

CITY OF GRAHAM
AGENDA
TUESDAY, FEBRUARY 7, 2017
7:00 P.M.

Meeting called to order by the Mayor
Invocation and Pledge of Allegiance

1. Honorary Resolution:

- **Melody Wiggins** – Resolution of Commendation and Appreciation for 21 years 2 months service to the City of Graham

2. Consent Agenda:

- a. Approval of Minutes – January 3, 2017 Regular Session
- b. Approval of Amended Minutes – January 5, 2016 Regular Session
- c. Tax Releases and Refunds
- d. Tax Collector’s Mid-Year Report
- e. Tax Collector’s Debt Set-Off Report
- f. Recommend the Alamance County Board of Commissioners appoint Barry Hicks to fill the Extra Territorial Jurisdiction (ETJ) vacancy on the Graham Planning Board and Board of Adjustment
- g. Approve Audit Contract with Stout, Stuart, McGowen & King, LLP

3. Recommendations from Planning Board:

- a. Public Hearing: S. Main B-2 (RZ1607). Request by Jonathan Zachary to rezone property located at 918 S. Main Street from R-MF Residential District (multi-family) to B-2 General Business District
- b. Public Hearing: Longdale Residential (RZ1608). Request by Joe Sizemore to rezone property located on Longdale Drive from R-18/R-12 Residential (low/medium density) to R-9 Residential (high density)
- c. Public Hearing: PB Residency (AM1622). Request by City Council to require members of the Planning Board to reside within the corporate limits of Graham N.C.

4. Boyd Creek Pump Station Project:

- a. Approve Amendment #1: Project Budget for Boyd Creek Pump Station
- b. Award Contract for Back Creek #2 Pump Station Upgrades

5. City Tree Status Report

6. Electric Vehicle Charging Station:

- a. Authorize City Manager to accept \$10,000 in reimbursement grant funds from Duke Energy Carolinas LLC.

7. Issues Not Included on Tonight’s Agenda

**RESOLUTION OF COMMENDATION AND APPRECIATION TO
MELODY WIGGINS**

FOR HER SERVICE TO THE CITY OF GRAHAM

WHEREAS, Melody Wiggins diligently served the City of Graham Recreation and Parks Department from December 4, 1995 until January 31, 2017; and

WHEREAS, Melody retired as Recreation and Parks Director from the City of Graham on January 31, 2017 with over 21 years of service; and

WHEREAS, Melody has spent a lifetime directing, managing and promoting recreation and healthy living; and

WHEREAS, Melody worked tirelessly to create a vibrant senior program, an annual holiday skating rink program and sports programs of every kind. She assisted in the building the new Children's Museum and was instrumental in the creation of the new Graham Regional Park that will serve all area citizens for years to come; and

WHEREAS, her commitment to recreation and public health led to her being named the recipient of the prestigious Meritorious Service Award presented by the North Carolina Recreation and Parks Association in October 2015; and

WHEREAS, it is the desire of the City Council to extend their deepest appreciation to Melody for the excellent time and service she has afforded the citizens of Graham and her fellow employees.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF GRAHAM THAT: Melody be commended for her outstanding public service to the City of Graham.

BE IT FURTHER RESOLVED THAT: an expression of appreciation be extended to Ms. Melody Wiggins in the form of this Resolution of Commendation and Appreciation, and that this Resolution become a part of the official records of the City of Graham for all of time, and the original thereof be presented to her in person.

This the 7th day of February 2017.

**Jerry Peterman, Mayor
City of Graham**

**CITY OF GRAHAM
REGULAR SESSION
TUESDAY, JANUARY 3, 2017
7:00 P.M.**

The City Council of the City of Graham met in regular session at 7:00 p.m. on Tuesday, January 3, 2017, in the Council Chambers of the Municipal Building located at 201 South Main Street.

Council Members Present:

Mayor Jerry Peterman
Mayor Pro Tem Jimmy Linens
Council Member Griffin McClure
Council Member Chip Turner
Council Member Lee Kimrey

Also Present:

Frankie Maness, City Manager
Aaron Holland, Assistant City Manager
Darcy Sperry, City Clerk
Keith Whited, City Attorney
Sandra King, Finance Director
Becky Loy, Cobb Ezekiel Loy & Company

Mayor Jerry Peterman called the meeting to order and presided at 7:00 p.m. Council Member Griffin McClure gave the invocation and everyone stood to recite the Pledge of Allegiance.

Mayor Peterman recognized Ms. Tammy Harton & Kiya Gordon from the “Give a Child a Smile” program. Council Members and members of the audience made personal donations to the program, which raises awareness to stop child abuse.

Consent Agenda:

- a. Approval of Minutes – December 6, 2016 Regular Session*
- b. Appoint Debarah Wilson to Tree Board*

Council Member Chip Turner made a motion to approve the Consent Agenda, seconded by Council Member McClure. All voted in favor of the motion.

Old Business:

- a. “Welcome to Graham” Sign*
 - i. Approve Budget Amendment*

Assistant City Manager Aaron Holland explained that per Council’s request at last month’s Council meeting, staff has proceeded with the design process for constructing a “Welcome to Graham” sign on City owned property located at the corner of Highway 54 and Cooper Road. Mr. Holland added that no funds were appropriated for the proposed sign in the current FY 2016-17 budget. A budget amendment is required to increase total General Fund expenditures by \$20,000 for FY 2016-2017.

Council Members and staff discussed the construction timeline, size, building materials, lighting, location and cost of this proposed sign. City Manager Frankie Maness advised that funds for this sign would come from the Fund Balance.

Council Member Lee Kimrey expressed concern with regards to the overall cost and scale of the proposed sign. He stated that he believes we can make a bigger impact by putting the sign somewhere else – specifically along the I40/I85 corridor.

Mayor Peterman explained that at last month’s meeting, Council directed staff to work on putting together a 3-5 year plan for constructing gateway signs throughout the City.

With no further discussion forthcoming, Council Member McClure made a motion to approve the 2016-2017 Budget Ordinance Amendment to provide \$20,000 in funding for the proposed “Welcome to Graham” sign, seconded by Mayor Pro Tem Jimmy Linens. Ayes: Council Member McClure, Mayor Pro Tem Linens, Mayor Peterman and Council Member Turner. Nays: Council Member Kimrey. Motion carried 4:1.

BE IT ORDAINED BY THE CITY COUNCIL of the City of Graham that the 2016 - 2017 Budget Ordinance shall be and is hereby amended as follows:

Section 1: General Fund Expenditures			
	APPROVED	AMENDED	DIFFERENCE
10-6600-7300 Capital Outlay Improvements	0	20,000	20,000
Section 2: General Fund Revenues			
10-3900-0000 Fund Balance	907,000	927,000	20,000

This the 3rd day of January, 2017.

Requests and Petitions of Citizens:

- a. **Public Hearing: Petition for Voluntary Contiguous Annexation at Jimmie Kerr Road (AN1603)**
 - i. **Approve Annexation Ordinance**

Assistant City Manager Aaron Holland explained that the annexation process has multiple steps and this is the final step in annexing property that belongs to Alamance Community College (ACC), located at 1247 Jimmie Kerr Road (29.74 acres) into the City of Graham.

Mayor Peterman opened the Public Hearing and with no comments forthcoming, Mayor Peterman closed the Public Hearing.

Council Member Turner made a motion to approve the Annexation Ordinance to Extend the Corporate Limits of the City of Graham, North Carolina, for the property at Jimmie Kerr Road, seconded by Council Member Kimrey. All voted in favor of the motion.

ANNEXATION ORDINANCE

TO EXTEND THE CORPORATE LIMITS
OF THE
CITY OF GRAHAM, NORTH CAROLINA
FOR PROPERTY ON JIMMIE KERR ROAD

WHEREAS, the Graham City Council has been petitioned under G.S. 160A-31 to annex the area described below;
and

WHEREAS, the Graham City Council has by resolution directed the City Clerk to investigate the sufficiency of the
petition; and

WHEREAS, the City Clerk has certified the sufficiency of the petition and a public hearing on the question of this
annexation was held at City Hall, 201 South Main Street, Graham at 7:00 P.M. on January 3, 2017, after due notice by
publication on December 22, 2016; and

WHEREAS, the Graham City Council finds that the petition meets the requirements of G.S. 160A-31;

NOW, THEREFORE, BE IT ORDAINED by the City Council of the City of Graham, North Carolina that:

Section 1. By virtue of the authority granted by G.S. 160A-31, the following described territory is hereby
annexed and made part of the City of Graham as of January 3, 2017:

Lying and being in the County of Alamance and being currently known as a portion PID 152801 and all
of PID 152800 and being the same parcels as conveyed to Alamance Community college by Deed Book
549 Page 313, Deed Book 709 Page 712 and Deed Book 849 Page 125 and being more particularly
described as follows to wit:

Commencing at NCGS Monument "HESS" bearing NC Grid coordinates of N:844,225.05 and
E:1,895,704.03 and running thence S 36°02'03"W 2631.85' to a found ½" iron pipe with said iron pipe
being the Point Of Beginning and being located in the southern line of the property of Alamance
Community College recorded in Deed Book 512 Page 132 and the current line of the City of Graham as
represented on the Alamance County GIS system, and bearing NC Grid Coordinates of N:842,096.86
and E:1,894,155.87, said iron also marking the western edge of a 60' Right of Way of Jimmie Kerr Road;
thence leaving said Point of Beginning S68°46'57"E 30.05' to a point in the center of Jimmie Kerr Road
(S.R.1928); thence along the center of Jimmie Kerr Road on a curve to the left having a chord bearing
and distance of S06°08'32"W 298.00' and a radius of 739.71' to a point, said point also marking the
northeast corner of the property of Alamance Community College recorded in Deed Book 709 Page 712
and Map Book 42 Page 188; thence continuing along the center of Jimmie Kerr Road on a curve to the
left having a chord bearing and distance of S09°35'48"E 105.19' and a radius of 733.84' to a point;
thence S13°42'01"E 97.82' to a point; thence leaving said center of road N76°01'21"W 33.62' to a
found ½" pinch iron pipe located in the western edge of the 60' right of way of Jimmie Kerr Road,
thence continuing along the western right of way edge of said road S13°47'02"E 76.16' to a point,
thence along a curve to the right having a chord bearing and distance of S04°43'03"W 203.22' and a
radius of 649.14' to a point, thence along a curve to the right having a chord bearing and distance of
S12°11'05"W 193.67' and a radius of 705.41' to a found ½" iron pipe marking the southeast corner of
the property of Alamance Community College recorded in Deed Book 849 Page 125 and Map Book 49

Page 15 and bearing NC Grid coordinates of N:841,133.31 and E:1,894,154.06; thence leaving the western edge of said right of way and running along a common line with the property of David K. Naylor 2014 Trust described in Deed Book 3369 Page 927 N78°45'04"W the following 5 distances, 252.47' to a found ½" iron pipe, thence 159.55' to a found ½" pinch iron pipe, thence 285.24' to a found ½" pinch iron pipe, thence 749.69' to a found ½" pinch iron pipe bearing NC Grid coordinates of N:841,415.54 and E:1,892,734.99 and continuing 30.00' to a point located at the top of bank of the Haw River, the south west corner of the property described in Deed Book 849 Page 125 and Map Book 49 page 15, thence with the top of bank of the Haw River the following 7 calls; N25°32'35"E 123.27' to a point, thence N27°42'05"E 349.16' to a point, thence N24°46'11"E 64.97' to a point, thence N24°55'54"E 186.30' to a point, thence N24°55'49"E 49.96' to a point, thence N25°15'09"E 343.05' to a point, thence N18°18'54"E 42.01' to a point being the north west corner of the property described in Deed Book 549 Page 313, thence leaving the bank of the Haw River and running with the northern line of Deed Book 549 Page 313 and the current line of the Corporate Limits of the City of Graham as currently represented in the Alamance County GIS system S68°46'57"E the following 3 distances; 29.82' to a found ½" iron pipe bearing NC Grid coordinates of N:842,454.31 and E:1,893,235.18, thence 785.46' to a found ¾" pinch top pipe, thence 202.23' to a found ½" iron pipe and being the Point and Place of Beginning and containing 29.74 Acres+/- as shown on a plat prepared by John P. Scoville III, PLS L-3343 of ESP Associates, P.A., dated September 2nd 2016 and bearing ESP Project Number ET07.800.

Issues Not on Tonight's Agenda (Public):

Mr. Robert Trahan, 713 New Street Graham, expressed concern with basketball being played in the street in his neighborhood. Mr. Maness advised that he will ask staff to address this issue.

Mr. Larry Ray, 609 Walker Avenue Graham, expressed concern over the tethering of a dog in his neighborhood. Mr. Maness advised that he will ask staff to investigate.

Audit Presentation:

Ms. Patricia Rhodes of Stout Stuart McGowen & King LLP spoke about the City's audit report for Fiscal Year 2015-2016. Ms. Rhodes stated that this is the second year in which her firm has done the audit and spoke favorably about the arrangement that the City maintains with Becky Loy of Cobb Ezekiel Loy & Company. She further stated that all operating funds yielded a surplus for the year, no findings were found and the City received an unmodified opinion – the cleanest and best opinion one can receive. Ms. Rhodes added that there were no difficulties or disagreements with management during this audit.

Mayor Peterman noted that this is the third year in a row in which all three operating funds have been in the "black" and asked Mr. Maness to pass along Council's thank you and appreciation to staff for all of their hard work. He thanked the staff of Stout Stuart McGowen & King, LLP for their work as well.

Council Member Kimrey inquired with Mr. Maness about the City's projected operational cost of \$90,000 for the animal shelter. He asked Mr. Maness to confirm that the City has not been asked to contribute any money towards the cost of building the new animal shelter and Mr. Maness confirmed that to be the case.

Issues Not on Tonight's Agenda (Council & Staff):

Mr. Maness asked that we remember the family of the late Rex Moser.

Mayor Peterman asked that we remember the family of the late Bobby James and Ms. Nell Clapp.

Council Member McClure advised that the Graham Area Business Association raised over \$11,000 that will be used towards purchasing new Christmas decorations for the City.

Mayor Peterman stated that going forward, requests from citizens to speak about fundraising, be heard under the Issues Not on Tonight's Agenda portion of the meeting.

At 7:55 p.m. Mayor Pro Tem Linens made a motion to adjourn, seconded by Council Member Turner. All voted in favor of the motion.

Darcy Sperry, City Clerk

Memorandum



To: Graham City Council
cc: Frankie Maness
From: Darcy Sperry
Date: 2/7/2017
Re: Amend January 2016 Minutes

Audit Presentation

Mayor Peterman called upon Ms. Patricia ~~Rose~~Rhodes of Stout Stuart McGowen & King LLP to speak about the City's Audit report for Fiscal Year 2014-2015. Ms. ~~Rose~~Rhodes pointed out that this is the first year they have performed the audit for Graham and that the arrangement the City currently has with Ms. Becky Loy of Cobb Ezekiel Loy & Company has proven to be beneficial to the City. Ms. Loy is now under contract with the City and is essentially an extension of the Finance Department.

Ms. Loy assisted Finance Director Sandra King with the year-end process and financial statement preparation and presentation. Ms. ~~Rose~~Rhodes gave an overview of the financial condition of the General, Water/Sewer, and Garage Funds of the City. She commented that on an operational basis, all three funds had revenues in excess of expenditures. Ms. ~~Rose~~Rhodes explained that the City received an unmodified opinion, the cleanest and best opinion you can receive. Ms. ~~Rose~~Rhodes pointed out that City staff and management made sure they were diligent in the day to day operations and reported that there were no findings in the Fiscal Year 2014-2015 audit. Ms. ~~Rose~~Rhodes stated that the two (2) findings from the Fiscal Year 2013-2014 audit (missed monthly billing and capitalization of assets not being recorded properly) have been corrected satisfactorily during the year. She stated there were no difficulties or disagreements with management.

**CITY OF GRAHAM
RELEASE ACCOUNTS**

FEBRUARY COUNCIL MEETING

<u>ACCT #</u>	<u>YEAR</u>	<u>NAME</u>	<u>REASON FOR RELEASE</u>	<u>AMOUNT RELEASED</u>
140579	2016	FRANK LEE TINNIN	BOAT WAS DOUBLE LISTED	124.67
597522	2016	JOSHUA ALLEN KELLY	SOLD BOAT IN 2012	3.81

TOTAL RELEASES ***128.48***

**CITY OF GRAHAM
REFUNDS**

FEBRUARY COUNCIL MEETING

<u>ACCT #</u>	<u>YEAR</u>	<u>NAME</u>	<u>REASON FOR REFUND</u>	<u>AMOUNT REFUNDED</u>
623417	2016	BARBARA A COUSINS	QUALIFIED FOR HOMESTEAD EXEMPTION	429.00
597522	2016	JOSHUA ALLEN KELLY	SOLD BOAT IN 2012	1.48
140579	2015	FRANK LEE TINNIN	DOUBLE BILLED FOR BOAT	124.67

TOTAL REFUNDS ***555.15***

City of Graham

P. O. Drawer 357
 201 South Main Street
 Graham, North Carolina 27253
 Tel: (336) 570-6700 / Fax: (336) 570-6703

MID YEAR REPORT

January 30, 2017

	TOTAL PROPERTY VALUATION	RATE	AMOUNT OF LEVY
TAX LEVY - CITY WIDE	987,369,158	0.455%	4,492,531.77
<u>DISCOVERIES:</u>			
CURRENT YEAR & PRIOR YEARS WITH VARIOUS TAX RATES	760,911		3,462.13
<u>ANNEXATIONS:</u>			
	140,618		426.53
<u>ABATEMENTS:</u>			
	(1,347,989)		(6,515.09)
CURRENT LEVY	986,922,698		4,489,905.34
OUTSTANDING REAL PROPERTY TAXES:			319,092.62
OUTSTANDING PERSONAL PROPERTY TAXES:			<u>19,170.03</u>
TOTAL OUTSTANDING TAXES			338,262.65
CURRENT YEAR TAXES COLLECTED:			4,151,642.69
TO DATE, THE PERCENT OF CURRENT YEAR COLLECTED:			92.47%

I REQUEST THAT THE DATE BE SET FOR LIEN ADVERTISEMENT ON MARCH 16, 2017 IN THE ALAMANCE NEWS. COST FOR ADVERTISING WILL BE \$4.00 PER PARCEL ADVERTISED AND WILL BE CHARGED ONE TIME TO THE TAXPAYER.

