____

Title: _____

NOTICE OF PHASE 2 AWARD

TO: _____

_____

_____

_____

PROJECT Description: Phase 2 – O&MMA – Provide the first year of three years monitoring, operating, maintaining, and providing fuel accounting services for the GUC CNG Vehicle Refueling Station

The Owner has considered the Proposal submitted by you for the above described Work in response to its Advertisement for Proposals and Instructions to Proposers.

You are hereby notified that your Proposal for Phase 2 has been accepted for Item _____ in the amount of $_____; and for Item 6 in the amount of _____ % per year.

You are required by the Instructions to Proposers to provide an Agreement and furnish the required Certificates of Insurance, Certifications, and Department of Transportation (DOT) Anti-Drug and Alcohol Program within ten (10) calendar days from the date of this Notice of Award.

If you fail to provide said Agreement and to furnish said Certifications and Programs within ten (10) days from the date of this Notice, said Owner will be entitled to consider all your rights arising out of the Owner's acceptance of your Proposal as abandoned. The Owner will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this Notice of Award to the Owner; Dated this _____ day of _____, 2014.

GREENVILLE UTILITIES COMMISSION
of the City of Greenville, North Carolina
(Owner)

By: Anthony C. Cannon

Signature: _____

Title: General Manager/CEO

ACCEPTANCE OF NOTICE

Receipt of the above Notice of Phase 2 Award is hereby acknowledged

By: _____

(Contractor)

this the _____ day of _____ , 2014.

By: _____

Signature: _____

Title: _____

Section K

Certificate of Finance Officer

CERTIFICATE OF FINANCE OFFICER

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

_____
Finance Officer

_____
Date

Section L

Certificate of Owner's Attorney

CERTIFICATE OF OWNER'S ATTORNEY

I, the undersigned, _____ , the duly authorized and acting legal representative of **The Greenville Utilities Commission of the City of Greenville, North Carolina** do hereby certify as follows:

I have examined the foregoing contract and surety bonds and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions and provisions thereof.

_____
Commission Attorney

_____
Date

Section M

Notice to Proceed (*Sample*)

NOTICE TO PROCEED

TO: _____

_____

_____

_____

DATE: _____

PROJECT: **GUC CNG VEHICLE REFUELING STATION – PHASE 1 – DESIGN/BUILD**

You are hereby notified to commence WORK in accordance with the Agreement dated _____, 2014, on or before _____ , 2014, and you are to substantially complete the Work within 294 consecutive calendar days thereafter.

The date of completion of all WORK is therefore _____, 2015.

GREENVILLE UTILITIES COMMISSION
of the City of Greenville, North Carolina
(Owner)

By: _____

Signature: _____

Title: _____

ACCEPTANCE OF NOTICE

Receipt of the above Notice to Proceed is hereby acknowledge by _____
this the _____ day of _____ , 2014.

By: _____

Signature: _____

Title: _____

Section N

General Conditions

Standard Form of General Conditions of Contract Between Owner and Design-Builder

This document has important legal consequences. Consultation with an attorney is recommended with respect to its completion or modification.

Table of Contents

Article 1
General

1.1 Mutual Obligations

1.1.1 *Owner and Design-Builder* commit at all times to cooperate fully with each other, and proceed on the basis of trust and good faith, to permit each party to realize the benefits afforded under the Contract Documents.

1.2 Basic Definitions

1.2.1 *Agreement* refers to the executed contract between Owner and Design-Builder under either DBIA Document No. 525, *Standard Form of Agreement Between Owner and Design-Builder Lump Sum* (2009 Edition) or DBIA Document No. 530, *Standard Form of Agreement Between Owner and Design-Builder Cost Plus Fee with an Option for a Guaranteed Maximum Price* (2009 Edition).

1.2.2 *Basis of Design Documents* are as follows: For DBIA Document No. 530, Standard Form of Agreement Between Owner and Design-Builder, Cost Plus Fee With an Option for a Guaranteed Maximum Price, the Basis of Design Documents are those documents specifically listed in, as applicable, the GMP Exhibit or GMP Proposal as being the "Basis of Design Documents." For DBIA Document No. 525, Standard Form of Agreement Between Owner and Design-Builder – Lump Sum, the Basis of Design Documents are the Owner's Project Criteria, Design-Builder's Proposal and the Deviation List, if any.

1.2.3 *Construction Documents* are the documents, consisting of Drawings and Specifications, to be prepared or assembled by the Design-Builder consistent with the Basis of Design Documents unless a deviation from the Basis of Design Documents is specifically set forth in a Change Order executed by both the Owner and Design Builder, as part of the design review process contemplated by Section 2.4 of these General Conditions of Contract.

1.2.4 *Day* or *Days* shall mean calendar days unless otherwise specifically noted in the Contract Documents.

1.2.5 *Design-Build Team* is comprised of the Design-Builder, the Design Consultant, and key Subcontractors identified by the Design-Builder.

1.2.6 *Design Consultant* is a qualified, licensed design professional who is not an employee of Design-Builder, but is retained by Design-Builder, or employed or retained by anyone under contract with Design-Builder or Subcontractor, to furnish design services required under the Contract Documents.

1.2.7 *Final Completion* is the date on which all Work is complete in accordance with the Contract Documents, including but not limited to, any items identified in the punch list prepared under Section 6.6.1 of the General Conditions of Contract and the submission of all documents set forth in Section 6.7.2 of the General Conditions of Contract.

1.2.8 *Force Majeure Events* are those events that are beyond the control of both Design-Builder and Owner, including the events of war, floods, labor disputes, earthquakes, epidemics,

adverse weather conditions not reasonably anticipated, and other acts of God.

1.2.9 *General Conditions of Contract* refer to this DBIA Document No. 535, Standard Form of General Conditions of Contract Between Owner and Design-Builder (2009 Edition).

1.2.10 *GMP Exhibit* means that exhibit attached to DBIA Document No. 530, Standard Form of Agreement Between Owner and Design-Builder, Cost Plus Fee With an Option for a Guaranteed Maximum Price, which exhibit will have been agreed upon by Owner and Design-Builder prior to the execution of the Agreement.

1.2.11 *GMP Proposal* means that proposal developed by Design-Builder in accordance with Section 6.6 of DBIA Document No. 530, Standard Form of Agreement Between Owner and Design-Builder, Cost Plus Fee With an Option for a Guaranteed Maximum Price.

1.2.12 *Hazardous Conditions* are any materials, wastes, substances and chemicals deemed to be hazardous under applicable Legal Requirements, or the handling, storage, remediation, or disposal of which are regulated by applicable Legal Requirements.

1.2.13 *Legal Requirements* are all applicable federal, state and local laws, codes, ordinances, rules, regulations, orders and decrees of any government or quasi-government entity having jurisdiction over the Project or Site, the practices involved in the Project or Site, or any Work.

1.2.14 *Owner's Project Criteria* are developed by or for Owner to describe Owner's program requirements and objectives for the Project, including use, space, price, time, site and expandability requirements, as well as submittal requirements and other requirements governing Design-Builder's performance of the Work. Owner's Project Criteria may include conceptual documents, design criteria, performance requirements, prescriptive specifications, and LEED ® or other sustainable design criteria and other Project-specific technical materials and requirements.

1.2.15 *Site* is the land or premises on which the Project is located.

1.2.16 *Subcontractor* is any person or entity retained by Design-Builder as an independent contractor to perform a portion of the Work and shall include materialmen and suppliers.

1.2.17 *Sub-Subcontractor* is any person or entity retained by a Subcontractor as an independent contractor to perform any portion of a Subcontractor's Work and shall include materialmen and suppliers.

1.2.18 *Substantial Completion* or Substantially Complete means the date on which the Work, or an agreed upon portion of the Work, is sufficiently complete in accordance with the Contract Documents so that Owner can occupy and use the Project or a portion thereof for its intended purposes.

1.2.19 *Work* is comprised of all Design-Builder's design, construction and other services required by the Contract Documents, including procuring and furnishing all materials, equipment, services and labor reasonably inferable from the Contract Documents.

Article 2
Design-Builder's Services and Responsibilities

2.1 General Services

2.1.1 Design-Builder's Representative shall be reasonably available to Owner and shall have the necessary expertise and experience required to supervise the Work. Design-Builder's Representative shall communicate regularly with Owner and shall be vested with the authority to act on behalf of Design-Builder. Design-Builder's Representative may be replaced at the discretion of the Owner.

2.1.2 Design-Builder shall provide Owner with a monthly status report detailing the progress of the Work, including whether (i) the Work is proceeding according to schedule, (ii) discrepancies, conflicts, or ambiguities exist in the Contract Documents that require resolution, (iii) health and safety issues exist in connection with the Work; (iv) status of the contingency account to the extent provided for in the Standard Form of Agreement Between Owner and Design-Builder Cost Plus Fee with an Option for a Guaranteed Maximum Price; and (v) other items that require resolution so as not to jeopardize Design-Builder's ability to complete the Work for the Contract Price and within the Contract Time(s).

2.1.3 Unless a schedule for the execution of the Work has been attached to the Agreement as an exhibit at the time the Agreement is executed, Design-Builder shall prepare and submit, at least three (3) days prior to the meeting contemplated by Section 2.1.4 hereof, a schedule for the execution of the Work for Owner's review and response. The schedule shall indicate the dates for the start and completion of the various stages of Work, including the dates when Owner information and approvals are required to enable Design-Builder to achieve the Contract Time(s). The schedule shall be revised as required by conditions and progress of the Work, but such revisions shall not relieve Design-Builder of its obligations to complete the Work within the Contract Time(s), as such dates may be adjusted in accordance with the Contract Documents. Owner's review of and response to the schedule shall not be construed as relieving Design-Builder of its complete and exclusive control over the means, methods, sequences and techniques for executing the Work.

2.1.4 The parties will meet within seven (7) days after execution of the Agreement to discuss issues affecting the administration of the Work and to implement the necessary procedures, including those relating to submittals and payment, to facilitate the ability of the parties to perform their obligations under the Contract Documents.

2.2 Design Professional Services

2.2.1 Design-Builder shall, consistent with applicable state licensing laws, provide through qualified, licensed design professionals employed by Design-Builder, or procured from qualified, independent licensed Design Consultants, the necessary design services, including architectural, engineering and other design professional services, for the preparation of the required drawings, specifications and other design submittals to permit Design-Builder to complete the Work consistent with the Contract Documents. Nothing in the Contract Documents is intended or deemed to create any legal or contractual relationship between Owner and any Design Consultant.

2.3 Standard of Care for Design Professional Services

2.3.1 The standard of care for all design professional services performed to execute the Work shall be the care and skill ordinarily used by members of the design profession practicing under similar conditions at the same time and locality of the Project. Notwithstanding the preceding sentence, if the parties agree upon specific performance standards for any aspect of the Work, which standards are to be set forth in an exhibit to the Agreement entitled "Performance Standard Requirements," the design professional services shall be performed to achieve such standards.

2.4 Design Development Services

2.4.1 Design-Builder and Owner shall, consistent with any applicable provision of the Contract Documents, agree upon any interim design submissions that Owner may wish to review, which interim design submissions may include design criteria, drawings, diagrams and specifications setting forth the Project requirements. Interim design submissions shall be consistent with the Basis of Design Documents, as the Basis of Design Documents may have been changed through the design process set forth in this Section 2.4.1. On or about the time of the scheduled submissions, Design-Builder and Owner shall meet and confer about the submissions, with Design-Builder identifying during such meetings, among other things, the evolution of the design and any changes to the Basis of Design Documents, or, if applicable, previously submitted design submissions. Changes to the Basis of Design Documents, including those that are deemed minor changes under Section 9.3.1, shall be processed in accordance with Article 9. Minutes of the meetings, including a full listing of all changes, will be maintained by Design-Builder and provided to all attendees for review. Following the design review meeting, Owner shall review and approve the interim design submissions and meeting minutes in a time that is consistent with the turnaround times set forth in Design-Builder's schedule.

2.4.2 Design-Builder shall submit to Owner Construction Documents setting forth in detail drawings and specifications describing the requirements for construction of the Work. The Construction Documents shall be consistent with the latest set of interim design submissions, as such submissions may have been modified in a design review meeting and recorded in the meetings minutes. The parties shall have a design review meeting to discuss, and Owner shall review and approve, the Construction Documents in accordance with the procedures set forth in Section 2.4.1 above. Design-Builder shall proceed with construction in accordance with the approved Construction Documents and shall submit one set of approved Construction Documents to Owner prior to commencement of construction.

2.4.3 Owner's review and approval of interim design submissions, meeting minutes, and the Construction Documents is for the purpose of mutually establishing a conformed set of Contract Documents compatible with the requirements of the Work. Neither Owner's review nor approval of any interim design submissions, meeting minutes, and Construction Documents shall be deemed to transfer any design liability from Design-Builder to Owner.

2.4.4 To the extent not prohibited by the Contract Documents or Legal Requirements, Design-Builder may prepare interim design submissions and Construction Documents for a portion of the Work to permit construction to proceed on that portion of the Work prior to completion of the Construction Documents for the entire Work.

2.5 Legal Requirements

2.5.1 Design-Builder shall perform the Work in accordance with all Legal Requirements and shall provide all notices applicable to the Work as required by the Legal Requirements.

2.5.2 The Contract Price and/or Contract Time(s) shall be adjusted to compensate Design-Builder for the effects of any changes in the Legal Requirements enacted after the date of the Agreement affecting the performance of the Work, or if a Guaranteed Maximum Price is established after the date of the Agreement, the date the parties agree upon the Guaranteed Maximum Price. Such effects may include, without limitation, revisions Design-Builder is required to make to the Construction Documents because of changes in Legal Requirements.

2.6 Government Approvals and Permits

2.6.1 Except as identified in an Owner's Permit List attached as an exhibit to the Agreement, Design-Builder shall obtain and pay for all necessary permits, approvals, licenses, government charges and inspection fees required for the prosecution of the Work by any government or quasi-government entity having jurisdiction over the Project.

2.6.2 Design-Builder shall provide reasonable assistance to Owner in obtaining those permits, approvals and licenses that are Owner's responsibility.

2.7 Design-Builder's Construction Phase Services

2.7.1 Unless otherwise provided in the Contract Documents to be the responsibility of Owner or a separate contractor, Design-Builder shall provide through itself or Subcontractors the necessary supervision, labor, inspection, testing, start-up, material, equipment, machinery, temporary utilities and other temporary facilities to permit Design-Builder to complete construction of the Project consistent with the Contract Documents.

2.7.2 Design-Builder shall perform all construction activities efficiently and with the requisite expertise, skill and competence to satisfy the requirements of the Contract Documents. Design-Builder shall at all times exercise complete and exclusive control over the means, methods, sequences and techniques of construction.

2.7.3 Design-Builder shall employ only Subcontractors who are duly licensed and qualified to perform the Work consistent with the Contract Documents. Owner may reasonably object to Design-Builder's selection of any Subcontractor, provided that the Contract Price and/or Contract Time(s) shall be adjusted to the extent that Owner's decision reasonably impacts Design-Builder's cost and/or time of performance.

2.7.4 Design-Builder assumes responsibility to Owner for the proper performance of the Work of Subcontractors and any acts and omissions in connection with such performance. Nothing in the Contract Documents is intended or deemed to create any legal or contractual relationship between Owner and any Subcontractor or Sub-Subcontractor, including but not limited to any third-party beneficiary rights.

2.7.5 Design-Builder shall coordinate the activities of all Subcontractors. If Owner performs other work on the Project or at the Site with separate contractors under Owner's control,

Design-Builder agrees to reasonably cooperate and coordinate its activities with those of such separate contractors so that the Project can be completed in an orderly and coordinated manner without unreasonable disruption.

2.7.6 Design-Builder shall keep the Site reasonably free from debris, trash and construction wastes to permit Design-Builder to perform its construction services efficiently, safely and without interfering with the use of adjacent land areas. Upon Substantial Completion of the Work, or a portion of the Work, Design-Builder shall remove all debris, trash, construction wastes, materials, equipment, machinery and tools arising from the Work or applicable portions thereof to permit Owner to occupy the Project or a portion of the Project for its intended use.

2.8 Design-Builder's Responsibility for Project Safety

2.8.1 Design-Builder recognizes the importance of performing the Work in a safe manner so as to prevent damage, injury or loss to (i) all individuals at the Site, whether working or visiting, (ii) the Work, including materials and equipment incorporated into the Work or stored on-Site or off-Site, and (iii) all other property at the Site or adjacent thereto. Design-Builder assumes responsibility for implementing and monitoring all safety precautions and programs related to the performance of the Work. Design-Builder shall, prior to commencing construction, designate a Safety Representative with the necessary qualifications and experience to supervise the implementation and monitoring of all safety precautions and programs related to the Work. Unless otherwise required by the Contract Documents, Design-Builder's Safety Representative shall be an individual stationed at the Site who may have responsibilities on the Project in addition to safety. The Safety Representative shall make routine daily inspections of the Site and shall hold weekly safety meetings with Design-Builder's personnel, Subcontractors and others as applicable.

2.8.2 Design-Builder and Subcontractors shall comply with all Legal Requirements relating to safety, as well as any Owner-specific safety requirements set forth in the Contract Documents, provided that such Owner-specific requirements do not violate any applicable Legal Requirement. Design-Builder will immediately report in writing any safety-related injury, loss, damage or accident arising from the Work to Owner's Representative and, to the extent mandated by Legal Requirements, to all government or quasi-government authorities having jurisdiction over safety-related matters involving the Project or the Work.

2.8.3 Design-Builder's responsibility for safety under this Section 2.8 is not intended in any way to relieve Subcontractors and Sub-Subcontractors of their own contractual and legal obligations and responsibility for (i) complying with all Legal Requirements, including those related to health and safety matters, and (ii) taking all necessary measures to implement and monitor all safety precautions and programs to guard against injury, losses, damages or accidents resulting from their performance of the Work.

2.9 Design-Builder's Warranty

2.9.1 Design-Builder warrants to Owner that the construction, including all materials and equipment furnished as part of the construction, shall be new unless otherwise specified in the Contract Documents, of good quality, in conformance with the Contract Documents and free of defects in materials and workmanship. Design-Builder's warranty obligation excludes defects caused by abuse, alterations, or failure to maintain the Work in a commercially reasonable

manner. Nothing in this warranty is intended to limit any manufacturer's warranty which provides Owner with greater warranty rights than set forth in this Section 2.9 or the Contract Documents. Design-Builder will provide Owner with all manufacturers' warranties upon Substantial Completion.

2.10 Correction of Defective Work

2.10.1 Design-Builder agrees to correct any Work that is found to not be in conformance with the Contract Documents, including that part of the Work subject to Section 2.9 hereof, within a period of one year from the date of Substantial Completion of the Work or any portion of the Work, or within such longer period to the extent required by any specific warranty included in the Contract Documents.

2.10.2 Design-Builder shall, within seven (7) days of receipt of written notice from Owner that the Work is not in conformance with the Contract Documents, take meaningful steps to commence correction of such nonconforming Work, including the correction, removal or replacement of the nonconforming Work and any damage caused to other parts of the Work affected by the nonconforming Work. If Design-Builder fails to commence the necessary steps within such seven (7) day period, Owner, in addition to any other remedies provided under the Contract Documents, may provide Design-Builder with written notice that Owner will commence correction of such nonconforming Work with its own forces. If Owner does perform such corrective Work, Design-Builder shall be responsible for all reasonable costs incurred by Owner in performing such correction. If the nonconforming Work creates an emergency requiring an immediate response, the seven (7) day periods identified herein shall be deemed inapplicable.

2.10.3 The one year period referenced in Section 2.10.1 above applies only to Design-Builder's obligation to correct nonconforming Work and is not intended to constitute a period of limitations for any other rights or remedies Owner may have regarding Design-Builder's other obligations under the Contract Documents.

Article 3
Owner's Services and Responsibilities

3.1 Duty to Cooperate

3.1.1 Owner shall, throughout the performance of the Work, cooperate with Design-Builder and perform its responsibilities, obligations and services in a timely manner to facilitate Design-Builder's timely and efficient performance of the Work and so as not to delay or interfere with Design-Builder's performance of its obligations under the Contract Documents.

3.1.2 Owner shall provide timely reviews and approvals of interim design submissions and Construction Documents consistent with the turnaround times set forth in Design-Builder's schedule.

3.1.3 Owner shall give Design-Builder timely notice of any Work that Owner notices to be

defective or not in compliance with the Contract Documents.

3.2 Furnishing of Services and Information

3.2.1 Unless expressly stated to the contrary in the Contract Documents, Owner shall provide, at its own cost and expense, for Design-Builder's information and use the following, all of which Design-Builder is entitled to rely upon in performing the Work:

.1 Surveys describing the property, boundaries, topography and reference points for use during construction, including existing service and utility lines;

.2 Geotechnical studies describing subsurface conditions, and other surveys describing other latent or concealed physical conditions at the Site;

.3 Temporary and permanent easements, zoning and other requirements and encumbrances affecting land use, or necessary to permit the proper design and construction of the Project and enable Design-Builder to perform the Work;

.4 A legal description of the Site;

.5 To the extent available, as-built and record drawings of any existing structures at the Site; and

.6 To the extent available, environmental studies, reports and impact statements describing the environmental conditions, including Hazardous Conditions, in existence at the Site.

3.2.2 Owner is responsible for securing and executing all necessary agreements with adjacent land or property owners that are necessary to enable Design-Builder to perform the Work. Owner is further responsible for all costs, including attorneys' fees, incurred in securing these necessary agreements.

3.3 Financial Information

3.3.1 At Design-Builder's request, Owner shall promptly furnish reasonable evidence satisfactory to Design-Builder that Owner has adequate funds available and committed to fulfill all of Owner's contractual obligations under the Contract Documents. If Owner fails to furnish such financial information in a timely manner, Design-Builder may stop Work under Section 11.3 hereof or exercise any other right permitted under the Contract Documents.

3.3.2 Design-Builder shall cooperate with the reasonable requirements of Owner's lenders or other financial sources. Notwithstanding the preceding sentence, after execution of the Agreement Design-Builder shall have no obligation to execute for Owner or Owner's lenders or other financial sources any documents or agreements that require Design-Builder to assume obligations or responsibilities greater than those existing obligations Design-Builder has under the Contract Documents.

3.4 Owner's Representative

3.4.1 Owner's Representative shall be responsible for providing Owner-supplied information and approvals in a timely manner to permit Design-Builder to fulfill its obligations under the Contract Documents. Owner's Representative shall also provide Design-Builder with prompt notice if it observes any failure on the part of Design-Builder to fulfill its contractual obligations, including any errors, omissions or defects in the performance of the Work. Owner's Representative shall communicate regularly with Design-Builder and shall be vested with the authority to act on behalf of Owner.

3.5 Government Approvals and Permits

3.5.1 Owner shall obtain and pay for all necessary permits, approvals, licenses, government charges and inspection fees set forth in the Owner's Permit List attached as an exhibit to the Agreement.

3.5.2 Owner shall provide reasonable assistance to Design-Builder in obtaining those permits, approvals and licenses that are Design-Builder's responsibility.

3.6 Owner's Separate Contractors

3.6.1 Owner is responsible for all work performed on the Project or at the Site by separate contractors under Owner's control. Owner shall contractually require its separate contractors to cooperate with, and coordinate their activities so as not to interfere with, Design-Builder in order to enable Design-Builder to timely complete the Work consistent with the Contract Documents.

Article 4
Hazardous Conditions and Differing Site Conditions

4.1 Hazardous Conditions

4.1.1 Unless otherwise expressly provided in the Contract Documents to be part of the Work, Design-Builder is not responsible for any Hazardous Conditions encountered at the Site. Upon encountering any Hazardous Conditions, Design-Builder will stop Work immediately in the affected area and duly notify Owner and, if required by Legal Requirements, all government or quasi-government entities with jurisdiction over the Project or Site.

4.1.2 Upon receiving notice of the presence of suspected Hazardous Conditions, Owner shall take the necessary measures required to ensure that the Hazardous Conditions are remediated or rendered harmless. Such necessary measures shall include Owner retaining qualified independent experts to (i) ascertain whether Hazardous Conditions have actually been encountered, and, if they have been encountered, (ii) prescribe the remedial measures that Owner must take either to remove the Hazardous Conditions or render the Hazardous Conditions harmless.

4.1.3 Design-Builder shall be obligated to resume Work at the affected area of the Project only after Owner's expert provides it with written certification that (i) the Hazardous Conditions have been removed or rendered harmless and (ii) all necessary approvals have been obtained

from all government and quasi-government entities having jurisdiction over the Project or Site.

4.1.4 Design-Builder will be entitled, in accordance with these General Conditions of Contract, to an adjustment in its Contract Price and/or Contract Time(s) to the extent Design-Builder's cost and/or time of performance have been adversely impacted by the presence of Hazardous Conditions.

4.1.5 To the fullest extent permitted by law, Owner shall indemnify, defend and hold harmless Design-Builder, Design Consultants, Subcontractors, anyone employed directly or indirectly for any of them, and their officers, directors, employees and agents, from and against any and all claims, losses, damages, liabilities and expenses, including reasonable attorneys' fees and expenses, arising out of or resulting from the presence, removal or remediation of Hazardous Conditions at the Site.

4.1.6 Notwithstanding the preceding provisions of this Section 4.1, Owner is not responsible for Hazardous Conditions introduced to the Site by Design-Builder, Subcontractors or anyone for whose acts they may be liable. To the fullest extent permitted by law, Design-Builder shall indemnify, defend and hold harmless Owner and Owner's officers, directors, employees and agents from and against all claims, losses, damages, liabilities and expenses, including attorneys' fees and expenses, arising out of or resulting from those Hazardous Conditions introduced to the Site by Design-Builder, Subcontractors or anyone for whose acts they may be liable.

4.2 Differing Site Conditions

4.2.1 Concealed or latent physical conditions or subsurface conditions at the Site that (i) materially differ from the conditions indicated in the Contract Documents or (ii) are of an unusual nature, differing materially from the conditions ordinarily encountered and generally recognized as inherent in the Work are collectively referred to herein as "Differing Site Conditions." If Design-Builder encounters a Differing Site Condition, Design-Builder will be entitled to an adjustment in the Contract Price and/or Contract Time(s) to the extent Design-Builder's cost and/or time of performance are reasonably adversely impacted by the Differing Site Condition.

4.2.2 Upon encountering a Differing Site Condition, Design-Builder shall provide prompt written notice to Owner of such condition, which notice shall not be later than fourteen (14) days after such condition has been encountered. Design-Builder shall, to the extent reasonably possible, provide such notice before the Differing Site Condition has been substantially disturbed or altered.

Article 5
Insurance and Bonds

5.1 Design-Builder's Insurance Requirements

5.1.1 Design-Builder is responsible for procuring and maintaining the insurance for the coverage amounts all as set forth in the Insurance Exhibit to the Agreement. Coverage shall be

secured from insurance companies authorized to do business in the state in which the Project is located, and with a minimum rating set forth in the Agreement.

5.1.2 Design-Builder's liability insurance set forth in the Agreement above shall specifically delete any design-build or similar exclusions that could compromise coverages because of the design-build delivery of the Project.

5.1.3 Any professional liability shall specifically delete any design-build or similar exclusions that could compromise coverages because of the design-build delivery of the Project. Such policies shall be provided prior to the commencement of any design services hereunder.

5.1.4 Prior to commencing any construction services hereunder, Design-Builder shall provide Owner with certificates evidencing that (i) all insurance obligations required by the Contract Documents are in full force and in effect and will remain in effect for the duration required by the Contract Documents and (ii) no insurance coverage will be canceled, renewal refused, or materially changed unless at least thirty (30) days prior written notice is given to Owner. If any of the foregoing insurance coverages are required to remain in force after final payment are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment. If any information concerning reduction of coverage is not furnished by the insurer, it shall be furnished by the Design-Builder with reasonable promptness according to the Design-Builder's information and belief.

5.1.5 With the exception of the Design-Builder's Professional Liability Insurance, the Owner shall be named as an additional insured on all Design-Builder's insurance policies.

5.2 Owner's Liability Insurance

5.2.1 Owner shall procure and maintain from insurance companies authorized to do business in the state in which the Project is located such liability insurance as set forth in the Insurance Exhibit to the Agreement to protect Owner from claims which may arise from the performance of Owner's obligations under the Contract Documents or Owner's conduct during the course of the Project.

5.3 Owner's Property Insurance

5.3.1 Unless otherwise provided in the Contract Documents, Owner shall procure and maintain from insurance companies authorized to do business in the state in which the Project is located property insurance upon the entire Project to the full insurable value of the Project, including professional fees, overtime premiums and all other expenses incurred to replace or repair the insured property. The property insurance obtained by Owner shall be limited to $1,000,000, and shall include as additional insureds the interests of Owner, Design-Builder, Design Consultants and Subcontractors of any tier. Such insurance shall include but not be limited to the perils of fire and extended coverage, theft, vandalism, malicious mischief, collapse, flood, earthquake, debris removal and other perils or causes of loss as called for in the Contract Documents. The property insurance shall include physical loss or damage to the Work, including materials and equipment in transit, at the Site or at another location as may be indicated in Design-Builder's Application for Payment and approved by Owner. The Owner is responsible for the payment of any deductibles under the insurance required by this Section 5.3.1.

5.3.2 Intentionally deleted.

5.3.3 Prior to Design-Builder commencing any Work, Owner shall provide Design-Builder with certificates evidencing that (i) all Owner's insurance obligations required by the Contract Documents are in full force and in effect and will remain in effect until Design-Builder has completed all of the Work and has received final payment from Owner and (ii) no insurance coverage will be canceled, renewal refused, or materially changed unless at least thirty (30) days prior written notice is given to Design-Builder. Owner's property insurance shall not lapse or be canceled if Owner occupies a portion of the Work pursuant to Section 6.6.3 hereof.

5.3.4 Any loss covered under Owner's property insurance shall be adjusted with the Owner and Design-Builder following agreement between the Owner and Design-Builder concerning distribution of any proceeds. Any disagreement concerning the distribution of any proceeds will be resolved in accordance with Article 10 hereof. The proceeds received as a result of any loss shall be placed in a separate trust account payable to both Owner and design-Builder as trustees for the insureds as their interests may appear, subject to any applicable mortgage clause, and distributed according to agreement to the interested parties.

5.4 Bonds and Other Performance Security

5.4.1 If Owner requires Design-Builder to obtain performance and labor and material payment bonds, or other forms of performance security, the amount, form and other conditions of such security shall be as set forth in the Agreement.

5.4.2 All bonds furnished by Design-Builder shall be in a form satisfactory to Owner. The surety shall be a company qualified and registered to conduct business in the state in which the Project is located.

Article 6
Payment

6.1 Schedule of Values

6.1.1 Unless required by the Owner upon execution of this Agreement, within ten (10) days of execution of the Agreement, Design-Builder shall submit for Owner's review and approval a schedule of values for all of the Work. The Schedule of Values will (i) subdivide the Work into its respective parts, (ii) include values for all items comprising the Work and (iii) serve as the basis for monthly progress payments made to Design-Builder throughout the Work.

6.1.2 The Owner will timely review and approve the schedule of values so as not to delay the submission of the Design-Builder's first application for payment. The Owner and Design-Builder shall timely resolve any differences so as not to delay the Design-Builder's submission of its first application for payment.

6.2 Monthly Progress Payments

6.2.1 On or before the date established in the Agreement, Design-Builder shall submit for Owner's review and approval its Application for Payment requesting payment for all Work performed as of the date of the Application for Payment. The Application for Payment shall be accompanied by all supporting documentation required by the Contract Documents and/or established at the meeting required by Section 2.1.4 hereof.

6.2.2 The Application for Payment may request payment for equipment and materials not yet incorporated into the Project, provided that (i) Owner is satisfied that the equipment and materials are suitably stored at either the Site or another acceptable location, (ii) the equipment and materials are protected by suitable insurance and (iii) upon payment, Owner will receive the equipment and materials free and clear of all liens and encumbrances.

6.2.3 All discounts offered by Subcontractor, Sub-Subcontractors and suppliers to Design-Builder for early payment shall accrue one hundred percent to Design-Builder to the extent Design-Builder advances payment. Unless Owner advances payment to Design-Builder specifically to receive the discount, Design-Builder may include in its Application for Payment the full undiscounted cost of the item for which payment is sought.

6.2.4 The Application for Payment shall constitute Design-Builder's representation that the Work described herein has been performed consistent with the Contract Documents, has progressed to the point indicated in the Application for Payment, and that title to all Work will pass to Owner free and clear of all claims, liens, encumbrances, and security interests upon the incorporation of the Work into the Project, or upon Design-Builder's receipt of payment, whichever occurs earlier.

6.3 Withholding of Payments

6.3.1 On or before the date established in the Agreement, Owner shall pay Design-Builder all amounts properly due. If Owner determines that Design-Builder is not entitled to all or part of an Application for Payment as a result of Design-Builder's failure to meet its obligations hereunder, it will notify Design-Builder in writing at least five (5) days prior to the date payment is due. The notice shall indicate the specific amounts Owner intends to withhold, the reasons and contractual basis for the withholding, and the specific measures Design-Builder must take to rectify Owner's concerns. Design-Builder and Owner will attempt to resolve Owner's concerns prior to the date payment is due. If the parties cannot resolve such concerns, Design-Builder may pursue its rights under the Contract Documents, including those under Article 10 hereof.

6.3.2 Notwithstanding anything to the contrary in the Contract Documents, Owner shall pay Design-Builder all undisputed amounts in an Application for Payment within the times required by the Agreement.

6.4 Right to Stop Work and Interest

6.4.1 If Owner fails to pay timely Design-Builder any amount that becomes due, Design-Builder, in addition to all other remedies provided in the Contract Documents, may stop Work pursuant to Section 11.3 hereof. All payments due and unpaid shall bear interest at the rate set forth in the Agreement.

6.5 Design-Builder's Payment Obligations

6.5.1 Design-Builder will pay Design Consultants and Subcontractors, in accordance with its contractual obligations to such parties, all the amounts Design-Builder has received from Owner on account of their work. Design-Builder will impose similar requirements on Design Consultants and Subcontractors to pay those parties with whom they have contracted. Design-Builder will indemnify and defend Owner against any claims for payment and mechanic's liens as set forth in Section 7.3 hereof.

6.6 Substantial Completion

6.6.1 Design-Builder shall notify Owner when it believes the Work, or to the extent permitted in the Contract Documents, a portion of the Work, is Substantially Complete. Within five (5) days of Owner's receipt of Design-Builder's notice, Owner and Design-Builder will jointly inspect such Work to verify that it is Substantially Complete in accordance with the requirements of the Contract Documents. If such Work is Substantially Complete, Owner shall prepare and issue a Certificate of Substantial Completion that will set forth (i) the date of Substantial Completion of the Work or portion thereof, (ii) the remaining items of Work that have to be completed before final payment, (iii) provisions (to the extent not already provided in the Contract Documents) establishing Owner's and Design-Builder's responsibility for the Project's security, maintenance, utilities and insurance pending final payment and (iv) an acknowledgment that warranties commence to run on the date of Substantial Completion, except as may otherwise be noted in the Certificate of Substantial Completion.

6.6.2 Upon Substantial Completion of the entire Work or, if applicable, any portion of the Work, Owner shall release to Design-Builder **up to fifty percent (50%) of the ten percent (10%)** total retained amounts relating, as applicable, to the entire Work or completed portion of the Work, less an amount equal to the reasonable value of all remaining or incomplete items of Work as noted in the Certificate of Substantial Completion.

6.6.3 Owner, at its option, may use a portion of the Work which has been determined to be Substantially Complete, provided, however, that (i) a Certificate of Substantial Completion has been issued for the portion of Work addressing the items set forth in Section 6.6.1 above, (ii) Design-Builder and Owner have obtained the consent of their sureties and insurers, and to the extent applicable, the appropriate government authorities having jurisdiction over the Project, and (iii) Owner and Design-Builder agree that Owner's use or occupancy will not interfere with Design-Builder's completion of the remaining Work.

6.7 Final Payment

6.7.1 After receipt of a Final Application for Payment from Design-Builder, Owner shall make final payment by the time required in the Agreement, provided that Design-Builder has achieved Final Completion.

6.7.2 At the time of submission of its Final Application for Payment, Design-Builder shall provide the following information:

.1 an affidavit that there are no claims, obligations or liens outstanding or unsatisfied for labor, services, material, equipment, taxes or other items performed, furnished or incurred for or in connection with the Work which will in any way affect Owner's interests;

.2 a general release executed by Design-Builder waiving, upon receipt of final payment by Design-Builder, all claims, except those claims previously made in writing to Owner and remaining unsettled at the time of final payment;

.3 consent of Design-Builder's surety, if any, to final payment;

.4 all operating manuals, warranties and other deliverables required by the Contract Documents; and

.5 certificates of insurance confirming that required coverages will remain in effect consistent with the requirements of the Contract Documents.

6.7.3 Intentionally omitted.

6.7.4 Deficiencies in the Work discovered after Substantial Completion, whether or not such deficiencies would have been included on the Punch List if discovered earlier, shall be deemed warranty Work. Such deficiencies shall be corrected by Design-Builder under Sections 2.9 and 2.10 herein, and shall not be a reason to withhold final payment from Design Builder, provided, however, that Owner shall be entitled to withhold from the Final Payment the reasonable value of completion of such deficient work until such work is completed. The withheld amount may be up to ten percent (10%) of the Contract value.

Article 7
Indemnification

7.1 Patent and Copyright Infringement

7.1.1 Design-Builder shall defend any action or proceeding brought against Owner based on any claim that the Work, or any part thereof, or the operation or use of the Work or any part thereof, constitutes infringement of any United States patent or copyright, now or hereafter issued. Owner shall give prompt written notice to Design-Builder of any such action or proceeding and will reasonably provide authority, information and assistance in the defense of same. Design-Builder shall indemnify and hold harmless Owner from and against all damages and costs, including but not limited to reasonable attorneys' fees and expenses awarded against Owner or Design-Builder in any such action or proceeding. Design-Builder agrees to keep Owner informed of all developments in the defense of such actions.

7.1.2 If Owner is enjoined from the operation or use of the Work, or any part thereof, as the result of any patent or copyright suit, claim, or proceeding, Design-Builder shall at its sole expense take reasonable steps to procure the right to operate or use the Work. If Design-Builder cannot so procure such right within a reasonable time, Design-Builder shall promptly, at Design-Builder's option and at Design-Builder's expense, (i) modify the Work so as to avoid

infringement of any such patent or copyright or (ii) replace said Work with Work that does not infringe or violate any such patent or copyright.

7.1.3 Sections 7.1.1 and 7.1.2 above shall not be applicable to any suit, claim or proceeding based on infringement or violation of a patent or copyright (i) relating solely to a particular process or product of a particular manufacturer specified by Owner and not offered or recommended by Design-Builder to Owner or (ii) arising from modifications to the Work by Owner or its agents after acceptance of the Work. If the suit, claim or proceeding is based upon events set forth in the preceding sentence, Owner shall defend, indemnify and hold harmless Design-Builder to the same extent Design-Builder is obligated to defend, indemnify and hold harmless Owner in Section 7.1.1 above.

7.1.4 The obligations set forth in this Section 7.1 shall constitute the sole agreement between the parties relating to liability for infringement of violation of any patent or copyright.

7.2 Tax Claim Indemnification

7.2.1 If, in accordance with Owner's direction, an exemption for all or part of the Work is claimed for taxes, Owner shall indemnify, defend and hold harmless Design-Builder from and against any liability, penalty, interest, fine, tax assessment, reasonable attorneys' fees or other expenses or costs incurred by Design-Builder as a result of any action taken by Design-Builder in accordance with Owner's directive. Owner shall furnish Design-Builder with any applicable tax exemption certificates necessary to obtain such exemption, upon which Design-Builder may rely.

7.3 Payment Claim Indemnification

7.3.1 Providing that Owner is not in breach of its contractual obligation to make payments to Design-Builder for the Work, Design-Builder shall indemnify, defend and hold harmless Owner from any claims or mechanic's liens brought against Owner or against the Project as a result of the failure of Design-Builder, or those for whose acts it is responsible, to pay for any services, materials, labor, equipment, taxes or other items or obligations furnished or incurred for or in connection with the Work. Within three (3) days of receiving written notice from Owner that such a claim or mechanic's lien has been filed, Design-Builder shall commence to take the steps necessary to discharge said claim or lien, including, if necessary, the furnishing of a mechanic's lien bond. If Design-Builder fails to do so, Owner will have the right to discharge the claim or lien and hold Design-Builder liable for costs and expenses incurred, including attorneys' fees.

7.4 Design-Builder's General Indemnification

7.4.1 Design-Builder, to the fullest extent permitted by law, shall indemnify, hold harmless and defend Owner, its officers, directors, and employees from and against claims, losses, damages, liabilities, including reasonable attorneys' fees and expenses, for bodily injury, sickness or death, and property damage or destruction (other than to the Work itself) to the extent resulting from the negligent or willful acts or omissions of Design-Builder, Design Consultants, Subcontractors, anyone employed directly or indirectly by any of them or anyone for whose acts any of them may be liable.

7.4.2 If an employee of Design-Builder, Design Consultants, Subcontractors, anyone employed

directly or indirectly by any of them or anyone for whose acts any of them may be liable has a claim against Owner, its officers, directors, employees, or agents, Design-Builder's indemnity obligation set forth in Section 7.4.1 above shall not be limited by any limitation on the amount of damages, compensation or benefits payable by or for Design-Builder, Design Consultants, Subcontractors, or other entity under any employee benefit acts, including workers' compensation or disability acts.

7.5 Owner's General Indemnification

7.5.1 Owner, to the fullest extent permitted by law, shall indemnify, hold harmless and defend Design-Builder and any of Design-Builder's officers, directors, and employees, from and against claims, losses, damages, liabilities, including reasonable attorneys' fees and expenses, for bodily injury, sickness or death, and property damage or destruction (other than to the Work itself) to the extent resulting from the negligent or willful acts or omissions of Owner's separate contractors or anyone for whose acts any of them may be liable.

Article 8
Time

8.1 Obligation to Achieve the Contract Times

8.1.1 Design-Builder agrees that it will commence performance of the Work and achieve the Contract Time(s) in accordance with Article 5 of the Agreement.

8.2 Delays to the Work

8.2.1 If Design-Builder is delayed in the performance of the Work due to acts, omissions, conditions, events, or circumstances beyond its control and due to no fault of its own or those for whom Design-Builder is responsible, the Contract Time(s) for performance shall be reasonably extended by Change Order. By way of example, events that will entitle Design-Builder to an extension of the Contract Time(s) include acts or omissions of Owner or anyone under Owner's control (including separate contractors), changes in the Work, Differing Site Conditions, Hazardous Conditions, and Force Majeure Events.

8.2.2 In addition to Design-Builder's right to a time extension for those events set forth in Section 8.2.1 above, Design-Builder shall also be entitled to an appropriate adjustment of the Contract Price provided, however, that the Contract Price shall not be adjusted for Force Majeure Events unless otherwise provided in the Agreement.

Article 9
Changes to the Contract Price and Time

9.1 Change Orders

9.1.1 A Change Order is a written instrument issued after execution of the Agreement signed by Owner and Design-Builder, stating their agreement upon all of the following:

.1 The scope of the change in the Work;

.2 The amount of the adjustment to the Contract Price; and

.3 The extent of the adjustment to the Contract Time(s).

9.1.2 All changes in the Work authorized by applicable Change Order shall be performed under the applicable conditions of the Contract Documents. Owner and Design-Builder shall negotiate in good faith and as expeditiously as possible the appropriate adjustments for such changes.

9.1.3 If Owner requests a proposal for a change in the Work from Design-Builder and subsequently elects not to proceed with the change, a Change Order shall be issued to reimburse Design-Builder for reasonable costs incurred for estimating services, design services and services involved in the preparation of proposed revisions to the Contract Documents.

9.2 Work Change Directives

9.2.1 A Work Change Directive is a written order prepared and signed by Owner, directing a change in the Work prior to agreement on an adjustment in the Contract Price and/or the Contract Time(s).

9.2.2 Owner and Design-Builder shall negotiate in good faith and as expeditiously as possible the appropriate adjustments for the Work Change Directive. Upon reaching an agreement, the parties shall prepare and execute an appropriate Change Order reflecting the terms of the agreement.

9.3 Minor Changes in the Work

9.3.1 Minor changes in the Work do not involve an adjustment in the Contract Price and/or Contract Time(s) and do not materially and adversely affect the Work, including the design, quality, performance and workmanship required by the Contract Documents. Design-Builder may make minor changes in the Work consistent with the intent of the Contract Documents, provided, however that Design-Builder shall promptly inform Owner, in writing, of any such changes and record such changes on the documents maintained by Design-Builder.

9.4 Contract Price Adjustments

9.4.1 The increase or decrease in Contract Price resulting from a change in the Work shall be determined by one or more of the following methods:

.1 Unit prices set forth in the Agreement or as subsequently agreed to between the parties;

.2 A mutually accepted, lump sum, properly itemized and supported by sufficient substantiating data to permit evaluation by Owner;

.3 Costs, fees and any other markups set forth in the Agreement; and

.4 If an increase or decrease cannot be agreed to as set forth in items .1 through .3 above and Owner issues a Work Change Directive, the cost of the change of the Work shall be determined by the reasonable expense and savings in the performance of the Work resulting from the change, including a reasonable overhead and profit, as may be set forth in the Agreement.

9.4.2 If unit prices are set forth in the Contract Documents or are subsequently agreed to by the parties, but application of such unit prices will cause substantial inequity to Owner or Design-Builder because of differences in the character or quantity of such unit items as originally contemplated, such unit prices shall be equitably adjusted.

9.4.3 If Owner and Design-Builder disagree upon whether Design-Builder is entitled to be paid for any services required by Owner, or if there are any other disagreements over the scope of Work or proposed changes to the Work, Owner and Design-Builder shall resolve the disagreement pursuant to Article 10 hereof. As part of the negotiation process, Design-Builder shall furnish Owner with a good faith estimate of the costs to perform the disputed services in accordance with Owner's interpretations. If the parties are unable to agree and Owner expects Design-Builder to perform the services in accordance with Owner's interpretations, Design-Builder shall proceed to perform the disputed services, conditioned upon Owner issuing a written order to Design-Builder (i) directing Design-Builder to proceed and (ii) specifying Owner's interpretation of the services that are to be performed. If this occurs, Design-Builder shall be entitled to submit in its Applications for Payment an amount equal to fifty percent (50%) of its reasonable estimated direct cost to perform the services, and Owner agrees to pay such amounts, with the express understanding that (i) such payment by Owner does not prejudice Owner's right to argue that it has no responsibility to pay for such services and (ii) receipt of such payment by Design-Builder does not prejudice Design-Builder's right to seek full payment of the disputed services if Owner's order is deemed to be a change to the Work.

9.5 Emergencies

9.5.1 In any emergency affecting the safety of persons and/or property, Design-Builder shall act, at its discretion, to prevent threatened damage, injury or loss. Any change in the Contract Price and/or Contract Time(s) on account of emergency work shall be determined as provided in this Article 9.

Article 10
Contract Adjustments and Disputes

10.1 Requests for Contract Adjustments and Relief

10.1.1 If either Design-Builder or Owner believes that it is entitled to relief against the other for any event arising out of or related to the Work or Project, such party shall provide written notice to the other party of the basis for its claim for relief. Such notice shall, if possible, be made prior to incurring any cost or expense and in accordance with any specific notice requirements contained in applicable sections of these General Conditions of Contract. In the absence of any specific notice requirement, written notice shall be given within a reasonable time, not to exceed twenty-one (21) days, after the occurrence giving rise to the claim for relief or after the claiming party reasonably should have recognized the event or condition giving rise to the request, whichever is later. Such notice shall include sufficient information to advise the other party of the circumstances giving rise to the claim for relief, the specific contractual adjustment or relief requested and the basis of such request.

10.2 Dispute Avoidance and Resolution

10.2.1 The parties are fully committed to working with each other throughout the Project and agree to communicate regularly with each other at all times so as to avoid or minimize disputes or disagreements. If disputes or disagreements do arise, Design-Builder and Owner each commit to resolving such disputes or disagreements in an amicable, professional and expeditious manner so as to avoid unnecessary losses, delays and disruptions to the Work.

10.2.2 Design-Builder and Owner will first attempt to resolve disputes or disagreements at the field level through discussions between Design-Builder's Representative and Owner's Representative which shall conclude within fourteen (14) days of the written notice provided for in Section 10.1.1 unless the Owner and Design-Builder mutually agree otherwise.

10.2.3 If a dispute or disagreement cannot be resolved through Design-Builder's Representative and Owner's Representative, Design-Builder's Senior Representative and Owner's Senior Representative, upon the request of either party, shall meet as soon as conveniently possible, but in no case later than thirty (30) days after such a request is made, to attempt to resolve such dispute or disagreement. Five (5) days prior to any meetings between the Senior Representatives, the parties will exchange relevant information that will assist the parties in resolving their dispute or disagreement.

10.2.4 Non-binding Mediation: In the event of a dispute between the Parties which the Parties are unable to resolve, the Parties shall submit their dispute to non-binding mediation before a mutually agreeable mediator prior to initiating litigation. If the Parties are unable to agree upon a mediator within thirty (30) days after failing to resolve the dispute, either Party may petition a Count of competent jurisdiction for the designation of a qualified mediator for these purposes. Each Party shall bear its own costs and expenses of participating in the mediation (including, without limitation, reasonable attorneys' fees), and each Party shall bear one-half (1/2) of the costs and expenses of the mediator. Unless otherwise agreed, the Parties will hold mediation in Greenville, North Carolina. The matters discussed or revealed in the mediation session shall not be revealed in any subsequent litigation.

10.3 Arbitration

10.3.1 In the event that any claims, disputes or controversies between the parties arising out of or relating to the Agreement, or the breach thereof, have not been resolved in accordance with the procedures set forth in Section 10.2 above, either Party may request arbitration. The Parties shall jointly select an Arbitrator, and shall be bound by the decision of the Arbitrator with respect to any dispute between the Parties with respect to this Agreement. If the parties are unable to mutually agree upon an Arbitrator, the Parties shall each select an Arbitrator, and the two Arbitrators so selected shall select a third Arbitrator, and the decision of the majority of the Arbitrators shall be conclusive and binding upon the Parties. The Parties at all times agree to equally split the costs of any Arbitrator(s) selected in an effort to resolve the dispute between the Parties. Any Party desiring to resolve a dispute under the terms of this Agreement shall notify the other Party in writing, and the Parties shall seek to agree upon a mutually agreed-upon Arbitrator within a period of ten (10) days from the date of such written demand. If the Parties are unable to agree within such ten (10) day period, the Parties shall each select an Arbitrator, and the two (2) Arbitrators so selected shall select a third Arbitrator within fifteen (15) days from the date of the written demand for arbitration, and a decision shall be rendered by the Arbitrators(s) so selected within five (5) days after such Arbitrator(s) is selected.

10.3.2 The award of the arbitrator(s) shall be final and binding upon the parties without the right of appeal to the courts. Judgment may be entered upon it in accordance with applicable law by any court having jurisdiction thereof.

10.3.3 Design-Builder and Owner expressly agree that any arbitration pursuant to this Section 10.3 may be joined or consolidated with any arbitration involving any other person or entity (i) necessary to resolve the claim, dispute or controversy, or (ii) substantially involved in or affected by such claim, dispute or controversy. Both Design-Builder and Owner will include appropriate provisions in all contracts they execute with other parties in connection with the Project to require such joinder or consolidation.

10.3.4 The prevailing party in any arbitration, or any other final, binding dispute proceeding upon which the parties may agree, shall be entitled to recover from the other party reasonable attorneys' fees and expenses incurred by the prevailing party.

10.4 Duty to Continue Performance

10.4.1 Unless provided to the contrary in the Contract Documents, Design-Builder shall continue to perform the Work and Owner shall continue to satisfy its payment obligations to Design-Builder, pending the final resolution of any dispute or disagreement between Design-Builder and Owner.

10.5 CONSEQUENTIAL DAMAGES

10.5.1 NOTWITHSTANDING ANYTHING HEREIN TO THE CONTRARY (EXCEPT AS SET FORTH IN SECTION 10.5.2 BELOW), NEITHER DESIGN-BUILDER NOR OWNER SHALL BE LIABLE TO THE OTHER FOR ANY CONSEQUENTIAL LOSSES OR DAMAGES, WHETHER ARISING IN CONTRACT, WARRANTY, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY OR OTHERWISE, INCLUDING BUT NOT LIMITED TO LOSSES OF USE, PROFITS, BUSINESS, REPUTATION OR FINANCING.

10.5.2 The consequential damages limitation set forth in Section 10.5.1 above is not intended to affect the payment of liquidated damages or lost early completion bonus, if any, set forth in Article 5 of the Agreement, which both parties recognize has been established, in part, to reimburse Owner or reward Design-Builder for some damages that might otherwise be deemed to be consequential.

Article 11
Stop Work and Termination for Cause

11.1 Owner's Right to Stop Work

11.1.1 Owner may, without cause and for its convenience, order Design-Builder in writing to stop and suspend the Work. Such suspension shall not exceed sixty (60) consecutive days or aggregate more than ninety (90) days during the duration of the Project.

11.1.2 Design-Builder is entitled to seek an adjustment of the Contract Price and/or Contract Time(s) if its cost or time to perform the Work has been adversely impacted by any suspension of stoppage of the Work by Owner.

11.2 Owner's Right to Perform and Terminate for Cause

11.2.1 If Design-Builder persistently fails to (i) provide a sufficient number of skilled workers, (ii) supply the materials required by the Contract Documents, (iii) comply with applicable Legal Requirements, (iv) timely pay, without cause, Design Consultants or Subcontractors, (v) prosecute the Work with promptness and diligence to ensure that the Work is completed by the Contract Time(s), as such times may be adjusted, or (vi) perform material obligations under the Contract Documents, then Owner, in addition to any other rights and remedies provided in the Contract Documents or by law, shall have the rights set forth in Sections 11.2.2 and 11.2.3 below.

11.2.2 Upon the occurrence of an event set forth in Section 11.2.1 above, Owner may provide written notice to Design-Builder that it intends to terminate the Agreement unless the problem cited is cured, or commenced to be cured, within seven (7) days of Design-Builder's receipt of such notice. If Design-Builder fails to cure, or reasonably commence to cure, such problem, then Owner may give a second written notice to Design-Builder of its intent to terminate within an additional seven (7) day period. If Design-Builder, within such second seven (7) day period, fails to cure, or reasonably commence to cure, such problem, then Owner may declare the Agreement terminated for default by providing written notice to Design-Builder of such declaration.

11.2.3 Upon declaring the Agreement terminated pursuant to Section 11.2.2 above, Owner may enter upon the premises and take possession, for the purpose of completing the Work, of all materials, equipment, scaffolds, tools, appliances and other items thereon, which have been purchased or provided for the performance of the Work, all of which Design-Builder hereby transfers, assigns and sets over to Owner for such purpose, and to employ any person or persons to complete the Work and provide all of the required labor, services, materials,

equipment and other items. In the event of such termination, Design-Builder shall not be entitled to receive any further payments under the Contract Documents until the Work shall be finally completed in accordance with the Contract Documents. At such time, if the unpaid balance of the Contract Price exceeds the cost and expense incurred by Owner in completing the Work, such excess shall be paid by Owner to Design-Builder. Notwithstanding the preceding sentence, if the Agreement establishes a Guaranteed Maximum Price, Design-Builder will only be entitled to be paid for Work performed prior to its default. If Owner's cost and expense of completing the Work exceeds the unpaid balance of the Contract Price, then Design-Builder shall be obligated to pay the difference to Owner. Such costs and expense shall include not only the cost of completing the Work, but also losses, damages, costs and expense, including attorneys' fees and expenses, incurred by Owner in connection with the reprocurement and defense of claims arising from Design-Builder's default, subject to the waiver of consequential damages set forth in Section 10.5 hereof.

11.2.4 If Owner improperly terminates the Agreement for cause, the termination for cause will be converted to a termination for convenience in accordance with the provisions of Article 8 of the Agreement.

11.3 Design-Builder's Right to Stop Work

11.3.1 Design-Builder may, in addition to any other rights afforded under the Contract Documents or at law, stop the Work for the following reasons:

.1 Owner's failure to provide financial assurances as required under Section 3.3 hereof; or

.2 Owner's failure to pay amounts properly due under Design-Builder's Application for Payment.

11.3.2 Should any of the events set forth in Section 11.3.1 above occur, Design-Builder has the right to provide Owner with written notice that Design-Builder will stop the Work unless said event is cured within seven (7) days from Owner's receipt of Design-Builder's notice. If Owner does not cure the problem within such seven (7) day period, Design-Builder may stop the Work. In such case, Design-Builder shall be entitled to make a claim for adjustment to the Contract Price and Contract Time(s) to the extent it has been adversely impacted by such stoppage.

11.4 Design-Builder's Right to Terminate for Cause

11.4.1 Design-Builder, in addition to any other rights and remedies provided in the Contract Documents or by law, may terminate the Agreement for cause for the following reasons:

.1 The Work has been stopped for sixty (60) consecutive days, or more than ninety (90) days during the duration of the Project, because of court order, any government authority having jurisdiction over the Work, or orders by Owner under Section 11.1.1 hereof, provided that such stoppages are not due to the acts or omissions of Design-Builder or anyone for whose acts Design-Builder may be responsible.

.2 Owner's failure to provide Design-Builder with any information, permits or approvals that are Owner's responsibility under the Contract Documents which result in

the Work being stopped for sixty (60) consecutive days, or more than ninety (90) days during the duration of the Project, even though Owner has not ordered Design-Builder in writing to stop and suspend the Work pursuant to Section 11.1.1 hereof.

.3 Owner's failure to cure the problems set forth in Section 11.3.1 above after Design-Builder has stopped the Work.

11.4.2 Upon the occurrence of an event set forth in Section 11.4.1 above, Design-Builder may provide written notice to Owner that it intends to terminate the Agreement unless the problem cited is cured, or commenced to be cured, within seven (7) days of Owner's receipt of such notice. If Owner fails to cure, or reasonably commence to cure, such problem, then Design-Builder may give a second written notice to Owner of its intent to terminate within an additional seven (7) day period. If Owner, within such second seven (7) day period, fails to cure, or reasonably commence to cure, such problem, then Design-Builder may declare the Agreement terminated for default by providing written notice to Owner of such declaration. In such case, Design-Builder shall be entitled to recover in the same manner as if Owner had terminated the Agreement for its convenience under Article 8 of the Agreement.

11.5 Bankruptcy of Owner or Design-Builder

11.5.1 If either Owner or Design-Builder institutes or has instituted against it a case under the United States Bankruptcy Code (such party being referred to as the "Bankrupt Party"), such event may impair or frustrate the Bankrupt Party's ability to perform its obligations under the Contract Documents. Accordingly, should such event occur:

.1 The Bankrupt Party, its trustee or other successor, shall furnish, upon request of the non-Bankrupt Party, adequate assurance of the ability of the Bankrupt Party to perform all future material obligations under the Contract Documents, which assurances shall be provided within ten (10) days after receiving notice of the request; and

.2 The Bankrupt Party shall file an appropriate action within the bankruptcy court to seek assumption or rejection of the Agreement within sixty (60) days of the institution of the bankruptcy filing and shall diligently prosecute such action.

If the Bankrupt Party fails to comply with its foregoing obligations, the non-Bankrupt Party shall be entitled to request the bankruptcy court to reject the Agreement, declare the Agreement terminated and pursue any other recourse available to the non-Bankrupt Party under this Article 11.

11.5.2 The rights and remedies under Section 11.5.1 above shall not be deemed to limit the ability of the non-Bankrupt Party to seek any other rights and remedies provided by the Contract Documents or by law, including its ability to seek relief from any automatic stays under the United States Bankruptcy Code or the right of Design-Builder to stop Work under any applicable provision of these General Conditions of Contract.

Article 12
Electronic Data

12.1 Electronic Data. The parties recognize that Contract Documents, including drawings, specifications and three-dimensional modeling (such as Building Information Models) and other Work Product may be transmitted among Owner, Design-Builder and others in electronic media as an alternative to paper hard copies (collectively "Electronic Data").

12.2 Transmission of Electronic Data

12.2.1 Owner and Design-Builder shall agree upon the software and the format for the transmission of Electronic Data. Each party shall be responsible for securing the legal rights to access the agreed-upon format, including, if necessary, obtaining appropriately licensed copies of the applicable software or electronic program to display, interpret and/or generate the Electronic Data.

12.2.2 Neither party makes any representations or warranties to the other with respect to the functionality of the software or computer program associated with the electronic transmission of Work Product. Unless specifically set forth in the Agreement, ownership of the Electronic Data does not include ownership of the software or computer program with which it is associated, transmitted, generated or interpreted.

12.2.3 By transmitting Work Product in electronic form, the transmitting party does not transfer or assign its rights in the Work Product. The rights in the Electronic Data shall be as set forth in Article 4 of the Agreement. Under no circumstances shall the transfer of ownership of Electronic Data be deemed to be a sale by the transmitting party of tangible goods.

12.3 Electronic Data Protocol

12.3.1 The parties acknowledge that Electronic Data may be altered or corrupted, intentionally or otherwise, due to occurrences beyond their reasonable control or knowledge, including but not limited to compatibility issues with user software, manipulation by the recipient, errors in transcription or transmission, machine error, environmental factors, and operator error. Consequently, the parties understand that there is some level of increased risk in the use of Electronic Data for the communication of design and construction information and, in consideration of this, agree, and shall require their independent contractors, Subcontractors and Design Consultants to agree, to the following protocols, terms and conditions set forth in this Section 12.3.

12.3.2 Electronic Data will be transmitted in the format agreed upon in Section 12.2.1 above, including file conventions and document properties, unless prior arrangements are made in advance in writing.

12.3.3 The Electronic Data represents the information at a particular point in time and is subject to change. Therefore, the parties shall agree upon protocols for notification by the author to the recipient of any changes which may thereafter be made to the Electronic Data, which protocol shall also address the duty, if any, to update such information, data or other

information contained in the electronic media if such information changes prior to Final Completion of the Project.