Submitted by Sandy P. Callahan, Tax Collector



MEMO

DATE: JANUARY 30, 2017
 TO: FRANKIE MANESS & CITY COUNCIL
 FROM: SANDY P. CALLAHAN *spc*
 RE: DEBT SETOFF UPDATE

The North Carolina Debt Setoff Program provides a means for counties and cities to garnish state income tax returns as well as lottery prizes to collect delinquent debts. In summary, the program involves sending qualifying debts to a Clearinghouse that has been jointly established by the NC Association of County Commissioners and the League of Municipalities. The Clearinghouse, which is operated by Five Star Computing, Inc., cross-references the debts with the NC Department of Revenue's information in order to match the debt with any available state income tax refund due the debtor. If a refund exists, then the amount(s) submitted by the counties/cities are offset and paid to the counties/cities. Debts owed to any state agency take priority over debts to local agencies, and local agency debts are set off on a first come, first serve basis.

There is a \$15 charge by Five Star Computing, Inc. and a \$5 charge by the Dept of Revenue for each successful match of an individual's tax refund. Both charges are added to the debt and no fees are charged to the City of Graham.

The City of Graham adopted to participate in the North Carolina Debt Setoff Program (N.C.G.S. 105A) on May 7, 2002. We are in our fifteenth year participating in the program and it has been very profitable for the City of Graham. Please see our results to date below.

OVERALL TOTALS

<u>YEAR</u>	<u>TAX</u>	<u>UTILITY</u>	<u>POLICE</u>	<u>LAKE</u>	<u>TOTAL</u>	<u>REFUND</u>	<u>NET TOTAL</u>
2003	299.46	596.28			895.74	0.00	895.74
2004	1,000.13	5,721.15			6,721.28	0.00	6,721.28
2005	4,876.92	5,095.24			9,972.16	(859.43)	9,112.73
2006	1,083.01	4,411.98			5,494.99	(374.20)	5,120.79
2007	3,076.88	8,973.95			12,050.83	(666.16)	11,384.67
2008	2,150.13	6,279.26			8,429.39	(1,072.72)	7,356.67
2009	1,015.83	10,191.10			11,206.93	(1,019.79)	10,187.14
2010	1,167.67	7,454.13			8,621.80	(375.53)	8,246.27
2011	369.64	6,356.95			6,726.59	(615.41)	6,111.18
2012	82.45	8,989.31			9,071.76	(1,069.19)	8,002.57
2013	630.20	6,665.78	106.13		7,402.11	(398.97)	7,003.14
2014	2,028.10	12,098.06	568.87		14,695.03	(2,118.74)	12,576.29
2015	614.05	5,552.79	234.90	75.00	6,476.74	(395.49)	6,081.25
2016	716.21	5,766.81	119.00	0.00	6,602.02	(707.21)	5,894.81
	19,110.68	94,152.79	1,028.90	75.00	114,367.37	(9,672.84)	104,694.53

RECEIVED

JAN 25 2017

CITY OF GRAHAM



**Volunteer Application
City of Graham Boards and Commissions**

If you are a City of Graham resident or reside in the extra-territorial jurisdiction (ETJ), at least 18 years, and are willing to volunteer your time and expertise to your community, please complete and return to:

By mail: City of Graham, Attn: City Clerk, PO Drawer 357, Graham, NC 27253

By email: dsperry@cityofgraham.com

By Fax: (336)570-6703

For questions, call: (336)570-6700

Please check all Boards and Commissions on which you would be willing to serve:

Extra-territorial residents can only serve on the Board of Adjustment or the Planning Board

- | | |
|--|--|
| <input type="checkbox"/> Alamance County Library Committee (2 years) | <input type="checkbox"/> Graham Housing Authority (5 years) |
| <input type="checkbox"/> Alcohol Beverage Control (3 years) | <input type="checkbox"/> Graham Sports Hall of Fame (6 years) |
| <input type="checkbox"/> Appearance Commission (4 years) | <input type="checkbox"/> Historic Resources Commission (4 years) |
| <input checked="" type="checkbox"/> Board of Adjustment (3 years) | <input checked="" type="checkbox"/> Planning Board (3 years) |
| <input type="checkbox"/> Canine Review Board (3 years) | <input type="checkbox"/> Recreation Commission (3 years) |
| <input type="checkbox"/> Graham Historical Museum (3 years) | <input type="checkbox"/> Tree Board (3 years) |

If you are currently serving on a Board in the City of Graham, please list:

Personal Information

Name: BARRY HILKES

Mailing Address: 1199 CESAR CT. GRAHAM NC,

Home Address (if different) _____

Home Phone: 336-693-4100 Work Phone: 336-693-4100

Employer: DREAM BUILDERS Position: OWNER

Email Address: dreambuildersnc@yahoo.com

Civic Involvement (please list the names of civic organizations in which you hold current membership):

Please list any work, volunteer, and/or educational experience that you would like us to consider

HOSPICE, DUFFY FOUND, CHRISTMAS CHEER,

Why do you wish to serve the City in this capacity?

TO IMPROVE MY COMMUNITY



STAFF REPORT

SUBJECT:	AUDIT CONTRACT
PREPARED BY:	FRANKIE MANESS, CITY MANAGER

REQUESTED ACTION:

Approve the Audit Contract with Stout, Stuart, McGowen & King, LLP

BACKGROUND/SUMMARY:

The *Local Government Budget and Fiscal Control Act* requires that all units of local government “have its accounts audited as soon as possible after the close of each fiscal year by a certified public accountant...” The City is approaching its third year of a new method of financial reporting and auditing due to growing concern in local government regarding auditor independence. Formerly our auditors prepared our financial statements as well as provided auditing services. Under this new arrangement, the City’s former auditors, Cobb, Ezekiel, Loy & Company, P.A, will assist Staff with audit preparation and financial reporting and Stout, Stuart, McGowen & King, LLP, will provide a “true audit” of the results.

FISCAL IMPACT:

The fee stipulated in the contract is \$19,500 which is \$250 greater than a year ago.

STAFF RECOMMENDATION:

Approval

SUGGESTED MOTION(S):

I move we approve the Audit contract with Stout, Stuart, McGowen & King, LLP.

CONTRACT TO AUDIT ACCOUNTS

Of City of Graham
Primary Governmental Unit

Discretely Presented Component Unit (DPCU) if applicable

On this 28th day of January, 2017,

Auditor: STOUT STUART MCGOWEN & KING, LLP Auditor Mailing Address: P.O. Box 1440,

Burlington, NC 27216-1440 Hereinafter referred to as The Auditor

and City Council (Governing Board(s)) of City of Graham
 (Primary Government)

and _____ : hereinafter referred to as the Governmental Unit(s), agree as follows:
 (Discretely Presented Component Unit)

1. The Auditor shall audit all statements and disclosures required by generally accepted accounting principles (GAAP) and additional required legal statements and disclosures of all funds and/or divisions of the Governmental Unit (s) for the period beginning July 1, 2016, and ending June 30, 2017. The non-major combining, and individual fund statements and schedules shall be subjected to the auditing procedures applied in the audit of the basic financial statements and an opinion will be rendered in relation to (as applicable) the governmental activities, the business-type activities, the aggregate DPCUs, each major governmental and enterprise fund, and the aggregate remaining fund information (non-major government and enterprise funds, the internal service fund type, and the fiduciary fund types).
2. At a minimum, the Auditor shall conduct his/her audit and render his/her report in accordance with generally accepted auditing standards. The Auditor shall perform the audit in accordance with *Government Auditing Standards* if required by the State Single Audit Implementation Act, as codified in G.S. 159-34. If required by OMB *Uniform Administration Requirements, Cost Principles, and Audit Requirements for Federal Awards*, (Uniform Guidance) and the State Single Audit Implementation Act, the Auditor shall perform a Single Audit. This audit and all associated audit documentation may be subject to review by Federal and State agencies in accordance with Federal and State laws, including the staffs of the Office of State Auditor (OSA) and the Local Government Commission (LGC). If the audit and auditor communication are found in this review to be substandard, the results of the review may be forwarded to the North Carolina State Board of CPA Examiners (NC CPA Board).

County and Multi-County Health Departments: The Office of State Auditor will designate certain programs that have eligibility requirements to be considered major programs in accordance with OMB Uniform Guidance for the State of North Carolina. The LGC will notify the auditor and the County and Multi-Health Department of these programs. A County or a Multi-County Health Department may be selected to audit any of these programs as major.

3. If an entity is determined to be a component of another government as defined by the group audit standards - the entity's auditor will make a good faith effort to comply in a timely manner with the requests of the group auditor in accordance with AU-6 §600.41 - §600.42.
4. This contract contemplates an unqualified opinion being rendered. The audit shall include such tests of the accounting records and such other auditing procedures as are considered by the Auditor to be necessary in the circumstances. Any limitations or restrictions in scope which would lead to a qualification should be fully explained in an attachment to this contract.
5. If this audit engagement is subject to the standards for audit as defined in *Government Auditing Standards*, 2011 revisions, issued by the Comptroller General of the United States, then by accepting this engagement, the Auditor warrants that he has met the requirements for a peer review and continuing education as specified in *Government*

Contract to Audit Accounts (cont.)

City of Graham

Primary Governmental Unit

Discretely Presented Component Units (DPCU) if applicable

Auditing Standards. The Auditor agrees to provide a copy of their most recent peer review report regardless of the date of the prior peer review report to the Governmental Unit and the Secretary of the LGC prior to the execution of the audit contract (See Item 22). **If the audit firm received a peer review rating other than pass**, the Auditor shall not contract with the Governmental Unit without first contacting the Secretary of the LGC for a peer review analysis that may result in additional contractual requirements.

If the audit engagement is not subject to Government Accounting Standards or if financial statements are not prepared in accordance with GAAP and fail to include all disclosures required by GAAP, the Auditor shall provide an explanation as to why in an attachment..

6. It is agreed that time is of the essence in this contract. All audits are to be performed and the report of audit submitted to the State and Local Government Finance Division (SLGFD) within four months of fiscal year end. Audit report is due on: October 31, 2017. If it becomes necessary to amend this due date or the audit fee, an amended contract along with a written explanation of the delay must be submitted to the secretary of the LGC for approval.
7. It is agreed that generally accepted auditing standards include a review of the Governmental Unit's systems of internal control and accounting as same relate to accountability of funds and adherence to budget and law requirements applicable thereto; that the Auditor will make a written report, which may or may not be a part of the written report of audit, to the Governing Board setting forth his findings, together with his recommendations for improvement. That written report must include all matters defined as "significant deficiencies and material weaknesses" in AU-C 265 of the *AICPA Professional Standards (Clarified)*. The Auditor shall file a copy of that report with the Secretary of the LGC.
8. All local government and public authority contracts for audit or audit-related work require the approval of the Secretary of the LGC. This includes annual or special audits, agreed upon procedures related to internal controls, bookkeeping or other assistance necessary to prepare the Governmental Unit's records for audit, financial statement preparation, any finance-related investigations, or any other audit-related work in the State of North Carolina. **Invoices for services rendered under these contracts shall not be paid by the Governmental Unit until the invoice has been approved by the Secretary of the LGC.** (This also includes any progress billings.) [G.S. 159-34 and 115C-447] All invoices for Audit work must be submitted by email in PDF format to the Secretary of the LGC for approval. The invoices must be sent via upload through the current portal address: <http://nctreasurer.slgfd.leapfile.net> Subject line should read "Invoice – [Unit Name]. The PDF invoice marked 'approved' with approval date will be returned by email to the Auditor to present to the Governmental Unit for payment. Approval is not required on contracts and invoices for system improvements and similar services of a non-auditing nature.
9. In consideration of the satisfactory performance of the provisions of this contract, the Primary Governmental Unit shall pay to the Auditor, upon approval by the Secretary of the LGC, the fee, which includes any cost the Auditor may incur from work paper or peer reviews or any other quality assurance program required by third parties (Federal and State grantor and oversight agencies or other organizations) as required under the Federal and State Single Audit Acts. (Note: **Fees listed on signature pages.**)
10. If the Governmental Unit has outstanding revenue bonds, the Auditor shall include documentation either in the notes to the audited financial statements or as a separate report submitted to the SLGFD along with the audit report, a calculation demonstrating compliance with the revenue bond rate covenant. Additionally, the Auditor should be aware that any other bond compliance statements or additional reports required in the authorizing bond documents need to be submitted to the SLGFD simultaneously with the Governmental Unit's audited financial statements unless otherwise specified in the bond documents.

Contract to Audit Accounts (cont.)

City of Graham

Primary Governmental Unit

Discretely Presented Component Units (DPCU) if applicable

11. After completing the audit, the Auditor shall submit to the Governing Board a written report of audit. This report shall include, but not be limited to, the following information: (a) Management's Discussion and Analysis, (b) the financial statements and notes of the Governmental Unit and all of its component units prepared in accordance with GAAP, (c) supplementary information requested by the client or required for full disclosure under the law, and (d) the Auditor's opinion on the material presented. The Auditor shall furnish the required number of copies of the report of audit to the Governing Board as soon as practical after the close of the accounting period.
12. If the audit firm is required by the NC CPA Board or the Secretary of the LGC to have a pre-issuance review of their audit work, there must be a statement added to the engagement letter specifying the pre-issuance review including a statement that the Governmental Unit will not be billed for the pre-issuance review. The pre-issuance review must be performed **prior** to the completed audit being submitted to the LGC. The pre-issuance report must accompany the audit report upon submission to the LGC.
13. The Auditor shall electronically submit the report of audit to the LGC as a text-based PDF file when (or prior to) submitting the invoice for services rendered. The report of audit, as filed with the Secretary of the LGC, becomes a matter of public record for inspection, review and copy in the offices of the SLGFD by any interested parties. Any subsequent revisions to these reports must be sent to the Secretary of the LGC. These audited financial statements, excluding the Auditors' opinion, may be used in the preparation of official statements for debt offerings, by municipal bond rating services to fulfill secondary market disclosure requirements of the Securities and Exchange Commission and other lawful purposes of the Governmental Unit without subsequent consent of the Auditor. If it is determined by the LGC that corrections need to be made to the Governmental Unit's financial statements, they should be provided within three days of notification unless another time frame is agreed to by the LGC.

If the OSA designates certain programs to be audited as major programs, as discussed in item #2, a turnaround document and a representation letter addressed to the OSA shall be submitted to the LGC.

The LGC's process for submitting contracts, audit reports and invoices is subject to change. Auditors should use the submission process in effect at the time of submission. The most current instructions will be found on our website: <https://www.nctreasurer.com/slg/Pages/Audit-Forms-and-Resources.aspx>

14. Should circumstances disclosed by the audit call for a more detailed investigation by the Auditor than necessary under ordinary circumstances, the Auditor shall inform the Governing Board in writing of the need for such additional investigation and the additional compensation required therefore. Upon approval by the Secretary of the LGC, this contract may be varied or changed to include the increased time and/or compensation as may be agreed upon by the Governing Board and the Auditor
15. If an approved contract needs to be varied or changed for any reason, the change must be made in writing, on the Amended LGC-205 contract form and pre-audited if the change includes a change in audit fee. This amended contract needs to be completed in full, including a written explanation of the change, signed and dated by all original parties to the contract, and then must be submitted through the audit contract portal to the Secretary of the LGC for approval. The portal address to upload your amended contract is <http://nctreasurer.slgfd.leapfile.net> No change shall be effective unless approved by the Secretary of the LGC, the Governing Board, and the Auditor.
16. A copy of the engagement letter, issued by the Auditor and signed by both the Auditor and the Governmental Unit should be attached to the contract, and by reference here becomes part of the contract. In case of conflict between the terms of the engagement letter and the terms of this contract, the terms of this contract will control. Engagement letter terms that conflict with the contract are deemed to be void unless the conflicting terms of this contract are specifically deleted in Item #25 of this contract. Engagement letters containing indemnification clauses will not be approved by the LGC.

Contract to Audit Accounts (cont.)

City of Graham

Primary Governmental Unit

Discretely presented component units if applicable

17. Special provisions should be limited. Please list any special provisions in an attachment.
18. A separate contract should not be made for each division to be audited or report to be submitted. If a DPCU is subject to the audit requirements detailed in the Local Government Budget and Fiscal Control Act and a separate audit report is issued, a separate audit contract is required. If a separate report is not to be issued and the DPCU is included in the primary government audit, the DPCU must be named along with the parent government on this audit contract. Signatures from the DPCU Board chairman and finance officer also must be included on this contract.
19. The contract must be executed, pre-audited, physically signed by all parties including Governmental Unit and Auditor signatures and submitted in PDF format to the Secretary of the LGC. The current portal address to upload your contractual documents is <http://nctreasurer.slgfd.leapfile.net> Electronic signatures are not accepted at this time. Included with this contract are instructions to submit contracts and invoices for approval as of November 2016. These instructions are subject to change. Please check the NC Treasurer's web site at <https://www.nctreasurer.com/slg/Pages/Audit-Forms-and-Resources.aspx> for the most recent instructions.
20. The contract is not valid until it is approved by the LGC Secretary. The staff of the LGC shall notify the Governmental Unit and Auditor of contract approval by email. **The audit should not be started before the contract is approved.**
21. There are no other agreements between the parties hereto and no other agreements relative hereto that shall be enforceable unless entered into in accordance with the procedure set out herein and approved by the Secretary of the LGC.
22. **E-Verify.** Auditor **shall comply** with the requirements of NCGS Chapter 64 Article 2. Further, if Auditor utilizes any subcontractor(s), Auditor **shall require** such subcontractor(s) to comply with the requirements of NCGS Chapter 64, Article 2.
23. Contractor hereby certifies that Contractor, and all subcontractors, are not on the Iran Final Divestment List ("List") created by the North Carolina State Treasurer pursuant to N.C.G.S. 147-86.58. Contractor shall not utilize any subcontractor that is identified on the List.
25. All of the above paragraphs are understood and shall apply to this contract, except the following numbered paragraphs shall be deleted: (See Item 16 for clarification).

SIGNATURE PAGES FOLLOW

Contract to Audit Accounts (cont.) City of Graham
Primary Governmental Unit
Discretely Presented Component Units (DPCU) if applicable

City of Graham - FEES

Year-end bookkeeping assistance – [For audits subject to Government Auditing Standards, this is limited to bookkeeping services permitted by revised Independence Standards]

Audit \$19,500

Preparation of the annual financial Statements

Prior to submission of the completed audited financial report, applicable compliance reports and amended contract (if required) the Auditor may submit invoices for approval for services rendered, not to exceed 75% of the total of the stated fees above. If the current contracted fee is not fixed in total, invoices for services rendered may be approved for up to 75% of the prior year audit fee.

The 75% cap for interim invoice approval for this audit contract is \$ \$14,625
** NA if there is to be no interim billing

Communication regarding audit contract requests for modification or official approvals will be sent to the email addresses provided in the spaces below.

Audit Firm Signature:

STOUT STUART MCGOWEN & KING, LLP

Name of Audit Firm

By Patricia B. Rhodes

Authorized Audit firm representative name: Type or print

Patricia B. Rhodes
Signature of authorized audit firm representative

Date January 28, 2017

pbrhodes@ssmklp.com

Email Address of Audit Firm

Governmental Unit Signatures:

City of Graham

Name of Primary Government

By Jerry Peterman, Mayor

Mayor / Chairperson: Type or print name and title

Signature of Mayor/Chairperson of governing board

Date _____

By Jerry Peterman

Chair of Audit Committee - Type or print name

**

Signature of Audit Committee Chairperson

Date _____
** If Governmental Unit has no audit committee, mark this section "N/A"

City of Graham

PRE-AUDIT CERTIFICATE: Required by G.S. 159-28 (a)

This instrument has been pre-audited in the manner required by The Local Government Budget and Fiscal Control Act or by the School Budget and Fiscal Control Act. Additionally, the following date is the date this audit contract was approved by the governing body.

By Sandra B. King

Primary Governmental Unit Finance Officer:

Type or print name

Primary Government Finance Officer Signature

Date _____

(Pre-audit Certificate **must be dated.**)

sking@cityofgraham.com

Email Address of Finance Officer

Date Primary Government Governing Body Approved Audit Contract - G.S. 159-34(a)



**STOUT
STUART
M^cGOWEN
& KING LLP**

*Certified
Public
Accountants*

*Advisors to
Management*

*Member of PCPS,
The AICPA Alliance
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*Mailing Address:
P.O. Box 1440
Burlington, NC 27216-1440*

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1233 South Church Street
Burlington, NC 27215*

*336-226-7343
fax 336-229-4204
www.ssmkllp.com
e-mail: ssmk@ssmkllp.com*

January 28, 2017

Mr. Jerry Peterman, Mayor
City of Graham
Graham, North Carolina

Dear Mayor Peterman:

We are pleased to confirm our understanding of the services we are to provide City of Graham for the year ended June 30, 2017. We will audit the financial statements of the governmental activities, the business-type activities, each major fund, and the aggregate remaining fund information, including the related notes to the financial statements, which collectively comprise the basic financial statements, of City of Graham as of and for the year ended June 30, 2017. Accounting standards generally accepted in the United States provide for certain required supplementary information (RSI), such as management's discussion and analysis (MD&A), to supplement City of Graham's basic financial statements. Such information, although not a part of the basic financial statements, is required by the Government Accounting Standards Board who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. As part of our engagement, we will apply certain limited procedures to City of Graham's RSI in accordance with auditing standards generally accepted in the United States of America. These limited procedures will consist of inquiries of management regarding the responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We will not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance. The following RSI is required by generally accepted accounting principles and will be subjected to certain limited procedures, but will not be audited:

1) Management's Discussion and Analysis.

We have also been engaged to report on supplementary information other than RSI that accompanies City of Graham's financial statements. We will subject the following supplementary information to the auditing procedures applied in our audit of the financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the financial statements or the financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America and we will provide an opinion on it in relation to the financial statements as a whole:

- 1) Schedule of expenditures of federal and State awards.
- 2) Combining and individual fund financial statements and schedules.

Audit Objectives

The objective of our audit is the expression of opinions as to whether your financial statements are fairly presented, in all material respects, in conformity with U.S. generally accepted accounting principles and to report on the fairness of the supplementary information referred to in the second paragraph when considered in relation to the financial statements taken as a whole. Our audit will be conducted in accordance with auditing standards generally accepted in the United States of America and the standards for financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States, and will include tests of the accounting records of the City of Graham and other procedures we consider necessary to enable us to express such opinions. We will issue a written report upon completion of our audit of the City of Graham's financial statements. Our report will be addressed to the City Council of the City of Graham. We cannot provide assurance that unmodified opinions will be expressed. Circumstances may arise in which it is necessary for us to modify our opinions or add emphasis-of-matter or other-matter paragraphs. If our opinions on the financial statements are other than unmodified, we will discuss the reasons with you in advance. If, for any reason, we are unable to complete the audit or are unable to form or have not formed opinions, we may decline to express opinions or to issue a report as a result of this engagement.

We will also provide a report (that does not include an opinion) on internal control related to the financial statements and compliance with the provisions of laws, regulations, contracts, and grant agreements, noncompliance with which could have a material effect on the financial statements as required by *Government Auditing Standards*. The report on internal control and compliance and other matters will include a paragraph that states (1) that the purpose of the report is solely to describe the scope of testing of internal control and internal control on compliance, and (2) that the report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the entity's internal control and compliance. The paragraph will also state that the report is not suitable for any other purpose. If during our audit we become aware that the City of Graham is subject to an audit requirement that is not encompassed in the terms of this engagement, we will communicate to management and those charged with governance that an audit in accordance with U.S. generally accepted auditing standards and the standards for financial audits contained in *Government Auditing Standards* may not satisfy the relevant legal, regulatory, or contractual requirements.

Audit Procedures—General

An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements; therefore, our audit will involve judgment about the number of transactions to be examined and the areas to be tested. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements. We will plan and perform the audit to obtain reasonable rather than absolute assurance about whether the financial statements are free of material misstatement, whether from (1) errors, (2) fraudulent financial reporting, (3) misappropriation of assets, or (4) violations of laws or governmental regulations that are attributable to the entity or to acts by management or employees acting on behalf of the entity. Because the determination of abuse is subjective, *Government Auditing Standards* do not expect auditors to provide reasonable assurance of detecting abuse.

Because of the inherent limitations of an audit, combined with the inherent limitations of internal control, and because we will not perform a detailed examination of all transactions, there is a risk that material misstatements or noncompliance may exist and not be detected by us, even though the audit is properly planned and performed in accordance with U.S. generally accepted auditing standards and *Government Auditing Standards*. In addition, an audit is not designed to detect immaterial misstatements or violations of laws or governmental regulations that do not have a direct and material effect on the financial

statements. However, we will inform the appropriate level of management of any material errors or any fraudulent financial reporting or misappropriation of assets that come to our attention. We will also inform the appropriate level of management of any violations of laws or governmental regulations that come to our attention, unless clearly inconsequential. Our responsibility as auditors is limited to the period covered by our audit and does not extend to any later periods for which we are not engaged as auditors.

Our procedures will include tests of documentary evidence supporting the transactions recorded in the accounts, and may include tests of the physical existence of inventories, and direct confirmation of receivables and certain other assets and liabilities by correspondence with selected individuals, funding sources, creditors, and financial institutions. We will request written representations from your attorneys as part of the engagement, and they may bill you for responding to this inquiry. At the conclusion of our audit, we will require certain written representations from you about your responsibilities for the financial statements; compliance with laws, regulations, contracts, and grant agreements, and other responsibilities required by generally accepted auditing standards.

Audit Procedures—Internal Controls

Our audit will include obtaining an understanding of the entity and its environment, including internal control, sufficient to assess the risks of material misstatement of the financial statements and to design the nature, timing, and extent of further audit procedures. Tests of controls may be performed to test the effectiveness of certain controls that we consider relevant to preventing and detecting errors and fraud that are material to the financial statements and to preventing and detecting misstatements resulting from illegal acts and other noncompliance matters that have a direct and material effect on the financial statements. Our tests, if performed, will be less in scope than would be necessary to render an opinion on internal control and, accordingly, no opinion will be expressed in our report on internal control issued pursuant to *Government Auditing Standards*.

An audit is not designed to provide assurance on internal control or to identify significant deficiencies. However, during the audit, we will communicate to management and those charged with governance internal control related matters that are required to be communicated under AICPA professional standards and *Government Auditing Standards*.

Audit Procedures—Compliance

As part of obtaining reasonable assurance about whether the financial statements are free of material misstatement, we will perform tests of City of Graham's compliance with provisions of applicable laws and regulations and the provisions of contracts and agreements, including grant agreements. However, the objective of those procedures will not be to provide an opinion on overall compliance and we will not express such an opinion in our report on compliance issued pursuant to *Government Auditing Standards*.

Management Responsibilities

Management is responsible for the financial statements and all accompanying information as well as all representations contained therein. As part of the audit, we will assist with preparation of your financial statements and related notes. These nonaudit services do not constitute an audit under *Government Auditing Standards* and such services will not be conducted in accordance with *Government Auditing Standards*. You agree to assume all management responsibilities relating to the financial statements and related notes and any other nonaudit services we provide. You will be required to acknowledge in the management representation letter our assistance with preparation of the financial statements and related notes prior to their issuance and have accepted responsibility for them. Further, you agree to oversee the nonaudit services by designating an individual, preferably from senior management, who possesses

suitable skill, knowledge, or experience; evaluate the adequacy and results of those services; and accept responsibility for them.

Management is responsible for establishing and maintaining effective internal controls, including evaluating and monitoring ongoing activities, to help ensure that appropriate goals and objectives are met; for the selection and application of accounting principles; and for the fair presentation in the financial statements of the respective financial position of the governmental activities, the business-type activities, each major fund, and the aggregate remaining fund information of the City of Graham and the respective changes in financial position and cash flows, where applicable, in conformity with U.S. generally accepted accounting principles.

Management is also responsible for making all financial records and related information available to us and for ensuring that management is reliable and financial information is reliable and properly recorded. You are also responsible for providing us with (1) access to all information of which you are aware that is relevant to the preparation and fair presentation of the financial statements, (2) additional information that we may request for the purpose of the audit, and (3) unrestricted access to persons within the government from whom we determine it necessary to obtain audit evidence.

Your responsibilities include adjusting the financial statements to correct material misstatements and confirming to us in the written representation letter that the effects of any uncorrected misstatements aggregated by us during the current engagement and pertaining to the latest period presented are immaterial, both individually and in the aggregate, to the financial statements taken as a whole.

You are responsible for the design and implementation of programs and controls to prevent and detect fraud, and for informing us about all known or suspected fraud or illegal acts affecting the government involving (1) management, (2) employees who have significant roles in internal control, and (3) others where the fraud or illegal acts could have a material effect on the financial statements. Your responsibilities include informing us of your knowledge of any allegations of fraud or suspected fraud affecting the government received in communications from employees, former employees, grantors, regulators, or others. In addition, you are responsible for identifying and ensuring that the entity complies with applicable laws, regulations, contracts, agreements, and grants for taking timely and appropriate steps to remedy any fraud, illegal acts, violations of contracts or grant agreements, or abuse that we may report.

You are also responsible for the preparation of the other supplementary information in conformity with U.S. generally accepted accounting principles. You agree to include our report on the supplementary information in any document that contains and indicates that we have reported on the supplementary information. You also agree to include the audited financial statements with any presentation of the supplementary information that includes our report thereon OR make the audited financial statements readily available to users of the supplementary information no later than the date the supplementary information is issued with our report thereon. Your responsibilities include acknowledging to us in the written representation letter that (1) you are responsible for presentation of the supplementary information in accordance with GAAP; (2) you believe the supplementary information, including its form and content, is fairly presented in accordance with GAAP; (3) the methods of measurement or presentation have not changed from those used in the prior period (or, if they have changed, the reasons for such changes); and (4) you have disclosed to us any significant assumptions or interpretations underlying the measurement or presentation of the supplementary information.

Management is responsible for establishing and maintaining a process for tracking the status of audit findings and recommendations. Management is also responsible for identifying for us previous financial audits, attestation engagements, performance audits, or other studies related to the objectives discussed in the Audit Objectives section of this letter. This responsibility includes relaying to us corrective actions taken to address significant findings and recommendations resulting from those audits, attestation engagements, performance audits, or studies. You are also responsible for providing management's views on our current findings, conclusions, and recommendations, as well as your planned corrective actions for the report, and for the timing and format for providing that information.

Engagement Administration, Fees, and Other

We understand that your employees will prepare all cash, accounts receivable, or other confirmations we request and will locate any documents selected by us for testing.

We will provide copies of our reports to the City of Graham; however, management is responsible for distribution of the reports and the financial statements. Unless restricted by law or regulation, or containing privileged and confidential information, copies of our reports are to be made available for public inspection.

The audit documentation for this engagement is the property of STOUT STUART McGOWEN & KING LLP and constitutes confidential information. However, pursuant to authority given by law or regulation, we may be requested to make certain audit documentation available to grantor agencies or its designee, a federal agency providing direct or indirect funding, or the U.S. Government Accountability Office for purposes of a quality review of the audit, to resolve audit findings, or to carry out oversight responsibilities. We will notify you of any such request. If requested, access to such audit documentation will be provided under the supervision of STOUT STUART McGOWEN & KING LLP's personnel. Furthermore, upon request, we may provide copies of selected audit documentation to the aforementioned parties. These parties may intend, or decide, to distribute the copies or information contained therein to others, including other governmental agencies.

The audit documentation for this engagement will be retained for a minimum of five years after the report release or for any additional period requested by the grantor agencies. If we are aware that a federal awarding agency, pass-through entity, or auditee is contesting an audit finding, we will contact the party(ies) contesting the audit finding for guidance prior to destroying the audit documentation.

We expect to begin our audit on approximately June 1, 2017 and to issue our reports no later than October 31, 2017. Patricia B. Rhodes is the engagement partner and is responsible for supervising the engagement and signing the report. Our fee for these services will be at \$19,500 in accordance with our audit contract dated January 28, 2017.

Government Auditing Standards require that we provide you with a copy of our most recent external peer review report and any letter of comment, and any subsequent peer review reports and letters of comment received during the period of the contract. Our 2014 peer review accompanies this letter.

We appreciate the opportunity to be of service to City of Graham and believe this letter accurately summarizes the significant terms of our engagement. If you have any questions, please let us know. If you agree with the terms of our engagement as described in this letter, please sign the enclosed copy and return it to us.

Very truly yours,

STOUT STUART McGOWEN & KING LLP

RESPONSE:

This letter correctly sets forth the understanding of City of Graham.

By:

Title:

Date:



PLANNING ZONING BOARD

Tuesday, January 17, 2017

The Planning & Zoning Board held their regular meeting on Tuesday, January 17, 2017 in the Council Chambers of the Graham Municipal Building at 7:00 p.m. Board members present were Ricky Hall, Andy Rumley, Michael Benesch and Dean Ward. Members absent were, Bonnie Blalock and Kenneth Dixon. Staff members present were Nathan Page, Planning Director, and Frank Glover, Planning Intern. Andy Rumley called the meeting to order, gave the Overview of the Board, and general meeting rules. Ricky Hall gave the invocation.

1. Approval of the November 15, 2016 meeting minutes. Ricky Hall made a motion for approval, second by Michael Benesch. All voted in favor.

2. New Business:

A. S Main B-2 (RZ1607) Request by Jonathan Zachary (RZ1607) to rezone property at 918 S Main St from Residential (multi-family) R-MF to Business (general) B-2

Robin Hendricks of 303 Treasure Trail, Greensboro spoke on behalf of the property owner Mr. Zachary. She encouraged the Board to rezone the existing property from R-MF to B-2. Mary Darnell, 1208 Brookview Dr, Elon also spoke to back up what was said by Robin Hendricks.

Eric Crissman of 208 Albright Ave and Tom Boney of 114 W Elm Street, spoke, asking for more information and offering feedback on this agenda item.

MaryAnn Ward, 314 Mattie Florence Drive, a neighboring resident of Graham spoke, mentioning that she was at the meeting to just gather information.

Jonathan Zachary, the property owner spoke, proposing that the entirety of his property be rezoned to B-2. He asserted that not rezoning his property would impact the value of his land.

Ricky Hall motioned to recommend approval and Michael Benesch seconded the motion. All voted aye.

B. Longdale Residential (RZ1608) Request by Joe Sizemore (RZ1608) to rezone property located on Longdale Dr from Residential (low/medium density) R-18/R-12 to Residential (high density) R9

Larry Carrol, 228 E Queen St, Hillsborough, representing Mr. Sizemore, requested the Board Members consider rezoning the property to R-9.

Ricky Hall made a motion to approve and Dean Ward seconded. All voted aye.

C. PB Residency (AM1622) Request by City Council to require members of the Planning Board reside within the City of Graham.

Eric Crissman asked clarifying questions. Tom Boney expressed concern given the residency status of Chair Andy Rumley.

Ricky Hall motioned to send the request back to the City Council with no changes. Dean Ward seconded. All voted aye.

3. Old Business

a. Grant Applications

Nathan suggested that the City maintain focus on the downtown economic revival by applying for Main

Street Grants. The Planning Board suggested the possibility of hiring additional staff within the department.