12.3.4 The transmitting party specifically disclaims all warranties, expressed or implied, including, but not limited to, implied warranties of merchantability and fitness for a particular purpose, with respect to the media transmitting the Electronic Data. However, transmission of the Electronic Data via electronic means shall not invalidate or negate any duties pursuant to the applicable standard of care with respect to the creation of the Electronic Data, unless such data is materially changed or altered after it is transmitted to the receiving party, and the transmitting party did not participate in such change or alteration.

Article 13
Miscellaneous

13.1 Confidential Information

13.1.1 Confidential Information is defined as information which is determined by the transmitting party to be of a confidential or proprietary nature and: (a) the transmitting party identifies as either confidential or proprietary; (b) the transmitting party takes steps to maintain the confidential or proprietary nature of the information; and (c) the document is not otherwise available in or considered to be in the public domain. The receiving party agrees to maintain the confidentiality of the Confidential Information and agrees to use the Confidential Information solely in connection with the Project except to the extent disclosure is required by law.

13.2 Assignment

13.2.1 Neither Design-Builder nor Owner shall, without the written consent of the other assign, transfer or sublet any portion or part of the Work or the obligations required by the Contract Documents.

13.3 Successorship

13.3.1 Design-Builder and Owner intend that the provisions of the Contract Documents are binding upon the parties, their employees, agents, heirs, successors and assigns.

13.4 Governing Law

13.4.1 The Agreement and all Contract Documents shall be governed by the laws of the place of the Project, without giving effect to its conflict of law principles.

13.5 Severability

13.5.1 If any provision or any part of a provision of the Contract Documents shall be finally determined to be superseded, invalid, illegal, or otherwise unenforceable pursuant to any applicable Legal Requirements, such determination shall not impair or otherwise affect the

validity, legality, or enforceability of the remaining provision or parts of the provision of the Contract Documents, which shall remain in full force and effect as if the unenforceable provision or part were deleted.

13.6 No Waiver

13.6.1 The failure of either Design-Builder or Owner to insist, in any one or more instances, on the performance of any of the obligations required by the other under the Contract Documents shall not be construed as a waiver or relinquishment of such obligation or right with respect to future performance.

13.7 Headings

13.7.1 The headings used in these General Conditions of Contract, or any other Contract Document, are for ease of reference only and shall not in any way be construed to limit or alter the meaning of any provision.

13.8 Notice

13.8.1 Whenever the Contract Documents require that notice be provided to the other party, notice will be deemed to have been validly given (i) if delivered in person to the individual intended to receive such notice, (ii) four (4) days after being sent by registered or certified mail, postage prepaid to the address indicated in the Agreement or (iii) if transmitted by facsimile, by the time stated in a machine generated confirmation that notice was received at the facsimile number of the intended recipient.

13.9 Amendments

13.9.1 The Contract Documents may not be changed, altered, or amended in any way except in writing signed by a duly authorized representative of each party.

Section O

Phase 1 Design/Build Base Technical Specifications

BASE DESIGN/BUILD SPECIFICATION
TABLE OF CONTENTS

DIVISION 00 – PROCUREMENT AND CONTROL REQUIREMENTS

DIVISION 01 – GENERAL REQUIREMENTS

DIVISION 02 – SITE CONSTRUCTION

DIVISION 18 – CNG STATION EQUIPMENT SPECIFICATIONS

End of Section

PART 1 - INTENT OF BASE DESIGN/BUILD SPECIFICATIONS COVERING PHASE 1 WORK

1.01 The Base Specifications provided for Proposing are minimum Specifications and must be met or exceeded by the Design/Build Contractor.

1.02 The Contractor awarded the Work shall prepare detailed Project Specific Specifications for all categories of Work, Equipment and Materials that the Contractor proposes to use on the Project.

1.03 Where a particular manufacturer or brand is specified for use or installation, that manufacturer/brand or equal is meant. Should the Contractor wish to provide “equal” material or equipment, it is the burden of the Contractor to prove that the proposed substitution is equal to or better than that specified.

1.04 This work will be awarded as a Lump Sum Contract.

1.05 The Contractor shall provide appropriately licensed, qualified and experienced personnel for the design, installation, construction, and commissioning of this facility as required in the Specifications.

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. List of drawings and exhibits for the construction and installation of the Compressed Natural Gas (CNG) Fueling Facility

1.02 LIST OF PROJECT DRAWINGS & EXHIBITS

All project drawings are included in the "**Exhibits**" section of the Document Package.

A. Exhibit: Station Location Map

End of Section

PART 1 - GENERAL

1.01 SUMMARY OF WORK

A. The Greenville Utilities Commission of the City of Greenville North Carolina (GUC) proposes to construct and operate a compressed natural gas (CNG) vehicle fueling facility.

B. Under Phase 1 of the Project, the selected Design/Build Contractor shall provide all design, permitting, procurement, construction, commissioning and training services, inclusive of all labor and materials necessary to deliver a turn-key CNG Fueling station to the GUC in accordance with the Contract Documents.

C. Under Phase 2 of the Project, the selected Contractor shall operate, maintain, monitor, and provide fuel accounting (O&MMA) services as described in the Background Information and Instructions to Bidders.

D. The GUC reserves the option of issuing a separate solicitation for Phase 2 services.

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. A general description on how the Phase 1 Work will be measured and how application for payment will be made

a. This is a Lump Sum Contract.

B. Related Sections:

1. Refer to the Standard Form of General Conditions of Contract Between Owner and Design-Builder, Article 6 - Payment.

1.02 ESTIMATED QUANTITIES ON PRICE PROPOSAL FORM

A. No estimated quantities are included on the Price Proposal Form. Proposers are responsible for developing their Price Proposals based on their understanding of the work as described in the Contract Documents.

1.03 MEASUREMENT

A. Completed work submitted for payment shall be based on the percentage of work included in the Lump Sum Contract Amount that is completed during the billing period, submitted for payment and approved by the Project Construction Manager.

1.04 PAYMENT

A. Payment will be based upon the invoices for work completed and approved based upon the percent of the total work included in the Lump Sum Contract Amount that the completed and approved work represents. All requirements of the Contract Documents apply with respect to payment conditions.

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. This station site shall be designed to ensure that vehicles ranging in size from small sedans to garbage trucks, to Class 8 tractors with 53 foot trailers can move safely and efficient though the fuel lanes without having to back up or make difficult maneuvers to enter or exit the fueling lanes or to enter or exit the station.

B. Entrance and exit driveways shall be clearly signed and configured for one way traffic through the site. These driveways shall be a minimum 25 feet in width.

C. The station shall be laid out then checked with various vehicle types using AutoTurn. The results of the AutoTurn analysis shall be provided to the GUC with the station layout proposals.

D. The Contractor shall provide a minimum of two (2) station layout options for evaluation by the GUC.

E. The Contractor shall provide three individual fuel islands with one dispenser on each island. The fuel islands shall be 5 feet in width with a minimum 25 feet between islands.

F. The Contractor shall layout the fueling facility to allow the future installation of two additional fuel islands without needing to trench across the existing surfaced area.

G. A bypass lane shall be provided on each side of the fueling area.

H. Contractor shall obtain all required permits from jurisdictional authorities necessary for constructing and operating the station.

I. Professional Engineer Qualifications for Delegated Design: A Design Professional or Professionals licensed in the State of North Carolina and who has (have) a minimum of (five) 5 years of experience in providing engineering services of the kinds required by the Phase I Work. Engineering services are defined as those required to ensure public safety and to support permitting applications which may include stamping manufacturer drawings.

J. Professional Land Surveyor Qualifications: A Surveying Professional licensed in the State of North Carolina who has a minimum of (five) 5 years of experience providing property and topographic surveys.

K. Contractor Qualifications: A Contractor Licensed in the State of North Carolina that possesses the knowledge, project experience, insurance and other requirements included within the Specifications.

1.02 DEFINITIONS

A. Within these documents:

1. The Owner is defined as Greenville Utilities Commission of the City of Greenville, NC (GUC).

2. The Engineer is defined as an external designate of the Owner that is responsible for design review, inspection and other tasks as instructed by the Owner.

3. The Equipment Supplier (or Fabricator) is the supplier of CNG equipment to the Contractor.

4. The Professional Engineer is a staff member or subcontractor of the Contractor.

5. The Contractor is the selected proponent under this bid.

6. The Authority (or Authorities) Having Jurisdiction (AHJ) includes any and all agencies that are legally empowered to review, inspect and permit any aspect of the project. This will include but not be limited to Building Departments, Fire Marshall, Electrical and Mechanical Inspection Departments, Electrical and Gas Utilities.

PART 2 - PRODUCTS

2.01 MINIMUM REQUIREMENTS ARE SPECIFIED ELSEWHERE WITHIN THESE SPECIFICATIONS

A. Work product shall be a fully functional state of the art, user friendly, safe, commercial CNG vehicle fueling station setting the benchmark for future GUC CNG fueling stations.

PART 3 - EXECUTION

3.01 NOT USED

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. This section contains the minimum Topographic Survey requirements.

PART 2 - PRODUCTS

2.01 TOPOGRAPHIC SURVEY

A. Digital in AutoCAD or MicroStation

PART 3 - EXECUTION

3.01 MINIMUM STANDARDS

A. Topographic Survey – A topographic survey shall be performed extending 100 feet beyond the project limits and to include the far side of adjacent roadway to obtain the information required in this section and any additional information requested by GUC. The Surveyor shall use accepted NSPS surveying methods and equipment necessary to obtain the horizontal and vertical positional accuracy required to produce a topographic map or plat of a scale, size and accuracy to clearly show the results of the survey. The Surveyor shall acquire the elevation and datum (NAD 1983) of all bench marks to be used in the survey.

B. The surveyor shall locate and show on the topographic survey map or plat the following information:

1. Existing contours lines indicating the shape and elevation of the land over the entire parcel in accordance with the following table, unless specifically excluded in the contract with the client:

	Map or Plat Scale	Contour Interval
a.		
b.	1” = 20’	1 foot
c.	1” = 30’	1 foot
d.	1” = 40’	1 foot
e.	1” = 50’	1 foot

2. The location of permanent structures including retaining walls, bridges, culverts, etc.

3. The locations of street or road paving, entrance drive openings and sidewalks.

4. Elevations on the top of curbs, gutters and sidewalks.

5. The official street or road names and address numbers assigned to the parcel.

6. North arrow and scale of drawing.

7. Legend depicting the symbols and abbreviations used on the drawing.

8. Spot elevations covering the entire survey limits showing high points, low points, grade changes, and at sufficient intervals to represent the general character of the terrain.

9. Provide main floor elevations of buildings.

10. Location and elevation of lakes, rivers, streams or drainage courses on or near the surveyed parcel.

11. Location of delineated boundaries of wetlands.

12. Description, location and elevation of bench marks used in the survey.

13. Boundary survey of the parcel. (Must comply with North Carolina boundary survey standards)

14. Observable evidence of recent earth moving work, borrow or fill.

15. Location and the top elevation of soil borings or monitoring wells if ascertainable.

16. Location and elevation of at least one bench mark within the limits of the survey.

17. Dimensions of curb, sidewalk, and gutter lines or ditch lines and centerline of all streets, alleys or roads adjoining the parcel.

18. Location, diameter, and species of all trees over a 10 inch diameter.

19. Electric utilities – the location of power poles, guy wires, anchors, vaults, etc., on the parcel or in the streets, roads, alleys, or railroad right of way adjoining the parcel(s).

20. Storm, sanitary or combined sewers – the location of all observable manholes and other structures such as culverts, headwalls, catch basins and clean-outs on the parcel or in street adjoining the parcel. Include elevations of the top and bottom of manholes and catch basins. Show type, size, and direction of flow and invert elevation of all pipes or culverts.

21. Water – the location of any water valves, standpipes, regulators, fire hydrants, etc. that are visible on the parcel.

22. Gas – the location of all valves, meters, and gas line markers that are visible on the parcel. Show elevation on top of any valves.

23. Telephone – the location of all poles, manholes, boxes, etc that are visible on the parcel.

24. Street lighting – the location of all lamp poles, boxes etc

25. Location and dimensions of any existing buildings, tanks, fences, miscellaneous structures, driveways, or other obstructions on the parcel.

26. Location and description of any building or major structure on adjoining land that is not more than 50 feet outside the parcel being surveyed

27. Location and elevation of the 100 year and 500 year floodplain, as applicable, for the surveyed parcel.

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. The design of this station site must meet all of the Erosion and Sedimentation Control, and Storm Water Management requirements of the State of North Carolina, Pitt County and the City of Greenville, North Carolina. Pitt County administers the State's Erosion and Sedimentation Control requirements within the County.

1.02 REFERENCES

A. North Carolina Department of Environment and Natural Resources (NCDENR)

1. Permits, Licenses and Certifications

a. http://portal.ncdenr.org/web/guest/permits-licenses-and-certifications

B. Pitt County, North Carolina, Planning and Development

1. http://www.pittcountync.gov/depts/planning/

C. Contractor is responsible for identifying all required permits and jurisdictional authorities.

PART 2 - PRODUCTS

2.01 PERMITS

A. An approved Erosion and Sedimentation Control Plan for the site.

B. An approved Storm Water Management Plan for the Site.

C. An approved Site Development Plan.

D. All other required permits necessary to develop the site and to construct and operate the CNG fueling station.

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. The Contractor is responsible for obtaining sufficient soil and geotechnical information for designing the site pavement, islands, equipment pads and other improvements necessary to construct the CNG Fueling Station.

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes: The minimum performance specification for site paving.

1. The Contractor shall consider the subsurface geotechnical and soil conditions of the site in the design of site pavement.

2. Pavement may either be asphalt or concrete and both may be used on the site depending upon the area being paved.

3. The pavement design(s) shall support the live and stationary loading of the various vehicles that will fuel at the station. Paving design should consider concrete fuel island aprons and concrete entrance and exit pavement.

4. The paved area should provide sufficient room for all vehicles to enter the station, park next to the fuel islands, and exit the station after fueling with the most direct routing possible considering the other station requirements.

5. Areas not requiring pavement may receive other surface treatments depending upon the requirements of permitting and intended site landscaping.

6. All paving should be designed and installed according to NCDOT standards for the intended use and conditions of the soils at the site.

1.02 REFERENCES

A. NCDOT – Roadway Design Manual (current addition)

1. https://connect.ncdot.gov/projects/Roadway/Pages/Roadway-Design-Manual.aspx

B. NCDOT – Standard Specifications and Special Provisions (current addition)

1. https://connect.ncdot.gov/resources/Specifications/Pages/Specifications-and-Special-Provisions.aspx?&&p_SortBehavior=0&p_Prov_x002e__x0020_No_x002e_=Z&p_FileLeafRef=Z087.docx&&PageFirstRow=1&&View={985E66E2-CE2E-4692-8C99-36680D3CE545}

C. City of Greenville Manual of Standard Designs and Details (current addition)

1. https://connect.ncdot.gov/resources/Specifications/Pages/Specifications-and-Special-Provisions.aspx?&&p_SortBehavior=0&p_Prov_x002e__x0020_No_x002e_=Z&p_FileLeafRef=Z087.docx&&PageFirstRow=1&&View={985E66E2-CE2E-4692-8C99-36680D3CE545}

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Pavement manufacturers shall be approved by the NCDOT for manufacturing the types of pavement proposed for the site. The concrete and/or asphalt mixtures proposed must be approved for the intended use and installation conditions by the NCDOT.

1.04 SUBMITTALS

A. Submit :

1. Site plan.

2. Pavement specifications.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. NCDOT approved.

2.02 MATERIALS

A. All materials utilized in paving mixes must meet the standards set by the NCDOT for the type of pavement specified.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor shall ensure adequate compaction is achieved and that the prescribed pavement or surface treatment including base courses are installed according to the manufacturer's recommendations and NCDOT standards.

B. Pavement samples should be obtained by the contractor according to NCDOT sample requirements and sent to an independent materials testing laboratory to ensure that the pavement design is functioning as intended. These reports shall be available to the GUC upon request.

3.02 INSTALLATION

A. Installation Requirements:

1. Pavement should be installed by a paving contractor experienced with installing the prescribed pavements in the project area.

2. All curing times shall be honored.

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes: Minimum performance requirements for pavement marking and painting.

1. Contractor shall include as part of the site design, pavement marking and painting supporting one-way traffic from the station entrance through the fuelling islands and through the station exit.

2. Contractor may use arrows, striping, words, and pavement colors subject to the approval of the GUC.

3. Pavement markings and paint shall be visible in low light conditions to facilitate fueling operations after sunset.

1.02 QUALITY ASSURANCE

A. Pavement markings shall meet or exceed the NCDOT standards for durability, environmental impact, and visibility for the materials, paints, colors being proposed.

1.03 SUBMITTALS

A. Submit :

1. Paint and marking material specifications and color samples for GUC approval.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. None specified.

2.02 MATERIALS

A. None specified.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor to ensure that manufacturers recommendations are followed and that products are installed by trained individuals using approved techniques in the approved installation conditions..

3.02 INSTALLATION

A. Per manufacturer’s instructions.

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes: Supplemental information on utilities and subsurface construction.

1. The GUC will provide electric, natural gas and telecommunications service to the site. The Contractor shall coordinate the service requirements and location with the GUC.

2. On-site subsurface piping and conduits shall be installed in clean screened sand forming a 6-inch envelope around the pipe or conduit.

3. On-site subsurface pipeline and conduits shall be installed with a minimum of 36 inches of cover.

4. In addition to meeting app permitting requirements, the site shall be designed to prevent ponding of water in the portions of the site developed for fueling and vehicle movement purposes.

5. Contractor is encouraged to use innovative, cost effective measures for meeting the Storm Water Management requirements for the site.

6. Where provisions are made for station expansion, Contractor shall install appropriate conduit and seal the ends for future use. Contractor shall design and construct the station to minimize the need for cutting the pavement and trenching across the station site to accommodate expansion.

B. Provided by Owner (GUC):

1. Electric service and meter

2. Install transformer on concrete pad designed and installed by the contractor outside of the fenced equipment compound. The pad must conform t the Owner's specifications.

3. Gas main extension, gas service(s) and meter(s)

a. Possible a separate service and meter for a natural gas powered generator

4. Water service to the meter as required

5. Gas composition information

6. Fiber optic telecommunication service to a junction box at the site

C. Provided by Contractor:

1. Transformer pad to GUC's specifications, outside of the fenced equipment compound at location determined during design.

2. Install the conduit and wire from the transformer to the equipment and provide wire, bolts and lugs for the GUC to make the final connections to the transformer

3. Station equipment peak gas supply requirements of flow and minimum suction pressure

4. All site electrical work downstream of the meter per specifications

5. All site lighting

6. All site natural gas piping downstream of the meter(s)

7. All remote monitoring, alarming and security as described elsewhere in these Specifications.

8. All information necessary for the GUC to coordinate the installation of utility services to the site at the agreed location

9. All storm water management design and construction required by permitting

10. All site sanitary sewer connection design and construction (not anticipated at this time)

1.02 QUALITY ASSURANCE

A. Not used.

1.03 SUBMITTALS

A. Submit :

1. Product Data: All specified products and materials.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Not used

2.02 MATERIALS

A. Not used

2.03 EXECUTION

A. Contractor must have the underground utilities in the site area located and marked by calling "811" a minimum of 48 hours prior to beginning earth disturbing operations at the site.

2.04 EXAMINATION

A. Verify installation by others as satisfactory prior to backfilling.

2.05 INSTALLATION

A. Supplemental Installation Requirements:

1. Install 'night-caps", temporary plugs, or otherwise ensure that water and debris does not enter the ends of conduit and piping during construction and prior to tying into landing or connection points.

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes general requirements for the station pads and islands.

1. Concrete fuel islands shall be formed with stainless steel island forms. The surfaces of the islands shall be a minimum of 7 inches above the pavement surface of the fueling area. The height above 7 inches should be minimized.

2. Each of the three islands shall include prefabricated CNG dispenser pits.

3. The center island shall have a fuel management terminal.

4. One fuel island shall include tie-down points to facilitate anchoring a calibration cylinder during venting (as required by the International Fire Code) during dispenser calibration. The anchor location shall include a connection point to the grounded dispenser vent stack to facilitate safe venting of the calibration cylinder after weighing.

5. Equipment pads shall be a minimum of 12 inches larger than the footprint of the equipment installed on the pad.

6. Equipment pads shall be designed of reinforced concrete with 4000 psi 28-day compressive strength.

   a. Typical equipment pads are a minimum of 18 inches thick with 12 inches of pad below grade resting on a minimum of 24 inches of fully compacted granular base. Reinforcement typically includes two #5 rebar mats at 12-inch centers in both directions.

   b. A broom-finish and chamfered top edge is preferred.

   c. The Contractor is responsible for designing the pads according to the equipment loading and soil conditions at the site.

7. The pad for gas storage vessel assemblies shall be sized and constructed to accommodate a total of four (4) storage vessel assemblies.

8. Generator pad shall be designed for load and soil/geotechnical conditions.

9. Transformer pad shall be constructed per GUC requirements.

1.02 QUALITY ASSURANCE

A. Concrete cylinder tests performed by an independent materials testing company.

1.03 SUBMITTALS

A. Submit :

1. Structural concrete mix data

2. Concrete cylinder test results

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. NCDOT approved.

2.02 MATERIALS

A. NCDOT approved.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Not used.

3.02 INSTALLATION

A. According to vendor's recommended procedures, industry practices and NCDOT guidelines.

B. In accordance with the American Concrete Institute recommended practices.

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes: Minimum requirements for protective barriers for fuel islands and compressor equipment compound.

1. Each fuel island shall include a minimum of four (4) concrete filled 8-inch galvanized pipe bollards. The bollards shall extend 48 inches above grade and 42 inches below grade. They shall be installed in 18-inch sonotubes set off the ends of the fuel islands.

2. The compressor compound shall be protected from vehicle damage with either bollards or NCDOT approved galvanized highway-rated guardrail. The barriers shall be installed outside of the compound fencing where the compound is exposed to station site and roadway traffic. Bollards shall be installed at 48-inch intervals and of the same material and manner of installation described above. Guardrails and post shall be galvanized and installed according to NCDOT standards. There shall be a minimum of two (2) feet between the bollards/guardrails and the compound fencing.

3. All compressor compound double gates shall be protected with two hollow galvanized 8-inch bollards installed in sonotubes as described in item-1 above.

1.02 QUALITY ASSURANCE

A. Not used

1.03 SUBMITTALS

A. Not used

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Not used

2.02 MATERIALS

A. Bollards and guardrails shall be galvanized steel.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Not used

3.02 INSTALLATION

A. Compressor compound protection shall be offset the fencing by a minimum of two (2) feet. Protection shall not interfere with entry and exit through station gates. Bollards installed in front of double gates shall be hollow and removeable.

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. A pre-engineered fuel canopy shall be provided over the fuel island area and extending a minimum of five (5) feet beyond each parking (fueling) position and drive lane.

1. Canopy shall have a minimum of 14 feet of clearance between the finished grade and the underside of the canopy.

2. Canopy shall be designed to withstand hurricane-force wind loading according to area requirements.

3. Canopy shall be designed to prevent accumulation of CNG in the event of a release.

4. Canopy shall be tied to the CNG station grounding grid.

5. Canopy shall include a lightning protection system, designed and installed by a contractor licensed for this work.

6. Canopy shall include a lighted banner on four (4) sides (other signage solutions may be offered)

7. Canopy lighting shall be LED.

1.02 QUALITY ASSURANCE

A. Manufacturer's warranty

1.03 SUBMITTALS

A. Submit :

1. Product Data

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Not used

2.02 MATERIALS

A. Not used

PART 3 - EXECUTION

3.01 EXAMINATION

A. Not used

3.02 INSTALLATION

1. Not used.

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. Contractor shall supply and install a lighted fuel pricing sign.

1. Sign shall be installed for best visibility from both roads adjacent to the station.

2. Sign shall meet all local jurisdictional requirements.

3. Without verifying the local jurisdictional requirements, the minimum sign specifications are:

a. 12 feet above station finished grade

b. A minimum of 60 inches by 60 inches square lighted logo area

c. 18-inch minimum height of fuel pricing information

d. Sign shall be capable of ground level or remote fuel pricing changes via network/internet/SCADA .

e. LED lighting is preferred.

B. Contractor shall supply and install all signs required by the various codes that apply to CNG fueling facilities, required by local jurisdictional authorities, and dictated by industry best practices.

1.02 QUALITY ASSURANCE

A. Manufacturer's warranty

1.03 SUBMITTALS

A. Submit :

1. Product Data

2. Proposed station signage and product data

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Not specified

2.02 MATERIALS

A. Suitable for intended use with low maintenance

PART 3 - EXECUTION

3.01 EXAMINATION

A. Not used

3.02 INSTALLATION

A. Not used

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. The Contractor shall supply and install all station lighting.

1. All station lighting shall be LED

2. Lighting shall operate on a photocell(s)

3. Lighting fixtures on the underside of the Canopy shall be rated Class 1, Division 2.

4. Contractor shall perform a lighting study as part of Contractor's design. The study should result in a lighting plan that produces high levels of light in all areas where personnel will be present even when large vehicles are parked in the fueling area.

5. Light poles shall be provided at the station entrance and exit and along the perimeter of the drive lanes and at the equipment compound as required to provide a safe level of lighting.

6. Additional switched task and area lighting shall be provided in the compressor compound area as required to fully light the area for safe and efficient night time repair operations.

7. Contractor's lighting design shall consider the effects of site lighting on surrounding properties and roadways and minimize the adverse effects of excessive light pollution and glare to neighboring properties and adjacent roadways.

1.02 QUALITY ASSURANCE

A. Manufacturer warranties

1.03 SUBMITTALS

A. Submit :

1. Product Data:

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. None specified

2.02 MATERIALS

A. LED lights

B. Low maintenance light poles and fixtures

PART 3 - EXECUTION

3.01 EXAMINATION

A. Not used

3.02 INSTALLATION

A. Per Contractor provided lighting plan.

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. Contractor shall supply and install secure fencing around the perimeter of the CNG equipment compound.

1. Fencing shall be galvanized, chain link and be installed around the CNG equipment and other equipment as required by code, best practices, and to meet the security needs of the site.

2. Fencing shall be a minimum of 8 feet high with three (3) strands of barbed wire along the top. Chain links shall be 9 gauge with links sized to inhibit climbing.

3. Corner and end gate posts shall be 4-inch schedule 40 galvanized. Run posts shall be 2.5-inch schedule 40 galvanized. All posts shall be set in 42-inch deep, 16-inch diameter concrete-filled sonotubes.

4. A minimum of four (4) 39-inch mangates shall be provided on the CNG equipment compound fencing. A minimum of three (3) 12-foot wide swing gates shall be provided on the CNG equipment compound fencing to facilitate service on the major equipment.

1.02 QUALITY ASSURANCE

A. Manufacturer warranties

1.03 SUBMITTALS

A. Submit :

1. Product Data:

PRODUCTS

1.04 MANUFACTURERS

A. No specified

1.05 MATERIALS

A. Galvanized steel

B. Schedule 40, 2.5-inch and 4-inch posts

C. 9 gauge fencing

PART 2 - EXECUTION

2.01 EXAMINATION

A. Not used

2.02 INSTALLATION

A. As specified above and according to the manufacturer's recommendations

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. Contractor shall provide a camera-based security solution with Contractor's technical proposal.

1. The system shall primarily cover the fueling island area and equipment compound area

2. Alarming may be incorporated in the security solution

3. The system shall have remote monitoring capabilities compatible with existing GUC capabilities or those proposed with the station design

4. The system must be low maintenance, tamper resistant and cost effective

1.02 QUALITY ASSURANCE

A. Manufacturer warranty

1.03 SUBMITTALS

A. Submit :

1. Product Data:

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. None specified

2.02 MATERIALS

A. For outdoor use and exposure to weather.

B. Low maintenance

PART 3 - EXECUTION

3.01 EXAMINATION

A. Not used

3.02 INSTALLATION

A. Not used

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. This CNG station shall be designed and equipped as a high capacity cascade type fast fill station to serve a fleet of garbage collection and transport trucks and unspecified other fleet vehicles.

The near term (first 2 years) garbage fleet includes a total of 13 trucks. This fleet will fuel 4 to 7 front loader trucks over a 60 to 120 minute window starting at 05:30 with each truck consuming an average 50 to 60 gallons per truck. The fleet will also fuel 4 to 7 other trucks over a 60 to 120 minute window starting at 16:00 with each truck consuming an average 50 to 60 gallons per truck.

The fleet requires the ability to simultaneously fuel two trucks in a 10 minute total time frame (a total of 19,090 scf dispensed in 10 minutes (assuming 60 gallons per truck and a 12% penalty)). Proposers are permitted to assume that both compressors are operable to meet this criteria.

B. This contract will include the design, engineering, permitting, fabrication, commissioning, testing and training associated with the supply and installation of a CNG station as outlined in these specifications and by the accompanying drawings.

1. This Section applies to all sections within Division 18.

2. **Secondary equipment suppliers must review the entire document**, not just the section focused on their specific equipment, to ensure that they have a complete understanding of all general electrical, mechanical and other requirements.

3. Requirements stated in this Section are in addition to, and supplement requirements stated in other parts of the Project Manual.

4. The requirements of these documents designate the minimum scope of supply.

5. Proposers are encouraged to provide alternative value engineering options to reduce cost or enhance performance, but **the base bid must meet the requirements of these specifications**.

C. The CNG Station shall include the design, permitting, procurement, fabrication, testing, delivery, startup/commissioning and training. **The following equipment and services represent the scope of the Base Bid:**

1. Single tower heated manually regenerative natural gas dryer.

2. One Duplex electric driven CNG compressor package. Compressors may be individually enclosed on a single skid.

3. One 35,000 scf 5500 psig ASME natural gas cascade storage system.

4. Two **single** hose, 3/4-inch, heavy duty vehicle CNG dispenser complete with required cascade storage controls and electronic temperature compensation controls and instrumentation.

5. One **dual** hose, 1/2-inch, light duty vehicle CNG dispenser complete with required cascade storage controls and electronic temperature compensation controls and instrumentation.

6. One electronically controlled priority fill, and Storage ESD system.

7. One fuel transfer hose.

8. Master control panel (MCP) complete with all required 480 VAC distribution, all other controls and software.

9. Automatic and manual gas valves, all flexible connections in the gas piping system, equipment mounted gas detection components, and equipment mounted emergency shutdown (ESD) buttons and remote ESD stations per the specifications.

10. Natural gas powered generator and Automatic Transfer Switch (ATS).

11. Training as outlined herein.

12. Miscellaneous equipment and services as outlined herein.

D. The following equipment is listed as Alternate Bids:

1. One 35,000 scf 5500 psig ASME natural gas cascade storage system.

2. One SCADA system.

E. Delegated Design: Design and calculations by professional engineer licensed in the State of North Carolina as required to provide all design and secure all permits for the station equipment (not installation)—if required by the local permitting agencies.

F. **Optional Bid**:

1. Operation and Maintenance three year contract.

1.02 DEFINITIONS

A. Within these documents:

1. The Owner is defined as Greenville Utilities Commission of the City of Greenville, NC.

2. The Engineer is defined as an external designate of the Owner that is responsible for design review, inspection and other tasks as instructed by the Owner.