4. Public comment on non-agenda items. None.

No further business, Ricky Hall motioned that the meeting be adjourned and Andy Rumley seconded, all agreed. Meeting was adjourned at 8:05 PM

Respectfully Submitted,
Frank Glover Planning Intern



STAFF REPORT

Prepared by Frank Glover, Planning Intern

S Main B2 (RZ1607)

Type of Request: Rezoning

Meeting Dates

Planning Board on January 17, 2017

City Council on February 7, 2017

Contact Information

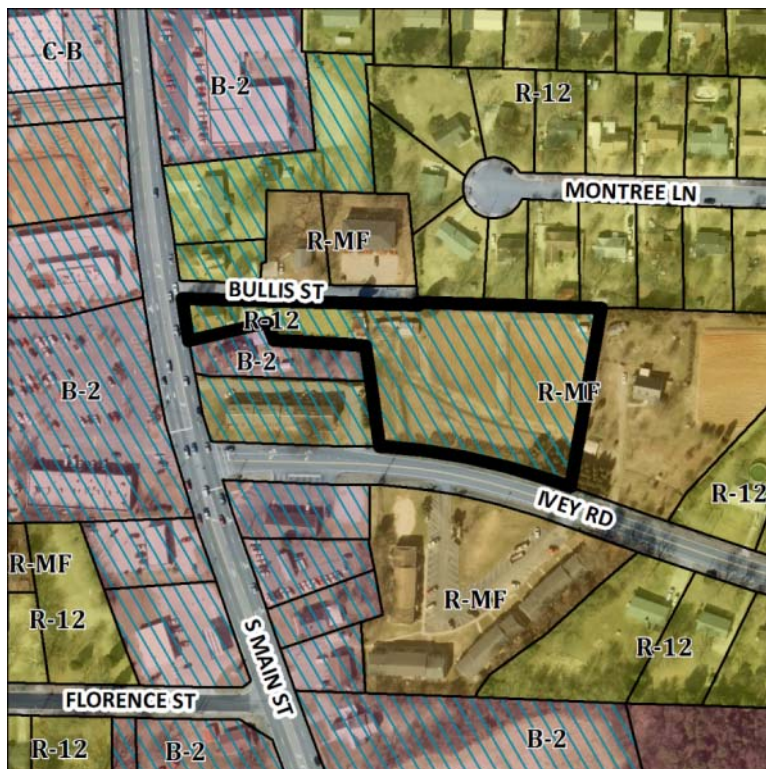
Jonathan L. Zachary

707 N. Wilba Rd, Mebane NC 27302

919-563-9615; zachary@mebtel.net

Summary

This property is surrounded by two development types; a commercial corridor which fronts on South Main Street, and suburban residential developments which surround the majority of the property. This request is to rezone a portion of the property from R-MF to all B-2. The lot is currently occupied by a farm growing produce and a single family dwelling. The stated reason for this rezoning request is "Only rezoning portion that is R-MF so it will all be the same." *This property is located on a lot whose portion facing 918 S. Main was rezoned from R-12 to B-2 in 2013; the remainder of this lot remaining R-MF. The R-MF portion with access from Ivey Rd and Bullis St is surrounded by properties zoned R-MF and R-12.*



Location

918 S Main St

GPIN: 8883283139

Current Zoning

Split Zoned for R-MF
and B-2

Proposed Zoning

General Business B-2

Overlay District

South Main Street/Highway 87
Overlay District

Surrounding Zoning

R-12, R-MF

Surrounding Land Uses

Single Family Homes, Multi-Family
Homes, Neighborhood Activity
Center

Size

2.265 acres

Public Water & Sewer

Water on Main St and Ivey Rd

Sewer only on Main St

Floodplain

No

Staff Recommendation

Denial

Conformity to the *Graham 2035 Comprehensive Plan (GCP)* and Other Adopted Plans

Planning District: Suburban Residential

Applicable Policies;

- 3.1.2 Safe Access to Businesses and Homes.**
 Limit direct highway access or the number of curb cuts to commercial activities by directing development to proposed regional and village centers and requiring internal connectivity between commercial uses, uniformity in design standards, and rear alley access where feasible. *Increasing the availability of strip commercial properties could work against the adjacent Neighborhood Activity Center, and potentially add traffic impacting the nearby school.*

Applicable Strategies;

- 1.1.5 Discourage Strip Development.** Discourage strip development along transportation arteries and proposed interstate interchanges by directing these commercial activities to proposed activity centers. *A General Business zoning would conflict with the surrounding residential areas which are to the north of a planned Neighborhood Activity Center and the Hwy/87 Overlay district.*
- 2.3.1 Facilitate focused development.** Incentivize pedestrian-oriented nodal development consistent with this plan by incentivizing smart growth development. *Rezoning this property lot to B-2 would counter the goals of pedestrian-oriented nodal development and smart growth development while encouraging commercial strip developments.*

Development Type Suburban Residential

For single family residential, townhouses, duplexes, accessory dwelling units, and small scale multi-family dwelling of twelve units or less. Buildings should be located near the front of the property line, oriented towards the street, and include front porches and other private outdoor spaces. Recess garages behind the front of buildings to avoid streetscapes dominated by garage doors. Density of 3 to 6 DU/acre

Commercial Corridor

Detached single family housing on small lots less than 6,000 sq ft in area, group homes, and live-work units. 2-5 story building heights, with 0-15 foot front build-to line; No minimum side yard setbacks, 16 foot minimum lot width and 50 foot maximum lot width. Mixed use residential neighborhoods should include diverse housing options. Housing should be built at a human scale, with buildings that reflect Graham's historic architecture and which create a comfortable space along the street.

Staff Recommendation

Based on *The Graham 2035 Comprehensive Plan*, staff recommends **denial** of the rezoning. The following supports this recommendation:

- Rezoning this portion of the property would not be consistent with the Suburban Residential development type. Leaving this property as its current zoning (R-MF) would provide a buffer between commercial and single family development.



Application for REZONING or CONDITIONAL REZONING

P.O. Drawer 357
201 South Main Street
Graham, NC 27253
(336) 570-6705
Fax (336) 570-6703
www.cityofgraham.com

This application is for both general district rezonings and conditional rezonings. Applications are due on the 25th of each month. Applicants are encouraged to consult with the *City of Graham Development Ordinances* and the City Planner.

Site

Street Address: 918 S. MAIN ST. GRAHAM, NC
 Tax Map#: 144218 GPIN: 9983283139
 Current Zoning District(s):
 R-7 R-9 R-12 R-15 R-18
 R-MF R-G C-R C-MXR
 B-1 B-2 B-3 C-B C-MXC
 O-I C-O-I I-1 I-2 C-I
 Overlay District, if applicable:
 Historic S Main St/Hwy 87 E Harden St/Hwy 54
 Current Use: FARM (growing produce)
 Total Site Acres: 2.265
 Property Owner: JONATHAN L. ZACHARY
 Mailing Address: 707 N. WILBA RD
 City, State, Zip: MEBANE, NC 27302

Proposed Rezoning or Conditional Rezoning

Proposed Zoning District(s):
 R-7 R-9 R-12 R-15 R-18
 R-MF R-G C-R C-MXR
 B-1 B-2 B-3 C-B C-MXC
 O-I C-O-I I-1 I-2 C-I

Describe the purpose of this rezoning request. *For Conditional Rezoning*s, also specify the actual use(s) intended for the property (from Sec. 10.135 Table of Permitted Uses) along with other descriptive or pertinent information, such as number of dwelling units, type of multifamily development, square footage and number of buildings:

ONLY REZONING PORTION
 THAT IS R-MF SO
 IT WILL ALL BE SAME

Applicant

Property Owner Other _____

Application for Conditional Rezoning may only be initiated by the owner of a legal interest in all affected property, any person having an interest in the property by reason of written contract with owner, or an agent authorized in writing to act on the owner's behalf. If the applicant for Conditional Rezoning is other than the Property Owner, documentation in compliance with the preceding statement must be provided in order for this application to be complete.

Name: JONATHAN L. ZACHARY
 Mailing Address: 707 N. WILBA RD
 City, State, Zip: MEBANE, NC 27302
 Phone #: 919-563-9615
 Email: ZACHARY@MEBTB1.NET

I have completed this application truthfully and to the best of my ability.

Jonathan L. Zachary
 Signature of Applicant Date

For Conditional Rezonings, this application must be accompanied by a **Preliminary Site Plan** and supporting information specifying the actual use(s) and any rules, regulations or conditions that, in addition to predetermined ordinance requirements, will govern the development and use of the property.

Site Plan Review Application **must be attached to this application for Conditional Rezoning**s

Office Use Only. DEVID# RT1607



PLANNING BOARD Recommendation & Statement of Consistency

Per NCGS 160A-383, zoning regulations shall be made in accordance with an adopted comprehensive plan and any other officially adopted plan that is applicable. The Planning Board shall advise and comment on whether the proposed amendment is consistent with "The Graham 2035 Comprehensive Plan" and any other officially adopted plan that is applicable. The Planning Board shall provide a written recommendation to the City Council that addresses plan consistency and other matters as deemed appropriate by the Planning Board, but a comment by the Planning Board that a proposed amendment is inconsistent with "The Graham 2035 Comprehensive Plan" shall not preclude consideration or approval of the proposed amendment by the City Council.

**S Main B-2
(RZ1607)**
Type of Request
Rezoning
Meeting Dates
Planning Board on January 17, 2017
City Council on February 7, 2017

I move to **recommend APPROVAL** of the application as presented.

I move to **recommend DENIAL**.

The application is **consistent** with *The Graham 2035 Comprehensive Plan*.

The application is **not fully consistent** with *The Graham 2035 Comprehensive Plan*.

The action is reasonable and in the public interest for the following reasons:

This report reflects the recommendation of the Planning Board, this the 17th day of January, 2017.

Attest:

Andy Rumley, Planning Board Chairman

Martha Johnson, Secretary

Frank Glover, Planning Intern



City Council Decision & Statement of Consistency

Per NCGS 160A-383, zoning regulations shall be made in accordance with an adopted comprehensive plan and any other officially adopted plan that is applicable. When adopting or rejecting any zoning amendment, the City Council shall also approve a statement describing whether its action is consistent with the "The Graham 2035 Comprehensive Plan" and briefly explaining why the City Council considers the action taken to be reasonable and in the public interest. The Planning Board shall provide a written recommendation to the City Council, but a comment by the Planning Board that a proposed amendment is inconsistent with the "The Graham 2035 Comprehensive Plan" shall not preclude consideration or approval of the proposed amendment by the City Council.

**S Main B-2
(RZ1607)**
Type of Request
Rezoning
Meeting Dates
Planning Board on January 17, 2017
City Council on February 7, 2017

Choose one...

- I move that the application be **APPROVED**.
- I move that the application be **DENIED**.

Choose one...

- The application is **consistent** with *The Graham 2035 Comprehensive Plan*.
- The application is **not fully consistent** with *The Graham 2035 Comprehensive Plan*.

State reasons...

This action is reasonable and in the public interest for the following reasons:

This report reflects the decision of the City Council, this the 7th day of February, 2017.

Attest:

Gerald R. Peterman, Mayor

Darcy L. Sperry, City Clerk



STAFF REPORT

Prepared by Nathan Page, Planning Director

Longdale Residential (RZ1608)

Type of Request: Rezoning

Meeting Dates

Planning Board on January 17, 2017

City Council on February 7, 2017

Contact Information

Joe Sizemore

5648 Mt Hermon Rock Creek Rd

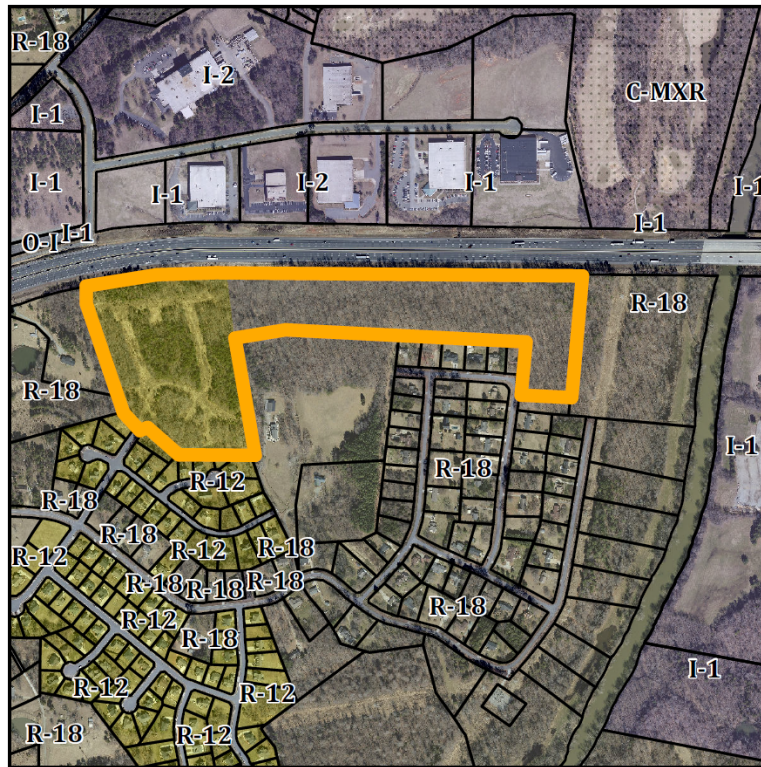
Snow Camp NC, 27349

919-260-9138; jlsizemorre@bellsouth.net

Summary

This is a request to rezone the subject property from R-12 and R-18 to R-9. The property is currently vacant and wooded. The Graham 2035 Comprehensive Plan recommends the western portion of the lot be Mixed Use Residential, with the remainder of the lot being Suburban Residential.

While the Plan suggests that portions of this area be considered for Mixed Use Residential, the lack of road connectivity raises access concerns for this area, and staff therefore recommends a rezoning in line with the less dense suburban residential.



Location

Longdale Dr

GPIN: 8894032541

Current Zoning

Residential, low density (R-18) and Residential, medium density (R-12)

Proposed Zoning

Residential, high density (R-9)

Overlay District

none

Surrounding Zoning

R-18, R-12

Surrounding Land Uses

Single Family and Vacant

Size

34.8 acres

Public Water & Sewer

Yes

Floodplain

No

Staff Recommendation

Approval

Conformity to the *Graham 2035 Comprehensive Plan (GCP)* and Other Adopted Plans

Applicable Policies;

- 3.3.2 Focused Development. In order to maintain Graham's affordability and promote growth, the city will facilitate smart growth development by promoting infill development and focused, walkable, and mixed use built environments. *This development utilizes the land which is served by city water and sewer more efficiently than maintaining the existing lower density zoning. Additionally, the Suburban Residential neighborhood type density recommendations are greater than that which is permitted by R-18 zoning.*

Applicable Strategies;

- 4.3.1 Land Use Patterns. Promote development of efficient land use patterns to allow continued quality and efficiency of water systems. Discourage the extension of water service into areas that are not most suitable for development. *The site would use existing city infrastructure.*

Staff Recommendation

Based on the *Graham 2035 Comprehensive Plan* and the *City of Graham Development Ordinance*, staff recommends **approval** of the rezoning. The following supports this recommendation:

- Rezoning the property is consistent with the Suburban Residential type and furthers the policies and strategies put forth by the *Graham 2035 Comprehensive Plan*, such as connected, efficient development.

Planning Type

Neighborhood

Development Type

Mixed Use Residential

Detached single family housing on small lots less than 6,000 sq ft in area, group homes, and live-work units.

2-5 story building heights, with 0-15 foot front build-to line; No minimum side yard setbacks, 16 foot minimum lot width and 50 foot maximum lot width.

Mixed use residential neighborhoods should include diverse housing options. Housing should be built at a human scale, with buildings that reflect Graham's historic architecture and which create a comfortable space along the street.

Suburban Residential

For single family residential, townhouses, duplexes, accessory dwelling units, and small scale multi-family dwelling of twelve units or less.

Buildings should be located near the front of the property line, oriented towards the street, and include front porches and other private outdoor spaces.

Recess garages behind the front of buildings to avoid streetscapes dominated by garage doors.

Density of 3 to 6 DU/acre



Application for REZONING or CONDITIONAL REZONING

P.O. Drawer 357
201 South Main Street
Graham, NC 27253
(336) 570-6705
Fax (336) 570-6703
www.cityofgraham.com

This application is for both general district rezonings and conditional rezonings. Applications are due on the 25th of each month. Applicants are encouraged to consult with the *City of Graham Development Ordinances* and the City Planner.

Site

Street Address: Longdale
 Tax Map#: 6-40-1C GPIN: 8894032541
 Current Zoning District(s):
 R-7 R-9 R-12 R-15 R-18
 R-MF R-G C-R C-MXR
 B-1 B-2 B-3 C-B C-MXC
 O-I C-O-I I-1 I-2 C-I
 Overlay District, if applicable:
 Historic S Main St/Hwy 87 E Harden St/Hwy 54
 Current Use: Vacant
 Total Site Acres: 34.80
 Property Owner: Size more Brother LLC
 Mailing Address: 5648 Mt. Hermon Rock Creek Rd
 City, State, Zip: Swan Camp, NC 27349

Proposed Rezoning or Conditional Rezoning

Proposed Zoning District(s):
 R-7 R-9 R-12 R-15 R-18
 R-MF R-G C-R C-MXR
 B-1 B-2 B-3 C-B C-MXC
 O-I C-O-I I-1 I-2 C-I

Describe the purpose of this rezoning request. *For Conditional Rezoning*s, also specify the actual use(s) intended for the property (from Sec. 10.135 Table of Permitted Uses) along with other descriptive or pertinent information, such as number of dwelling units, type of multifamily development, square footage and number of buildings:

Single family Development

For Conditional Rezonings, this application must be accompanied by a Preliminary Site Plan and supporting information specifying the actual use(s) and any rules, regulations or conditions that, in addition to predetermined ordinance requirements, will govern the development and use of the property.

Site Plan Review Application *must be attached to this application for Conditional Rezoning*s

Applicant

Property Owner Other _____

Application for Conditional Rezoning may only be initiated by the owner of a legal interest in all affected property, any person having an interest in the property by reason of written contract with owner, or an agent authorized in writing to act on the owner's behalf. If the applicant for Conditional Rezoning is other than the Property Owner, documentation in compliance with the preceding statement must be provided in order for this application to be complete.

Name: Joe Sizemore
 Mailing Address: 5648 Mt. Hermon Rock Creek
 City, State, Zip: Swan Camp NC 27349
 Phone #: 919-260-9158
 Email: jsizemore@bellsouth.net

I have completed this application truthfully and to the best of my ability.

Signature of Applicant: Joseph L. Sizemore Date: 12/13/06

Office Use Only. DEVID# RZ1608



PLANNING BOARD Recommendation & Statement of Consistency

Per NCGS 160A-383, zoning regulations shall be made in accordance with an adopted comprehensive plan and any other officially adopted plan that is applicable. The Planning Board shall advise and comment on whether the proposed amendment is consistent with "The Graham 2035 Comprehensive Plan" and any other officially adopted plan that is applicable. The Planning Board shall provide a written recommendation to the City Council that addresses plan consistency and other matters as deemed appropriate by the Planning Board, but a comment by the Planning Board that a proposed amendment is inconsistent with "The Graham 2035 Comprehensive Plan" shall not preclude consideration or approval of the proposed amendment by the City Council.

**Longdale Residential
(RZ1608)**
Type of Request
Rezoning
Meeting Dates
Planning Board on January 17, 2017
City Council on February 7, 2017

- I move to recommend **APPROVAL** of the application as presented.
- I move to recommend **DENIAL**.

- The application is **consistent** with *The Graham 2035 Comprehensive Plan*.
- The application is **not fully consistent** with *The Graham 2035 Comprehensive Plan*.

The action is reasonable and in the public interest for the following reasons:

Increase taxbase of Graham.

This report reflects the recommendation of the Planning Board, this the 17th day of January, 2017.

Attest:

Andy Rumley
Andy Rumley, Planning Board Chairman

Frank Glover
Martha Johnson, Secretary
Frank Glover, Planning Intern



City Council Decision & Statement of Consistency

Per NCGS 160A-383, zoning regulations shall be made in accordance with an adopted comprehensive plan and any other officially adopted plan that is applicable. When adopting or rejecting any zoning amendment, the City Council shall also approve a statement describing whether its action is consistent with the "The Graham 2035 Comprehensive Plan" and briefly explaining why the City Council considers the action taken to be reasonable and in the public interest. The Planning Board shall provide a written recommendation to the City Council, but a comment by the Planning Board that a proposed amendment is inconsistent with the "The Graham 2035 Comprehensive Plan" shall not preclude consideration or approval of the proposed amendment by the City Council.

**Longdale Residential
(RZ1608)**
Type of Request
Rezoning
Meeting Dates
Planning Board on January 17, 2017
City Council on February 7, 2017

Choose one...

- I move that the application be **APPROVED**.
- I move that the application be **DENIED**.

Choose one...

- The application is **consistent** with *The Graham 2035 Comprehensive Plan*.
- The application is **not fully consistent** with *The Graham 2035 Comprehensive Plan*.

State reasons...

This action is reasonable and in the public interest for the following reasons:

This report reflects the decision of the City Council, this the 7th day of February, 2017.

Attest:

Gerald R. Peterman, Mayor

Darcy L. Sperry, City Clerk



STAFF REPORT

Prepared by Nathan Page, Planning Director

Text Amendment for: Section 10.17 Created

Type of Request: Text Amendment

Meeting Dates

Planning Board on January 17, 2017

City Council on February 7, 2017

Contact Information

N/A

Summary

The City Council has proposed adding a residency requirement for Planning Board members to the Development Ordinance

The following amendments to the Development Ordinance are proposed:

Existing Language:

Section 10.17 Created

There is hereby created a planning board, referred to in this article as the "board," to be composed of seven members, five members appointed by the city and two members appointed by the county commissioners to represent the extraterritorial area. All members of the board, before entering upon their duties, shall take and subscribe to the oath of office required to be taken by officials of the city.

Proposed Language:

Section 10.17 Created

There is hereby created a planning board, referred to in this article as the "board," to be composed of seven members, ~~five members~~ residents and citizens of the City of Graham, appointed by the city and two members appointed by the county commissioners to represent the extraterritorial area. All members of the board, before entering upon their duties, shall take and subscribe to the oath of office required to be taken by officials of the city.

Conformity to The Graham 2035 Comprehensive Plan and Other Adopted Plans

Not applicable.

Applicable Planning District Policies and Recommendations

- Not applicable; city-wide.

Project Name

PB Requirements (AM1622)

Location

city-wide

Current Zoning

not applicable

Proposed Zoning

not applicable

Overlay District

not applicable

Staff Recommendation

see below

Planning District

All

Development Type

All

Staff Recommendation

Because of the nature of this amendment, staff acknowledges that the authority to appoint and remove members of the Planning Board lie solely with the City Council, who shall make decisions regarding requirements.

- The proposed amendment restricts who may serve on the Planning Board, and ability of the City Council to use their discretion regarding who may best represent the City's goals.



PLANNING BOARD Recommendation & Statement of Consistency

Per NCGS 160A-383, zoning regulations shall be made in accordance with an adopted comprehensive plan and any other officially adopted plan that is applicable. The Planning Board shall advise and comment on whether the proposed amendment is consistent with "The Graham 2035 Comprehensive Plan" and any other officially adopted plan that is applicable. The Planning Board shall provide a written recommendation to the City Council that addresses plan consistency and other matters as deemed appropriate by the Planning Board, but a comment by the Planning Board that a proposed amendment is inconsistent with "The Graham 2035 Comprehensive Plan" shall not preclude consideration or approval of the proposed amendment by the City Council.

PB Requirements (AM1622)
Type of Request
Text Amendment
Meeting Dates
Planning Board on January 17, 2017
City Council on February 7, 2017

I move to **recommend APPROVAL** of the application as presented.

I move to **recommend DENIAL**.

The application is **consistent** with *The Graham 2035 Comprehensive Plan*.

The application is **not fully consistent** with *The Graham 2035 Comprehensive Plan*.

The action is reasonable and in the public interest for the following reasons:

The current board serves the citizens and
should continue to do so.

This report reflects the recommendation of the Planning Board, this the 17th day of January, 2017.

Attest:

Andy Rumley
Andy Rumley, Planning Board Chairman

Martha Johnson
Martha Johnson, Secretary

Frank Glover, Planning Intern



City Council Decision & Statement of Consistency

Per NCGS 160A-383, zoning regulations shall be made in accordance with an adopted comprehensive plan and any other officially adopted plan that is applicable. When adopting or rejecting any zoning amendment, the City Council shall also approve a statement describing whether its action is consistent with the "The Graham 2035 Comprehensive Plan" and briefly explaining why the City Council considers the action taken to be reasonable and in the public interest. The Planning Board shall provide a written recommendation to the City Council, but a comment by the Planning Board that a proposed amendment is inconsistent with the "The Graham 2035 Comprehensive Plan" shall not preclude consideration or approval of the proposed amendment by the City Council.

PB Requirements (AM1622)

Type of Request
Text Amendment

Meeting Dates
Planning Board on January 17, 2017
City Council on February 7, 2017

Choose one...

- I move that the text amendment be **APPROVED**.
- I move that the text amendment be **DENIED**.

Choose one...

- The text amendment is **consistent** with *The Graham 2035 Comprehensive Plan*.
- The text amendment is **not fully consistent** with *The Graham 2035 Comprehensive Plan*.

State reasons...

This action is reasonable and in the public interest for the following reasons:

This report reflects the decision of the City Council, this the 7th day of February, 2017.

Attest:

Gerald R. Peterman, Mayor

Darcy L. Sperry, City Clerk



STAFF REPORT

SUBJECT:	AMENDMENT #1: PROJECT BUDGET FOR BOYD CREEK PUMP STATION
PREPARED BY:	FRANKIE MANESS, CITY MANAGER

REQUESTED ACTION:

Approve Amendment #1 to the Boyd Creek Pump Station project.

BACKGROUND/SUMMARY:

The Boyd Creek Pump Station Project is actually two projects in one. The first, and most significant, being the replacement of the Boyd Creek Pump Station. The second, and smaller part of the project, is an upgrade to the Back Creek #2 lift station. This secondary project is the purpose of the requested budget amendment.

The City received bids for the upgrades to the Back Creek #2 lift station on January 31, 2017. The bid package included the installation of new guide rails, an access hatch, blower, standby generator, shelter, controls and a platform to access the station control equipment. The pumps for this station were replaced in 2016 due to failure.

FISCAL IMPACT:

The original project budget was adopted in July of 2015, but only included funds for preliminary engineering and design services. An appropriation of \$475,000 from fund balance in the Water and Sewer Fund is required to complete the project. At the end of FY 2016, the cash balance in the Water and Sewer Fund was \$7,243,000 or enough to support operations for 398 days (109%) without any other source of revenue. The City Council requires that a 50% fund balance must be maintained, leaving about \$2.8 million available for appropriation.

STAFF RECOMMENDATION:

Approval. An additional amendment(s) will be required in the coming months as we begin to move closer to the construction phase of the Boyd Creek Station.

SUGGESTED MOTION(S):

I move we approve Amendment #1 to the Boyd Creek Pump Station project budget.

AMENDMENT #1 CAPITAL PROJECT ORDINANCE BOYD CREEK PUMP STATION

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF GRAHAM, NORTH CAROLINA, that pursuant to Section 13.2, Chapter 159 of the General Statutes of North Carolina, the following Capital Project Ordinance is hereby amended:

- Section 1. The Project authorized is Boyd Creek Pump Station.
- Section 2. The officials of the City of Graham are hereby directed to proceed with this program within the terms of the project. Staff is authorized to execute change orders within the budget ordinance.
- Section 3. The following revenues are anticipated to be available to the City to complete the project:

Proceeds from Water/Sewer Fund Balance	\$650,000
--	-----------

- Section 4. The following amounts are appropriated for this project:

Professional Services	\$220,000
Back Creek #2 Construction	<u>\$430,000</u>
	\$650,000

- Section 5. The Finance Director shall report on the financial status of this project as directed by the City Council and will inform the Council of any unusual occurrences.
- Section 6. Copies of this project ordinance shall be made available to the City Manager and the Finance Director for direction in carrying out this project.
- Section 7. That this ordinance shall take effect upon passage.

This the 7th day of February, 2017.

Jerry Peterman - Mayor

ATTEST:

Darcy Sperry, City Clerk



STAFF REPORT

SUBJECT:	AWARD CONTRACT FOR BACK CREEK #2 LIFT STATION UPGRADES
PREPARED BY:	FRANKIE MANESS, CITY MANAGER

REQUESTED ACTION:

Award contract for Back Creek #2 Lift Station Upgrades to the lowest responsive bidder.

BACKGROUND/SUMMARY:

The City began the process of upgrading the Back Creek Lift Station in July of 2015 when funds were appropriated to begin preliminary and design engineering. Upgrades to the station include the installation of new guide rails, an access hatch, blower, standby generator, shelter, controls and a platform to access the station control equipment. The replacement of the pumps were originally part of the project but had to be installed earlier due to failure. The City received lump sum bids for the project on January 31, 2017 as follows:

CONTRACTOR	N.C. LICENSE NO.	BID SECURITY	CONTRACTOR'S QUALIFICATION STATEMENT	IRAN DIVESTMENT ACT CERT	E-VERIFY	ADDM REC'D	TOTAL BID AMOUNT
Shiloh Utilities, Inc.*	27780	✓	✓	✓	✓	✓	\$382,000.00
James E. Harris Construction Co., Inc	6794	✓	✓	✓	✓	✓	\$446,170.00
Laughlin Sutton Construction Co.	3067	✓	✓	✓	✓	✓	\$500,900.00

FISCAL IMPACT:

The original estimate for project construction and contingencies was \$430,000.

STAFF RECOMMENDATION:

Approval.

SUGGESTED MOTION(S):

I move we award the contract for Back Creek #2 Lift Station Upgrades to Shiloh Utilities Inc. and authorize the Mayor, City Manager, City Attorney and City Clerk to execute the contract on behalf of the City.



alley, williams, carmen & king, inc.

Engineering • Architecture • Land Surveying

February 1, 2017

City of Graham
201 South Main Street
Graham, North Carolina 27253

Subject: Back Creek #2 Renovations
AWCK Project No. 15082

Honorable Mayor and City Council Members:

Bids for the subject project were received on Tuesday, January 31, 2017 at 2:00 P.M. in the Municipal Building Council Chambers. There were three bidders for the project. The bids received ranged from \$382,000.00 to \$500,900.00. Attached with this letter is a copy of the Tabulation of Bids showing the bidders name and amount of each bid received.

We have reviewed the bids and all bids complied with the bidding requirements. Shiloh Utilities of Eden, North Carolina submitted the lowest responsive bid in the amount of \$382,000.00. For over thirty one years, Shiloh Utilities has been successfully completing water and sewer utility work for many municipalities within Piedmont, North Carolina. Staff in our office has worked with Shiloh for water line projects in the City of Burlington, a sewer lift station renovation for the Town of Elon, and water, sewer, and storm sewer improvements for a developer in the Town of Gibsonville. The list of contacts in the Contractor's Qualification Statement where also contacted and the Municipalities gave favorable comments for Shiloh.

Therefore, we recommend that the City Council award a contract to Shiloh Utilities, Inc. in the amount of \$382,000.00 as they were the lowest responsive bidder.

We appreciate the opportunity to be of service to the City of Graham and we look forward to working with the City and Contractor during the construction phase of this project.

Should you have any questions, please feel free to contact us.

Sincerely,

ALLEY, WILLIAMS, CARMEN & KING, INC.

A handwritten signature in blue ink that reads 'C. Mark Averette'.

C. Mark Averette, P.E.

encl.

cc: Frankie Maness



Engineering • Architecture • Land Surveying
740 Chapel Hill Road (27215) - P.O. Box 1179 - Burlington, North Carolina 27216
Tel. - (336)226-5534 - Fax - (336)226-3034 - awck.com
ESTABLISHED - 1960

Tabulation of Bids

Contract 1 – Back Creek Lift Station No. 2 Renovations

Bid Date: Tuesday, January 31st, 2016 at 2:00pm at the Graham Municipal Building

AWCK Project No. 15082

Table with 8 columns: CONTRACTOR, N.C. LICENSE NO., BID SECURITY, CONTRACTOR'S QUALIFICATION STATEMENT, IRAN DIVESTMENT ACT CERT, E-VERIFY, ADDM REC'D, TOTAL BID AMOUNT. Rows include Shiloh Utilities, Inc.*, James E. Harris Construction Co., Inc, and Laughlin Sutton Construction Co.

* Low Bidder

THIS IS CERTIFIED TO BE A TRUE COPY OF BIDS RECEIVED

Handwritten signature of Troy King

Troy King, PE – NC License No. 035017
ALLEY, WILLIAMS CARMEN & KING, INC
Firm's License Number: F-0203



SPECIFICATIONS AND BID DOCUMENTS

FOR

CONTRACT NO. 1 – BACK CREEK NO. 2 LIFT STATION RENOVATIONS

OWNER: City of Graham

Graham, North Carolina

Graham City Council:

Mayor: Jerry Peterman

Council Members:

Jimmy Linens, Mayor Pro-Tem
Lee Kimrey
Griffin McClure
Chip Turner

City Manager: Frankie Maness

City Attorney: Keith Whited

Prepared by:



alley, williams, carmen & king, inc.
engineers and architects
740 chapel hill road - post office box 1179
burlington, north carolina 27216-1179



January 2017
Project No. 15082

Set No. _____

TABLE OF CONTENTS

	<u>PAGES</u>
BIDDING REQUIREMENTS	
Table of Contents	TOC-1 : TOC-2
Invitation for Bids	I-1
Instructions to Bidders (AWCK)	B-1 : B-6
Bid Forms	Contract 1 BF-1 : BF-6
Contractor's Qualification Statement	CQS-1 : CQS-3
E-Verify	000500-1
Iran Divestment Act Certification	IDA-1
CONTRACT FORMS	
Construction Contract 1	CC-1 : CC-3
Performance Bond Contract 1	PEB-1 : PEB-3
Payment Bond Contract 1	PAB-1 : PAB-3
Certificate of Finance Officer	CFO-1
Certificate of Owner's Attorney	COA-1
Certificate of Insurance	CI-1
Notice of Award Contract 1	NA-1
Notice to Proceed Contract 1	NP-1
CONDITIONS OF CONTRACT	
General Conditions of the Contract for Construction	C700-1 : C700-62
Supplemental General Conditions	SGC-1 : SGC-7
SPECIFICATIONS	
DIVISION 1 - GENERAL REQUIREMENTS	
01015 -- Project Requirements	01015-1 : 01015-5
OSHA	1-2
Stormwater Inspections for General Permit NCG010000	1
01025 -- Measurement and Payment	01025-1 : 01025-12
01027 -- Applications for Payment	01027-1 : 01027-7
01039 -- Coordination and Meetings	01039-1 -- 01039-3
01300 - Submittals	01300-1 : 01300-3
01400 - Quality Control	01400-1 : 01400-3
01500 - Construction Facilities and Temporary Controls	01500-1 : 01500-5
01600 - Material and Equipment	01600-1 : 01600-2
01610 - General Equipment Stipulations	01610-1 : 01610-2
01620 -- Project Special Provisions	01620-1 : 01620-4
01650 - Start-Up	01650-1
01700 - Contract Closeout	01700-1 : 01700-4
Consent of Surety Company to Final Payment	1
Contractor's Affidavit of Release of Liens	1
Contractor's Affidavit of Payments of Debits and Claims	1
01740 - Warranties	01740-1
DIVISION 2 - SITEWORK	
02010 - Subsurface Investigation	02010-1
02230 - Site Clearing	02230-1 : 02230-3
02240 - Dewatering	02240-1 : 02240-2
02260 - Excavation Support and Protection	02260-1 : 02260-2
02321 -- Trenching and Excavating for Utilities and Structures	02321-1 : 02321-6
02322 - Rock Excavation	02322-1 : 02322-3

DIVISION 2 – SITEWORK (CONTINUED)

02530 – Sanitary Sewers	02530-1 : 02530-8
02540 – Sewer Force Mains	02540-1 : 02540-6
02630 - Storm Drainage	02630-1 : 02630-3
02821 - Gates	02821-1 : 02821-3
02825 - Lawns and Grasses	02825-1 : 02825-5
02832 - Chain Link Fencing	02832-1 : 02832-3
02875 - Shelter	02875-1 : 02875-4

DIVISION 3 - CONCRETE

03100 - Concrete Formwork	03100-1 : 03100-3
03200 - Concrete Reinforcement	03200-1 : 03200-2
03300 - Cast-in-Place Concrete	03300-1 : 03300-5
03346 - Concrete Slab Finishing	03346-1 : 03346-2
03370 - Concrete Curing	03370-1 : 03370-2
03410 - Precast Concrete Structures	03410-1 : 03410-5

DIVISION 5 - METALS

05120 - Structural Steel	05120-1 : 05120-2
05140 - Structural Aluminum	05140-1
05500 - Metal Fabrications	05500-1 : 05500-3
05501 - Anchor Bolts and Anchors	05501-1 : 05501-2
05520 - Handrails and Railings	05520-1 : 05520-2
05531 - Gratings and Floor Plates	05531-1 : 05531-2

DIVISION 9 - FINISHES

09900 - Painting	09900-1 : 09900-6
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DIVISION 11 - EQUIPMENT

11060 – Pump Controls	11060-1 : 11060-3
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DIVISION 13 - SPECIAL CONSTRUCTION

13300 - Process Gauges and Meters	13300-1 : 13300-2
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DIVISION 16 - ELECTRICAL

16111 - Conduit	16111-1 : 16111-4
16123 - Building Wire and Cable	16123-1 : 16123-3
16130 - Boxes	16130-1 : 16130-3
16140 - Wiring Devices	16140-1 : 16140-3
16160 - Cabinets and Enclosures	16160-1 : 16160-3
16170 - Grounding and Bonding	16170-1 : 16170-2
16180 - Equipment Wiring Systems	16180-1 : 16180-2
16190 - Supporting Devices	16190-1 : 16190-2
16195 - Electrical Identifications	16195-1 : 16195-2
16421 - Utility Service Entrance	16421-1 : 16421-2
16691 - Transient Surge Protection	16691-1
16741 - Telephone Service, Pathways and Wiring	16741-1 : 16741-2

INVITATION FOR BIDS

Sealed Bids will be received by the City of Graham (Owner), 201 South Main Street, Graham, NC 27253, (336) 570-6700, at the Graham Municipal Building, until **2:00 P.M., Tuesday, January 31, 2017**, for the Back Creek No. 2 Lift Station Renovations.

At said place and time, and promptly thereafter, all Bids that have been duly received will be publicly opened and read aloud.

The proposed work is generally described as follows:

Contract No. 1 Back Creek No. 2 Lift Station Renovation

- Renovation of an existing sewer lift station including new controls, electrical, generator, hatches, elevated platform, shelter and appurtenances

Project plans and specifications with blank forms of the proposal may be obtained from Alley, Williams, Carmen & King, Inc. upon request. Digital versions of the same may be downloaded from the following link: <http://www.awck.com/resources/bidding-plans/>.

Bidders must be licensed contractors in the State of North Carolina, duly licensed accordingly for the appropriate section of Bid.

A 5% Bid security must accompany each Bid.

Each Successful Bidder will be required to furnish a Construction Performance Bond and a Construction Payment Bond as security for the faithful performance and the payment of all bids and obligations arising from the performance of the Contract.

No bidder may withdraw his bid within 60 days after the actual date of opening. Owner reserves the right to reject any or all Bids, including without limitation the right to reject any or all nonconforming, nonresponsive, unbalanced, or conditional bids, and to reject the bid of any Bidder if Owner believes that it would not be in the best interest of Owner to make an award to that Bidder. Owner also reserves the right to waive informalities.

If the Contract is to be awarded, Owner will give to the Successful Bidder a Notice of Award within the number of days set forth in the Bid Form.