3. The Equipment Supplier (or Fabricator) is the supplier of CNG equipment to the Contractor.

4. The Professional Engineer is a staff member or subcontractor of the Contractor.

5. The Contractor is the selected proponent under this bid.

6. The Authority (or Authorities) Having Jurisdiction (AHJ) includes any and all agencies that are legally empowered to review, inspect and permit any aspect of the project. This will include but not be limited to Building Departments, Fire Marshall, Electrical and Mechanical Inspection Departments, Electrical and Gas Utilities.

B. The following list includes acronyms and abbreviations used in the Division 18 sections pertaining to the work of this Division but not necessarily used in other parts of the Project Manual. The list does not contain acronyms used for reference standards, or technical and commonly used and understood abbreviations and acronyms.

CNG	Compressed Natural Gas
ESD	Emergency Shut Down
FACP	Fire Alarm Control Panel
GTAW	Gas Tungsten Arc Welding
MCP	Master Control Panel
N.B.	National Board
O.D.	Outside Diameter
PLC	Programmable Logic Controller
PQR	Procedure Qualification Records
SCADA	System Control and Data Acquisition
SCR	Silicon Controlled Rectifier
SMAW	Shielded Metal Arc Welding
SRV	Safety Relief Valve
UCP	Unit Control Panel
WPS	Welding Procedure Specifications

1.03 REFERENCES

A. Applicable provisions of the most current versions of the following standards shall apply to the work of this Division 18, except as modified herein, and are hereby made a part of these Contract Specifications to the extent required:

ASME	Boiler Pressure Vessel Code Section VIII Division 1
ASME B31.3	Refinery Piping
IBC	International Building Code: Both general references and any special seismic requirements for equipment and installation at the project site
IFC	International Fire Code

IMC	International Mechanical Code
NFPA 52	Vehicular Gaseous Fuel Systems Code
NFPA 70	National Electrical Code (NEC)
NFPA 780	Standard for the Installation of Lightning Protection Systems
OSHA	Applicable standards and regulations by Occupational Safety and Health Administration

Any other codes that are mandated by the AHJs.
In the event that one code is more stringent than another, the most stringent code will be used as the basis of design. In the event that codes contradict each other, the local Authority Having Jurisdiction will determine the governing code.

B. Other Division 18 sections include additional references referring particularly to work in those sections.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Major components (such as but not limited to compressor blocks and cylinders, valves, instrumentation or control) of the same or essentially the same model have been used in similar applications in the United States. If a manufacturer other than those listed in this document are proposed, the manufacturer must provide verifiable, positive references citing a minimum of 10 other installations in the previous 5 years within the USA.

2. Further, it must be demonstrated that any proposed alternate compressor block manufacturer has manufactured an average of at least 20 blocks per year for the past 5 years and they must be able to demonstrate consistently available, quality spare parts available on a next day basis through references and through the presence of spare parts in inventory sufficient to construct 5 compressor blocks and cylinders of the proposed model.

3. Other Division 18 sections may include additional requirements.

B. Fabricator Qualifications: Ensure that assemblies (such as but not limited to compressor packages, gas dryer, dispensers) of the same or essentially the same model have been used in similar transit applications in the United States. This requires verifiable positive references citing a minimum of 5 other installations commissioned in the previous 5 years.

C. Professional Engineer Qualifications for Delegated Design: A Design Professional licensed in the State of North Carolina and who has a minimum of 5 years of experience in providing engineering services of the kind indicated. Engineering services are defined as those required to support permitting applications which may include stamping manufacturer drawings.

D. Regulatory Requirements:

1. Permitting: This Work shall also include:

a. Providing technical backup required through this phase.

b. Provide a Professional Engineer licensed in North Carolina to review and stamp drawings as required by regulating agencies and the Owner.

c. In addition to regulatory and approvals, receive approval of the facility from the local gas and electrical utilities prior to these agencies turning on the gas and power to the facility.

1.05 SUBMITTALS

A. General requirements include:

1. Manufacturer Approval Drawings: Equipment that is laid out, configured, or designed by manufacturer based on performance specifications only shall be submitted to the Engineer for approval prior to release of Drawings for manufacturing.

2. Submittals prior to fabrication include the following drawings submitted as pdf and AutoCAD drawings.

a. Equipment layout details, including full conduit, wire & terminations, pipe and tubing layouts and schedules.

b. Equipment gas, air, vent and drain line Piping and Instrumentation (P and I or P and ID) drawings and piping isometric diagrams.

c. General assembly drawings of packaged dryers, compression units, storage assembly and control system, dispensing system, other station equipment and process piping including elevation and plan views, and major sub-assembly and component drawings.

d. Skid construction drawings.

e. Gas dryer P and I drawings, Bills of Material and piping isometric diagrams

f. CNG Compressor P and I drawings, Bills of Material and piping isometric diagrams

g. Storage control P and I drawings and Bills of Material

h. Dispenser P and I drawings and Bills of Material

i. Distribution and Control Panels, Master Control Panel (MCP) and Unit Control Panel (UCP) Programmable Logic Controller (PLC) electrical

power, control and Emergency Shut Down (ESD) schematics and Bills of Material.

j. Skid and panel penetration and connection drawings

k. Equipment anchoring and grouting details and locations (note that chemical concrete anchor style bolts or approved equal must be used).

l. Compressor run simulation based on minimum, maximum and typical suction pressures (or on regulated pressure if applicable). These runs shall clearly illustrate operating horsepowers, pressures, temperatures, rod loads, rod reversal, clearances and piston speeds.

m. Product cut sheets listing approvals, materials, dimensions, spare parts, rebuild kits and including exploded parts diagrams for all procured components. Note: If the product cut sheet is for more than one model, size or type of component, the component the product cut sheet is being submitted for must be clearly indicated or the inapplicable information shall be deleted.

n. Welding Procedure Specifications (WPS) and Procedure Qualification Records (PQR) for all shops and site Contractors involved in fabrication and installation of the equipment.

3. Deferred Submittal: The designs, drawings, calculations and analysis data for the CNG station shall bear the seal of a Professional Engineer licensed in the State of North Carolina and shall meet the requirements of a Deferred Submittal to the Owner for review and permit approval prior to approval to proceed with the work.

B. Additional requirements are included in the Division 18 sections.

1. As-built record documents for Division 18 work includes but is not limited to the following drawings submitted as pdf and AutoCAD drawings, and Solidworks (or convertible) 3-D models: (3-D models apply only to assembly type drawings.)

a. Equipment layout and details, including full conduit, wire & terminations, pipe and tubing layouts and schedules.

b. Equipment gas, air, vent and drain line Piping and Instrumentation (P and I or P and ID) drawings and piping isometric diagrams.

c. General assembly drawings of packaged dryers, compression units, storage assembly and control system, dispensing system, other station equipment and process piping including all elevation and plan views, and major sub-assembly and component drawings.

d. Skid construction drawings.

e. Gas dryer P and I drawings, Bills of Material and piping isometric diagrams.

f. Compressor P and I drawings, Bills of Material and piping isometric diagrams.

g. Storage control P and I drawings and Bills of Material.

h. Dispenser P and I drawings and Bills of Material.

i. Distribution and Control Panels, Master Control Panel (MCP) and Unit Control Panel (UCP) Programmable Logic Controller (PLC) electrical power, control and Emergency Shut Down (ESD) schematics and Bills of Material.

j. Equipment anchoring and grouting details and locations (note that chemical concrete anchor style bolts or approved equal must be used).

k. Product cut sheets listing approvals, materials, dimensions, spare parts, rebuild kits and including exploded parts diagrams for all procured components. Note: If the product cut sheet is for more than one model, size or type of component, the component the product cut sheet is being submitted for must be clearly indicated or the inapplicable information must be deleted.

2. Quality Control Manual (note that the Owner may require periodic submission of portions of this material to confirm compliance.) Include the following:

a. Welding Procedure Specifications (WPS).

b. Procedure Qualification Records (PQR).

c. Piping and Instrumentation Drawings referenced to isometric drawings.

d. Piping isometric drawings detailing all fittings, flanges, weld locations, pipe size and schedule or tubing size and wall thickness, components, pressure vessels and design pressure. These drawings must indicate which welder performed each weld.

e. X-ray films and reports referenced to individual welds on the piping isometric drawings.

f. Pressure test reports.

g. Form U1A for all pressure vessels.

h. National Board registration for all pressure vessels.

i. Mill test certificates for pipe and tubing.

j. Certificates of Compliance for all fittings, flanges and pressure retaining bolts, studs and nuts.

k. Summary table of all pipe, tubing, welds, fittings, flanges, fasteners and pressure vessels listed above referenced to isometric drawings by pipe spool.

3. Operations and Maintenance Manuals:

a. Outline emergency procedures, standard operating procedures, general sequence of operations, recommended maintenance intervals and procedures, recommended parts, troubleshooting and repair procedures. These shall address all parts normally requiring maintenance, repair, or adjustment. All procedures must be specific to the equipment supplied and must reference specific component ID numbers (such as provided on the valve tags).

b. Manuals shall include a complete set of as-built drawings reduced to "B" size. Manuals shall also provide product cuts and product manuals on all components used in the system.

4. Number and Format of Closeout Submittal Documents:

a. All Quality Control, Operation Manuals and As-Built drawings are to be provided to the Owner in bound form with 6 hard copies.

b. All Operation Manuals, As-Built drawings and all PLC and Operator Interface Programs are to be provided to the Owner on USB Flash drive--6 sets.

c. All third party software such as but not limited to PLC and Operator Interface programming software is to be provided on disc to the Owner—1 set.

1.06 PROJECT SITE CONDITIONS

A.	Ambient Temperature-Minimum:	0 deg F
B.	Ambient Temperature-Maximum:	105 deg F
C.	Inlet Gas Temperature:	60 deg F
D.	Gas Supply Pressure at 60 deg F (min / typical / max):	30/45/60 psig
E.	Estimated Throughput per Year (Year 10): MMSCF average in year one and two.	Estimated to be 20
F.	Normal Compressor Outlet Pressure:	4,500 psig
G.	Inlet Gas Moisture Content:	7.0 lbs H_2O/MMSCF

H. Typical Natural Gas Composition—pipeline quality gas.

1.07 COORDINATION AND SCHEDULING

A. Deliveries must be scheduled in cooperation with the Engineer and the Installation Contractor.

1.08 SAFETY AND PROTECTION

A. Comply with the safety requirements specified in the General Sections of this Project Manual.

B. Employ all special precautions necessary to ensure the safety of personnel and property given the close proximity of 480 VAC power and natural gas at pressures exceeding 4,500 psig.

1.09 WARRANTY

A. Provide in accordance with General Sections Warranties and Bond requirements, and the following:

1. Warrant all equipment to be free of defective material and workmanship for a period of 12 months from successful completion of all site testing as required by Sections in Division 18, not from date of first beneficial use. It is the Equipment Supplier's responsibility to request and receive a letter from the Engineer when tests have been successfully completed. Any defect found during the warranty period shall be repaired or replaced free of charge, with shipment and labor charges borne by the Equipment Supplier.

2. If the station startup is delayed by the Owner, the warranty period will commence beginning six months after the date when the equipment arrived at the site or was ready to ship to site.

3. A warranty bond in the amount of 10 percent of the value of the CNG station equipment shall be issued that extends to the end of the warranty period.

PART 2 - PRODUCTS

2.01 MANUFACTURERS AND MODELS

A. Manufacturers and models are outlined in specific Division 18 Sections.

B. Basis of Design: Products are specified by manufacturer name, description, and/or catalog number to show intended function and quality. Manufacturer's catalog numbers and descriptions establish the quality of product required.

C. Substitutions:

1. In order to propose an alternate component, system, supplier of equipment, or a modification to the specified design that uses specified brands, demonstrate

that any proposed alternative system is suitable for and has been successfully used in other projects.

a. Provide technical specifications required to allow the Owner to confirm that design, efficiency, quality, appearance and delivery is comparable to or better than the specified component.

b. Provide a detailed description of the design implications, such as the impact on the size of the equipment, impact on electrical service, and the like. These facility and cost implications shall be itemized and a final net cost adder/reduction presented.

c. The Owner retains the right to refuse any request for substitution that it, in its sole discretion, deems to be less desirable that the specified component.

2.02 MATERIALS

A. Materials are outlined in Division 18 Sections.

2.03 FINISHES

A. The equipment shall be cleaned, prepared, primed and painted in accordance with paint manufacturer's recommendations, and the following:

1. Paint shall be a minimum 6 mil total film thickness including a corrosion resistant primer and epoxy or enamel top coats. All paint must be suitable for outdoor use and rated for the temperatures of the application.

2. Apply anti-seize lubricants such as Loctite to the bolts on flange sets to prevent future removal problems due to paint accumulation on bolts.

3. Compressor interstage piping paint shall be heat resistant to 400 deg F.

4. Colors shall be as follows:

a. Gas piping shall be heat resistant as applicable. Preferred piping color within the package is bright yellow, however, Equipment Suppliers are permitted to use their standard color.

b. Intrinsic conduits and junction/pull boxes shall be labeled as per NEC.

c. Other conduits and junction/pull boxes shall be galvanized or factory painted.

d. Stainless steel tubing and fittings shall not be painted.

B. Touch-up Painting in Field: Touch up equipment marred by shipment or erection using the same color and type of finish as the original. The finished condition shall be to the satisfaction of the Owner.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of this Division prior to commissioning. Beginning commissioning work constitutes acceptance of conditions as satisfactory.

3.02 INSTALLATION, APPLICATION AND ERECTION

A. Placing, Anchoring and Grouting:

1. The Equipment Supplier shall specify required rigging, anchoring, shimming and grouting to be completed by the Contractor.

2. If grouting is required by the Equipment Supplier, the packaged equipment must be designed with grout access ports, jack screws or brackets and all other provisions necessary to ensure that the Contractor can install grout properly.

3. A final alignment on the compressor drive couplings (if applicable) shall be performed by the Equipment Supplier prior to commissioning.

3.03 QUALITY CONTROL

A. Unit/Equipment/System testing shall include the following:

1. The Owner reserves the right to inspect the manufacturing facility at any time during this Contract without prior notice. The Owner also reserves the right to have test equipment verified and recalibrated for accuracy at any time during the Contract at no cost to the Owner.

2. Submit test procedures, blank test report forms, a list of calibrated test equipment items used in testing with manufacturer, model number, serial number, and calibration date, test set-up and P& ID at least 30 days prior to the date of the scheduled test(s).

3. Shop testing and field testing shall be coordinated with the Owner a minimum of 14 days prior to intended test date.

4. Factory testing (General): Submit copies of completed test reports to the Owner within 48 hours of test completion whether the test was successful or not.

5. Tests witnessed by the Owner or Contractor witnessing of third party testing shall require their signature.

6. If the shop function test is not witnessed by the Owner a report outlining outcome shall be notarized by the Contractor and issued to the Owner.

7. After successful completion of factory test(s) and approval by the Owner, the unit shall be shipped to the site. Upon completion of installation, field testing will commence.

8. Coordinate and execute on site tests which may be required by the various regulatory agencies. This testing may include, but not be limited to, a testing of shut-downs and alarms (including fire alarm and ESD system), noise testing and the like. Pay all costs except the cost of the gas and power.

9. The Owner will not unduly delay site tests, and hence will provide vehicles as required for the timely completion of the testing program.

3.04 CLOSEOUT ACTIVITIES

A. Startup: Full system startup shall be included.

1. Coordinate with the Owner. The Owner will provide 14 days advance notice prior to startup.

2. Provide manpower and equipment as required to test and make the station fully operational at no cost to the Owner, subject to approval by the Owner.

3. The Equipment Supplier shall revisit the site after all compressors have accumulated approximately 100 hours.

a. Recheck calibration and operation of equipment. This will include reviewing operating temperatures, pressures, calibration of transducers, leak checking, checking torque on all bolts/nuts and verifying the drive coupling alignment or belt alignment and tension.

b. Change the compressor oil and replace all oil and gas filters on the station with new OEM branded filters.

4. Station acceptance shall be granted contingent on the 100 hour service being performed after acceptance.

B. Training:

1. Factory training:

a. Provide the Owner with 14 days' notice prior to training.

b. The Equipment Supplier shall cover all training session and training materials costs.

c. Provide a minimum of 2 days training on the service of the compressor package and other station equipment at the factory(s) (Gas dryer not included). This shall be provided for up to 2 of the Owner's designates. Training shall include routine maintenance, inspection, troubleshooting and debugging of equipment. Training shall also include repairs, service and troubleshooting training and safety training for staff performing

maintenance on the equipment. Compressor training shall include routine maintenance and inspection such as inspecting bores, and planned maintenance. Compressor training shall also include repairs such as valve and ring replacements, and major overhaul procedures such as crankshaft and connecting rod replacement.

d. All training manuals, presentations and documentation must be provided in reproducible form without copyright limitation, to allow the Owner to reproduce this information for the purpose of training additional maintenance staff or contractors.

2. Site operator training:

a. Provide the Owner with 14 days' notice prior to training.

b. Provide a minimum of 1 day training on the equipment, at no cost to the Owner. Training materials are to be comprehensive, professional and shall be given to the Owner for the Owner's future use in training or retraining. This training shall include:

1) Fueling Training (2 shifts).

2) Performance of daily and weekly inspections (log forms must be provided by the Contractor).

3) Routine maintenance and service requirements.

4) Safety procedures.

5) Emergency and routine maintenance procedures.

6) System operation overview.

7) Troubleshooting procedures.

3.05 OPERATION AND MAINTENANCE

A. Five Year O&M Period Option (Included in O&M Scope):

1. The Contractor shall provide a three (3) year comprehensive service contract for the routine maintenance and repair of the CNG station, and to provide fuel management and billing services for the Owner. The contract start date shall correspond to the Warranty period in start date. The Contractor shall include all required labor, materials, parts, consumables, freight, tools, personnel training, personnel transportation and tools and all other costs associated with providing an all-inclusive operations, maintenance, repair and service contract for the CNG station except as specifically exempted below.
2. The Authority will pay the cost of all gas, electric power, and communications to the station.
3. The Owner will provide insurance on the property. Contractor will provide other insurance as indicated elsewhere in this document.

4. The Owner will provide staff to fuel and defuel vehicles as required.
5. This operations and maintenance comprehensive service contract scope shall include:

    a. Contractor shall keep all operating permits current. Contractor shall at their own expense provide any documentation and/or testing required and pay any fees required for these permits.
    b. Contractor shall pay any upgrade or annual license fees as required to keep all copies of software current.
    c. Contractor shall maintain an inventory of all required parts including consumables and major repair parts.
    d. This contract shall include all maintenance required or recommended by the equipment and component manufacturers and all work that is normally provided by current industry best practice, as well as any work that may be required by the AHJ.
    e. The Contractor shall supply all parts (including normal wear items and failed components) and consumables included within the cost of the contract.
    f. Contractor shall maintain a clean facility and shall dispose off-site of all waste material in an environmentally responsible and legal manner. Documentation of proper disposal shall be provided to the Owner. This material will include but not be limited to oil, used filters, desiccant, and dryer and filter condensate.
    g. The Owner does not intend to use its own staff to provide daily or other inspections, thus the Contractor is required to check fluids, drain filters and perform other similar light inspection and service.
    h. Contractor shall visit the site not less frequently than once per day to perform inspections and maintenance as required. This inspection shall include all inspections required to ensure the safe and reliable operation of the equipment and as a minimum shall include all inspections and service work required or recommended by equipment manufacturers and by best industry practice. These visits must be coordinated with the Owner to ensure that there are buses that can be fueled to allow operational testing.
    i. Contractor shall review Station SCADA logs to determine if equipment is operating in expected ranges and to diagnose impending problems.
    j. All safety relief valves, pressure transducers and RTDs shall be calibrated annually or more frequently if required.
    k. ESD and other safety systems shall be tested at a frequency of semiannually or more frequently if recommended by the manufacturer.
    l. Contractor shall provide all other inspection, maintenance, repair, logging of information, ordering and stocking of parts as required to provide a comprehensive maintenance service.
    m. Since the installation is covered under the warranty for the first year, there shall be no additional charge for labor or material for the replacement of failed components.
    n. At the end of each year or more frequently as required, the Contractor shall replace all filter elements in the station.
    o. All parts that fail are no longer covered by Warranty and shall be included in the cost of the contract such that the Owner will have no costs beyond the service contract charge.

p. The Contractor shall test the Gas Detection, Fire Alarm and Generator and ATS equipment on a semiannual basis.
q. Contractor shall maintain detailed records of all inspections, calibrations, tests, maintenance and repairs.
r. Contractor staff shall weigh the quantity of oil added and drained in the station. Contractor shall set up and maintain this record keeping system. This record will be used to determine the extent of oil carryover in the station.
s. All records shall be maintained on site in a binder that is accessible to Owner staff. A copy of all reports from: inspections, tests, calibrations, maintenance, repairs, call outs and all parts consumed shall be submitted monthly electronically and in hard copy with each invoice.
t. The Contractor shall provide 120 minute call back and four hour on site response time (from time of fault shutdown being transmitted either electronically or by phone whichever occurs first). At no time shall the equipment deliver less than 50 percent of firm capacity for more than 4 hours.
u. Callouts that are the result of the Owner actions such as nuisance ESD events and hose drive-aways shall be charged to the Owner at regular time rates as proposed herein with no additional charges for overtime, premium, time, equipment or mileage charges.
v. Contractor shall repeat the training required under this contract on an annual basis with updates to reflect lessons learned in operating the station. Contractor shall maintain and submit to the Owner the sign in sheet for each training session.
w. The dryer desiccant shall be removed and replaced at the end of the fifth year. The old desiccant shall be disposed of as hazardous waste.

6. The fuel management and billing component of this contract scope shall include:

a. Contractor shall supply and install a fuel management terminal connected to all on site dispensers—terminal shall be of a brand and model that is compatible with Contractor administrative systems.
b. The cost of this terminal shall be borne by the Contractor, but ownership of the terminal shall go to the Owner at the conclusion of this five year contract.
c. Terminal shall accept the Owner's proprietary fleet card, other user proprietary fleet access cards and Visa and MasterCard.
d. Contractor shall monitor, administer and perform all billing and collections for the transactions at the dispensers. Contractor shall issue invoices monthly and provide a check to the Owner each month for the previously billed amounts.
e. The Contractor shall remit all applicable taxes.
f. Owner will set pricing for each customer.
g. Contractor will be encouraged to develop fuel usage at the site. The Owner will pay the Contractor a throughput fee (to be negotiated) for Customers signed by the Contractor.

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Piping and tubing work required in the manufacturing of the Compressed Natural Gas Station. Work includes:

a. Supply, installation and hookup of piping and tubing listed herein and shown on the Drawings, and as required to fabricate complete and functioning equipment consistent with the Owner's requirements.

b. Piping and tubing work required in the shop fabrication of the CNG equipment.

B. Related Sections:

1. Section 18000 - General

1.02 REFERENCES

A. Applicable provisions of the following standards shall apply to the work of this Section, except as modified herein, and are hereby made a part of these Contract Specifications to the extent required:

1. ASME Section IX Welding and Brazing Qualifications

2. ASME B31.3 Process Piping

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Per Section 18000, General, and the following:

1. Equipment manufacturers shall have at least 10-years experience in manufacturing products and accessories similar to those specified for this Project, with a record of successful in-service performance.

B. Shop Personnel Qualifications:

1. Tube fitters shall provide a letter from the local Swagelok and/or Parker Seal-Lok representative (as applicable) certifying that they have been adequately trained in the proper make-up and inspection of Swagelok and/or Parker Seal-Lok products (as applicable).

2. Pressure welding shall be performed by certified welders per ASME Section IX to registered welding procedures.

a. Certification and registration shall be by a National Board (N.B.) registered Agency.

b. Each welder shall permanently stamp their welds with the welder's identification number and the pipe spool weld identification number.

3. Performance test cards shall be copied and submitted to the Owner for documentation purposes and shown to the Engineer when requested.

C. Mill Test Certificates: Gas piping, tubing, and fittings shall be as listed herein and shall be ordered with mill test certificates and/or certificates of compliance which shall be submitted to the Owner and packaged with the Quality Assurance manual for the project.

D. Regulatory Requirements: Per Section 18000, General and the following:

1. Notify Owner at least 14 days in advance of any factory pressure testing to allow them the opportunity to witness these tests.

1.04 SUBMITTALS

A. Submit the following:

1. Qualifications:

a. Procedure Qualification Records and Welding Procedure Specification for certified welders.

b. Performance test cards.

c. Tube fitters' qualification letters.

d. Piping subcontractor's qualifications as indicated.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with the following:

1. Pipe and tubing shall be handled in a manner to prevent possible damage to walls or ends or scratching of the tube O.D. Pipe and tubing shall be unloaded by lifting at both ends of any one length to avoid bending and placing the section carefully upon a padded skid such that the entire length is uniformly supported to prevent bending or flexure.

PART 2 - PRODUCTS

2.01 GENERAL SYSTEM DESCRIPTION AND PERFORMANCE REQUIREMENTS:

A. Piping work specifically listed herein and shown or indicated on the Drawings. Work includes supply and installation of the following:

1. Piping on the inlet side of the CNG compressors shall be sized to the greatest of:

a. The utility supply line diameter

b. The dryer inlet piping diameter

c. The size prescribed by the compressor package supplier.

d. The minimum size to ensure that station inlet pressure loss does not exceed 10 percent from the meter outlet to the compressor inlet with both compressors operating and including the dryer pressure loss.

2. Piping on the outlet side of the CNG compressors shall be sized to the following minimum sizes:

   a. 1" tubing from the pair of compressors or ¾" from each compressor to the priority panel.

   b. 1" tubing from the priority panel to the storage.

   c. 1" tubing (underground in 2 inch yellow ENT sleeves) from the priority panel to each dispenser if the dispensers are within 200 feet of the priority panel. Note that this requires 3 tubes in individual sleeves to each dispenser not a manifold or daisy chain arrangement. These tubes to be butt weld and 100 percent RT.

   d. 1.5" Sch 160 pipe from the priority panel to each dispenser if the dispensers are greater than 200 feet of the priority panel. Note that this requires 3 pipes in manifold arrangement. These pipes to be butt weld and 10 percent RT.

   e. If the equipment supplier requires larger piping and tubing than outlined above, the larger size shall be used at no additional cost to the Owner.

3. Gas isolation valves (manual and automated), flexible connectors and check valves used in the site installation and piping shall be supplied loose by the equipment supplier and shall be standardized to the similar components used on the equipment. Each skid mounted piece of equipment, each gas valve panel and each dispenser shall be provided with manual isolation valves on all air and gas pipes and tubes coming into or leaving the panel.

4. Piping and tubing work required in the manufacturing and fabrication of the CNG equipment at the factories where this equipment is manufactured or fabricated.

5. An ANSI 150 rated, 2 or 3 piece fire rated (API 607) carbon steel ball valve with stainless steel trim immediately downstream of the utility meter set. The valve shall be the same size as the station inlet piping and be lockable in the open or closed position.

6. Spring return (normally closed) actuated, ANSI 150, 2 or 3 piece fire rated (API 607) carbon steel ball valve with stainless steel trim and a remote, explosion proof solenoid on the inlet to the station, downstream of the flex

connector and upstream of the CNG dryer (supplied loose). This valve shall open only when any CNG compressor is operating and close when no compressor is running, or under ESD conditions. This actuator is to be equipped with a Division 2 rated 120 VAC, 3-way pilot gas solenoid valve and a flow control valve to allow the valve to open at a controlled speed but close without restriction.

7. Supply four 36-inch long, ANSI 150 rated, stainless steel flexible connectors—two for the CNG dryer and one for each compressor.

8. 2-inch Schedule 80 vent piping and required supports and bracketing from the safety relief valves (SRV) on the CNG Dryer to a minimum of 15 feet above grade. Pipe unions shall be provided at each SRV to allow for easy removal and replacement of the SRV. The vent stack shall have a vertical discharge with rain cap (tack welded to the stack and weighted for closure) and be equipped with a drip pocket with drain valve located approximately 24 inches above grade.

9. 2-inch Schedule 80 vent piping and required supports and bracketing from the SRVs on each storage assembly to a minimum of 15 feet above grade. Pipe unions shall be provided at each SRV to allow for easy removal and replacement of the SRV. The vent stack shall have a vertical discharge with rain cap (tack welded to the stack and weighted for closure) and be equipped with a drip pocket with drain valve located approximately 24 inches above grade. A separate vent stack shall be provided for each Storage Assembly.

10. Tubing and piping shall be installed as defined in the approved equipment supplier shop drawings, as indicated in the Specifications and approved drawings. Tubing shall be installed with expansion offsets and “U” bends as required to allow for expansion/contraction and vibration. All tubing and piping shall be laid out/configured and connected in a manner that allows each section to be removed without disassembly of adjacent piping, tubing or equipment.

11. Signs and labels as specified in the Drawings, Codes and OSHA.

2.02 MANUFACTURERS AND PRODUCTS

A. Gas Instrumentation Tube Fittings:

1. Description/Requirements:

a. Tube fittings shall be 316 Stainless Steel (SS).

b. Fittings used on all pieces of equipment shall be approved by the compressor packager and identical to those used on the compressor package. Compression fittings on the site shall be identical make and series. O-ring face seal fittings used on the site shall be identical make and series.

c. Compression fittings shall be dual ferrule design. Both ferrules shall be machined (not stamped) and the rear ferrule is to be hinging design.

2. Manufacturers: Swagelok, approved equal.

a. Fittings shall be supported with manufacturing, engineering and parts storage in North America.

3. Products - Basis of Design for zero clearance face seal fittings: Parker "Seal-Lok."

B. Screwed pipe fittings may be SA 105 or carbon steel or 316 SS, as manufactured by Cajon or Hoke.

C. Tapered Thread Sealant: Crawford "SWAK" anaerobic liquid Teflon thread sealant, Crawford "Strip-Tease" Teflon tape, or approved equal.

D. Gages:

1. Description/Requirements: Stainless steel case and wetted parts. 4:1 safety factor at full scale. Glycerin filled with blow out plug.

2. Manufacturers: Swagelok, Ashcroft, WIKA, or approved equal.

E. Low Pressure (less than 500 psig) Ball Valves (including actuated ball valves):

1. Description/Requirements: 2-piece or 3-piece, carbon steel ball valves with stainless steel trim. Valves larger than 1 inch must include raised face ends.

2. Manufacturers: Worchester, Watts, Habonim, SVF, or approved equal.

3. Ball valves 1 inch and smaller that are manually actuated on an infrequent basis and are not located in the gas primary flow path (for example SRV and gauge isolation valves and dryer filter drains) may be commodity style minimum 1000 WOG rated, and rated for a minimum 400 F if exposed to heated gas. Valves to be carbon steel or stainless steel body and stainless steel ball and stem. Stem to be blowout proof design.

4. Dryers may alternatively be supplied with wafer style butterfly valve for internal piping, but not for block and bypass. The wafer valves are to be carbon steel body. Valves are to be Tyco, Jamesbury or approved equal.

F. High Pressure (greater than 500 psig) Ball Valves (including actuated ball valves):

1. Description/Requirements: Stainless steel ball valves with stainless steel trim. Manual valves shall include locking kit.

a. Valves up to and including 3/4-inch: Approved for Alternative Fuel applications with a minimum C_v of 12 for 3/4 inch and 7 for 1/2 inch valves. Pressure rated to be minimum 5,800 psig. End connections

shall be compression fittings of the same manufacturer and series used in the station.

b. Valves greater than 3/4-inch: Bodies shall be 3 piece, 6 bolt design with a minimum pressure rating of 6000 psig and female NPT ends.