City of Graham
Jerry Peterman, Mayor

INSTRUCTIONS TO BIDDERS

1. DEFINED TERMS. Terms used in these Instructions to Bidders shall have the meanings assigned to them in the General Conditions and the Supplementary Conditions. Additional terms are defined as follows:

Successful Bidder – The contracts will be evaluated and awarded separately and independently to the lowest, qualified, responsible, and responsive Bidder for each contract to whom Owner (on the basis of Owner’s evaluation as herein provided) makes an award.

2. COPIES OF BIDDING DOCUMENTS. Bidding Documents may be obtained from Alley, Williams, Carmen & King, Inc., Post Office Box 1179/740 Chapel Hill Road, Burlington, North Carolina 27216-1179.

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

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

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

Subsurface Information. There is no Subsurface Exploration for Contract 1. The Bidder, at Bidder's own expense, is encouraged to perform subsurface investigations within accessible areas. The Bidder, by way of establishing a unit price for the work within the contract agreement's price schedule or by otherwise submitting a bid on this project, has acknowledged that he is aware of the limited subsurface information or data, and has satisfied himself that his established unit price is sufficient to ensure the proper completion of the project and the conditions which may effect the work, including but not restricted to those bearing upon transportation, disposal, handling and storage of materials; rock excavation; water tables or similar conditions at the site; availability of labor, water, electric power, roads, and uncertainties of weather, river stages, or similar conditions at the site; and the character of equipment and facilities needed preliminary to and during prosecution of the work. Any failure by the CONTRACTOR to acquaint himself with these facts will not relieve him from responsibility for work. The OWNER and ENGINEER assume no responsibility nor will be liable for any conclusions or interpretations made by the CONTRACTOR on the basis of the information made available by the OWNER/ENGINEER.

On request 48 hours in advance, Owner will provide each Bidder access to the site to conduct such explorations and tests as each Bidder deems necessary for submission of a

Bid. Bidder shall be responsible for contacting 811 to locate existing utilities prior to explorations.

Bidder shall fill all holes and clean up and restore the site to its former conditions upon completion of such explorations. Arrangements for site visits shall be made by calling the City of Graham Utilities Director at (336) 570-6721.

- 3.02 Easements. The lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and other lands designated for use by Contractor in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction ingress and egress or storage of materials and equipment are to be provided by Contractor. See Division 1, Section "Project Requirements" for additional information.
- 3.03 Bidder's Representation. The submission of a Bid will constitute and incontrovertible representation by Bidder the Bidder has complied with every requirement concerning examination of the Contract Documents and the site, that without exception the Bid is premised upon performing and furnishing the work required by the Contract Documents, and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
4. INTERPRETATIONS AND ADDENDA. All questions about the meaning or intent of the Bidding Documents and the Contract Documents shall 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 Bidding Documents. Questions received less than 10 days prior to the date for opening of Bids may not be answered. Only answers issued by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
5. CONTRACT TIMES. The number of days within which, or the dates by which, the work is to be substantially complete and also completed and ready for payment are set forth in the Bid Form.
6. LIQUIDATED DAMAGES. Provisions for liquidated damages are set forth in the Supplementary Conditions. The amount of liquidated damages set forth is \$500.00 per calendar day for each day work is not completed beyond the completion date.
7. SUBSTITUTE OR "OR-EQUAL" ITEMS. The procedure for submission of any application for review of substitute or "or-equal" items by Contractor and consideration by Engineer is set forth in Paragraph 6.05 of the General Conditions and may be supplemented in the project requirements section of Division 1, General Requirements. The Contract, if awarded, will be on the basis of materials and equipment indicated on the Drawings or specified in the Specifications. Application for review of substitute or "or equal" materials or equipment will not be considered by Engineer unless received by Engineer within 15 working days prior to the bid opening. Judgment concerning substitutes and "or-equal" reviews will be determined by the sole discretion of the Engineer. Any additional cost that is created by the bidder submitting a unit price including an "or equal" item without prior approval by the Engineer will be borne by the bidder.
8. BID FORM. The Bid Form for Contract 1 is included in the Bidding Documents and must be completed in ink.

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

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

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

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

9. **BID SECURITY**: Each bid must be accompanied by cash, certified check of the bidder, or a bid bond prepared on the Form of Bid Bond attached hereto, duly executed by the bidder as principal and having as surety thereon a Surety Company approved by the Owner, in the amount of 5% of the bid. Such cash, checks or bid bonds will be returned to all except the three lowest bidders within three days after the opening of bids, and the Owner and accepted bidder have executed the contract, or, if no award has been made within 45 days after the date of the opening of bids, upon demand of the bidder at any time thereafter, so long as he/she has not been notified of the acceptance of his/her bid.
10. **MODIFICATION AND WITHDRAWAL OF BIDS**. Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.
 - 10.1 **Telegraphic Modification**: Telegraphic modification of bids is not permitted.
 - 10.2 **Bid Withdrawal**: Withdrawal of a bid, after bids are opened, will only be permitted under the provisions of laws and regulations.
11. **OPENING OF BIDS**. Bids will be publicly opened and read aloud. An abstract of the amount of the Base Bids and major alternatives (if any) will be made available to Bidders after the opening of Bids.
12. **BIDS TO REMAIN SUBJECT TO ACCEPTANCE**. All Bids will remain subject to acceptance for the number of days set forth in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the bid security prior to that date.
13. **AWARD OF CONTRACT**. Owner reserves the right to reject any or all Bids, including without limitation the rights to reject any or all nonconforming, nonresponsive, unbalanced, or conditional Bids, and to reject the Bid of any Bidder if Owner believes that it would not be in the best interest of Owner to make an award to that Bidder. Owner also reserves the right to waive informalities.

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

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

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

If the Contract is to be awarded, it will be awarded to the lowest Bidder whose evaluation by Owner indicates to the Owner that the award will be in the best interests of Owner.

13. SIGNING OF AGREEMENT. When Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by three (3) unsigned counterparts of the Agreement with all other written Contract Documents attached. Within the number of days set forth in the Bid Form, the Successful Bidder shall sign, leaving the dates blank, and deliver the required number of counterparts of the Agreement and attached documents to Owner with the required Bonds and Power of Attorney. Within twenty (20) days thereafter, Owner shall execute all copies of the Agreement and other Contract Documents submitted by Contractor (Successful Bidder); shall insert the date of contract on the Agreement, Bonds, and Power of Attorney; and shall return all copies to Engineer for review and distribution. Distribution of signed copies shall be as stipulated in the Agreement. Each counterpart is to be accompanied by a complete set of the Drawings with appropriate identification.
14. SALES AND USE TAX. Provisions for sales and use taxes are set forth in the General and Supplementary Conditions. The Contractor will be required to submit statements on sales tax paid to the Owner as outlined in Division 1 "Applications for Payment".

15. INSURANCE. Insurance requirements for the project shall be provided as follows:

CONTRACT 1 INSURANCE REQUIREMENTS LIMITS OF LIABILITY IN THOUSANDS (000)

	<u>Each Person</u>	<u>Each Occurrence</u>	<u>Aggregate</u>
<u>GENERAL LIABILITY</u>			
Personal Injury (Including Bodily Injury)	\$ 1,000	\$ 1,000	
Property Damage		\$ 1,000	\$ 1,000
Or			
Personal Injury (Including Bodily Injury) and Property Damage Combined		\$ 1,000	\$ 2,000
<u>AUTOMOBILE LIABILITY</u>			
Bodily Injury	\$ 1,000	\$ 1,000	
Property Damage		\$ 1,000	
Or			
Bodily Injury and Property Damage Combined		\$ 1,000	\$ 2,000
<u>OWNER'S PROTECTIVE LIABILITY*</u>			
Personal Injury (Including Bodily Injury)	\$ 1,000	\$ 1,000	
Property Damage		\$ 1,000	\$ 1,000
Or			
Personal Injury (Including Bodily Injury) and Property Damage Combined		\$ 1,000	\$ 2,000

- This is a special additional policy written for this project alone which specifically indemnifies the City of Graham as the Owner of this project.

** Note: THE CITY OF GRAHAM MUST BE NAMED AS AN ADDITIONAL NAMED INSURED ON THE CONTRACTOR'S POLICY. A WAIVER OF SUBROGATION SHALL ALSO APPLY TO THE ABOVE POLICIES.

WORKMEN'S COMPENSATION _____ As required by law.

SPECIAL HAZARD _____ Blasting (as required).

NOTE: WRITTEN NOTICE OF CANCELLATION MUST BE 30 DAYS AND STATED ON THE CERTIFICATE OF INSURANCE.
 AGGREGATE AMOUNT MAY NOT INCLUDE EXCESS COVERAGES.

16. SAFETY. Within five (5) calendar days following the bid opening, the apparent low bidder for each section shall submit to the Owner the following documents as evidence of the safety record of the Contractor:

- A. OSHA 200 Log for the Bidder's Firm for the last 5 years.
- B. Current Worker's Compensation Rating for Bidder's firm.

Review of these records shall be a part of evaluating the bidder's qualifications and a poor safety record may be cause for rejection of bid.

17. QUANTITIES AND UNIT PRICES. Owner reserves the right to delete any bid item or items in the bid prior to awarding the contract, except such deletions shall not reduce the total bid by more than 25% unless mutually agreed upon.

The Owner/Engineer reserves the right to make at any time after award of the contract such changes in quantities as are necessary to complete the project. Such changes in quantities shall not invalidate the contract nor release the surety, and the Contractor agrees to perform the work as changed at the unit prices agreed to in the Proposal.

The non-utilization or partial utilization of any bid item shall not serve as a claim for any contract or unit price adjustment as the Contractor shall be paid the unit price bid for the number of units actually installed.

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

City of Graham
201 South Main Street
Graham, NC 27253

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

Each bid envelope shall be identified on the outside as to the appropriate bid submitted.

Bidders may bid on more than one section and include them on the same bid form, but shall so indicate on the outside of their bid as to which sections are included.

Bidders shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

Bids received after the time and date for receipt of Bids will be returned unopened.

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

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

END OF SECTION

BID FORM FOR CONTRACT 1
Back Creek No. 2 Lift Station Renovations

PROJECT IDENTIFICATION:

City of Graham
Sanitary Sewer Improvements
Contract 1 – Back Creek No. 2 Lift Station Renovations

THIS BID IS SUBMITTED TO:

City of Graham
201 South Main Street
Graham, NC 27253

1. The undersigned bidder proposes and agrees, if this Bid is accepted, to enter into an agreement with the Owner in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents within the specified time and for the amount indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.
2. Bidder accepts all of the terms and conditions of the invitation to Bid and the Instructions to Bidders, including without limitation those dealing with the disposition of bid security. This Bid will remain subject to acceptance for 60 days after the day of bid opening. Bidder will sign and submit the Agreement with the Bonds and other documents required by the Bidding Documents within 20 days after the date of Owner's Notice of Award.
3. In submitting this Bid, Bidder represents that:
 - a. Bidder has examined copies of all the Bidding Documents and of the following addenda (receipt of all which is hereby acknowledged):

No. _____ Dated _____	No. _____ Dated _____
No. _____ Dated _____	No. _____ Dated _____
No. _____ Dated _____	No. _____ Dated _____
 - b. Bidder has visited the site and become familiar with and satisfied itself as to the general, local and site conditions that may affect cost, progress, performance and furnishing of the Work.
 - c. Bidder is familiar with and has satisfied itself as to all Federal, State and Local Laws and Regulations that may affect cost, progress, performance and furnishing of the Work.
 - d. Bidder acknowledges that Owner and Engineer do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Bidding Documents with respect to underground facilities at or contiguous to the site.

-
- e. Bidder is aware of the general nature of Work to be performed by Owner and others at the site that relates to Work for which this Bid is submitted as indicated in the Contract Documents.
 - f. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies and data with the Contract Documents.
 - g. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Contract Documents and the written resolution thereof by Engineer is acceptable to Bidder, and the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work for which this Bid is submitted.
 - h. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or corporation to obtain for itself any advantage over any other Bidder or over Owner.
 - i. Bidder shall list the manufacturer or supplier of the major items of equipment to be provided in this contract with their bid as provided on page BF-4. Any manufacturer not approved prior to the bid opening shall be grounds for the bid to be considered non-responsive and subject to rejection. Also list the major subcontractors.

4. Bidder will complete the Work for the following prices:

Contract 1 – Back Creek No. 2 Lift Station Renovations

Project: Back Creek No. 2 Lift Station Renovations
 Owner: City of Graham

Item No.	Description	Estimated Quantity	Unit	Unit Price	Amount
1.	Back Creek #2 is a Renovation. The contractor shall provide and install all materials, parts, wiring conduit, temporary systems and power to keep the existing station in service until the renovation is complete, accepted by the City and placed into service. The contractor shall provide all equipment, personnel and any other components necessary to complete the work, including but not limited to new black vinyl fence, 16' rolling gate, 12' swing gate and 4' walk through gate, temp fence to secure site, fence removal and relocation/reinstallation as shown on plans, maintenance of existing station and answering all trouble/alarm calls for station w/in one hour, stabilization stone, clearing, grubbing, grading, dewatering and backfill as required, erosion control, site and access road – 8" ABC gravel, 8" ABC gravel and set-up inside fence, bypass pumping, water tight wet well and valve vault hatches, site maintenance, all electrical work, conduit, wiring, all concrete work including pads for all equipment, all controls, aluminum grating & elevated platform, 42" aluminum handrails and steps, aluminum shelter (color by owner) over platform - 7' min clearance, bracing and supports, removal of existing controls, hoist and fan, seal hole for fan with gasketed aluminum non-skid plate to at least 300 PSF, all seeding and mulching, phone line connection, SCADA meeting the same specs as Graham's current SCADA and connection to Graham's existing SCADA, standby generator, power to all equipment as required; factory start up and test of equipment, alarm, (all items are to be complete in place) and all other pump station items and incidentals to place Back Creek #2 back into service, materials and work shown on plans and in the specifications for a lump sum price..	Lump Sum	LS	\$	\$
2.	Off site borrow, including removal and disposal of unsuitable material off the site and replacement with suitable off site material properly compacted	100	CY	\$	\$

TOTAL BID - CONTRACT 1

The bidder shall provide the following alternate prices:

Alternate No. 1- Add to the Total Bid- Contract 1 price a lump sum of

_____ \$ _____

For replacing the Ductile iron pipe (Class 52) between the base elbow and the check valves with associated installation & materials as shown on Sheet No.3 of 5 of the plans.

5. Bidder agrees that the Work covered by the section or sections included in the contract award will be completed within the following number of days after the date when the Contract time commences to run as provided in Paragraph 14.04 of the General Conditions. Completion shall mean completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions.

Completion

Contract 1

180 Days

Bidder also agrees that should the bidder fail to accept a contract if awarded to them, or default on any other provisions of a contract award, the cash, certified check, or bid bond attached hereto shall become the property of the City of Graham as ascertained as liquidating damages for such default.

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

7. The terms used in this Bid, which are defined in the General Conditions included as part of the Contract Documents, have the meanings assigned to them in the General Conditions.
8. Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities provided, determined as provided in the contract documents.
9. Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the work within the times specified above, which shall be stated in the Agreement. Bidder agrees that as liquidated damages for delay (but not as a penalty), Bidder shall pay Owner **Five Hundred Dollars (\$500.00)** for each day that expires after the time specified and in accordance with the Agreement.
10. The following documents are attached to and made a condition of the Bid:
 - A. Required Bid security in the form of Bid Bond – Certified Check (circle type of security provided);
 - B. Bidder is instructed to complete the Contractor’s Qualification Statement; see pages CQS-1 to CQS-3;
 - C. Bidder is instructed to complete E-Verify Affidavit; see page 000500-1;

D. Bidder is instructed to complete Iran Divestment Act Certification; see page IDA-1.

11. List of major equipment manufacturers and/or suppliers to be provided:

A. Stand by Generator _____

B. Controls _____

C. Electrical Contractor _____

SIGNATURE OF BIDDER

Contractor's License Number _____

License Expiration Date _____

If an Individual

By _____
(Signature of Individual)

doing business as _____

Business address _____

Phone No. _____ Date _____, 20____

If a Partnership

By _____
(Firm Name)

(signature of general partner)

Business address _____

Phone No. _____ Date _____, 20____

If a Corporation

By _____
(Corporation Name)

(signature of authorized person)

(title)

Business address _____

Phone No. _____ Date _____, 20____

Fax No. _____

END OF SECTION

CONTRACTOR'S QUALIFICATION STATEMENT

Regarding Project: City of Graham
Contract 1: Back Creek No. 2 Lift Station Renovations

Submitted by:

Name _____ Corporation

Firm _____ Partnership

Address _____ Individual

_____ Joint Venture

Telephone _____ Other

North Carolina License No. _____

A. How many years has your organization, under its present business name, been in business as a licensed contractor? _____

B. Under what other or former names has your organization operated during the past ten years?

Explain! _____

C. If a corporation, provide the following information:

Date of incorporation _____

State of incorporation _____

President's name _____

Secretary's name _____

Treasurer's name _____

D. If an individual, partnership, etc., provide the following information:

Date of organization _____

Names of all partners or principals

E. Please list the projects (and locations) that your organization has completed in the past two years that are similar in scope to the project named above.

F. Please give the name of the proposed field supervisor on the above named project and provide a summary of this person's experience and qualifications for such work.

Name _____

Qualifications _____

G. What percentage of the above named project do you anticipate completing through the utilization of subcontractors? _____%.

Please list the areas of work and the names of subcontractors that you anticipate utilizing on the above named project.

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

H. Have you ever failed to satisfactorily complete any work awarded to you? If so, note when, where and why?

I. Name of Bonding Company and name and address of agent.

Company

Agent

Address

Dated on this _____ day of _____, 20____

Name of
Organization:

By:

Title:

NORTH CAROLINA

_____ COUNTY

I, _____, a Notary Public for the said County and State, do hereby

certify that _____ personally appeared before
me this day and acknowledged the answers to the foregoing questions and all statements therein
contained are true and correct.

Witness my hand and official seal, this the _____ day of _____, 20____.

Notary Public

(SEAL)

My Commission Expires:

**STATE OF NORTH CAROLINA
E-VERIFY AFFIDAVIT
COUNTY OF ALAMANCE – CITY OF GRAHAM**

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 City of Graham;

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 retain 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 _____, 20____.

Affiant

Sworn to and subscribed before me, this the _____ day of _____, 20____.