2. Manufacturers: Swagelok, Habonim, SVF, or approved equal as indicated below:

a. Valves up to and including 3/4-inch: Swagelok "SS-AFS series."

b. Valves greater than 3/4-inch: SVF H7 series.

G. All manual ball valves in the station are to include locking kits.

H. Check valves on low pressure applications (<500 psig) to be ANSI flange wafer/flapper style with carbon steel bodies and stainless steel trim and O-ring seat. Valves to be Tyco or approved equal.

I. Check Valves on Compressor Interstage Drains and equipment located Downstream of the Compressor High Pressure Cylinder: 316 stainless steel poppet style with compression ends. Cv shall be minimum of 2.0 on 1/2-inch valves and 6.0 on 3/4- and 1-inch valves. Check Valves to be 316 stainless steel.

J. Drain Valves on Filters, Vessels and Throttling Valves:

1. Description/Requirements: Valves shall be “Gage Style” bar stock stainless steel body and trim. Needle/plug shall be non-rotating. Seat shall be replaceable soft seat. Pressure rated to 6,000 psig minimum.

2. Manufacturers: Swagelok, Anderson Greenwood, or approved equal.

a. Valves shall be supported with manufacturing, engineering and parts storage in North America.

3. Products: Swagelok “Rising Plug” series SS-4PD with replaceable seats.

K. Safety Relief Valves (SRVs):

1. Description/Requirements: Carbon steel or stainless steel bodies with stainless steel trim and “UV” stamped N.B. rated.

2. Manufacturers: Anderson Greenwood, Mercer, or approved equal.

L. Pressure Transducers:

1. Description/Requirements: 316 SS for wetted parts and explosion proof or intrinsically safe. Transducer shall be rated for a minimum 10 percent higher range than the relief valve protecting the system.

2. Manufacturers: Swagelok, Ashcroft, Wika, or approved equal.

    a. Transducers shall be supported with engineering and parts storage in North America.

M. Mass Flow Meters:

1. Description/Requirements: Stainless steel case and wetted parts. Coriolis type with minimum pressure rating of 5,000 psig. Meter shall have type approval in the United States for retail sale of CNG.

2. Manufacturers: Meter shall be supported with manufacturing, engineering and parts storage in North America.

3. Products: Rosemount-Micromotion CNG 50, or approved equal.

N. Bleed Valves Required for Service:

1. Description/Requirements: Stainless steel with minimum design equal to 6,000 psig for high pressure applications and 1.5 times the relief valve setting for station inlet and interstage pressure applications.

2. Manufacturers and Products: Swagelok BV series, Hoke 6600 series, or approved equal. Commodity type Stainless Steel ball valves, compliant with other terms of this section, may be used on inlet (low) pressure systems for bleeding pressure.

2.03 MATERIALS

A. Valves, fittings, instrumentation and other mechanical components (except internal compressor components) that are not specifically called out in this Section, shall be non-proprietary, third party supplied.

B. Gas and Lubricating Oil Flow Piping and Tubing:

1. Components containing gas shall be carbon steel or stainless steel as indicated below. The vehicle filling hoses are considered to be the only exception to this rule.

2. Carbon Steel Piping: ASME SA106B seamless pipe of appropriate diameter and schedule.

3. Underground piping operating at less than 100 psig shall be HDPE with coated carbon steel risers. Risers shall include flange insulation kits and anodes.

4. ASME SA179 carbon steel tubing of diameter and wall thickness as required by ASME B31.3 may be used in the compressor interstage piping only.

5. Tubing: ASME SA213 TP316 seamless, cold drawn stainless steel. This includes gage lines, pressure transducer sensing lines and pilot pressure gas

lines. TP316L and TP316N stainless steel tubing is not permitted. Surface hardness shall not exceed Rockwell B80. Diameters and wall thickness as follows:

a. 1 inch O.D. x 0.120 inch minimum wall

b. 3/4 inch O.D. x 0.109 inch average wall

c. 1/2 inch O.D. x 0.065 inch average wall

d. 3/8 inch O.D. x 0.049 inch average wall

e. 1/4 inch O.D. x 0.035 inch average wall

6. Flared fittings shall not be permitted.

7. Zero clearance fittings or pipe “U-bends” must be used where actuated ball valves, safety relief valves, check valves, and the like, need to be removed for servicing. Zero clearance fittings must be verified to meet the design pressure of the system they are installed in.

8. Threadolets, flanges, swaged nipples, plugs and bushings shall be ASME SA105. All butt weld pipe fittings including elbows, returns and reducers shall be ASME SA234 WPB.

9. Socket weld fittings are not acceptable except on the Gas Dryer.

10. Bolts and studs shall be ASME SA193 Grade B7. Nuts shall be ASME SA194 Grade 2H.

11. Pipe unions shall only be used on vent lines. Weld neck flanges are the approved method of connecting pipe spools to equipment—slip on flanges are not approved except on the CNG dryer. Raised Face (RF) flanges shall be used on ANSI Class 900# and lower flanges as well as on any ANSI Class 1500# and higher flanges requiring a flange isolation kit. Ring Type Joint (RTJ) flanges shall be used on ANSI Class 1500# and higher flanges not requiring a flange isolation kit.

12. Screwed pipe and fittings shall be used only where a transition to tubing is required, or for gas service 2 inch or smaller with pressures below 15 psig, or for vent lines. The use of stainless steel threaded fittings in combination with compression fittings shall be minimized. Seal welding of threaded fittings is prohibited.

13. Where threaded fittings are necessary on gas piping, the fittings shall be selected and arranged such that positioning of the fitting is flexible. The use of tees or elbows with compression ends and threaded ends on the same fitting is prohibited. In such a case, a union tee or elbow shall be used in conjunction with a male or female tube adapter.

a. Some female pipe thread fittings cannot be used downstream of the compressor as they are not rated to high enough pressures. In addition, safety relief valves must be installed so they can be removed and replaced without having to turn the safety relief valve (SRV) to loosen or tighten it. A flange, compression fitting or zero clearance fitting on the inlet and outlet, in compliance with the above shall be used. Pipe unions may also be used on the SRV vent piping only.

14. Tube fittings in the station shall all be of the same manufacturer and shall be of the same material as the tubing.

C. Gas Vent Lines:

1. Gas vent lines shall be of the same materials as specified for gas flow lines. Each line shall be Schedule 80 minimum and sized to match the outlet size or maximum flow capacity of the Safety Relief Valve (SRV) it serves, whichever is greater. Each vent stack shall be sized to match the total maximum flow capacity of the relief valves it serves. The compressor vent stack is to be a minimum of the same size as the compressor suction piping (2-inch Schedule 80 minimum).

2. Air and gas safety relief valves shall be piped to discharge vertically a minimum of 5 feet above the roof of the shelter (if applicable) and a minimum of 12 feet above surrounding grade, whichever is greater. Vent pipes shall be provided with a drip pocket to trap liquids and/or solids. This pocket shall be located within the enclosure (if applicable) and shall be equipped with a manual drain valve. Vent lines shall be securely fastened and vent stacks shall be given sufficient support to prevent pipe movement during a discharge event. Vent stacks shall also be equipped with rain caps to prevent airborne rain and snow from contaminating the vent piping. Note that gas and air vent systems shall be piped such that mixing cannot occur.

3. Compressor packings shall be externally vented and shall be piped separately from safety relief vent piping and provided with a drip pocket to trap liquids and/or solids. This pocket shall be located within the enclosure and equipped with a manual drain valve.

D. Pilot Gas Lines: ASME SA213 TP316 tubing as specified in Subparagraph 2.03 above.

1. The use of stainless steel tubing and fittings of the same manufacturer selected in Paragraph 2.02 above.

2. Valves shall be 2 piece, 600 pound WOG rated ball valves with steel handles and locking kits.

E. Miscellaneous Piping Components

1. Flange gaskets shall be spiral wound metallic with centering ring (up to ANSI 900# RF, non-isolation), malleable iron (ANSI 1500# RTJ and higher, non-isolation), or phenolic (up to ANSI 2500# RF flange isolation kits only) or a

material approved by the Engineer. Gasket materials shall be non flammable, non asbestos materials.

2. Threads shall be NPT if tapered, or SAE if straight, unless otherwise specified.

3. Bolts, tubing, piping, and fittings shall be to SAE (i.e. non-metric) standards. Bolts shall be threaded UNF or UNC.

4. Swivel hose ends and fittings shall be 37 degree flare cadmium or zinc plated carbon steel.

5. Gages shall be equipped with stainless steel wetted parts and rated at 4:1 safety factor (minimum). Gages shall be equipped with a blow out disc in the case. Gages shall be selected to provide normal operating pressure (at maximum suction and discharge conditions) at approximately 60 percent of their range. All gages shall be glycerin filled.

6. Station inlet and compressor inlet valves shall be rated fire safe to API 607. Lever operated valves must be equipped with locking kits capable of securing the valve in either an open or closed position. Actuated and manual ball valves shall be equipped with high cycle life stem and seals and shall be positionable in any orientation. Actuators shall be mounted to ISO or equivalent standards using a minimum of 1/4-inch wall square steel tubing or valve manufacturer supplied bracket. The mounting bracket shall be fastened to the ball valve and the actuator with a minimum of 4 stainless steel bolts with split lock washers. Actuator/ball valve assemblies shall be factory tested for proper alignment and operation.

7. Safety relief valves, actuated valves (valve stem vertical, actuator above or below valve), and filters shall be mounted in their normal vertical orientation. Mass flow meters shall be mounted to be self draining.

PART 3 - EXECUTION

3.01 INSTALLATION, APPLICATION AND ERECTION

A. Piping and Tubing Bending and Fitting Practices:

1. Piping and tubing shall be installed in a manner consistent with the Contract Documents; in straight, evenly spaced, parallel runs and properly insulated if indicated on the Drawings. Piping systems shall be built, supported and pitched to provide suitable venting and draining. The piping shall be run true to the vertical and horizontal axis of the facilities wherever possible. If the type of installation requires a slope on the pipe, the slope is to remain even along the pipe. Valves shall be accessible for ease of operation, maintenance and overhaul/replacement. Bends shall be minimized wherever possible. Pipe bends shall not be permitted. Tubing shall be bent using benders which minimize radial distortion. This distortion shall not exceed code requirements.

2. Pipe, and tubing shall be cut with a cutter intended for the application. The use of a hand hacksaw is prohibited (unless a Swagelok tube vise and guide is

used). The use of a power hacksaw or bandsaw shall be allowed for pipe and 1-inch and larger tubing only, provided cuts are square. Cuts shall be deburred externally and internally. Tubing shall be free of scratches subsequent to cutting and deburring. Filings and cuttings shall be removed prior to assembly. Compression fittings and threaded fittings shall be bench made wherever possible (i.e. factory or field preassembled before installation to minimize leaks due to poor or misaligned connections). A hydraulic swager shall be used for 3/4-inch and larger tubing.

3. All sections of tubing and piping shall be designed to allow safe and controlled depressurization. This will require that bleed valves be installed at various points in the system that could be captive. Drain valves on filters are considered to be acceptable depressurization points. As with other valves, these valves shall be identified and tagged with a unique identification number and standard depressurization procedures shall be provided describing in detail by reference to valve numbers how to safety depressurize, purge and re-pressurize all systems in the station.

4. The use of tube unions shall be minimized by using long sticks of tubing—unions will only be allowed where a bulkhead is required, or where the length of tubing without the union will exceed a 20 foot stick. The use of tube union elbows shall be minimized by using bends where feasible.

B. Pressure Welding and Fitting Practices:

1. Construction - General Requirements:

a. Provide welding materials, equipment, tools and supplies of a size, grade and quality approved by the Engineer.

b. End Preparation and Fit up: End preparation or beveling shall be made by hand filing, machine tool or flame cutting device. Cut surfaces shall be smooth and regular. Free hand torch beveling shall not be permitted unless previously authorized on a case-by-case basis by the Engineer. Rust, scale, mill slag, primer, moisture, oil or other material which may be detrimental to the finished weld shall be completely removed from the weld area. The ends of pipe, fittings, valves, and the like, shall be cleaned beyond the beveled edges at least 2 inches both internally and externally to assure no foreign material enters the weld puddle. Cleaning of weld bevels shall be done with power or hand tools.

c. Line up Clamps: The abutting edges of weldments shall be held in alignment by an approved type of line up clamp where practical. When welding fitting to fitting where an approved type of line up clamp is not practical, each fitting shall be properly supported so as to minimize movement and strain during welding. Short runs of station piping or runs of pipe of limited distances shall demand an approved external line up clamp. When using an external line up clamp, the clamp shall not be removed until the stringer bead segments have been uniformly spaced

around the circumference of the pipe and shall have an accumulative length of at least 50 percent of the pipe circumference.

d. Alignment: The alignment of the abutting ends shall be such as to minimize the offset between surfaces. For pipe of the same nominal wall thickness, the offset shall not exceed 1/16 inch. Any greater offset, provided it is caused by dimensional variations, shall be equally distributed around the circumference of the pipe or fitting.

e. Weather Protection: Welding shall be performed within a weather proof enclosure to prevent rain, snow or foreign objects from contaminating the work. The glare from arc welding shall be blocked by the use of commercially available weld curtains.

f. Exposed Pipe Joints: Pipe joints for the buried pipe shall remain exposed until inspected. Where the exposed pipe is in an area where vehicles need to cross, the inspection process shall be expedited to minimize disruption in traffic flow.

g. Underground carbon steel pipes shall be coated, joints wrapped, and pipe shall be equipped with anode beds as required to provide a minimum 30 year life. Insulating flanges shall be provided at each end of all underground piping. Contractors shall adhere to these requirements and the attached cathodic protection section.

C. Pipe and Tubing Support and Fastening Techniques:

1. Pipe and tubing shall be adequately supported per UPC and ASME requirements to prevent bending, sagging and excessive vibration or damage to threads or flanges. When placing the pipe on to the supports, care shall be exercised so as not to jerk the pipe or impose any stresses that may kink or put a permanent bend or stress in the pipe or crack a thread.

2. Pipe and tubing clamps for suction, interstage, discharge and blowdown lines within the compressor package shall be fabricated from 2-inch x 3/16 inch flat bar bent in a 180 degree radius with the identification equal to the outside dimensions of the pipe. Sleeves for bolting shall be provided on either side. A minimum of 3/8-inch clearance between the bottom of the clamp and the pipe support shall be maintained for tightening. Swagelok or Stauff block/saddle style pipe clamps with aluminum inserts may be used within the compressor package as an alternative on compressor flow lines and plastic inserts may be used on all instrumentation and drain lines. As a minimum, clamps on the compressor package shall be placed no greater than 48 inches apart and 12 inches from both sides of any bends. Where the requirements of any codes, or manufacturer or the vibration and pulsation study are more stringent, that clamping interval shall apply. Pipe and tubing shall not be used to support external devices. Clamps and fasteners shall be adequate for the application intended.

3. Clamps and fasteners shall be secured by mechanical means (e.g., welded, bolt with lock washer). The use of adhesives and self-tapping screws shall be approved by the Engineer. The use of Swagelok or Stauff Tubing Support Systems is required for gage sense lines inside the compressor package and tubing and piping outside the compressor package where temperatures do not exceed approximately 150 deg F. Clamp spacing shall be as per governing code or the clamp manufacturer's specifications, whichever is more stringent. Unistrut style conduit clamps will not be acceptable for piping and tubing.

4. Site pipes and tubes shall be run underground or on pipe racks with a minimum 8 feet of clearance under them. Pipes and tubes shall not be run across pads or other areas where they may pose a hazard except as explicitly allowed by the Owner. Pipe racks shall be designed to ensure support of all piping and tubing at the intervals required by Stauff. Stauff saddle/block style clamps shall be used on all piping and tubing installed on site and on equipment.

D. Identification:

1. Weld Identification: After completing a weld, the welder shall mark it to identify their work. Where two or more welders are employed to produce a single weld, the joint shall be marked to identify the portion made by each welder. No notch stencils shall be used. Paint sticks are acceptable so long as the identification will last until the weld has been deemed satisfactory.

2. Valve Identification:

a. Valve Identification: Manual and automated valves (including ball, drain, safety and check valves) shall be equipped with stainless steel or brass labels with a unique valve number clearly indicated in 1/2-inch high letters and permanently affixed to the valve with stainless steel wire or chain.

3.02 QUALITY CONTROL

A. As per other Section 18000, General, and following.

B. Non-Destructive Examination of Weld Joints:

1. All welds shall be visually examined for uniform appearance and finish.

2. Butt welds shall be subjected to 10 percent full circumference radiographic testing by a N.B. certified agency or as required by governing code, whichever is greater. Acceptability of weld is based on ANSI B31.3. Radiographic test reports and films on shop fabricated piping shall be forwarded to the Owner at time of shipping. Testing shall include 10 percent of each welder's welds and 10 percent of each pipe size and thickness.

3. Pipe spool sketches referenced to each X-ray to allow later identification of a particular X-ray to a particular weld must be provided along with the X-ray

reports and films. These sketches must also identify the welder that performed each weld.

4. Thread-o-lets and weld-o-lets must be die penetrant or mag particle tested.

C. Pressure Testing:

1. General:

a. Gas piping shall be pressure tested to a value of 1.5x (hydrostatic) the relief valve setting for 30 minutes, or 1.1x (pneumatic) the relief valve setting or as required by the local inspection agency. Extreme care shall be used due to the inherent risk of a catastrophic failure which could cause serious injury. Nonessential personnel shall leave and protection from injury shall be provided for those left on site. Shop reports shall be signed by a Professional Engineer and shall include:

1) Spool number

2) Spool description

3) SRV setting

4) Test pressure(s)

5) Test duration (starting and ending times)

6) Test date

7) Signature of Technician

8) Calibration data for gages, meters, transducers, telemetry equipment, and the like.

9) Ambient temperature

b. Prior to performing tests, SRV's and filter cartridges shall be removed from the system. Subsequent to the pressure tests, the SRV's and filter cartridges shall be reinstalled.

c. Pressure testing shall be witnessed to the satisfaction of the Owner.

2. Pneumatic Testing:

a. The test test shall be performed with clean dry nitrogen only. Pre-testing to approximately 60 psig is required, to locate major deficiencies. Subsequent pressure increases shall be made gradually to prevent "shocking" of the pipe system, increasing the pressure gradually to full test pressure (1.1 times the SRV setting) and holding it for one half hour.

b. All tubing and piping downstream of the compressor shall be pressure tested to a minimum of 5750 psig.

c. All welds, threaded and flanged connections and all fittings shall be soap tested at each pressure during the test.

d. At the end of the test, a visual inspection of all joints (welded, threaded, compression and flanged) shall be made to determine if any visible leakage has occurred.

3. Tie-Ins: Piping or tubing tie-ins shall be removed from the system and pressure tested in accordance with the above requirements. After re-installation, the tie-ins will be leak tested at the working pressure of the system.

4. Purging and Pressurizing:

a. Purging and pressurizing shall be performed by the Contractor and witnessed by the Engineer or the Owner's designate.

b. Before pressurizing with natural gas commences, the ESD system shall be tested and fully operational. Natural gas shall not be introduced into the system without prior approval of the local gas utility and the express authorization of the Engineer. Air shall be purged from the entire system to the satisfaction of the Engineer prior to pressurizing the system.

c. Before natural gas is introduced into any piping system, fabrication, testing and work requiring flame or sparking devices shall be complete. After natural gas has been introduced, welding or other work which could ignite natural gas vapors shall be performed only upon express authorization by the Owner on a case-by-case basis.

5. Leak Test:

a. Subsequent to final field installation and pressure tests, completed piping with valves in place shall be leak tested before being placed in operation to ensure that it does not leak.

b. The piping and tubing shall be pressurized with natural gas to its normal operating pressure (4500 psig downstream of the CNG compressors) and tested with a suitable liquid leak detector such as "Snoop" (by Swagelok Company).

c. The following locations shall be tested:

1) Flanged joints

2) Threaded joints

3) Tube joints

4) Accessible butt joints

3.03 CLEANING

A. Pipe and Tube Cleaning:

1. Subsequent to pipe fabrication and testing, mechanical cleaning with wire brushes and/or swabs or pigs shall be performed where possible, then the pipe shall be cleaned internally with a non residual, degreasing and slag removing solution. A high velocity dry nitrogen purge shall be made to remove any loose scale, filings, water or other foreign material.

2. Subsequent to tubing fabrication a high velocity nitrogen purge shall be made to remove any loose scale, filings, water or other foreign material.

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. This Section applies to underground metallic piping required in the installation of the Compressed Natural Gas Fueling Station.

1. The station piping must be electrically isolated from the gas system supply at the outlet of the gas meter.

2. All cathodic protection design, materials and installation shall be in accordance with the Greenville Utilities Commission Operations and Maintenance Manual – current edition, Section F-7

3. All cathodic protection design shall be in accordance with the recommended practices of the National Association of Corrosion Engineers (NACE) RP0169.

B. Related Sections:

1. Section 18000 - General

2. Section 15150 – Piping and Tubing

1.02 REFERENCES

A. The following apply:

1. ASME Section IX Welding and Brazing Qualifications

2. ASME B31.3 Process Piping

3. Title 49, CFR Part 192 Pipeline Safety Code

4. GUC Natural Gas Operations and Maintenance Manual
Section F-7 Cathodic Protection

1.03 QUALITY ASSURANCE

1. Not used

1.04 SUBMITTALS

A. Submit the following:

1. Cathodic protection plan

2. Materials

PRODUCTS

1.05 GENERAL SYSTEM DESCRIPTION AND PERFORMANCE REQUIREMENTS:

A. As approved by the GUC – Natural Gas Operations and Maintenance Manual, Section F-7

B. As approved by NACE for similar application

PART 2 - EXECUTION

2.01 INSTALLATION

A. According to the GUC – Natural Gas Operations and Maintenance Manual, Section F-7

B. According to NACE recommended practices

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes: Electrical work required in the manufacturing and commissioning of the compressed natural gas station. Work Includes:

1. Provision and hookup of electrical and controls equipment and materials specifically listed herein or as required to accomplish a complete and functioning system consistent with the Owner's requirements.

2. Electrical work required in the shop fabrication and site installation of the CNG equipment. All skid mounted equipment including the two compressors, the dryer, and all gas and electrical control panels shall be factory or site interconnected by the Contractor.

3. Supply and install a site grounding grid of 3/0 bare copper. Grid to include a minimum of two ground rods in the station equipment compound and two ground rods in the fueling area—two areas are to be tied together. A minimum of two jumpers from the grid to each of the following are required:
   a. Each section of fence with ground jumpers to gates at hinge points.
   b. Gas Dryer
   c. Gas Compressors
   d. Gas Storage
   e. Control Panels
   f. Canopy
   g. Generator

4. Provide wire, conduit, fixtures, appurtenances and equipment as indicated.

5. Unless otherwise indicated, provide galvanized steel rigid metal conduit complete with fittings and seals as required in each of the pieces of equipment. Note that underground conduits (not including risers) can be rigid PVC.

6. Provide ready access and connection points in conduit or boxes to facilitate field installation and connection.

7. Where necessary to observe minimum bend radii, supply and install adequately sized junction boxes or pull fittings.

8. Terminations and testing of circuits.

9. Leave all seals unpoured but supply approved sealing material (such as "chico") for field Installation Contractor.

10. Explosion proof ESD buttons – supply loose buttons for site installation in addition to buttons supplied on each compressor, the gas dryer, and each dispenser. Each ESD button shall be equipped with two normally closed (NC) contacts. The first NC contact shall be hardwired in series with the other

station ESDs and the master start pushbutton located on the face of the MCP. The second NC contact shall be hardwired as an independent input to the MCP PLC.

11. Signs and labeling as indicated and as required by code.

12. Provide related Work not included in this Section, which is required through applicable codes and for complete installations.

B. Related Sections:

1. Section 18000 - General

1.02 QUALITY ASSURANCE

A. Manufacturer Qualifications: Equipment manufacturers shall have at least 10 years of experience in manufacturing products and accessories similar to those specified for this Project, with a record of successful in-service performance. Provide list of projects.

1.03 SUBMITTALS

A. Submit :

1. Product Data: All specified products and materials.

2. Qualifications: Manufacturer's list of products.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Contactors, Panel Pilot Lights and Push Buttons: NEMA rated "heavy duty, industrial," as manufactured by Square D, Cutler Hammer, GE, Allen-Bradley or approved equal.

B. SCR and VFD motor control equipment to be Allen Bradley, Square D or approved equal.

C. Circuit Breakers: Square D, Cutler Hammer or approved equal.

1. Circuit breakers shall be interchangeable with equipment supplied in the Owner's Maintenance buildings.

D. Programmable Logic Controllers (PLCs): Allen Bradley, GE, Horner, Siemens, Modicom or approved equal for the MCP and CNG dryer. PLCs shall be networked together.

E. Motors: Reliance, Siemens, Toshiba, Marathon, or approved equal.

F. Shielded Cable: Belden, Carol, Omni or approved equal.

G. Combustible Gas Detectors: Det-tronics Infrared Hydrocarbon Gas Detector PointWatch Eclipse Model PIRECL with relay and 4-20mA outputs, or approved equal.

2.02 MATERIALS

A. Electrical components and assemblies shall be new and shall bear CSA/NRTL or UL or FM approval for this application.

B. Each panel and skid mounted piece of equipment shall include an NRTL inspection and sticker.

C. All cabling and buss bar is to be copper—aluminum is not acceptable.

D. All breakers are to be rated with KAIC ratings as dictated by utility and short circuit protection study.

E. Controls, displays, switches, IS barriers, relays and contactors, instrumentation and other electrical components that are not specifically called out in this Section shall be non-proprietary, third party supplied.

F. Main compressor drive motors, cooler fan motors and exhaust fan motors shall be 480 VAC with a service factor of 1.15. Compressor main drive motors shall be Class 1, Division 2 rated. Fan motors shall be Class 1, Division 1 rated. Motors over 25 horsepower shall be equipped with thermocouples in each winding to allow monitoring of winding temperatures. Motors shall be the highest catalog efficiency rating available, at full load. Motors over 25 horsepower shall include integral heaters to protect against condensation.

G. Motor starters shall be NEMA rated and equipped with overload relays to protect the motor from excessive current. Overloads shall be wired to provide an overload fault signal to the PLC controls. Contactors shall be equipped with an auxiliary contact which will be wired to the PLC controls to indicate a contact closure failure. Motors over 50 horsepower shall be controlled with an SCR electronic soft start.

H. Electrical panels mounted outdoors shall be NEMA 3R or NEMA 4 rated. Electrical panels shall be designated to avoid the need for air purging by using Class 1, Division 2 rated components, or by remote mounting. All Control Panels shall be sized such that at least 25 percent of the panel back plate area is available for future installation of additional equipment, including room for an additional 25 percent of terminal blocks of each voltage. Panels must be equipped with door interlocks and guards as required to protect personnel who are accessing the panel. All panels with 480 VAC components shall be equipment with a flange mounted disconnect or breaker rated to the amp rating of the panel.

I. Intrinsically protected circuits, pressure transducer circuits and communications cable shall be shielded cable of 18 gauge or larger. Individual pairs shall be shielded. The shield shall be grounded at one end only to the common frame ground.

J. Conduit for Intrinsically Safe (IS) circuits shall be rigid galvanized or "Liquid Tite" sealed and installed in accordance with the NEC requirements for Class 1 (Hazardous Locations).

K. Devices isolated from the main skid, such as shelter door panels, shall be grounded with copper ground cables.

L. Conduit seals shall be EYS or EZS. Sealing cement (chico) shall be packaged and shipped with the equipment to site. Seals shall not be poured until equipment has received final Owner and regulatory approval.

M. Power Distribution and Control Panel: Panel shall meet seismic requirements of site location.

1. Panel amp rating shall be minimum 800 A, 480 V, 3 phase—or larger if required.

2. Main panel breaker is to be equipped with an appropriately rated surge suppressor on the load side. Leads from the surge suppressor to the breaker shall not exceed 18".

3. Breakers shall be lockable in the off position and all 480 VAC breakers to include 120 V shunt trip coil.

4. SCR starters for the CNG main compressor motors (if applicable). SCRs shall be heavy duty rating with integral bypass contactor to engage once motors reach full operating speed.

5. Disconnects and cross-line starters for fans, air compressors, and pumps shall be provided.

6. Station controls shall include a transformer to provide power for controls and control room power. An Uninterruptible Power Supply (UPS) sized to maintain control power for a minimum of 30 minutes is to be provided.

N. All electrical panels shall include a thermostatically controlled panel heater if required for equipment to operate reliably in all climatic conditions on site.

O. A natural gas powered standby generator and Automatic Transfer Switch (ATS shall be supplied and installed.

1. The specification for the generator are provided elsewhere in these specifications. The generator shall be equipped with a hospital grade silencer, and a sound attenuating enclosure. The generator shall be equipped for remote monitoring via internet.

2. The generator is to be sized to comfortably start and run one CNG compressor and all other station loads with the exception of the CNG dryer and the second compressor.

3. The ATS is to have the same amp rating as the main power distribution panel for the station (800 Amps or larger if required). The ATS shall be equipped with auxiliary contacts to communicate its status to the MCP to ensure that station load is matched to available power.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation by others as satisfactory prior to commissioning station. Beginning commissioning work constitutes acceptance of conditions as satisfactory.

3.02 INSTALLATION

A. Supplemental Installation Requirements:

1. Terminations: The Equipment Supplier shall verify electrical terminations to the CNG station equipment in the field.

2. Sealing: The cross-sectional area of the conductors permitted in a conduit seal shall not exceed 25 percent of the cross-sectional area of a conduit of the same trade size.

3. Labeling and Identification:

a. Intrinsic conduits shall be labeled as indicated in the NEC (NFPA 70).

b. Conduits shall be labeled immediately outside of every box or panel as they enter or leave with stainless steel or brass labels. The conduit number and maximum voltage shall be clearly indicated in 1/2 inch high letters and permanently affixed to the conduit with stainless steel wire or chain.

c. At distribution centers, pullboxes, wireways, and the like, feeder conductors of each feeder group shall be neatly labeled, then laced or clipped into a feeder group.

d. Label conductors at each end of every wire and at each junction box where splicing is required with permanent, fade resistant wire numbers as listed on the equipment supplier's drawings. The numbering system shall be in strict accordance with the equipment drawings. Site numbering which does not match the drawings shall not be acceptable. Where no numbers are shown on the drawings, the wires shall be identified according to the panelboard and circuit number of device terminal block number from which they originate. Hand written labels shall not be used.

e. Spare PLC I/O shall be wired to the terminal strip and labeled. External terminations to the electrical panels shall be made at the terminal strip and labeled.

f. Supply revised installation drawings as well as equipment drawings which indicate wire numbers for all wires including spare conductors.

4. Miscellaneous:

a. Wires and cables shall be bundled neatly and tied using T & B TY-RAPS, or approved equal. Wiring shall represent a neat appearance upon completion.

b. All conduit runs shall include spare conduits capped on each end. As a minimum, two 1" spare conduit shall be provided from a central pull point (the MCP is the most likely location) to each dryer, compressor, valve control panel, dispenser and fuel management terminal.

c. Conduits except 480 VAC shall be provided with a minimum of 25 percent spares. Spares shall be numbered on the record drawings.

d. All conduits associated with the fuel management system to provide power, communication and connection with the dispensers is to be supplied and installed.