[OFFICIAL SEAL]

_____, Notary Public

My Commission Expires: _____



JANET COWELL
TREASURER

NORTH CAROLINA
DEPARTMENT OF STATE TREASURER
STATE AND LOCAL GOVERNMENT FINANCE DIVISION
AND THE LOCAL GOVERNMENT COMMISSION

GREGORY C. GASKINS
DEPUTY TREASURER

Memorandum # 2016-10

TO: All Local Governments, Public Authorities and Their Independent Auditors
FROM: Sharon Edmundson, Director, Fiscal Management Section
SUBJECT: Iran Divestment Act Notice for Local Governments in North Carolina
DATE: February 17, 2016

The North Carolina Department of State Treasurer is providing this letter to Local Government Units to explain new contracting and procurement compliance obligations created by the Iran Divestment Act of 2015 (N.C.G.S. 143C-6A-1 to 6A-9).^{*} Local Government Units should be aware that effective February 26, 2016, this law imposes new obligations on each new bid process, each new contract, and each renewal or assignment of an existing contract. The specific requirements are as follows:

1. **Local Government Units must obtain a one-page mandatory certification under the Act.** *(See sample "Contract Certification" form below for details.)*
2. **Local Government Units may not enter into contracts with any entity or individual found on the State Treasurer's Iran Final Divestment List.** This list will be posted on the Department of State Treasurer's website on February 26, 2016 and will be updated every 180 days. *(See "Contract Restrictions" below for details.)*

Background

The Iran Divestment Act's requirements applicable to Local Government Units^{**} will become effective on February 26, 2016, at the time the State Treasurer publishes the first list of prohibited companies and individuals (a "Final Divestment List") under the Act.

^{*} The Iran Divestment Act of 2015 can be found online at:

<http://www.ncleg.net/Sessions/2015/Bills/Senate/PDF/S455v5.pdf>

^{**} The Act's requirements use the term "State agency." G.S. 143C-6A-3(7) provides that in the act, the term "State agency" includes not only State departments, boards, and commissions, but also "any political subdivision of the State" such as a Local Government Unit.

Memorandum #2016-10
Iran Divestment Act
February 17, 2016
Page 2

Final Divestment List

The Department of State Treasurer develops the Final Divestment List using data from a research vendor, U.S. federal sanctions lists, and other credible information available to the public. It consists of any individual or company, including parent entities and majority owned subsidiaries, that:

- Provided goods or services of \$20,000,000 or more within any 12-month period in the energy sector of Iran during the preceding five years;
- Extended \$20,000,000 or more in credit, under certain circumstances, to another individual or company that will use the credit to provide goods or services in the energy sector in Iran. (G.S. 143C-6A-3(4).)

The Department of State Treasurer will update the Final Divestment List at least every 180 days. The list will be published on the State Treasurer's website at www.nctreasurer.com/Iran and periodically circulated to Local Government Units.

Requirement 1: Contract Certification

For new procurements and new, renewed, or assigned contracts on or after February 26, 2016, each Local Government Unit must obtain a simple certification from each bidder or vendor. The bidder or vendor must affirm that it is not listed on the State Treasurer's Final Divestment List found at www.nctreasurer.com/Iran as of the date of signature. The certification is due at the time a bid is submitted or the time a contract is entered into, renewed, or assigned. (G.S. 143C-6A-5(a).)

We have attached on the next page a short form that can be used for this certification, but Local Government Units are free to instead use their own form or put the required certification in the text of a contract or purchase order. Each Local Government Unit shall maintain its own records demonstrating these certifications.

Requirement 2: Restriction on Contracting

Individuals or companies on the Final Divestment List are ineligible to contract or subcontract with Local Government Units. (G.S. 143C-6A-6(a).) Any existing contracts with these Iran-linked persons will be allowed to expire in accordance with the contract's terms. (G.S. 143C-6A-6(c).)

Contracts valued at less than \$1,000.00 are exempt from this restriction. (G.S. 143C-6A-7(a).) In addition, a Local Government Unit may contract with a listed individual or company if it makes a good-faith determination that (1) the commodities or services are necessary to perform its functions and (2) that, absent such an exemption, it would be unable to obtain those commodities or services. (G.S. 143C-6A-7(c).) Local Government Units shall enter such exemptions into the procurement record.

Memorandum #2016-10
Iran Divestment Act
February 17, 2016
Page 3

The Act provides that vendors to Local Government Units may not utilize any subcontractor found on the State Treasurer's Final Divestment List. (N.C.G.S. 143C-6A-5(b).) It is each vendor's responsibility to monitor its compliance with this restriction.

Next Steps

The Department of State Treasurer anticipates distributing the first Final Divestment List on February 26, 2016. Once the List has been distributed, all Local Government Units should meet the contract certification requirements.

If you have questions about the Department of State Treasurer's Iran Divestment Policy, please contact Sharon Edmundson at Sharon.Edmundson@nctreasurer.com or 919-814-4289.

RFP Number (if applicable): _____

Name of Vendor or Bidder: _____

**IRAN DIVESTMENT ACT CERTIFICATION
REQUIRED BY N.C.G.S. 143C-6A-5(a)**

As of the date listed below, the vendor or bidder listed above is not listed on the Final Divestment List created by the State Treasurer pursuant to N.C.G.S. 143-6A-4.

The undersigned hereby certifies that he or she is authorized by the vendor or bidder listed above to make the foregoing statement.



Signature

Date

Printed Name

Title

Notes to persons signing this form:

N.C.G.S. 143C-6A-5(a) requires this certification for bids or contracts with the State of North Carolina, a North Carolina local government, or any other political subdivision of the State of North Carolina. The certification is required at the following times:

- When a bid is submitted
- When a contract is entered into (if the certification was not already made when the vendor made its bid)
- When a contract is renewed or assigned

N.C.G.S. 143C-6A-5(b) requires that contractors with the State, a North Carolina local government, or any other political subdivision of the State of North Carolina must not utilize any subcontractor found on the State Treasurer's Final Divestment List.

The State Treasurer's Final Divestment List can be found on the State Treasurer's website at the address www.nctreasurer.com/iran and will be updated every 180 days.

CONSTRUCTION CONTRACT: CONTRACT 1

THIS AGREEMENT, made the ___ day of ___ in the year 2017 by and between _____ the Party of the First Part, hereinafter called the

CONTRACTOR, and the City of Graham, the Party of the Second Part, hereinafter called the OWNER.

WITNESSETH:

That for and in consideration of the payments and agreements to be made and performed by the OWNER, the CONTRACTOR at its own proper cost and expense and with skill and diligence, will construct and complete all work included in a Construction Contract for the construction of:

City of Graham

Contract No. 1: Back Creek #2 Lift Station Renovation

Graham, North Carolina

in accordance with Contract Documents, and in full compliance with this Agreement and the CONTRACTOR agrees to receive the prices stated in the Proposal attached to be full compensation for furnishing all labor, materials and equipment necessary to execute all the work contemplated in this Construction Contract.

The work on the site is to be commenced when directed by the ENGINEER, and to be diligently prosecuted to completion within 180 calendar days.

It is agreed by and between both parties to this Construction Contract that the ENGINEER shall in all cases determine the quantity of the several kinds of work and materials which are to be paid for under this Construction Contract, and he shall determine all questions in relation to lines, levels and dimensions of the work and as to the interpretation of the plans and specifications. Payment shall be made in accordance with provisions as outlined in the Proposal.

The Contract Documents shall consist of the following:

1. Table of Contents
2. Summation of Detailed Information to Bidders
3. North Carolina Sales Tax
4. OSHA’s Revised Standard for Excavations 29 CFR Part 1926
5. Project Special Provisions
6. Material Specifications
7. Sanitary Sewer Lines: Detailed Specifications for Installation
8. Proposal
9. Construction Contract
10. Drawings Entitled: City of Graham – Contract: Back Creek Lift Station No. 2

consisting of the following sheets:

Cover Sheet and Sheets 1 – 15

IN WITNESS WHEREOF the Parties hereto have executed this Agreement on the day and date first above written in three (3) counterparts, each of which shall, without proof or accounting for other counterparts, be deemed an original Construction Contract.

FOR THE CONTRACTOR

WITNESS:

Proprietorship or Partnership

OR

ATTEST:

(Contractor)

TITLE _____

By _____

(Corporate Secretary or
Assistant Secretary only)

TITLE _____

(Owner, Partner, or
Corporate President or
Vice-President only)

CORPORATE SEAL

FOR THE OWNER

WITNESS:

Proprietorship or Partnership

OR

ATTEST:

City of Graham _____

(Owner)

TITLE _____

By _____

(Corporate Secretary or Assistant Secretary only)

TITLE _____

CITY SEAL

PAYMENT BOND: CONTRACT 2

Date of Execution: _____

Name of Principal: _____
(Contractor)

Name of Surety: _____

Name of Contracting
Body: City of Graham
201 South Main Street, Graham, NC 27253

Amount of Bond: _____

Project: City of Graham
Sanitary Sewer Improvements
Contract No. 1: Back Creek No. 2 Lift Station Renovations

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

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

NOW THEREFORE, if the principal shall promptly make payment to all persons supplying labor and material in the prosecution of the work provided for in said contract, and any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

All persons supplying labor and material in the prosecution of the work, known as claimant, shall be defined as one having a direct contract with the Principal or with a Subcontractor of the Principal for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.

The above named Principal and Surety hereby jointly and severally agree with the Contracting Body that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The Contracting Body shall not be liable for the payment of any costs or expenses of any such suit.

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 Contracting Body, 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 labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, Contracting Body 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 on which Principal ceased Work on said Contract, it being understood, however, that if any limitation embodied in this bond 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.

c) Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the Project, or any part thereof, is situated, or in the United States District Court for the district in which the Project, or any part thereof, is situated, and not elsewhere.

The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against said improvements, whether or not claim for the amount of such lien be presented under and against this bond.

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

Executed in _____ counterparts.

Witness:

(Proprietorship or Partnership)

Attest: (Corporation)

By: _____

Title: _____
(Corp. Sec. or
Asst. Sec. only)

Witness:

Countersigned:

N. C. Licensed Resident Agent

Name and Address - Surety Agency

Surety Company Name and N. C.
Regional or Branch Office Address

Contractor: (Trade or Corporate Name)

By: _____

Title: _____
(Owner, Partner, or Corp.
Pres. or Vice-Pres. only)

(Corporate Seal)

(Surety Company)

By: _____

Title: _____
(Attorney in Fact)

(Surety Corporate Seal)

PERFORMANCE BOND: CONTRACT 2

Date of Execution: _____

Name of Principal: _____
(Contractor) _____

Name of Surety: _____

Name of Contracting Body _____ City of Graham
_____ 201 South Main Street, Graham, NC 27253

Amount of Bond: _____

Project: _____ City of Graham

_____ Sanitary Sewer Improvements

_____ Contract No. 1: Back Creek No. 2 Lift Station Renovations

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

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

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

Whenever Contractor shall be, and declared by Contracting Body to be in default under the Contract, the Contracting Body having performed Contracting Body's obligations thereunder, the Surety may promptly remedy the default, or shall promptly

- 1) Complete the Contract in accordance with its terms and conditions, or

2) Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, or, if the Contracting Body elects, upon determination by the Contracting Body and the Surety jointly of the lowest responsible bidder, arrange for a contract between such bidder and Contracting Body, and make available as Work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the contract price", as used in this paragraph, shall mean the total amount payable by Contracting Body to Contractor under the Contract and any amendments thereto, less the amount properly paid by the Contracting Body to Contractor.

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

Executed in three (3) counterparts.

Witness:

(Proprietorship or Partnership)

Attest: (Corporation)

By: _____

Title: _____
(Corp. Sec. or
Asst. Sec. only)

Witness:

Countersigned:

N. C. Licensed Resident Agent

Name and Address - Surety Agency

Surety Company Name and N. C.
Regional or Branch Office Address

Contractor: (Trade or Corporate
Name)

By: _____

Title: _____
(Owner, Partner, or Corp.
Pres. or Vice-Pres. only)

(Corporate Seal)

(Surety Company)

By: _____

Title: _____
(Attorney in Fact)

(Surety Corporate Seal)

CERTIFICATE OF FINANCE OFFICER

Provisions for the payment of the moneys to fall due under this agreement has been made by appropriation duly made or by bonds or notes duly authorized, as required by the "Municipal Fiscal Control Act".

Sandra B. King - Finance Officer

Date

CERTIFICATE OF OWNER'S ATTORNEY

I, the undersigned, Keith Whited, the duly authorized and acting
Legal representative of the City of Graham do hereby certify as follows:

I have examined the foregoing contract and surety bonds and on their face the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements on their face has been duly executed by the proper parties thereto acting through their representatives; 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.

Keith Whited, City Attorney

Date: _____

CERTIFICATE OF INSURANCE

(Attach to this sheet)

NOTICE OF AWARD: CONTRACT 2

TO: _____

PROJECT DESCRIPTION: Contract No. 1: Back Creek No. 2 Lift Station Renovations
Sanitary Sewer Improvements
AWCK Job No. 15082

Advertisement for Bids dated _____ and Instructions to Bidders.

You are hereby notified that your BID has been accepted for items in the amount of \$ _____

You are required by the Instructions to Bidders to execute the Agreement and furnish the required CONTRACTOR'S Performance BOND, Payment BOND and certificates of insurance within ten (10) Calendar days from the date of this Notice to you.

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 BID 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 _____ 20____.

City of Graham
Owner

By _____
Frankie Maness

Title _____
City Manager

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO AWARD is hereby acknowledged by _____

This the _____ day of _____ 20____.

By: _____

Title: _____

NOTICE TO PROCEED: CONTRACT 2

TO: _____ DATE: _____
 _____ PROJECT: Contract No. 1: Back Creek No. 2
 _____ Lift Station Renovations
 _____ City of Graham

You are hereby notified to commence WORK in accordance with the Agreement dated _____
 on or before _____, and you are to complete WORK within
 _____ 180 _____ consecutive calendar days thereafter. The date of completion of all WORK is

 City of Graham
 Owner
 By _____
 Frankie Maness
 Title City Manager

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED
 is hereby acknowledged by _____

This the _____ 20____
 By: _____
 Title: _____
 Employer Identification
 Number: _____

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by



AMERICAN COUNCIL OF ENGINEERING COMPANIES

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A Practice Division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Endorsed by



CONSTRUCTION SPECIFICATIONS INSTITUTE

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor (EJCDC C-520 or C-525, 2007 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the Narrative Guide to the EJCDC Construction Documents (EJCDC C-001, 2007 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (EJCDC C-800, 2007 Edition).

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

	Page
Article 1 – Definitions and Terminology.....	1
1.01 Defined Terms	1
1.02 Terminology	5
Article 2 – Preliminary Matters	6
2.01 Delivery of Bonds and Evidence of Insurance.....	6
2.02 Copies of Documents	6
2.03 Commencement of Contract Times; Notice to Proceed.....	6
2.04 Starting the Work	7
2.05 Before Starting Construction.....	7
2.06 Preconstruction Conference; Designation of Authorized Representatives	7
2.07 Initial Acceptance of Schedules	7
Article 3 – Contract Documents: Intent, Amending, Reuse.....	8
3.01 Intent	8
3.02 Reference Standards	8
3.03 Reporting and Resolving Discrepancies	9
3.04 Amending and Supplementing Contract Documents	9
3.05 Reuse of Documents.....	10
3.06 Electronic Data	10
Article 4 – Availability of Lands; Subsurface and Physical Conditions; Hazardous Environmental Conditions; Reference Points.....	11
4.01 Availability of Lands	11
4.02 Subsurface and Physical Conditions.....	11
4.03 Differing Subsurface or Physical Conditions	12
4.04 Underground Facilities	13
4.05 Reference Points.....	14
4.06 Hazardous Environmental Condition at Site	14
Article 5 – Bonds and Insurance	16
5.01 Performance, Payment, and Other Bonds	16
5.02 Licensed Sureties and Insurers	16
5.03 Certificates of Insurance.....	17
5.04 Contractor’s Insurance	17
5.05 Owner’s Liability Insurance	19
5.06 Property Insurance.....	19
5.07 Waiver of Rights	20
5.08 Receipt and Application of Insurance Proceeds	21

5.09	Acceptance of Bonds and Insurance; Option to Replace	21
5.10	Partial Utilization, Acknowledgment of Property Insurer	22
Article 6 – Contractor’s Responsibilities.....		22
6.01	Supervision and Superintendence	22
6.02	Labor; Working Hours	22
6.03	Services, Materials, and Equipment.....	22
6.04	Progress Schedule.....	23
6.05	Substitutes and “Or-Equals”	23
6.06	Concerning Subcontractors, Suppliers, and Others	25
6.07	Patent Fees and Royalties.....	27
6.08	Permits	27
6.09	Laws and Regulations	28
6.10	Taxes.....	28
6.11	Use of Site and Other Areas.....	28
6.12	Record Documents	29
6.13	Safety and Protection.....	29
6.14	Safety Representative	30
6.15	Hazard Communication Programs.....	30
6.16	Emergencies	30
6.17	Shop Drawings and Samples.....	31
6.18	Continuing the Work.....	32
6.19	Contractor’s General Warranty and Guarantee.....	33
6.20	Indemnification.....	33
6.21	Delegation of Professional Design Services	34
Article 7 – Other Work at the Site		35
7.01	Related Work at Site	35
7.02	Coordination.....	35
7.03	Legal Relationships	36
Article 8 – Owner’s Responsibilities.....		36
8.01	Communications to Contractor	36
8.02	Replacement of Engineer	36
8.03	Furnish Data	36
8.04	Pay When Due.....	36
8.05	Lands and Easements; Reports and Tests	36
8.06	Insurance.....	36
8.07	Change Orders.....	37
8.08	Inspections, Tests, and Approvals.....	37
8.09	Limitations on Owner’s Responsibilities.....	37
8.10	Undisclosed Hazardous Environmental Condition	37
8.11	Evidence of Financial Arrangements.....	37
8.12	Compliance with Safety Program	37
Article 9 – Engineer’s Status During Construction.....		37
9.01	Owner’s Representative	37

9.02	Visits to Site	37
9.03	Project Representative.....	38
9.04	Authorized Variations in Work.....	38
9.05	Rejecting Defective Work.....	38
9.06	Shop Drawings, Change Orders and Payments	39
9.07	Determinations for Unit Price Work.....	39
9.08	Decisions on Requirements of Contract Documents and Acceptability of Work	39
9.09	Limitations on Engineer's Authority and Responsibilities.....	39
9.10	Compliance with Safety Program	40
Article 10 – Changes in the Work; Claims.....		40
10.01	Authorized Changes in the Work.....	40
10.02	Unauthorized Changes in the Work.....	41
10.03	Execution of Change Orders	41
10.04	Notification to Surety	41
10.05	Claims.....	41
Article 11 – Cost of the Work; Allowances; Unit Price Work		42
11.01	Cost of the Work	42
11.02	Allowances	45
11.03	Unit Price Work.....	45
Article 12 – Change of Contract Price; Change of Contract Times.....		46
12.01	Change of Contract Price	46
12.02	Change of Contract Times	47
12.03	Delays	47
Article 13 – Tests and Inspections; Correction, Removal or Acceptance of Defective Work.....		48
13.01	Notice of Defects.....	48
13.02	Access to Work	48
13.03	Tests and Inspections.....	49
13.04	Uncovering Work.....	49
13.05	Owner May Stop the Work	50
13.06	Correction or Removal of Defective Work	50
13.07	Correction Period	50
13.08	Acceptance of Defective Work	51
13.09	Owner May Correct Defective Work.....	52
Article 14 – Payments to Contractor and Completion		52
14.01	Schedule of Values	52
14.02	Progress Payments.....	52
14.03	Contractor's Warranty of Title.....	55
14.04	Substantial Completion	55
14.05	Partial Utilization	56
14.06	Final Inspection	57
14.07	Final Payment.....	57
14.08	Final Completion Delayed	58

14.09 Waiver of Claims	58
Article 15 – Suspension of Work and Termination.....	59
15.01 Owner May Suspend Work.....	59
15.02 Owner May Terminate for Cause.....	59
15.03 Owner May Terminate For Convenience	60
15.04 Contractor May Stop Work or Terminate.....	60
Article 16 – Dispute Resolution.....	61
16.01 Methods and Procedures	61
Article 17 – Miscellaneous	61
17.01 Giving Notice	61
17.02 Computation of Times.....	62
17.03 Cumulative Remedies	62
17.04 Survival of Obligations	62
17.05 Controlling Law.....	62
17.06 Headings	62

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.
 3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
 5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 6. *Bidder*—The individual or entity who submits a Bid directly to Owner.
 7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).
 8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.
 9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
 10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
 11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).
14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.
15. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.
16. *Cost of the Work*—See Paragraph 11.01 for definition.
17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
19. *Engineer*—The individual or entity named as such in the Agreement.
20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
21. *General Requirements*—Sections of Division 1 of the Specifications.
22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.
23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
24. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
28. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
30. *PCBs*—Polychlorinated biphenyls.
31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
32. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.
33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.
37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
39. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
43. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.
46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.
47. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.
48. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
49. *Unit Price Work*—Work to be paid for on the basis of unit prices.
50. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.
51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an

addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 Terminology

A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives:*

1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day:*

1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective:*

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. does not conform to the Contract Documents; or
 - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide:*

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, "provide" is implied.