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Design, manufacturing and testing of the single tower CNG dryer for the compressed natural gas station.

2. The work includes mechanical and electrical fabrication work and programming required in the shop fabrication of the CNG drying equipment.

B. Related Sections:

1. Section 18000 - All

1.02 QUALITY ASSURANCE

A. Manufacturer Qualifications: Equipment manufacturers shall have at least 5 years experience in manufacturing products and accessories similar to those specified for this Project, with a record of successful in-service performance.

1. Provide list of projects with owner contact information.

1.03 SUBMITTALS

A. Submit in accordance with applicable provisions of Section 018000, General:

1. Manufacturer's qualifications: Project list.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Comply with the following:

1. Ship dryer to site only when its pad is completed and ready for permanent installation.

1.05 PROJECT SITE AND DESIGN CONDITIONS

A. Design Conditions:

1. Number of dryers 1

2. Minimum Inlet Gas Flowrate 1,000 Scfm @ 45 psig inlet

3. Minimum Process Flow Pipe Size 4 inches or larger if required to provide required flow and pressure drop.

4. Minimum throughput before regeneration 20 MMSCF

5.	Regeneration Time (maximum)	8 hours
6.	Maximum Outlet Gas Pressure Dew Point	-50 F
7.	Outlet Gas Moisture Content	<0.25 lbs/MMScf
8.	Minimum design pressure	150 PSIG
9.	Max. Pressure Drop Across Dryer Assembly	3 PSID

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS AND SYSTEM DESCRIPTION FOR CNG DRYER

A. General:

1. The design, fabrication, testing, delivery, installation, startup, testing, commissioning and training for a compressed natural gas purification system complete with a coalescing prefilter, captive blower purge, desiccant gas dryer system integral with the regeneration package, particulate afterfilter and relevant controls and instrumentation, factory pre-piped, wired and tested on a common skid.

2. Weatherproofing: Dryer system shall be suitable for operation outdoors without the concern of undue corrosion or degradation of any components from the elements. Electrical components shall be rated as weatherproof and for use in a Class I, Division 2, Group D hazardous area. External cooling coils shall be protected from accumulation of debris or fouling by use of shields, screens, and positioning. Insulation shall be fully weatherproofed with an external metal skin and sealing. Lines or components which could transport, trap, or contain condensate material shall be effectively heat traced and insulated to prevent freezing and adequately sloped to allow drainage.

3. Design Pressure:

   a. *The minimum design pressure shall be the greatest of a minimum of 1.5 times the maximum station inlet design pressure, the minimum design pressure indicated in Section 1.05 above, or higher if required due to expansion of gas during the heating cycle of regeneration.*

B. Prefilter and Afterfilter:

1. The prefilter shall be a coalescing, high efficiency, sub-micron oil removal type, designed to remove aerosols, liquids and solids down to 0.1 microns absolute size and 0.0014 ppm oil concentration.

2. The afterfilter shall be a high efficiency, particulate filter, designed to remove solids down to 1.0 microns absolute size.

3. Filters shall consist of an ASME section VIII designed and U or UM-stamped pressure vessel (if required by vessel size), stainless steel or carbon steel housing rated for the design pressure as specified in Section 18510, Para. 1.05. Filters shall contain the element and the captured liquids and replaceable filter cartridges to remove the contaminants, with both parts combined to form a complete assembly. The filter cartridge shall be positively sealed to the housing by means of elastomeric O-ring seals suitable for natural gas service.

4. The filter housing shall be designed so as to allow servicing of the cartridges without removing the filter assembly from the system piping.

5. The filter assembly shall be equipped with a manual drain valve for the periodic removal of the collected liquid(s) and for depressurization of the chamber for service.

6. A locally mounted differential pressure gauge shall be provided to indicate the filter element condition.

7. An isolation ball or butterfly valve shall be provided between the filter and the tower switching valve to allow the filter to be serviced without venting down the entire dryer.

C. Drying and Regeneration System:

1. The dryer shall be a single tower externally heated regeneration type using 3A molecular sieve as the adsorbing media. Regeneration shall be accomplished by recirculation of a captive volume of the gas. The regeneration cycle shall include a heating and cooling cycle to ensure proper regeneration of the desiccant and a constant outlet dewpoint at all times.

2. The drying flow shall be downward to minimize fluidization of the desiccant bed in the event of upset conditions.

3. Desiccant chambers shall be of carbon steel construction and ASME Section VIII designed and U-stamped, manufactured and stamped for design pressure at minimum 400 deg F with a 1/16-inch corrosion allowance.

4. The gas piping shall include necessary interconnecting piping from the inlet of the prefilter to the outlet of the after-filter. Included in the piping shall be a prefilter, dryer, after-filter, and other fittings and supports as required.

5. Desiccant chamber shall be fitted with desiccant fill and drain ports to facilitate filling and draining of desiccant without the need to disassemble manifold piping.

6. Desiccant chamber shall be designed and constructed to ensure that wet gas is evenly distributed across the bed to maximize the life of the desiccant bed.

7. Desiccant chamber shall be fitted with a relief valve set at the design pressure of the dryer. Relief valves shall be complete with isolating ball valve with lockable handle and shall have outlets that are piped to a single accumulation pipe header at site for remote venting.

8. Desiccant chamber (tan to tan), heater housing and heated gas piping shall be insulated with 2 inch fiberglass and aluminum jacket for personnel protection and to minimize heat loss. Desiccant chamber top shall be equipped with an insulation blanket.

9. Desiccant chamber inlet and outlet switching valves shall be high performance, non-lubricated, low pressure drop valves, suitable for high temperature operation. Regular port ball valves or butterfly valves are acceptable as long as the overall system pressure drop requirements are met. Dryer block and bypass valves shall be lockable ball valves.

10. Valves shall be non-proprietary and manufactured through a third party.

11. Dryer desiccant shall be high capacity, non-corrosive, rugged and low pressure drop molecular sieve and a sieve size so selected as not to absorb or desorb a measurable amount of odorant from the main gas stream. The odorant is a mixture of tertiary butyl mercaptan (75 percent weight), isopropyl mercaptan (15 percent weight), and n-propyl mercaptan (10 percent weight).

12. Dryer regeneration at lower than line pressure is permitted. If venting of gas prior to regeneration is required, valves and tubing to the vent stack are to be provided.

13. If it is necessary to regenerate at higher than inlet pressures, lockable ball valves, multi-turn gage valve, regulator and tubing from a high pressure source shall be provided and configured to ensure the safe pressurization of the regeneration loop.

14. The heating cycle shall continue until the desiccant bed is completely dry and the cooling cycle shall continue until the desiccant bed temperature is within 20 deg F of the ambient temperature, and until all condensate is removed from the regeneration loop (exception: condensate collection tank).

15. The cooling cycle shall ensure adequate cooling of the desiccant bed to provide a constant outlet dewpoint at all times.

16. Recirculation of the regeneration gas shall be closed-loop with a blower and motor housed inside a U-stamped ASME Section VIII coded pressure vessel. It shall have the same or higher pressure rating as the dryer vessels. The blower and motor assembly shall be supported on the blind

flange of the housing. The housing shall be installed in a manner to provide and allow for ease of access to the blower and motor assembly. The horizontal housing shall be designed to permit sliding it away from the blind flange with minimal effort and by one person. Suitable anchoring of the blower housing shall be provided to support the blower housing (i.e. leveling bolts) once installed. This vessel must be flooded with gas at all times when power is connected to the system. The blower motor is to be certified by the manufacturer for use in a 100 percent natural gas environment.

17. Relief valves shall be installed to protect ASME vessels. This will include heater chambers, blower vessel, and filters and separators if they are defined as vessels. Relief valves shall be complete with isolating ball valve(s) with lockable handle and shall have outlets that are piped to a single accumulation vent stack.

18. Bleed valves are to be installed in all sections as required to depressurize the dryer for regeneration or for service or repair. These valves must be tubed to the vent header.

19. A fin and tube type air-cooled regeneration loop gas cooler shall be utilized to cool and condense water vapor from the regeneration gas. It shall have the same pressure and temperature rating as the dryer vessels. The Maximum Allowable Working Pressure (MAWP) for the unit shall account for any pressure increase due to the temperature increase during the dryer regeneration cycle. The cooler shall be complete with a Division 2 rated and weatherproof fan motor, non-sparking fan.

20. Sufficient heat tracing shall be installed to prevent freezing of any condensate which may be present in the regeneration lines, condensate bowl, coalescing filter, or any location which impedes proper condensate draining. If the piping/tubing and vessels and the regeneration procedures are to designed to eliminate any trapped condensate heat racing can be omitted.

21. A centrifugal type or coalescing, high efficiency separator shall be located downstream of the regeneration gas cooler to remove liquid water. The separator shall be complete with an integral condensate reservoir to accumulate the condensed liquids. The reservoir shall have a liquid capacity equivalent to at least two regeneration cycles.

22. The dryer manufacturer shall specify and supply an appropriate storage and disposal container (minimum 5 US gallon capacity) to receive odorized water which will be automatically drained from the dryer regeneration loop.

23. A single, electric, external regeneration gas heater shall be used for each dryer. The heater shall utilize “Incoloy” (alloy) sheathed low watt density heater elements located inside an insulated heater housing. The heater shall be complete with a sheath and a chamber, and a chamber downstream piping mounted thermocouple to monitor heater skin, heater

chamber and heater outlet regeneration gas temperatures, (adjustable in the controls) to control the regeneration gas temperature and provide heater over-temperature shutdown and alarm.

24. Dryer shall be equipped with a PLC to perform the following:

    a. *Assure full utilization of the moisture holding capacity of the desiccant bed before indicating a need to regenerate.*

    b. *Monitor the regeneration process and indicate switching points within the regeneration cycle.*

    c. *Communicate with the MCP PLC and the monitoring computer via Ethernet Network.*

25. The dryer controller shall be comprised of reliable and durable components not susceptible to shorting and corrosion. Control components including controllers and displays shall be third party/non-proprietary manufacture.

26. A hygrometer complete with a moisture sensor installed at the dryer outlet to monitor the actual dryer outlet dewpoint shall be provided. The dewpoint shall be indicated in degrees Fahrenheit through a display and transmitted to the MCP PLC.

27. The moisture sensor shall be installed such that it may be serviced without removing desiccant from the dryer and while the dryer is on service.

28. Dryer Regeneration shall be initiated manually upon receipt of a signal from the hygrometer that regeneration is required. The controller shall contain built-in diagnostics to check each operation as it is initiated and provide fault shutdown and annunciation.

29. The dryer system shall be equipped with the following standard instrumentation and alarms. All gauges are to be equipped with isolation valves to permit service without depressurizing connected piping and vessels.

    a. *Locally mounted inlet and outlet gas pressure gauges.*

    b. *Locally mounted chamber pressure gauge.*

    c. *Locally mounted regeneration blower gas differential pressure gauge.*

    d. *Locally mounted inlet and outlet filter gas differential pressure gauges.*

    e. *Panel mounted warning lights to indicate locally and to be communicated to the station master PLC:*

        1) High regeneration temperature.

2) Dryer outlet high humidity alarm.

3) Blower motor overload alarm with shutdown.

30. Panel mounted ESD button tied into the station ESD system. Any station ESD is to terminate dryer regeneration. Dryer operation shall be automatically restarted upon restoration of power on the ESD system.

31. Dryer shall include a fixed temperature heat detector and collection pan mounted above the dryer. This detector will be wired as an input to the dryer PLC and to the station Master PLC. A fire signal will cause the station to ESD and activate annunciation devices.

32. No pilot gas is to be required.

33. A block and bypass assembly shall be factory piped with two or three piece, carbon steel, butt weld or flanged, ball valves with stainless steel trim and handles that can be locked in either the open or closed position.

34. A ½" tube bypass shall be provided to allow a small quantity of odorized gas to bypass the bed. This bypass shall be equipped with a gauge style valve to meter this quantity.

2.02 MANUFACTURERS

A. Dryer assembly shall be designed and manufactured by:

1. PSB Industries Inc. "General Air Division"

2. SPX

3. XEBEC Adsorption Inc.

2.03 MATERIALS

A. Guards over moving parts shall be non-sparking aluminum construction meeting all OSHA requirements.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Refer to Section 18000, General, for general commissioning requirements.

3.02 QUALITY CONTROL

A. Shop Testing:

1. Dryer functions test (no flow) of minimum 4 hour duration (accelerated cycle).

2. Function test to check operation of control systems, safety alarms and shutdowns.

3. Calibration of instruments.

4. Performance tests to check motor voltage, current draw and power.

B. Field Testing During Startup and Testing:

1. Dryer functions test of minimum one regeneration cycle and 30 days of normal operation.

2. Function test to check operation of control systems, safety alarms and shutdowns.

3. Calibration of instruments.

4. Performance tests to check motor voltages, current draws and power distribution to other components. Verify all circuits are operational.

5. Verify shutdown alarms and sequences are working.

6. Verify the dew point immediately prior to regeneration and after at least one regeneration.

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. This Section applies to the design, manufacturing and testing of the CNG compressors for the compressed natural gas station.

2. The Work includes mechanical and electrical fabrication work and programming required in the shop fabrication of the CNG compression equipment.

B. Related Sections:

1. Section 18000 - All

1.02 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Equipment manufacturers shall have at least 10 years experience in manufacturing products and accessories similar to those specified for this Project, with a record of successful in-service performance.

1.03 SUBMITTALS

A. Submit in accordance with Section 18000, General:

1. Product data for products and materials in this section.

a. Include for oil carry-over control, the percentage of oil added that will be recovered in the filtration system before the gas leaves the compressor skid.

b. Submit operations and maintenance data in accordance with applicable provisions of Section 18000:

1) Include sections of the compressor not bled down by the service valve.

2. Manufacturer’s qualifications: Provide documented:

a. Evidence of oil carry-over performance from other projects.

b. Proposed methodology to achieve performance levels for the station.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Comply with the following:

1. Compressors shall be shipped to site only once after the pad has been completed and is ready for permanent installation. Equipment not ready for installation shall not be stored on site.

1.05 PROJECT SITE AND DESIGN CONDITIONS

A. Design Conditions:

1. Number of compressors — 2 compressors enclosed individually or in a single common enclosure

2. Inlet Gas Flowrate (minimum for each compressor):

425 Scfm @ 45 psig station inlet pressure but capable of operating through full range of station inlet pressures.

Proposers are encouraged to propose an option to increase this flow if this can be accomplished at minimum additional cost. This value added option will be considered when evaluating proposals.

3. Compressor must be minimum 4 stage

PART 2 - PRODUCTS

2.01 SYSTEM DESCRIPTION AND PERFORMANCE OF CNG COMPRESSOR

A. Compressors shall be fully redundant and shall have power and gas isolation to permit the complete tear down of one compressor while operating the second compressor. The compressors may be tied into a common suction line, gas dryer, pilot gas supply, gas recovery system and Master Control Panel. Otherwise, the units shall be constructed to be redundant with gas isolation for each unit. Each compressor shall have its own piping, separators, coolers, relief valves, instrumentation and controls. Control PLC can be common but I/O must be on separate cards such that the failure of one card affects only one compressor.

B. The output of the compression equipment shall be rated at a minimum of above flowrate for each compressor at the pressure downstream of the CNG dryer at typical station inlet and 4,500 psig discharge. The potential range of pressures on the incoming gas service line is provided in Section 18000. The compressors shall float continuously without adjustment through this range. (Note that these suction pressures are at the station inlet and not the actual compressor suction). If the compressors cannot float through the entire range, a regulator or pressure controller must be provided to limit the maximum pressure to prevent excessive rod load or power requirements. The setting of this device shall be specified.

C. Compressors shall be rated for continuous and intermittent/transient operation.

D. Compressors must meet the vibration levels outlined herein. If compressors do not meet these levels, the Owner may require the compressor packager to take certain remedial measures including the rebalancing of the compressor. Any remedial measures shall be at the Contractor's sole expense.

E. Crankcases shall be lubricated by a pressurized lubrication system.

F. Cylinders and interstage gas are to be air cooled.

G. Cylinders are to be lubricated or non-lubricated, but in either case must meet the design requirements outlined herein. Lubricated and non-lubricated proposals will require documented evidence of successful and reliable operation of at least 10 CNG compressors in North America with consistent ring and packing life of at least 4000 hours. Evidence must address the methodology used to provide high ring life including ring materials, bore/piston clearance and hardening, piston speeds, maximum temperatures and other design data deemed necessary by the Engineer.

H. Interstage temperatures shall not exceed 325 deg F on lubricated compressors and 300 degF on non-lubricated compressors.

I. Lubricated compressors shall have a maximum average piston speed of 900 feet per minute. Non-lubricated compressors shall have a maximum average piston speed of 750 feet per minute.

J. Each compressor shall be equipped with a continuous duty rated electric motor driven prelube pump. Prelube pump shall circulate oil from the crankcase sump through the lubrication channels for 60 seconds (user settable) prior to a startup attempt.

K. Oil carryover control: As a minimum, the compressor packages shall include:

1. The final coalescing filters for each compressor shall be a precoalescer and a coalescer filter in series. Each filter shall be sized to handle a minimum of 4 times the maximum compressor capacity at maximum suction conditions and a discharge pressure of 1,000 psig. (Minimum acceptable filter shall be a Parker J-6.) (Lubricated and non-lubricated designs)

2. Bidders are to specify with their bid, the percentage of oil added that will be recovered in the filtration system before the gas leaves the compressor skid.

L. Control, safety and isolation valves:

1. A manual 2 or 3 piece fire rated ball valve (API 607) with a carbon steel body and stainless steel trim and a locking kit shall be supplied and installed on the suction line immediately outside of the enclosure and on each compressor inside the enclosure.

2. A suction check valve with a carbon steel body, stainless steel trim and an O-ring seal (bubble tight) shall be installed on the suction line.

3. A spring return (Normally closed) actuated 2 or 3 piece fire rated ball valve (API 607) with a carbon steel body and stainless steel trim shall be installed on the suction line upstream of the compressor inlet.

4. Each interstage separator shall include its own check valve and a normally open (NO) actuated ball valve with its own pilot solenoid valve to control drainage of condensates from each stage separator or filter independently. Separators and filters shall be flushed hourly and also on shutdown of the compressor to the recovery tank(s).

5. The final compressor discharge shall be equipped with a check valve.

6. Immediately outside of the enclosure, a manual, stainless steel ball valve with stainless steel trim and a locking kit shall be supplied on each outlet tube.

7. Compressor suction, recovery system and each stage must be equipped with an ASME "UV" stamped safety relief valve set and sealed at the design pressure.

    a. For SRVs located between the compressor inlet and discharge, inlet and outlet ports of SRVs shall be equipped with integral ANSI flanges or Compression fittings with tube adapters of appropriate pressure rating, which will ensure that the valves can be reinstalled repeatedly without damage or difficulty in returning the valve to the exact orientation, prior to removal.

    b. For the SRV located on the recovery system, a manual, locked open, isolation ball valve shall be provided upstream of the flanged inlet port to the SRV.

8. Manual, stainless steel service drain valve (rising plug or gage valve type) shall be provided between sections of piping, and vessels to allow them to be safely blown down to the vent stack. Any sections of the compressor not bled down by the service valve shall be clearly identified in the maintenance procedures.

M. Suction and Interstage Gas Filtration and Pulsation Control:

1. Suction filter complete with minimum 0.9 micron absolute filter cartridge. Suction filters and valves must be sized so that the pressure drop shall not exceed 2 psig at a flowrate of 2 times the maximum compressor capacity at maximum suction conditions. If the recovery line is tied into the suction line upstream of the filter, without a coalescing filter, a coalescing, high efficiency, sub-micron oil removal type filter, designed to remove aerosols, liquids and solids down to 0.9 microns absolute size and 0.0014 ppmw oil concentration is required. The filter drain port shall be equipped with a manual, lockable isolation valve and tied to the condensate collection tank through a separate drain line.

2. Each compression stage shall be equipped with a properly sized knockout, mesh pad, or vortex separator to remove oil and condensates. This separator shall be mounted after each cooler stage. Piping and coolers shall be oriented to be self draining to the separators, without inadvertently trapping condensate within sections of pipe or cooler.

3. Suction and/or discharge pulsation bottles/dampeners shall be provided as per compressor block manufacturer's recommendations.

N. Cooler Requirements:

1. Approach Temperature: Coolers shall be designed and sized to reduce the cold side interstage gas temperature to 20 °F above ambient temperature at maximum compressor cylinder discharge temperature and maximum ambient temperature.

2. Heat exchangers shall be oversized a minimum of 10 percent to compensate for fouling and damaged passes (which require plugs). Thus the cooler must be able to meet the specified approach temperature with 10 percent of the tubes plugged, on all stages.

3. The cooler shall be thoroughly cleaned and purged to ensure that contaminants and hydro testing water is removed.

4. The main cooler fan shall be direct driven from a 480 VAC electric motor, or belt driven off of the compressor. If the fan is belt driven, a separate enclosure exhaust fan is required to purge the enclosure if a leak is detected. If direct drive, the cooler motor shall be maximum 1200 rpm.

5. Fans shall be aluminum or plastic composite construction.

O. Piping and Pressure Retaining Components:

1. Interstage coolers, piping, separators and appurtenances shall be designed for 350 deg F and a minimum of 20 percent or 50 psi (whichever is greater) above the interstage discharge pressure at maximum suction pressure and 4500 psig discharge pressure. All of these devices shall be stamped and certified for the actual maximum design pressure of the device rather than the calculated required pressure. (For example if a vessel is required to be rated for 600 psig but is actually capable of 680 psig using ASME design standards, the vessel shall be stamped for 680 psig.)

2. Final discharge cooler, piping, separators and appurtenances shall be designed for 350 deg F and a minimum of 5,000 psig.

3. Piping, instrumentation tubing, electrical conduit and devices shall be routed and installed to allow for full access for inspections and repairs of the cooling coils.

4. Coolers and downstream piping shall be designed, constructed and oriented such that all liquids (condensate and oil) will drain by gravity from the cooler inlet to the suction separator of the next stage.

P. Gas recovery system:

1. A "run down" sequence is not acceptable except on high suction pressure machines where permitted by the Engineer.

2. Gas vented during the unloading cycle shall be captured in an ASME Section VIII, Division 1 vessel(s) and cycled back to the compressor suction on next start up. The recovery receiver shall be sized to contain all gas released from two shutdowns of both compressors simultaneously, with no recirculation between shutdowns, and without relief valve activation under any circumstances. Where multiple tanks are used, gas is to be vented into one near the bottom, flow out of the first near the top and into the second at the bottom, then out of the second near the top to the next tank or to compressor suction.

3. A manual, lockable, isolation ball valve shall be provided on the inlet of the first recovery tank and on the outlet of the final recovery tank.

4. A recycle regulator shall be provided downstream of the manual isolation valve on the outlet of the final recovery tank and its pressure drop shall not exceed 5 psig at a flowrate of 2 times the maximum compressor capacity at maximum suction conditions.

   a. A NC actuated, carbon steel or stainless steel ball valve with stainless steel trim shall be mounted downstream of the recycle pressure controller at the connection to the suction line which shall be upstream of the suction pulsation dampener.

   b. The line from the recovery tank to the suction shall be sized to allow continuous flow of the compressor when the compressor is running unloaded.

Q. Control and Instrumentation:

1. Duplex compressor package shall be equipped with a single Master Control Panel (MCP) and instrumentation as indicated in Section 18550, Control Systems. The MCP shall be factory mounted and wired on the end of the compressor skid.

2. Compressor suction, discharge at each stage, final discharge (downstream of discharge check valve), recovery system, pilot air and compressor crankcase oil system shall be equipped with remotely mounted, glycerin filled, 2-1/2 inch pressure gages. Instrumentation tubing shall be included.

3. Compressor suction, discharge at each stage, final discharge (downstream of discharge check valve), recovery system, pilot air and compressor crankcase

oil system shall be equipped with explosion proof or intrinsically safe pressure transducers. A manual, lockable, isolation valve is to be provided for the recovery system pressure transducer. The compressor crankcase oil system pressure transducer shall be mounted as close as possible to the compressor. All other pressure transducers shall be mounted remotely. Instrumentation tubing shall be included.

4. The discharge from each stage, ambient temperature, compressor oil, and the enclosure interior shall be equipped with Type J thermocouples or RTD equipped with a stainless steel armored sheath and cable. Thermocouple wires shall run continuous to their termination point on the UCP PLC thermocouple card.

5. The compressor shall be equipped with an explosion proof or intrinsically safe vibration switch.

R. Enclosure:

1. The compressors shall be housed in a noise attenuating enclosure. The enclosure shall shield the compressor and auxiliary equipment from climatic conditions. The enclosure shall be provided with adequate ventilation to prevent heat or gas build up and reject heat generated by the compressor and after cooler.

2. The enclosure shall be designed to limit acoustic emissions from the package by the use of noise attenuating insulation, baffles, silencers, soundproof doors, panel gasketing and low noise fans. Maximum sound emission is to be 80 dBa at 15 feet from the shelter. No octave band shall exceed the average of its neighbors by more than 5 dBa (based on open field individual operation). The compressor enclosure shall be equipped with sufficient silencers to achieve specified maximum noise level. All air discharge points from the enclosure are to be designed to channel the air away from the end where the electrical room is mounted—this will add to the safety of the system and will reduce noise to neighboring properties.

3. Air openings shall be equipped with bird screen.

4. Sufficient access shall be provided using doors and hatches to perform routine or major work on the compressor (e.g. SRV replacement, cooler tube inspection, cooler fin cleaning, oil changes, belt replacement, ring and valve replacement, control valve replacement, compressor frame and cylinder rebuilds), without removing or disassembling the shelter. Door holdbacks shall be provided on each door. Service access for infrequent repairs required less than once per year shall be provided by either a door or a removable panel.

5. Materials shall be non combustible or fire rated materials. This shall include insulation, interior and exterior panels, roof, floors and doors, and enclosure framing members.

6. A 480 VAC 3 phase electric exhaust fan shall be provided in the enclosure. Fan shall be activated if the temperature inside the enclosure exceeds 110 deg F and the compressor is not operating, and shall be sized to ensure that with 100 deg F ambient air, that the air temperature inside the shelter does not exceed 120 deg F. Fan shall also be activated by a manual purge switch on the unit control panel door and by the MCP in the event of a gas detection event. If a separate motor is provided for the cooler fan, the cooler fan may be used to provide this function.

7. Class I, Division 2, Group D explosion proof lighting shall be provided to light all areas inside each enclosure.

8. Compressor crankcase is to be equipped with an explosionproof, electric immersion heater. The prelube pump shall run continuously to circulate heat from the immersion heater if ambient temperatures drop below a user setting (40 degrees F to be set initially). The prelube pump shall cease operating 30 seconds (user settable) after the compressor has successfully started and shall remain off until 30 minutes (user settable) after the compressor has shut down.

9. Compressor enclosure shall be equipped with a forced air, electric resistance unit heater and/or immersion heaters if and as required by climatic conditions to ensure that equipment starts and operates reliably at the lowest ambient conditions. If forced air electric heater is used, the enclosure openings shall be equipped with actuated dampers that open on power loss. Heaters shall be rated for Class 1, Division 2 locations. The heater shall shutdown automatically immediately prior to and during compressor operation.

S. Main and secondary motors:

1. The prime mover shall be an 1,800 rpm electric motor with continuous nameplate horsepower rating equal to or exceeding the maximum compressor and ancillary equipment horsepower requirement.

2. All motors shall have a service factor of 1.15 and shall be rated for Class 1 Division 2 except that fan motors shall have a Class 1, Division 1 rating.

3. Compressors may be belt driven.

T. Miscellaneous Requirements:

1. Guards including fan and belt guards shall be OSHA compliant and shall be of a spark proof construction.

2.02 MANUFACTURERS

A. Explosionproof electric forced air convection heaters shall be supplied by Ruffneck or Chromalox.

B. Compressor Packages shall be designed and manufactured by:

1. ANGI Energy
2. Atlas Copco (Greenfield Compression)
3. Bauer
4. IMW
5. JW Energy
6. Universal Air

2.03 MATERIALS

A. Guards over moving parts shall be non-sparking aluminum construction meeting all OSHA requirements.

PART 3 - EXECUTION

3.01 SHOP AND FIELD QUALITY CONTROL

A. Mechanical/Acoustical Vibration Analysis and Testing:

1. If the compressor package is deemed to have excessive levels of vibration, the Owner may require the vendor to address this condition with additional bracing, isolation, pulsation control and other measures as deemed necessary by the Owner.

2. The following levels of vibration will form the basis of this evaluation:

a. Piping: The entire range of operating conditions (loaded operation from minimum to maximum suction pressure and from 1,000 psig to 4,500 psig discharge pressure as well as unloaded operation) shall be modeled.

1) As a percentage of average absolute line pressure, shall be limited to 7 percent or 3R percent (R = stage pressure ratio), whichever is lower.

2) Pulsation generated unbalanced forces shall be evaluated in all piping and shall be less than 100 lbs peak-peak X nominal pipe size to maximum of 1,000 lbs peak-peak for frequencies up to 30 Hz. At frequencies above 30 Hz the maximum level shall be decreased in a manner similar to the line side pulsation guideline specified in API 618 (i.e. the square root of 30/frequency).

3) The mechanical vibration levels of the piping on the assembled and installed compressor package and the site piping shall not exceed the lesser of 10.0 mils peak to peak displacement, 1 inch/sec peak velocity or 2 G peak acceleration with the compressor running at normal operating speed.

b. Rotating Equipment:

1) The equipment vibration amplitude at all frequencies shall not exceed the lesser of 5.0 mils peak to peak displacement, 0.2 in/second peak velocity on rotating equipment, 0.4 in/second peak velocity on reciprocating equipment or 1 G peak acceleration with the compressor running at normal operating speed.

2) The vibration amplitude may be plotted in acceleration, velocity or displacement; however the limits outlined above shall be clearly identified at each frequency of interest.

B. Shop Testing:

1. Cycle valves under maximum operating pressure by actuating solenoids.

2. Function test to check operation of controls systems, system annunciation, safety alarms and shutdowns, coordinated with others.

3. Calibration of instrumentation.

4. Operations of subsystems including ESD and remote alarms.

5. Successful compressor operation on test loop for 8 hours (if shop does not have adequate equipment and pressure available, test must be completed during field test).

6. Performance tests to check motor voltage, current draw and power.

C. Field Testing During Commissioning:

1. Mechanical reliability of componentry.

2. Verification of controls logic and wiring.

3. Verification of safety and control device calibration and program logic.

4. Successful operation for 100 loaded compressor hours on each compressor within predicted performance parameters (pressures, temperatures, flow, noise, pulsation and vibration). If the package operates out of specified performance levels, or if nuisance shutdowns occur during this period, correct the underlying problem and the test period shall be restarted.

5. Provide a site test of vibration levels of piping, vessels and other major components (compressor, cooler, motor) for each compressor after startup. This site test will be evaluated to confirm compliance with specified vibration levels.

6. Performance tests to check motor voltages, current draws, and power distribution to other components. Verify all circuits are operational.

7. In-situ noise testing to confirm that CNG compressor package noise levels are within the levels permitted by this specification.

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Design, manufacturing and testing of the CNG gas control, storage and dispensing equipment for the compressed natural gas station. The station shall include the supply of one (1) dual hose ½" dispenser suitable for light vehicle applications, two (2) single hose high flow ¾" single hose heavy vehicle dispensers, one priority fill/ESD panel, and one gas storage assembly and another ***alternate for an additional gas storage assembly***.

2. The Work includes mechanical and electrical fabrication work and programming required in the shop fabrication of the CNG gas control equipment.

B. Related Sections:

1. Section 18000 - All

1.02 QUALITY ASSURANCE

A. Manufacturer Qualifications: Equipment manufacturers shall have at least 5-years experience in manufacturing products and accessories similar to those specified for this Project, with a record of successful in-service performance.

B. All dispensers shall have NIST approval.

C. All dispensers shall have NRTL approval.

1.03 SUBMITTALS

A. Submit in accordance with:

1. Product Data: for products and materials in this Section.

2. Test Certificates: Dispenser hoses.

3. Qualifications: Manufacturer's list of projects.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Comply with the following:

1. Dispensing and gas storage equipment shall be shipped to site only once the Contractor has completed its pad and is ready for permanent installation.

PART 2 - PRODUCTS

2.01 SYSTEM DESCRIPTION AND PERFORMANCE OF GAS CONTROL SYSTEM

A. CNG Priority Fill, and ESD System:

1. Panel to be factory installed, tubed and wired to common compressor skid or field installed and wired adjacent to the storage assembly.

2. Panel shall be controlled by the MCP PLC. All flow control valves to be 1" actuated ball valves.

3. Provide one explosion proof or intrinsically safe pressure transducer for each of the three banks of storage, plus one for the compressor inlet. The pressure transducers must be tied directly into, and monitored by, the compressor MCP PLC.

4. One stainless steel, glycerin filled, 2-1/2 inch pressure gage shall be installed in the panel for each of the three banks of storage, plus one gauge for the compressor inlet. The pressure gages will be flush mounted so they can be viewed from the outside of the panel without opening the panel doors.

5. Explosion proof, three way pilot gas solenoid valves. These solenoids shall be controlled by the MCP PLC.

6. Automatic fail safe, normally closed, 1 inch stainless steel valves with stainless steel trim. The tubing to/from each valve shall be installed so the valve can easily be removed without removing any additional tubing or components. Each valve shall be controlled by a three-way solenoid valve with control logic from the station Master PLC. The valves shall provide the following function:

   a. Direct the flow of gas from the compressor(s), first to any vehicle that is filling at a dispenser.

   b. If no vehicles are fueling, direct the gas flow to the third or high pressure bank to keep it at maximum pressure (4500 psig or as set on site), when the third bank reaches maximum pressure, fill the second bank to maximum pressure, when the second bank reaches maximum pressure fill the first or low bank to maximum pressure, then signal the compressor(s) to shut down.

   c. If at any time an ESD is pressed, the storage banks must be isolated by removing power from the spring return, fail safe, actuated ball valves. The master PLC will use a signal from the dispenser to open the storage ESD valves only when a hose is active.

7. The panel shall be equipped with service bleed valves to properly and safely bleed down fittings required to service all components and instrumentation within the panel.

8. Lines to and from the panel shall be equipped with manual, stainless steel ball valves with stainless steel trim and a locking kit. The inlet and outlet of each valve shall be a compression fitting.

9. Minimum tubing and valve size within the panel and in the flow path from the compressor to the storage and from the storage to the dispenser manifolds is 1-inch.

10. This panel shall include a pilot gas system to provide gas to power all actuated valves in the station. The pilot gas system shall include two high pressure regulators in series each designed to accept high pressure inlet gas (to provide redundancy) to cut storage gas to the required 100 +/- psig and two ASME UV stamped safety relief valves in parallel sized to each handle the flow from one of the regulators. Pressure gauges shall be provided between and downstream of the regulators. Contractors are permitted to install this system, compliant with the above requirements, on each piece of equipment in lieu of running pilot gas from this one central point.

11. Pilot gas tubing from the actuators to the solenoid valves and from the solenoid valves to the pilot gas supply including one manual ball valve with locking kit for the pilot gas supply to the panel.

12. Junction boxes and conduits required for installation of the solenoids and pressure transducer including explosion proof seals on each conduit entering the buffer panel.

B. CNG Cascade Storage System: One included plus one **Alternate**

1. One storage vessel assembly comprised of three vessels with a total of 35,000 scf of CNG storage (nominal) capacity at 4,500 psig shall be provided.

2. Vessels shall be 5,500 psig (or greater) design pressure to ASME Section VIII, Div. 1, (3:1 safety factor is allowed on seamless cylindrical vessels).

3. Vessels shall be either cylindrical tubes or spheres supported by a structural steel frame.

4. Vessels shall meet ASME Sect VIII Division 1 requirements for CNG application, and be registered with the National Board.

5. 1-inch lockable isolation ball valves shall be provided on the process connection of each vessel.

6. A "UV" stamped safety relief valve is to be provided on each vessel with an isolation ball valve locked in the open position.

7. Each vessel shall be equipped with a multi-turn “gage valve style” drain valve at the relief valve end. Storage assemblies must be approximately 2 inches higher at the process end to facilitate draining at the relief valve end. Vessel drain valves shall be arranged and tubed to a height of approximately 24 inches to 36 inches from grade. Note that for 6 tube assemblies, drains for

one 3 tube assembly will be operated from the one side of the assembly (in place) while drains for the other assembly will be drained for the other side (in place).

C. Common Requirements for Heavy and Light Duty Vehicle Dispensers:

1. Meters and dispensers shall be approved for retail sale of fuel with all regulatory agencies with authority at this site.

2. Cabinets and dispenser entrance/service pits shall be stainless steel.

3. Dispenser display heads must be compatible with commonly available fuel management systems. This display head must provide scalable volume and penny pulse outputs and authorization in and out signals.

4. High capacity, pre-coalescing (Grade 10) filters must be provided at the inlet to each dispenser line. These filters shall have a minimum 5,000 psig rating as well as filter size and capacity meeting or exceeding the specifications of Parker J-4 filters for light vehicle dispensers and Parker J-6 filters for heavy vehicle dispensers. The filter shall be serviceable without removal of adjacent tubing or equipment. The filter shall be equipped with a multi-turn “gage style” manual drain valve. Filters may be mounted externally in a lockable stainless steel panel beside the dispenser if there is insufficient room in the pit for service.

5. Dispensers shall include electronic temperature compensation as follows:

   a. Electronic temperature compensation controlled by the main PLC or the dispenser, to regulate to 3,600 psig at 70 deg F.

   b. The system shall be reprogrammable to regulate to 3,000 psig at 70 deg F.

   c. For fast fill, this system shall compensate for ambient temperature and heat of compression effects to fill to 95 to100 percent of tank rated capacity under initial pressure and ambient conditions where code pressure limits do not restrict filling to higher pressures.

6. A minimum of one explosion proof or intrinsic pressure transducer shall be installed on tubing immediately upstream of each fast fill hose. The pressure transducers shall be tied directly into and monitored by the dispenser temperature compensation controller.

7. One stainless steel, glycerin filled, 2-1/2-inch pressure gage shall be connected to the tubing upstream of each hose. The pressure gage shall be tied into the dispenser panel downstream of the automatic valve and flush mounted so it can be viewed from the front of the dispenser panel.

8. Each fast fill hose shall have an ASME "UV" Stamped SRV set and sealed at 4,500 psig to protect the hose from over pressurization. This will include an

SRV inlet connection to the process tubing and an adequately sized SRV outlet connection to the vent piping.

9. Components shall be rated to 5,000 psig with safety factor as required by ASME B31.3.

10. Each line within the dispenser shall be equipped with service bleed valves to properly and safely bleed down fittings required to reconnect the hose after breakaway or to service any components or instrumentation in the dispenser.

11. Hoses shall be mounted to be sufficiently anchored and reinforced that it can withstand, without damage, a hose tension 4 times that imposed by a breakaway event. (This may require the installation of outside 4-inch HSS support posts to suspend the fueling hose on fast fill dispensers.)

12. Hoses shall be a maximum of 18 feet in length. The Owner will advise the actual required length prior to shipment of the equipment.

13. Hose retractors shall be provided to prevent the hose from touching the ground when in use or in storage position.

D. CNG Heavy Duty Fast Fill Vehicle Dispensers (**Two Single Hose Dispensers in Scope)**

1. Dispenser shall include displays on both sides and shall be configured to allow fueling from either side of the fuel island.

2. Minimum tubing and valve size within the dispenser flow path is 3/4-inch. Standard port ball valves are acceptable. The mass flow meter is exempted from this requirement.

3. Micromotion CNG 50 meter on each hose (approved by local weights and measures authorities).

4. Each dispenser hose assembly shall be 3/4-inch for flow and 3/8-inch for vent and shall be equipped with a stainless steel OPW CT5000 (or approved equal) fueling nozzle (vented away from the dispenser), an OPW ILB-5 (or approved equal) in-line stainless steel breakaway connection to limit longitudinal hose tension (to the level currently stipulated by NFPA 52) on each of the flow and vent hose.

5. Three explosion proof, three-way, pilot gas solenoid valves per hose to control the actuated valves that provide sequencing. These solenoid valves shall be controlled by the main PLC or the dispenser mounted sequencing controller. Sequencing system is to provide cascaded fill to maximize fill speed and storage utilization. In the event of an ESD, all actuated ball valves must close automatically.

6. Three automatic fail safe, normally closed, stainless steel ball valves with stainless steel trim, per hose. **High pressure solenoid valves are not acceptable.** The inlet/outlet of this valve shall be a 3/4-inch compression (or

zero clearance) fitting. If compression fittings are used, the tubing to/from the valve must be installed so the valve can easily be removed without removing any additional tubing or components. These valves shall be controlled by the three-way solenoid valves.

7. One dispenser shall be equipped with a hose vent down assembly. This assembly shall consist of a receptacle with check valve for a Sherex CT5000 and a 1/4-inch multi-turn valve. The downstream side of the valve shall be tied into the vent piping in the dispenser.

8. Each supply line to the dispenser shall be equipped with a manual, stainless steel ball valve with stainless steel trim and a locking kit mounted upstream of the filters. The inlet to each valve must be a 3/4-inch compression fitting.

9. Each line to the dispenser shall be equipped with a check valve internal to the sequencing system to prevent back feed from higher banks. The inlet/outlet of each valve shall be a 3/4-inch compression fitting.

10. A manual, 3/4-inch stainless steel ball valve with stainless steel trim and a locking kit shall be provided in an easily accessible location on the outside of the dispenser cabinet just upstream of the fueling hose.

11. Dispenser manufacturer shall provide prefabricated dispenser installation “pits” which shall be cast into the concrete island. One pit is to be included with each dispenser. Pits shall be sized to permit generous access to dispenser gas and electrical services and full serviceability for components within the dispenser. Dispenser pits with side extensions shall include a diamond plate lid designed with a drop in handle and provision for padlocking.

12. The dispenser shall be shutdown automatically by the master PLC or dispenser controller if preset flow rates or fill volumes are exceeded, or if a sudden loss of pressure occurs. These values shall be determined by the Equipment Supplier at time of commissioning. These values must be easily recalibrated in the field. The Equipment Supplier shall perform tests for the Owner, the Engineer and the local regulatory agency to prove its reliable operation.

13. Dispensers shall be field calibrated to +/-1 percent accuracy with a vehicle fill from 1,000 psig, 2,000 psig and 2,500 psig initial pressures.

14. Dispensers shall include an electronic digital display showing quantity in Therms, GGE or GDE as determined by the Owner at time of commissioning. This unit must be compatible with a fuel management system selected by the Owner. Pulse output from this display head shall be connected to a customer supplied fuel management system.

15. Dispenser shall be equipped with a green “dispenser active” light (or approved equal) mounted at the dispenser. This light will energize when the controller activates the dispensing cycle and will de-energize only after this cycle is fully

completed or has been terminated manually. A digital display indicating fill status is acceptable.

16. An explosion proof, momentary contact, ESD button shall be installed on each dispenser and clearly labeled. Each ESD button shall be equipped with two Normally Closed (NC) contacts. One NC contact shall be hardwired in series with the other station ESDs and the master start pushbutton located on the face of the MCP. The second NC contact shall be hardwired as an independent input to the MCP PLC.

17. One explosion proof or intrinsically safe vibration switch shall be installed in each dispenser enclosure. This switch shall initiate an ESD.

18. Junction boxes, conduits and explosion proof seals required for installation of the display head, micro motion, lights, solenoid and pressure transducers including explosion proof seals on each conduit entering the dispenser.

E. CNG Light Duty Fast Fill Vehicle Dispensers (**One Dual Hose included in scope**) Requirements:

1. Minimum tubing and valve size within the dispenser flow path is 1/2-inch. Standard port ball valves are acceptable.

2. Micromotion CNG 50 meter on each hose (approved by local weights and measures authorities).

3. Each dispenser hose assembly shall be 3/8-inch for flow and 3/8-inch for vent and shall be equipped with a stainless steel OPW CT1000 (or approved equal) fueling nozzle (vented away from the dispenser), an OPW ILB-1 (or approved equal) in-line stainless steel breakaway connection to limit longitudinal hose tension (to the level currently stipulated by NFPA 52) on each of the flow and vent hose.

4. Three explosion proof, three-way, pilot gas solenoid valves per hose to control the actuated valves that provide sequencing. These solenoid valves shall be controlled by the main PLC or the dispenser mounted sequencing controller. Sequencing system is to provide cascaded fill to maximize fill speed and storage utilization. In the event of an ESD, all actuated ball valves must close automatically.

5. Three automatic fail safe, normally closed, stainless steel ball valves with stainless steel trim, per hose. **High pressure solenoid valves are not acceptable.** The inlet/outlet of this valve shall be a 1/2-inch compression (or zero clearance) fitting. If compression fittings are used, the tubing to/from the valve must be installed so the valve can easily be removed without removing any additional tubing or components. These valves shall be controlled by the three-way solenoid valves.

6. One dispenser shall be equipped with a hose vent down assembly. This assembly shall consist of a receptacle with check valve for a Sherex CT1000

(or approved equal) and a 1/4-inch multi-turn valve. The downstream side of the valve shall be tied into the vent piping in the dispenser.

7. Each supply line to the dispenser shall be equipped with a manual, stainless steel ball valve with stainless steel trim and a locking kit mounted upstream of the filters. The inlet to each valve must be a 1/2-inch compression fitting.

8. Each line to the dispenser shall be equipped with a check valve internal to the sequencing system to prevent back feed from higher banks.

9. A manual, 1/2-inch stainless steel ball valve with stainless steel trim and a locking kit shall be provided in an easily accessible location on the outside of the dispenser cabinet just upstream of the fueling hose.

10. Dispenser manufacturer shall provide prefabricated dispenser installation "pits" which shall be cast into the concrete island. One pit is to be included with each dispenser. Pits shall be sized to permit generous access to dispenser gas and electrical services and full serviceability for components within the dispenser. Dispenser pits with side extensions shall include a diamond plate lid designed with a drop in handle and provision for padlocking.

11. The dispenser shall be shutdown automatically by the master PLC or dispenser controller if preset flow rates or fill volumes are exceeded, or if a sudden loss of pressure occurs. These values shall be determined by the Equipment Supplier at time of commissioning. These values must be easily recalibrated in the field. The Equipment Supplier shall perform tests for the Owner, the Engineer and the local regulatory agency to prove its reliable operation.

12. Dispensers shall be field calibrated to +/-1 percent accuracy with a vehicle fill from 1,000 psig, 2,000 psig and 2,500 psig initial pressures.

13. Dispensers shall include an electronic digital display showing quantity in Therms, GGE or GDE as determined by the Owner at time of commissioning. This unit must be compatible with a fuel management system selected by the Owner. Pulse output from this display head shall be connected to a customer supplied fuel management system.

14. Dispenser shall be equipped with a green "dispenser active" light (or approved equal) mounted at the dispenser. This light will energize when the controller activates the dispensing cycle and will de-energize only after this cycle is fully completed or has been terminated manually. A digital display indicating fill status is acceptable.

15. An explosion proof, momentary contact, ESD button shall be installed on each dispenser and clearly labeled. Each ESD button shall be equipped with two Normally Closed (NC) contacts. One NC contact shall be hardwired in series with the other station ESDs and the master start pushbutton located on the face of the MCP. The second NC contact shall be hardwired as an independent input to the MCP PLC.

16. One explosion proof or intrinsically safe vibration switch shall be installed in each dispenser enclosure. This switch shall initiate an ESD.

17. Junction boxes, conduits and explosion proof seals required for installation of the display head, micro motion, lights, solenoid and pressure transducers including explosion proof seals on each conduit entering the dispenser.

F. Vehicle Defueling System (supplied loose):

1. Supply one vehicle-to-vehicle defueling hose. Hoses shall be conductive 3/8-inch CNG hoses meeting requirements in Article 2.03, Materials, and with an overall length of 50 feet with an in-line breakaway installed at the midpoint. Hoses shall be equipped with a Swagelok 83 series 3-way valve on each end. One end shall be equipped with an OPW BDN defueling connector. The other end shall be equipped with an OPW NGV1 fueling connector. The vent hose shall be split in the middle of the hose assembly to allow venting.

2. A detailed defueling and vehicle-to-vehicle defueling procedure shall be provided.

2.02 MANUFACTURERS

A. Dispensing Equipment shall be designed and manufactured by one of the following:

1. ANGI Energy

2. Atlas Copco (Greenfield Compression)

3. IMW

4. Kraus Industries

5. TGT

2.03 MATERIALS

A. Gas control panels shall be NEMA 4 rated stainless steel panels.

B. Dispenser Hoses:

1. Hose to be rated for CNG use by manufacturer and marked or tagged "For CNG Use".

2. Carbon steel braid hoses are not acceptable, even if the braid has a corrosion resistant plating.

3. If the hose is thermoplastic, it shall be factory pin pricked and pressure tested per NFPA requirements. Hose tag shall include the following:

a. “For CNG Use"

b. Test date

c. Test pressure

d. Hose serial number

e. MAWP (maximum allowable working pressure)

f. Burst pressure

g. A copy of the test certificate shall be included in quality control information for the station.

4. Hoses shall be comprised of:

a. A 2-foot electrically conductive hose rated for a minimum of 5000 psig operating pressure and 20,000 psig burst pressure, bonded to a 3/8-inch vent hose of the same specifications as the flow hose.

b. An electrically conductive hose rated for a minimum of 5000 psig operating pressure and 20,000 psig burst pressure of sufficient length to reach the fueling receptacle on the vehicles yet not touch the ground when the hose is disconnected, bonded to a 3/8-inch vent hose of the same specifications as the flow hose.

c. Total hose length is to be 20 feet or longer if allowed by code and if required to be functional with the vehicle fill points.

5. Flow and vent hoses shall be equipped with an OPW ILB (in line breakaway), (or approved equal), in-line stainless steel breakaway connection to limit longitudinal hose tension to the level currently stipulated by NFPA 52.

6. A hose retractor and a holster are required for each hose to ensure that a 20' long hose does not touch the ground.

7. Vent hoses shall be tubed away from the vehicle and vented above the dispenser.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Refer to Section 18000, General, for general installation requirements.

3.02 SHOP AND FIELD QUALITY CONTROL

A. Shop Testing – Dispensers:

1. Cycle valves under maximum operating pressure by actuating solenoids.

2. Test display head reset sequence and totalizers using signal generator on Micro Motion electronics.

B. Shop Testing – Storage : As required by governing codes, standards and best industry practice.

C. Field Testing During Commissioning:

1. Mechanical reliability of componentry based on a minimum of 10 fills per dispenser or 30 days operation, whichever occurs first.

2. Verification of controls logic and wiring.

3. Verification of safety and control device calibration, operation and program logic.

4. Accurate and repeatable measurement based on a minimum of 500 fills per dispenser or 30 days operation, whichever occurs first. (not including defueling panel)

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. The control system work required in the manufacturing of the Compressed Natural Gas Station.

2. The Work includes but is not limited to, the supply, installation and hookup of electrical and controls equipment and materials to accomplish complete and functioning equipment. The Work consists generally of the complete fabrication and programming of the natural gas fueling equipment and control systems.

B. Related Sections:

1. Section 18000 - All

1.02 QUALITY ASSURANCE

A. Manufacturer Qualifications: Equipment manufacturers shall have at least 5 years' experience in manufacturing products and accessories similar to those specified for this Project, with a record of successful in-service performance.

1.03 SUBMITTALS

A. Submit in accordance with Section 18000, General:

1. Product data for all components of control system.

2. Qualification: Manufacturer's project list.

PART 2 - PRODUCTS

2.01 SYSTEM DESCRIPTION AND PERFORMANCE OF ELECTRICAL AND COMPUTER CONTROLS

A. Power Distribution and Control Panel: Panel shall meet seismic requirements of site location (as applicable).

1. Power Distribution and motor control panel may be supplied loose for site installation beyond the hazardous location.

2. Panel shall be sized and equipped to service all existing equipment as outlined herein.

3. Breakers shall be lockable in the off position and all 480 VAC breakers to include 120 V shunt trip coil. Breakers for all skid mounted equipment and the CNG dryer is to be provided.

4. SCR starters for the CNG main compressor motors. SCRs shall be heavy duty rating with integral bypass contactor to engage once motors reach full operating speed.

5. Flange mounted disconnect rated at the full amperage rating of the panel. Minimum amp rating to be 800 Amps at 480 Volts or larger if required to provide sufficient capacity.

6. A 480VAC surge suppressor shall be installed in the panel on the load side of the primary disconnect.

7. Disconnects and cross-line starters for fans, and pumps.

8. Disconnects and contactors for compressor heaters and CNG compound lighting.

9. Control transformer to provide 120 VAC for the equipment and a minimum of four 15 A duplex receptacles mounted in a safe area but accessible for wok near the CNG station equipment compound.

B. Equipment Suppliers are to provide a Master Control Panel (MCP) to provide overall station control and control of the two compressors. <u>All station power distribution and control systems are to be designed to integrate all of the existing equipment as specified herein plus allow network/control system integration of two future dual hose dispensers.</u>

1. General:

   a. The Master Control Panel shall be designed to provide centralized station monitoring and control functions. The panel shall be generously sized to allow it to be used as a central pull point for control systems in the facility. (Note requirements for open, unused space to be provided in the panels as outlined in Section 18160, Electrical Equipment Fabrication and Installation).

   b. The Master Control Panel shall control all dispensing operations, normal compressor start/stop and the utilization of all compressors. Dispensers that provide their own cascade control and temperature compensation shall be permitted.

   c. The Contractor will be permitted to combine the operation of the UCP and MCP into one panel with one PLC.

2. MCP and UCP Requirements:

   a. An off/on selector switch shall be provided for each compressor on the face of the MCP hard wired to the MCP PLC

   b. An off/on selector switch shall be provided for each fast fill dispenser hose on the face of the MCP. Provision shall be made for two future dispensers.

c. A keyed alarm acknowledge pushbutton shall be provided on the face of the MCP hard wired to the MCP PLC. A reset pushbutton shall be provided on the face of the MCP hard wired to the MCP PLC.

3. The MCP shall be equipped with its own Programmable Logic Controller (PLC) based control system which shall be linked to the dryer PLC via Ethernet. Each compressor UCP PLC shall accept discrete and analog inputs and effect control on its respective compressor.

4. MCP and dryer shall be equipped with a panel mounted, NEMA 4 and Class 1, Division 2, Group D rated, color LCD displays, suitable for the ambient temperature range, readable in sunlight or darkness, and installed such that the panel electrical rating is not compromised. The display used in all control panels shall be of the same manufacturer. Outdoor displays are to include a sun and rain shield. Displays shall be connected to the Ethernet network.

5. The MCP display shall show the status of compressors; the current pressure, status and flow rate and total dispensed quantity of each dispenser; the ambient temperature; station inlet pressure (upstream of the dryer) the cascade pressures; pilot gas pressure; and the status of the gas dryer. The display shall indicate compressor suction, interstage and discharge pressures, interstage and discharge temperatures, and machine status (operation, or shutdown mode, type of fault or ready).

6. MCP and the gas dryer control panels shall be NEMA 4 panels, factory mounted and wired on the equipment skids.

7. PLC power and power to displays shall be protected by an uninterruptible power supply (UPS) and surge suppression. PLC CPUs, operator interfaces and ESD circuits must be maintained for a minimum of 1 hour under a power outage event and must automatically restart the system if power is restored within that time unless a fault is present. Power to dispenser meters and display heads, intrinsic barriers, power supplies and transformers and solid state control devices must be protected with surge suppressors across hot, ground and neutral, at its source.

8. The MCP PLC shall control lead-lag start and stop control of gas compressors which are "on-line". This system shall be designed to equalize operating hours on all machines.

9. The MCP PLC shall start an additional "on-line" compressor, when available, to replace a machine which has been automatically shut down for fault conditions.

10. The MCP Operator Interface shall allow the operator to select 0, 1, or 2 compressors allowed to operate (to allow for the future units), however, the MCP shall have the ability to override the automatic operation and manually select a lower number of compressors to be operating if additional flow is not required. Thus the startup logic for compressors should not start any compressor until the cascade is sufficiently depleted (third bank pressure less than 3800 psig). A second compressor shall not be started unless the first

compressor is not maintaining the high bank at 3600 psig, and so on. The sequence must time delay the start of a subsequent compressor by approximately 2 minutes under any compressor start scenario. A PLC input from the station Standby Power ATS will signal the controls to shed load under standby power—the Owner will advise the load shed condition at time of commissioning.

11. Status lights shall be provided on the MCP to indicate if:

    a. Each compressor is ready, faulted or in local mode.

    b. The CNG dryer requires regeneration.

    c. A station ESD or power failure has occurred.

12. An audible alarm (bell or buzzer) shall sound at the remote mounted distribution panel in case of a station fault. If this alarm is not acknowledged after 60 seconds, remotely mounted lights and or buzzers shall be activated.

13. An external weatherproof horn and strobe to be mounted 36” above the distribution panel shall be supplied and programmed to indicate a fault (white) and an emergency (red).

14. Audible alarms and strobes shall be silenced/disabled when a keyed momentary contact switch on the MCP is activated. The maximum time lag between alarm generation and alarm activation shall be one second.

15. The MCP PLC shall allow for authorization input from each dispenser fuel management controller.

16. MCP shall be capable of discrete communication of station ESD and gas detection alarms by providing 8 dry contact outputs for programming as directed by the Owner.

C. PLC Requirements:

1. PLCs shall be the same model and shall include the same CPU. The dryer shall be exempt from this requirement; however, it shall be compatible with other station PLCs and able to communicate with the MCP PLC by Ethernet.

2. PLC power supplies shall be the largest output available.

3. I/O cards shall be selected to provide a minimum of 20 percent additional, unused channels which shall be wired to the terminal strip. A minimum of 4 spare slots shall be provided on each PLC for future needs.

D. PLC Controlled Fault Shutdowns to be provided and annunciated:

1. Dryer Shutdowns:

    a. Dryer outlet high humidity

b. Blower motor overload

c. High cooler discharge temperature

d. High heater bundle or chamber temperature

e. Transducer, thermocouple or RTD failure (i.e. broken wire or shorted)

f. Heat detector alarm

2. Compressor Shutdowns:

a. Low oil pressure

b. High oil temperature

c. Low suction pressure

d. High suction pressure

e. High interstage and discharge temperature set at or below 325 °F

f. High crankcase pressure (if applicable)

g. High interstage and recovery tank pressure

h. Normal discharge pressure 0-6,000 psig range set at 4,500 psig

i. High discharge pressure 0-6,000 psig range set at 4,700 psig

j. Transducer, thermocouple or RTD failure (i.e. broken wire, or shorted)

k. High vibration in compressor

3. Electric Motor Shutdowns:

a. High winding temperature

b. Overcurrent

c. Contactor/SCR fault

4. Dispenser Shutdowns: (local annunciation only)

a. Excess flow rate (Fast fill only)

b. Excess fill amount (Fast fill only)

c. Sudden loss of pressure (Fast fill only)

d. Transducer, thermocouple or RTD failure (i.e. broken wire or shorted)

e. High vibration in dispenser (Fast fill only)

5. Cascade Storage System Shutdowns: Transducer, thermocouple or RTD failure (i.e. broken wire or shorted)

6. General Shutdowns:

a. Emergency shutdown buttons.

b. High or low pilot gas pressure.

c. High or low station inlet pressure. Transducer to be installed upstream of dryer isolation valves.

E. Fault Notification:

1. The MCP or communications panel shall include email notification of faults and ESD events at the station.

2. The notification of event shall include a time and the nature of the fault or event. This information is to be emailed out to up to 10 Owner defined email addresses.

3. A followup email shall be sent to the same addresses indicating the time that the fault was reset or cleared.

F. Additional Control System Design Requirements:

1. Inputs shall be wired fail-safe (circuit to open on fault condition).

2. In the case of 4-20mA inputs, the PLC shall be configured for 0-20mA inputs to determine if an input is a zero drift (typically 3.6 to 4 mA) or if there is a broken wire (<3.6mA). A reading of 20 mA shall be interpreted as a short circuit.

3. Thermocouple inputs shall be configured so that a broken wire situation is identified and annunciated.

4. Output channels on PLC cards shall be de-energized in the event of an ESD, causing devices such as valves and contactors/motor starters to go to their safe, unpowered condition.

5. Controls shall be organized in a "first out" sequence. The controls react to the first of a possible series of sequential faults, shut the equipment down and lock out subsequent faults.

G. Emergency Shut Down (ESD) System Requirements

1. Hardware Requirements:

a. The ESD system shall operate on 120V AC.

b. Buttons shall be red momentary contact mushroom type. Each ESD button shall be equipped with two Normally Closed (NC) contacts. The first NC contact shall be hardwired in series with the other station ESDs and the master start pushbutton located on the face of the MCP. The second NC contact shall be hardwired as an independent input to the MCP PLC.

c. One keyed reset momentary contact switch shall be provided on the Master Control Panel (MCP).

d. A hard wired, Master Control Relay (MCR) shall be provided in the MCP and in each compressor UCP and the dryer UCP.

2. Buttons shall be provided as follows:

a. One button on each side wall of the compressor enclosure and on the gas dryer control panel.

b. One button at each dispenser (including the defueling panel) which is of the type that is protected to prevent accidental activation (recessed button). Each dispenser (including the defueling panel) shall be equipped with an internally installed earthquake switch in series with the ESD button.

c. Additional buttons to be supplied loose and installed at each mangate and other locations around the facility as dictated by local authorities and best design practice.

d. One button/station shall be available for remote mounting (supplied loose). This button/station shall be supplied with an ESD button, a white light indicating station fault, a red light and buzzer indicating an ESD and a keyed alarm silence button.

3. The system shall perform as follows:

a. Power is removed from all motor contactors and the main motor starters.

b. The power is removed from all solenoid valves, and hence the following valves close automatically:

1) Station inlet valve

2) Compressor inlet valves

3) Storage panel high pressure line valves

4) Dispenser end high pressure line valves

c. The following valves open automatically:

1) Compressor drains (unloaders) and/or compressor bypass valves.

d. In the event of a 50 percent LEL, the Master control PLC will cause an ESD and cause a shunt to trip on the power supply breaker. This shunt feature will require a manual reset.

e. The station inlet valve will be controlled by the PLC and will open only when one or more compressors are required to operate. The valve will remain closed when no compressors are operating.

H. Combustible Gas Detection System Requirements:

1. One self-contained combustible gas detection unit shall be installed in each compressor enclosure and wired to the MCP.

2. The combustible gas detection unit shall be an Infra-Red (IR) type, and shall include internal diagnostics to confirm that the lens is not dirty.

3. The unit shall have a local LED or LCD readout (suitable for outdoor use) in percent LEL.

4. The unit shall have 120V rated relay contacts for 20 percent and 50 percent LEL.

a. A 20 percent LEL signal from the detector to the UCP in a compressor will cause the immediate shutdown of that compressor and starting that compressor's enclosure exhaust fan.

b. A 50 percent LEL signal from the detector to the UCP in a compressor will cause the shunting of power to that compressor, while leaving its dampers open (if applicable).

c. Dry contact outputs to allow the above events to be displayed and logged on the Owner's Garage FACP shall be provided.

5. The unit shall have a 4-20 mA output in percent LEL.

6. One calibration kit shall be included.

I. Systems Control And Data Acquisition (SCADA) System Requirements: This system is **included in this bid as an Alternate.** Even in the event the Owner does not elect to purchase this system under this contract, the control system must contain all data points necessary to allow the future connection of the Master PLC to a SCADA system **by others** to achieve the following reporting, without any hardware change to the station equipment.

1. System shall include Dell Precision Workstation with Windows 7 Professional Operating system, MS Office 2010 Professional and all SCADA development and runtime software with licenses naming the Owner. Workstation to include external 2TB portable USB drive, 24" Dell monitor and 1500 VA APC UPS. SCADA runtime license to include at least 3 times the current required number of points/tags.

2. The status of subsystems including Emergency Shut Down (ESD), each compressor, gas dryer, the dispensing and defueling system, valves, fans and motors shall be displayed on a monitoring computer to be networked to the station equipment by Ethernet. The SCADA computer may be mounted on site or remote from the other equipment in another Owner building.

3. Monitored Parameters and Shutdowns: The following list indicates parameters which shall be monitored, and fault conditions for which the PLC control system shall shut down the equipment. The master control PLC shall have the ability to provide (via the network) this data.

    a. Status—SCADA Monitored Parameters:

        1) Dryer status:

            a) Regeneration chamber gas inlet temperature during heating

            b) Regeneration chamber gas discharge temperature during heating

            c) Regeneration chamber internal temperature during heating

            d) Status of tower (regeneration in progress, or in use)

            e) On-line or fault condition

            f) Outlet dewpoint--MANDATORY

        2) Compressor Status (each compressor):

            a) Suction, interstage, discharge, final discharge, recovery tank, pilot air pressure and oil pressure

            b) Interstage, discharge, enclosure, ambient, crankcase oil temperature

            c) Status of discrete I/O

            d) On-line or fault condition

            e) Idle or compressing

            f) Total hours of operation, loaded hours of operation, number of starts in total

            g) Hours of operation in last 24 hours, number of starts in last 24 hours

            h) Status of control valves

        3) Electric Motor Status:

a) Temperatures of windings

b) Motor faults (overcurrent, contact failure and the like)

4) Dispenser Status (for each fast fill dispenser):

a) Ambient temperature

b) Vehicle pressure (psig)

c) Running and final gas pressure

d) Running and final mass dispensed (Therms)—this will require a high speed counter/frequency input from each dispenser head to the MCP PLC.

e) Status of control valves

5) Storage System Status:

a) Pressure in storage banks

b) Status of valves

6) Instrument Air Status:

a) Air system pressure-receiver and downstream of regulator

7) General Status:

a) Date and time

b) Ambient temperature (precision thermocouple)

c) Status of station inlet fire valve.

d) Station inlet gas pressure.

4. SCADA Logging:

a. The SCADA shall be configured to log operations and faults automatically as outlined below. These logs shall be in Excel and should be individual files for each category, not a composite file. Given the size limitations of the files, it is required that the system automatically create a new folder and files each month.

b. Individual Log: Log entries shall include the time and date and the ambient temperature: (Dryer logging can be limited to those parameters available on the PLC or by discrete signal.)

c. Dryer Dewpoint: Trigger-once daily and log: (Mandatory)

1) Dewpoint

d. Dryer Regeneration: Trigger regeneration. Log:

1) Start and end time.

2) Each thermocouple maximum reading during heating cycle (if available)

e. Dryer Fault: Trigger dryer fault. Log:

1) Type of fault.

2) Dryer status-drying or regeneration

3) All pressures and temperatures immediately prior to fault (if available)

f. Compressor Operations (for each compressor individually). Trigger-each time a compressor reaches a target pressure such as 4,200 psig, log:

1) Compressor loaded and unloaded hours

2) Compressor starts (total and within last hour)

3) Gas, oil, enclosure and motor temperatures

4) Gas, air and oil pressures

5) Status of valves and status of compressor

6) Gas detector reading (percent LEL)

g. Compressor Fault (for each compressor individually). Trigger shall be any compressor fault then log:

1) Type of fault

2) Data Recorded from Compressor Operations Log: Data shall be captured immediately prior to shutdown

h. Dispenser Transactions (for each dispenser individually). Trigger shall be each fill or attempted fill, then log:

1) Start time and end time of fill

2) Air Pressure

3) Initial and final vehicle pressure.

4) Quantity of gas dispensed—note that the dispenser head will need to communicate with a high speed counter on the MCP PLC.

5) Type of termination—automatic or operator switched

i. Dispenser Fault (for each dispenser individually). Trigger shall be any dispenser fault, then log:

1) Type of fault

2) Data from Dispenser Transaction Log: Data shall be captured immediately prior to shutdown

j. Gas Detection. Trigger shall be any gas 20 percent, 50 percent or fault event, then Log:

1) Type of fault or alarm

2) Which detector

3) Time acknowledged

4) Status of dryer, each compressor, each dispenser (operating or standby)

k. ESD: Trigger shall be any ESD event, then log:

1) Which button caused the ESD

2) Time acknowledged

3) Status of dryer, each compressor, each dispenser (operating or standby)

PART 3 - EXECUTION

3.01 INSTALLATION

A. Refer to Section 18000, General, for general installation requirements.

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Specifications for a NATURAL GAS ENGINE– DRIVEN GENERATOR SET and SWITCHGEAR that has been tested, factory built, and production-tested with all necessary components for a complete installation as specified on plans and drawings.

2. The Work includes but is not limited to, the supply, installation, hookup, and commissioning of the generator and switchgear inclusive of all materials required to accomplish complete and functioning equipment installation.

B. Related Sections:

1. Section 18000 - All

C. Any exception to the published specification shall be subject to the approval of the engineer.

1.02 QUALITY ASSURANCE

A. The power system shall be furnished by a single manufacturer who shall be responsible for the design, coordination, and testing of the complete system as described on plans and drawings.

B. B.The complete power generation system, including engine, generator, switchgear, shall be the product of one manufacturer who has been regularly engaged in the production of complete generating systems for at least 10 years. All components shall have been designed to achieve optimum physical and performance capability and prototype tested to prove design integration.

C. The generator shall be listed to UL 2200 or submitted to an independent third party certification process to confirm compliance as installed.

1. IEEE 446 – Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications

2. NFPA 70 – National Electric Code, Equipment shall be suitable for use in systems in compliance to Article 700, 701, and 702

3. NFPA 110 – Emergency and Standby Power Systems

1.03 GENERAL REQUIREMENTS

A. The generator set will be a commercial design and will be complete with all of the necessary accessories for complete installation as shown on the Contractor’s plans and drawings. The equipment supplied shall meet the requirements of the National Electric Code and applicable local codes and regulations. All equipment shall be

new and of current production by a national firm that manufactures the generator sets, controls, transfer switches, switchgear, and assembles the generator set as a complete and coordinated system.

1.04 SUBMITTALS

A. Submit in accordance with Section 18000, General; include data on features, components, ratings, and performance. Include the following:

1. Dimensioned outline plan and elevation drawings of engine generator set and other components specified.

2. Time-current characteristic curves for generator protective device.

3. Design calculations, including total site load (kW) requirements.

4. Transient response of frequency and voltage for the generator set.

5. Wiring diagrams.

6. Warranty statements.

PART 2 - PRODUCTS

2.01 SYSTEM DESCRIPTION AND PERFORMANCE OF NATURAL GAS ENGINE – DRIVEN GENERATOR SET

A. The power generating system shall satisfy the following performance criteria at site conditions:

1. Total **Power Capability** Continuous full site electrical load as determined by the Design/Build Contractor

2. **Frequency** 60 Hz

3. **Voltage** 480/277 – 3 phase, 4 wire

4. **Power Factor** 0.8

B. The emergency electric power generating system shall have a site capability of carrying the full electrical load under continuous operation as determined per the Contractor's load summary.

C. The system shall consist of a NATURAL GAS ENGINE – DRIVEN GENERATOR set which includes all controls, protection, output circuit breaker, wiring and accessories for automatic start-stop operation.

D. The overload capability shall be in excess of this rating, at extreme limits of parameters specified.

E. The generator set shall include the capability of automatically controlling the generator set operation. After starting, the unit will attain rated speed and voltage,

and accept rated load. Generator set speed shall be controlled by the engine governor, while generating output voltage regulation shall be a function of the generator automatic voltage regulator.

F. The generator set start-stop sequence shall be initiated manually or automatically by closing or opening of a contact. The control system shall automatically engage the cranking motor, sense the starting speed, disengage the motor and arm the engine protection circuit.

G. The generator set shall be equipped with a SCR starter.

H. The automatic transfer switch must be rated for the station main panel amperage.

I. System Performance.

1. The power generating system shall conform to the following performance criteria:

a. Rating - Engine brake horsepower shall be sufficient to deliver full rated generator set KW/KVA at the installation site when operated at rated rpm and equipped with all engine-mounted parasitic and external loads such as radiator fans and power generators.

b. Start Time and Load Acceptance - Engines shall start, achieve rated voltage and frequency, and be capable of accepting load within 10 seconds when properly equipped and maintained.

c. Block Load Acceptance - Transient response shall conform to ISO 8528 requirements.

J. Responsibility.

1. The responsibility for performance to this specification shall not be divided among individual component manufacturers, but must be assumed solely by the primary manufacturer. This includes generating system design, manufacture, test, and having a local supplier responsible for service, parts, and warranty for the total system.

K. Subassembly and Packaging

1. Generator set mounted subassemblies such as cooling system, base, air intake system, exhaust outlet fittings, and generator set mounted controls and switchgear shall also be designed, built, and assembled as a complete unit by the engine - generator manufacturer.

L. Production Tests

1. The system manufacturer shall perform post production tests on the generator set supplied. A certified report of these tests shall be available when requested at the time of the generator set order.

M. Service and Warranty

1. The manufacturer shall have a local authorized dealer who can provide factory trained servicemen, the required stock of replacement parts, technical assistance, and warranty administration.

2. The generator set supplier shall have factory trained service representatives and tooling necessary to install, test, maintain, and repair all provided equipment.

N. Parts Availability

1. The generator set supplier shall have sufficient parts inventory to maintain over the counter availability of at least 90% of any normal wear and tear parts. (Belts, hoses, filters, turbines, pumps, safeties, regulators, injectors, gaskets).

2.02 SYSTEM COMPONENTS

A. Approved systems are Caterpillar, Kohler, Cummins, or equivalent subject to conforming to the specifications herein.

B. Generators shall be designed to provide not less than 110% output, based on specified capacity, for a period of 2 hours at temperature extremes.

C. Engine

1. The engine shall be a stationary, 1800 rpm, four-cycle design, vertical inline or V-type, with Dry exhaust manifolds.

D. Engine Equipment

1. The engine shall be equipped with air filters, fuel filters and pressure gauge, lubricating oil cooler, filters, and pressure gauge, water pump and temperature gauge, service hour meter, flywheel, and flywheel housing.

E. Lubrication System

1. The lubrication oil pump shall be integral with the engine and gear driven from the engine gear train. The system shall incorporate full flow filtration with bypass valve to continue lubrication in the event of filter clogging.

2. System shall utilize synthetic lubricants with compatible filtration, and compatible engine seals, approved by the engine manufacturer.

F. Governor

1. The engine governor shall control engine speed and transient load response within commercial and ISO 8528 tolerances. It will be selected, installed, and tested by the generator set manufacturer.

G. Exhaust System

1. The engine exhaust system shall be installed to discharge combustion gases quickly and silently with minimum restriction.

H. Electric Starting System

1. The engine SCR starting system shall include 24 volt DC starting motor(s), starter relay, and automatic reset circuit breaker to protect against butt engagement. Batteries shall be maintenance free, lead acid type mounted near the starting motor. A corrosion resistant or coated steel battery rack shall be provided for mounting. Required cables will be furnished and sized to satisfy circuit requirements. The system shall be capable of starting engine within 10 seconds.

I. Generator

1. The emergency generator shall be rated for continuous service at the total site electrical load as determined by the Design/Build Contractor, 0.8 PF, 480 V, three phase, four wire, 60 Hz, 1800 rpm.

2. The generator shall be capable of withstanding a three phase load of 300% rated current for 10 seconds, and sustaining 150% of continuous load current for 2 minutes with field set for normal rated load excitation.

J. Structure

1. The generator shall be close coupled, drip proof and guarded, constructed to NEMA I, single bearing, salient pole, revolving field, synchronous type with windings in the pole faces of the rotating field.

K. Voltage Regulator

1. The automatic voltage regulator shall be manufactured by the manufacturer of the engine generator set. The volts/hertz regulator shall sense three phases of generator output voltage and exhibit the following characteristics:

a. Generator output voltage maintained within +/- 1% of rated value for any load variation between no load and full load.

b. Generator output voltage drift no more than +/- 1/2% of rated value at constant temperature.

c. Generator frequency change not over ¼ cycle no load to full load and back.

L. Enclosure

1. The enclosure shall offer protection as specified by OSHA from all moving and hot parts of the engine, generator and radiator. It shall be constructed to allow full access to the engine for maintenance without exposing personnel to any moving machinery. Radiator and radiator fan assembly shall be totally enclosed with lockable door over the radiator cap. The radiator shall be sized

to accommodate any resulting air flow restrictions. Provision shall be made for a duct flange or perforated metal grill to protect the radiator core. Doors shall be the lift off hinge less type with lockable stainless steel security latches.

M. Automatic Start-Stop Control

1. The control panel shall be shock mounted on the generator and have the capability to face either side or the rear of the generator. The 24 volt DC system shall power the logic and include:

   a. Control:

      1) Generator voltage level rheostat and ammeter/voltmeter phase selector switch shall be mounted on the panel door.

      2) The engine start-stop switch shall be door mounted and include positions for off/reset, manual, automatic and stop

   b. Shutdowns/Annunciation:

      1) The generator set shall shut down and individual red lights shall signal operational faults of high water temperature, low oil pressure, over speed and over crank

   c. Monitor:

      1) Monitoring devices shall include AC voltmeter, AC ammeter, ammeter/voltmeter phase select switch, frequency meter, electric hour meter, oil pressure gauge, and water temperature gauge.

   d. Safety Devices:

      1) ISO red emergency stop pushbutton shall be provided, and all controls, annunciation, and monitors labeled with ISO symbols.

   e. Emergency Stop Switch

      1) The engine controls will be arranged to stop the engine if a remote maintained contact emergency stop switch is depressed. Once the switch has been operated, it should not be possible to start the engine until the stop switch is released. The "Switch Off Normal" indicating lamp on the front of the panel and the remote engine fail alarm must both be activated if the stop switch has been operated.

   f. Circuit Breaker

      1) The circuit breaker shall be mounted and connected in a guarded drip-proof enclosure.

      2) One molded case electronic circuit breaker, three pole, single-throw, stationary-mounted with manual operating handle, overload and short circuit trips, complete with cable lugs. Overcurrent trip

shall be 100% rated and sized to provide enclosed and ambient temperature compensation. The breaker shall be qualified for 600 volt operation and tested in accordance with UL Standard 489, LSI / LSIG. Breaker shall be adjustable to allow for 110% output test.

g. Weatherproof Enclosure

1) Enclosure shall be sound attenuating enclosure: the engine-generator set shall be factory enclosed in not less than a 12 gauge steel enclosure constructed with corner posts, uprights and headers. The roof shall aid in the runoff of water and include a drip edge. The enclosure shall be coated with electrostatically applied paint, baked and finished to manufacturers specifications. The enclosure shall be completely lined with not less than 1” thick, UL 94 HF-1 listed, sound deadening material. This material must be of a self-extinguishing design. The critical silencer shall be included to further reduce the unit sound level.

h. Automatic Transfer Switch

1) The automatic transfer switch (ATS) will be used to momentarily connect the generator set to the utility during transfer. This will be achieved through an electrically operated and mechanically held design with double throw construction to achieve a “make-before-break” (closed transition) configuration.

2) Voltage and frequency on the normal power supply and the generator set shall be continuously monitored. The voltage and frequency settings at the controller shall be field adjustable in 1% increments either locally or remotely. An adjustable dropout time for transient voltage and frequency events shall also be provided.

3) An adjustable time delay shall be provided to override momentary normal power outages and delay the transfer and generator set starting signals. All time delay features shall be adjustable to 1 second increments.

4) Auxiliary contacts shall be provided consisting of a minimum of two contacts. Closed when the ATS is connected to the normal power source, and two closed when the ATS is connected to the generator set.

5) LED indicating lights shall be provided. One to indicate when the ATS is connected to the normal power source (Green) and one when the ATS is connected to the generator set (Red).

6) The ATS controller shall be able to interface through a standard communications network. This will be achieved via an RS-485 serial communication. The transfer switch shall also be able to interface to applications using Modbus RTU standard protocols utilizing register maps.

7) **Transfer switch – 480 VAC, 3 Phase, 4 Wire, Amperage to be determined by Design/Build Contractor**

8) **Enclosure Type – NEMA 1**

PART 3 - EXECUTION

3.01 INSTALLATION

A. Refer to Section 18000, General, for general installation requirements.

B. The installation shall be performed in accordance with shop drawings, specifications, and the manufacturer's instructions.

C. Post-Installation Testing

1. Following installation, pre-start, operational, and orientation tests shall be performed by the system manufacturer's local dealer representative(s) in the presence of the owner's engineer or designated appointee.

End of Section

PART 1 - GENERAL

1.01 SUMMARY

A. Requirements and Contract Obligations:

1. Section includes CNG Technical Data Forms that must be completed and submitted with each Technical Proposal. Technical data is to be provided on the included Excel Spreadsheets that are downloaded as part of the "Request for Proposals" documents from http://www.guc.com/Vendors/. Proposers must complete all cells filled in bright green that are applicable to their proposal.

2. These forms will be used as part of the evaluation as to whether the proposal is compliant with the Specifications.

3. Proposers understand and agree that if they are awarded the contract, that the data provided on these forms will form a basis of their technical and price proposals. Proposers will not be allowed to substitute suppliers, manufacturers, models, quantities or specifications without the prior written consent of the Owner.

4. In addition to the Information on the forms, Proposers shall be required to provide the computer simulation output from the compressor manufacturer's simulated runs. This data shall be provided for minimum, typical and maximum station inlet pressure.

B. Related Sections:

1. All other sections of Division 18, CNG Station Design, Fabrication, Installation and Commissioning.

2. Section 18000 - All

C. The following Six (6) pages include copies of the Technical Data Form Spreadsheets for reference.

Single Tower CNG Dryer Data			
Item #	Item Description:	Base Specification Compliant	
1	Manufacturer:		
2	Model:		
3	Design Pressure (psig):		
4	Flow Capacity in SCFM @ 100 psig:		
5	Maximum Inlet Gas Pressure (psig)		
6	Vessel Height:		
7	Vessel Diameter:		
8	Pounds of Desiccant:		
9	Type of Desiccant:		
10	Manufacturer of Desiccant:		
11	Outlet Dewpoint at System Pressure: (F)		
12	MMSCF between Regenerations based on specified pounds of H2O/MMSCF:		
13	Regeneration Heating Time at 0 F Ambient Temperature:		
14	Regeneration Cooling Time at 100F Ambient Temperature:		
15	Electrical Classification: (Class and Division)		
16	Heater Size: (kW)		
17	Amp Draw During Regeneration:		
18	Make and Model of Control PLC:		
19	Communication with MCP PLC by Ethernet or by Analog and Discrete I/O:		
20	System Pressure Drop: (psi)		
21	Air Pressure Required: (psig)		
22	Air Flow Required: (cfm)		
23	Process Inlet and Outlet Pipe Size and Type: (inches/ANSI XXX Flange)		
24	Length x Width x Height of Dryer Assembly: (inches)		
25	Weight of Assembly: (pounds)		

See Next Sheet for Additional Data Requirements

CNG Compressor Data			
Item #	**Item Description:**	**Contractor to Complete Data:**	
	Compressor:	Attach compressor run simulation at maximum ambient temperature and minimum, maximum and typical inlet pressure conditions. This run must indicate predicted operating pressures, heat rejection and temperatures, rod loads and horsepower at these operating conditions.	
		Base Specification Equipment	
1	Compressor Packager:		
2	Compressor Block Manufacturer:		
3	Compressor Block Model:		
	CNG Compressor Specifications:		
4	Rotating Speed: (rpm)		
5	Piston Stroke: (inches)		
6	Piston Speed: (Feet/minute)		
7	Allowable Suction Range: (Minimum and Maximum Pressure in psig)		
8	Flow Capacity in SCFM and Hp required @ minimum **station inlet pressure:**		
9	Flow Capacity in SCFM and Hp required @ typcial **station inlet pressure:**		
10	Flow Capacity in SCFM and Hp required @ maximum **station inlet pressure:**		
11	Horsepower and Speed of Main Motor: (HP/rpm)		
12	Main Motor-Belt Drive or Direct Coupled:		
13	Maximum Discharge Pressure: (psig)		
14	Compression Ratio and Maximum Discharge Gas Temperature - 1st **Stage: (Ratio/Degrees F)**		
15	Compression Ratio and Maximum Discharge Gas Temperature - 2nd **Stage: (Ratio/Degrees F)**		
16	Compression Ratio and Maximum Discharge Gas Temperature - 3rd **Stage: (Ratio/Degrees F)**		
17	Compression Ratio and Maximum Discharge Gas Temperature - 4th **Stage: (Ratio/Degrees F)**		
18	Manufacturer Rod Load Rating: (pounds Compression/pounds Tension)		
19	Maximum Rod Loads-1st **Stage: (pounds Compression/pounds Tension)**		
20	Maximum Rod Loads-2nd **Stage: (pounds Compression/pounds Tension)**		
21	Maximum Rod Loads-3rd **Stage: (pounds Compression/pounds Tension)**		
22	Maximum Rod Loads-4th **Stage: (pounds Compression/pounds Tension)**		
23	Compressor Ring Material(s)--1st Stage:		
24	Compressor Ring Material(s)--2nd Stage:		
25	Compressor Ring Material(s)--3rd Stage:		
26	Compressor Ring Material(s)--4th Stage:		
27	Expected Ring Life in Intermittent CNG Service: (Hours)		
28			

	Cooling System		
40	Air Cooled: (Y/N)		
41	Number of Cooling Fans:		
42	Diameter/Hp of Cooling Fan: (inches/Hp)		
43	Cooling Fan Air Flow and Maximum Static Pressure: (cfm/inches wc)		
	Compressor Lubrication		
50	Recommended Crankcase Oil		
51	'Spin Off' Oil filter-?		
52			
53	Points of pressurized lubrication:		
54	Amount of oil in gas stream downstream of the final compresoor coaling filter: (pounds per MMSCF)		
55	Amount of oil recaptured as a percentage of oil injected or added to the compressor: (percent)		
	Package Information		
60	Suction and/or Discharge Pulsation Vessels on all stages? (yes/no—which stages if no)		
61	Size of Blowdown Receiver: (gallons)		
62	Design Pressure of Blowdown Receiver: (psig)		
63	Estimated Pressure in Blowdown Receiver after Shutdown from Operation at Maximum Suction and Discharge Pressures: (psig)		
64	Enclosure Heater Size and Type: (kW/Forced Air)		
65	Maximum Noise Level (at loudest point) at 15 feet from the compressor: (dbA)		
66	Length x Width x Height of Compressor Assembly: (inches)—Individual Compressor Package		
67	Length x Width x Height of Compressor Assembly: (inches)—Integrated package with two compressors, control panels and CNG dryer		
68	Weight of Assembly: (pounds)—Individual Compressor Package.		
69	Weight of Assembly: (pounds)—Integrated package with 2 compressors, control panels and CNG dryer.		
70	Make and Model of UCP PLC:--specification compliant		
71			
73			

See Next Sheet for Additional Data Requirements

Buffer Storage Data		
Item #	Item Description:	Contractor to Complete Data:
1	Manufacturer:	
2	Cylinders or Spheres:	
3	Design Pressure: (psig)	
4	Number of Vessels per Assembly:	
5	Outside Diameter: (inches)	
6	Vessel Length (cylinders only): (Feet-inches)	
7	Water Capacity/Vessel: (Cubic Feet)	
8	Total Capacity in SCF of CNG at 4500 psig:	
9	Year of Manufacture:	
10	Length of Each Assembly:	
11	Width of Each Assembly:	

See Next Sheet for Additional Data Requirements

Station Valve Data					
Item #	Item Description:	Contractor to Complete Data:			
	Size/Application:	Valve Brand:	Valve Model	Pressure Rating (psig)	Connection Size and Type (inches/NPT or ANSI ??? Flanged)
1	½" and lower ball valve for high pressure:				
2	Light Duty Dispenser Flow Control Valves:				
3	¾" ball valve for -high pressure				
4	1" ball valve for high pressure				
5	>1" Ball Valve for inlet and interstage pressures				
6	Compressor recovery system recycle pressure controller:				
7	Filter and Vessel Multi-turn Drain Valves-high pressure				
8	Storage SRVs				
9	Compressor 1st stage Discharge SRV				
10	Compressor 2nd stage Discharge SRV				
11	Compressor 3rd stage Discharge SRV				
12	Compressor 4th stage Discharge SRV				
13	Compressor Recovery Tank SRV				
14	Dispenser SRV				
15	Other:				
16					
17					
18					
19					

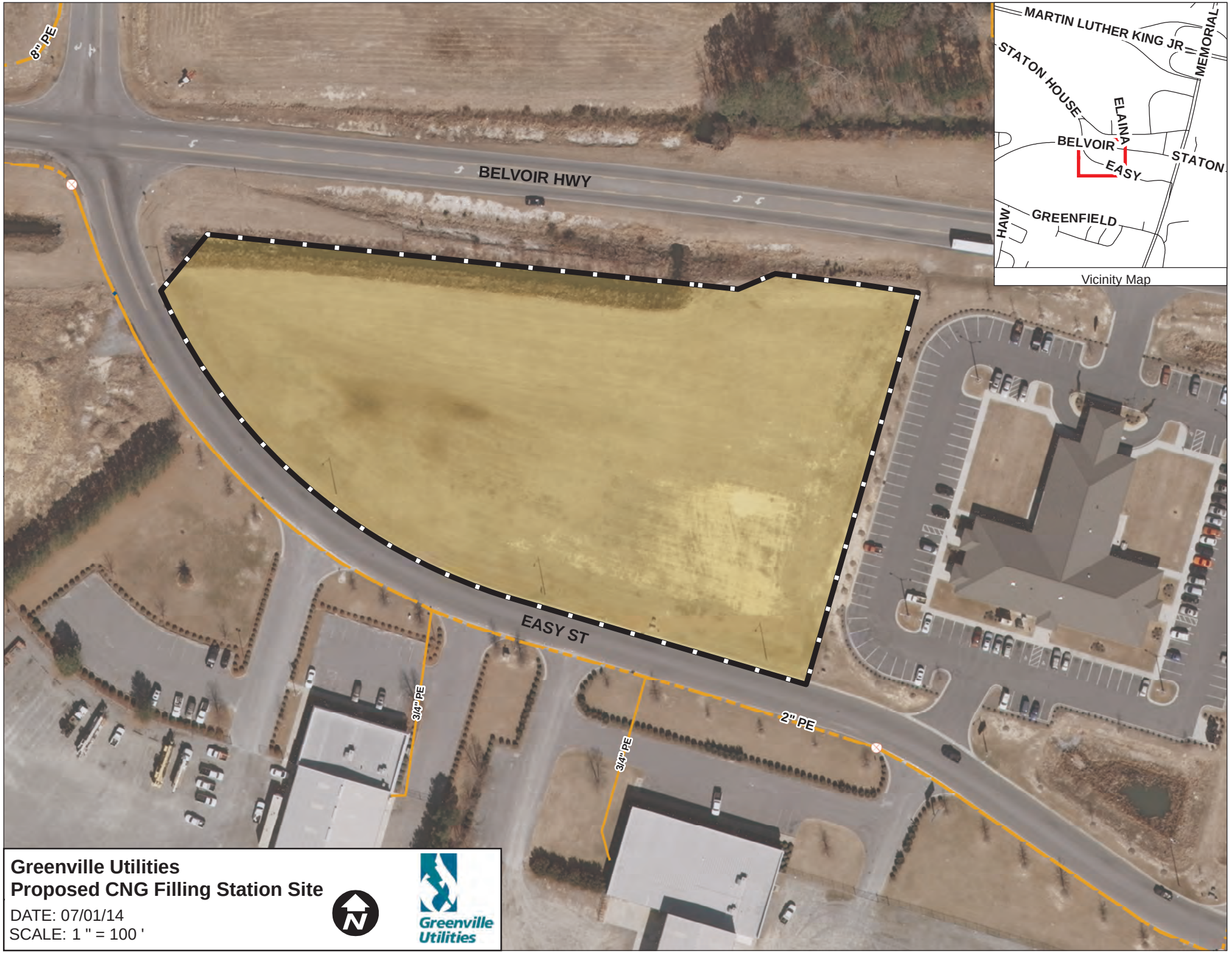
See Next Sheet for Additional Data Requirements

Station Filter Data							
Item #	Item Description:	Contractor to Complete Data:					
	Filter:	Brand:	Model and Type: (Model #/Coaclecing or Particulate or Mesh Pad)	Pressure Rating: (psig)	Flow Rating: (scfm @ XX psig)	Filter Diameter and Height: (inches)	Connection Size and Type: (inches/NPT or ANSI ??? Flanged)
1	Gas Dryer Inlet:						
2	Gas Dryer Outlet:						
3	Compressor Suction:						
4	Compressor 1st Stage:						
5	Compressor 2nd Stage:						
6	Compressor 3rd Stage:						
7	Compressor 4th Stage:						
8	Compressor Final Coalescing System-1st Filter:						
9	Compressor Final Coalescing System-2nd Filter:						
10	Compressor Recovery System:						
11	Dispenser Inlet Coalescing System-1/2" dispenser						
12	Dispenser Inlet Coalescing System-3/4" dispenser						
13	Air System Coalescer:						
14	Other:						
15							
16							
17							
18							

See Next Sheet for Additional Data Requirements

Section P

Exhibits



Greenville Utilities
Proposed CNG Filling Station Site

DATE: 07/01/14
SCALE: 1 " = 100 '

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