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

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

- A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

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

2.05 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:
1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;
 2. a preliminary Schedule of Submittals; and
 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.07 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on

Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.
- C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

- A. Standards, Specifications, Codes, Laws, and Regulations
 1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
 2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies:*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
 - a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
- B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. A Field Order;
2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or
3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or
2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

- A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.
- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

- A. *Reports and Drawings:* The Supplementary Conditions identify:
 1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and
 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

- A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed either:
1. is of such a nature as to establish that any “technical data” on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
 2. is of such a nature as to require a change in the Contract Documents; or
 3. differs materially from that shown or indicated in the Contract Documents; or
 4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

- B. *Engineer’s Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner’s obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer’s findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor’s cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and
 - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
 - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
 - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and

contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

- c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and
2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all such information and data;
 - b. locating all Underground Facilities shown or indicated in the Contract Documents;
 - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and
 - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the

consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

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

4.06 *Hazardous Environmental Condition at Site*

- A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

- C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.
- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.
- F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.
- G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

- H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.
- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also

meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

- A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.
- B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.
- C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

- A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
 - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
 - 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
 - 3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
 - 4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

- a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
 - b. by any other person for any other reason;
5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
 6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.
- B. The policies of insurance required by this Paragraph 5.04 shall:
1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;
 2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;
 3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
 4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
 5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
 6. include completed operations coverage:
 - a. Such insurance shall remain in effect for two years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

- A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:
1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;
 2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.
 3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
 4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;
 5. allow for partial utilization of the Work by Owner;
 6. include testing and startup; and
 7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.
- B. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors,

members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.

- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.
- E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

- A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.
- B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's

interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

- A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

6.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner’s written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.
1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.
1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that:
 - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

- 114 of 345
- 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and
 - 3) it has a proven record of performance and availability of responsive service.

b. Contractor certifies that, if approved and incorporated into the Work:

- 1) there will be no increase in cost to the Owner or increase in Contract Times; and
- 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items:*

- a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
- b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.
- c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.
- d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
 - 1) shall certify that the proposed substitute item will:
 - a) perform adequately the functions and achieve the results called for by the general design,
 - b) be similar in substance to that specified, and
 - c) be suited to the same use as that specified;
 - 2) will state:
 - a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,
 - b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

- c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
 - 3) will identify:
 - a) all variations of the proposed substitute item from that specified, and
 - b) available engineering, sales, maintenance, repair, and replacement services; and
 - 4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.
- B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.
- C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.
- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be

required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

- B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.
- C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:
1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor
 2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner,

Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

- A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas:*

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought

by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
- C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
- D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
 1. all persons on the Site or who may be affected by the Work;
 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and

shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is

required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*

- a. Submit number of copies specified in the General Requirements.
- b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:*

- a. Submit number of Samples specified in the Specifications.
 - b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.
- B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Submittal Procedures:*

1. Before submitting each Shop Drawing or Sample, Contractor shall have:
 - a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
 - c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.
3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. *Engineer's Review:*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures:*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

- A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
1. observations by Engineer;
 2. recommendation by Engineer or payment by Owner of any progress or final payment;
 3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 4. use or occupancy of the Work or any part thereof by Owner;
 5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;
 6. any inspection, test, or approval by others; or
 7. any correction of defective Work by Owner.

6.20 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .

- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
 - 1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
 - 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

- A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:
1. written notice thereof will be given to Contractor prior to starting any such other work; and
 2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.
- C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:
1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
 2. the specific matters to be covered by such authority and responsibility will be itemized; and
 3. the extent of such authority and responsibilities will be provided.

- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

- A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

- A. Owner's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents.

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or

continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

- A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

- A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

- A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.
- B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.
- C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.
- D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

- A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.
- B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

- A. *Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise*

or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

9.10 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.03 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
 2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
 3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data

shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

- C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
1. deny the Claim in whole or in part;
 2. approve the Claim; or
 3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.
- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 Cost of the Work

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.
2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of

said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
- e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.
2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not

limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.
- C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.
- D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. *Cash Allowances:*
1. Contractor agrees that:
 - a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 - b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
- C. *Contingency Allowance:*
1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to

the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:
 - 1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
 - 2. there is no corresponding adjustment with respect to any other item of Work; and
 - 3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:
 - 1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
 - 2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
 - 3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

- C. *Contractor's Fee*: The Contractor's fee for overhead and profit shall be determined as follows:
1. a mutually acceptable fixed fee; or
 2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;
 - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
 - d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
 - e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
 - f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or

neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

- B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.
- D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 Notice of Defects

- A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 Access to Work

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

13.03 *Tests and Inspections*

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
 - 1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;
 - 2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and
 - 3. as otherwise specifically provided in the Contract Documents.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.
- E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.
- D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

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

13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).
- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or
 2. correct such defective Work; or
 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.
- C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

- A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. *Applications for Payments:*

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an

Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. *Review of Applications:*

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or

- involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or
- b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work, or
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
 - d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
 5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
 - d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due:

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. *Reduction in Payment:*

1. Owner may refuse to make payment of the full amount recommended by Engineer because:
 - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
 - b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - c. there are other items entitling Owner to a set-off against the amount recommended; or
 - d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.
2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.
3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before

final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.
- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

14.05 *Partial Utilization*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
 1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.
 2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
 3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

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

14.07 *Final Payment*

A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;
 - b. consent of the surety, if any, to final payment;
 - c. a list of all Claims against Owner that Contractor believes are unsettled; and
 - d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. *Engineer's Review of Application and Acceptance:*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying

documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Payment Becomes Due:*

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

- A. The making and acceptance of final payment will constitute:
 1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and
 2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will justify termination for cause:
1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
 2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
 3. Contractor's repeated disregard of the authority of Engineer; or
 4. Contractor's violation in any substantial way of any provisions of the Contract Documents.
- B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:
1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);
 2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and
 3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when

so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.
- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.
- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
 - 3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
 - 4. reasonable expenses directly attributable to termination.
- B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days

to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

- A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.
- B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.
- C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:
1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or
 2. agrees with the other party to submit the Claim to another dispute resolution process; or
 3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or
2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

- A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SUPPLEMENTAL GENERAL CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (No. EJCDC C-700, 2007 Edition) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplemental Conditions will have the meanings indicated in the General Conditions. Additional terms used in these Supplemental Conditions have the meanings indicated below, which are applicable to both the singular and plural thereof.

1. Paragraph 2.03.A shall be revised as follows:
 - A. The bids are good for 60 calendar days from the bid opening. The City will make a contract award within this 60-day period. After being notified of the award, the contractor will have 20 days to submit bonds and insurance to owner and execute the contracts. Upon receipt, the Owner has 20 days to execute the contract. Notice to Proceed will be issued no later than the 40th day from the contract award.
2. Delete paragraph 2.05.A.3 in its entirety.
3. Delete paragraph 2.07.A.3 in its entirety.
4. Add the following new paragraphs immediately after paragraph 4.02.B:
 - C. In the preparation of Drawings and Specifications, ENGINEER or ENGINEER's Consultants relied upon the following reports of exploration and tests of subsurface conditions at the Site:
 1. None
 - D. In the preparation of Drawings and Specifications, ENGINEER or ENGINEER's Consultants relied upon the following drawings of physical conditions in or relating to existing surface and subsurface structures (except Underground Facilities) which are at or contiguous to the Site:
 1. None
5. Add the following sub-paragraph to the end of paragraph 4.05.A:
 1. Replacement of property monuments or irons disturbed by the contractors operation shall be reestablished by a licensed registered Land Surveyor in the State of North Carolina.
6. Add the following new paragraphs immediately after paragraph 4.06.A:
 1. In the preparation of Drawings and Specifications, ENGINEER or ENGINEER's Consultants relied upon the following reports of Hazardous Environmental Conditions at the Site:
 - a. None
 2. In the preparation of Drawings and Specifications, ENGINEER or ENGINEER's Consultants relied upon the following drawings of Hazardous Environmental Conditions which are at or contiguous to the Site:
 - a. None.

7. Revise paragraph 5.03.A to read as follows:
 - A. CONTRACTOR shall deliver to OWNER, with copies to each additional insured identified in the Supplementary Conditions, Certificate of Insurance (and other evidence of insurance requested by owner or any other additional insured; specifically including but not limited to copies of insurance policies) which CONTRACTOR is required to purchase and maintain in accordance with paragraph 5.04. OWNER shall deliver to CONTRACTOR, with copies to each additional insured identified in the Supplementary Conditions Certificates of Insurance (and other evidence of insurance requested by CONTRACTOR or any other additional insured) which OWNER is required to purchase and maintain.

8. Add the following paragraph immediately after 5.04.B:
 - C. Contractor shall provide general and automobile liability insurance coverage to the limits as shown in Instructions to Bidders, Section 19, Insurance.

9. Revise paragraph 5.06.A to read as follows:
 - A. Owner, at Owner's option and expense, may purchase property insurance as will protect Owner against claims which may arise from operations under this contract.

10. Delete paragraphs 5.07 thru 5.10 INCLUSIVE FROM THE "General Conditions".

11. Add the following new paragraph immediately after paragraph 6.06.G:
 - H. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by a particular Subcontractor or Supplier.

12. Paragraph 6.10.A shall be revised to read as follows:
 - A. CONTRACTOR shall include in his bid all costs for all sales and use tax applicable to the project. CONTRACTOR shall submit to the OWNER an Itemized list of the quantity and value of materials and rentals used on the project and the amount of sales and use tax paid on such materials and rentals. Itemized list shall be submitted monthly to the ENGINEER. ENGINEER will not authorize monthly pay requests to CONTRACTOR until sales and use tax report has been submitted to the ENGINEER. See Section 01027 for additional information.

13. Add the following paragraph immediately after 6.11 D:
 - E. Contractor shall not use owner's property except in performing the work specified in the contract documents.

14. Paragraph 8.11.A. shall be revised to read as follows:
 - A. Owner shall execute Certificate of Finance Officer form and document will be an exhibit to the Form of Agreement. See page CFO-1.

15. Add the following new paragraphs immediately after paragraph 9.03.A:
 - B. The Resident Project Representative (RPR) will be Engineer's employee or agent at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions. RPR's dealings in matters pertaining to the Work in general shall be with Engineer and Contractor. RPR's dealings with Subcontractors shall be through or with the full knowledge and approval of Contractor. The RPR shall:
 1. Schedules: Review the progress schedule, schedule of Shop Drawing and Sample submittals, and schedule of values prepared by Contractor and consult with Engineer concerning acceptability.
 2. Conferences and Meetings: Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences and other project-related meetings, and prepare and circulate copies of minutes thereof.
 3. Liaison:
 - a. Serve as Engineer's liaison with Contractor, working principally through Contractor's authorized representative, assist in providing information regarding the intent of the Contract Documents.
 - b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.
 - c. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.
 4. Interpretation of Contract Documents: Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.
 5. Shop Drawings and Samples:
 - a. Record date of receipt of Samples and approved Shop Drawings.
 - b. Receive Samples which are furnished at the Site by Contractor, and notify Engineer of availability of Samples for examination.
 6. Modifications: Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report such suggestions, together with RPR's recommendations, to Engineer. Transmit to Contractor in writing decisions as issued by Engineer.

7. **Review of Work and Rejection of Defective Work:**
 - a. Conduct on-Site observations of Contractor's work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.
 - b. Report to Engineer whenever RPR believes that any part of Contractor's work in progress will not produce a completed Project that conforms generally to the Contract Documents or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of that part of work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.
8. **inspections, Tests, and System Startups:**
 - a. Verify that tests, equipment, and systems start-ups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that Contractor maintains adequate records thereof.
 - b. Observe, record, and report to Engineer appropriate details relative to the test procedures and systems start-ups.
9. **Records:**
 - a. Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of all Contractors, Subcontractors, and major Suppliers of materials and equipment.
 - b. Maintain records for use in preparing Project documentation.
10. **Reports:**
 - a. Furnish to Engineer periodic reports as required of progress of the Work and of Contractor's compliance with the progress schedule and schedule of Shop Drawing and Sample submittals.
 - b. Draft and recommend to Engineer proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from Contractor.

- c. Immediately notify Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, damage to property by fire or other causes, or the discovery of any Hazardous Environmental Condition.
- 11. Payment Requests: Review Applications for Payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the schedule of values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.
- 12. Certificates, Operation and Maintenance Manuals: During the course of the Work, verify that materials and equipment certificates, operation and maintenance manuals and other data required by the Specifications to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents delivered to Engineer for review and forwarding to Owner prior to payment for that part of the Work.
- 13. Completion:
 - a. Substantial Completion inspection, assist in the determination of Substantial Completion and the preparation of lists of items to be completed or corrected.
 - b. Participate in a final inspection in the company of Engineer, Owner, and Contractor and prepare a final list of items to be completed and deficiencies to be remedied.
 - c. Observe whether all items on the final list have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the Notice of Acceptability of the Work.
- C. The RPR shall not:
 - 1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).
 - 2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.
 - 3. Undertake any of the responsibilities of Contractor, Subcontractors, Suppliers, or Contractor's superintendent.

4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of Contractor's work unless such advice or directions are specifically required by the Contract Documents.
 5. Advise on, issue directions regarding, or assume control over safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.
 6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.
 7. Accept Shop Drawing or Sample submittals from anyone other than Contractor.
 8. Authorize Owner to occupy the Project in whole or in part.
16. Paragraph 11.03.D shall be revised to read as follows:
- D. The Owner reserves the right to increase or decrease the estimated quantities in the contract as necessary to complete the project. Such changes in quantities from the estimated quantity shall not invalidate the contract nor release the surety, and the Contractor agrees to perform the work at the unit prices established in the contract. Overruns and under runs of estimated quantities shall not constitute a basis for any claims under this contract.
17. Add the following new paragraph 11.03.E:
- E. The Owner reserves the right to eliminate any item from the contract and such action will in no way invalidate the Contract. Payment will be made for the remaining items in the contract at the unit price established in the Contract. The elimination of any items from the contract shall not constitute a basis for any claims under this contract
18. Add the following new paragraph 11.03.F.
- F. The contract to be awarded for the proposed work may be extended fifty (50%) of the contract price without consent or permission of the Contractor, and an additional fifty (50%) with the consent of the Contractor. Total extensions shall not to exceed one hundred (100%) percent of the contract price.
19. Delete paragraph 15.04.A. in its entirety.
20. Delete Article 16 in its entirety.
21. Add paragraph 18.0 to the "General Conditions".

ARTICLE 18 - LIQUIDATED DAMAGES

- A. The date of beginning and the time of completion of the WORK are ESSENTIAL CONDITIONS of the CONTRACT DOCUMENTS and the WORK embraced shall be commenced on the available date specified in the Supplemental General Conditions.
- B. The contractor will proceed with the work at such rate of progress to insure full completion within the contract time. It is expressly understood and agreed, by and between the Contractor and the Owner, that the contract time for the completion of the work described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the work.
- C. If the Contractor shall fail to complete the work within the contract time or extension of time granted by the Owner, then the Contractor will pay the Owner of the amount of liquidated damages as specified in the Bid Form for each calendar day that the Contractor shall be in the default after the time stipulated in the contract documents.
- D. The Contractor shall not be charged with liquidated damages or any excess cost when the delay in completion of the work is due to the following, and the Contractor has promptly given WRITTEN NOTICE of such delay to the Owner or Engineer.
 - 1. To any preference, priority of allocation order duly issued by the Owner.
 - 2. To unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to, acts of God, or of the public enemy, act of the Owner, acts of another contractor in the performance of a contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather; and
 - 3. To any delays of subcontractors occasioned by any of the causes specified in paragraphs (a) and (b) of this article.
- E. PROVIDED FURTHER, that the Contractor shall, within ten (10) days from the beginning of such delay, unless the Owner shall grant a further period of time prior to the date of final settlement of contract, notify the Owner, in writing, of the cause of the delay, who shall ascertain the facts and extent of the delay and notify the Contractor within a reasonable time of its decision in the matter.
- F. It is further agreed that, if default is made in completion, the City shall default as liquidated damages, the sum of five hundred dollars (\$500.00) per day for each and every calendar day completion is delayed in excess of the contract time set forth in the Bid Form. This amount is agreed upon as reasonable due to the effect of each section of the work on the time of completions of the entire project.

END OF SECTION

SECTION 01015 - PROJECT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of these Contracts, including General and Supplementary Conditions and other Division 1-16 Specification Sections, apply to this Section.

1.2 COORDINATION

- A. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, operation and maintenance.

1.3 CONSTRUCTION STAKEOUT

- A. On behalf of Owner, Engineer will provide construction stakeout for proposed sewer improvements as shown on the drawings. Two offset stakes will be provided for wet well, valve vault and all manhole locations to provide horizontal and vertical control. Tee and horizontal bends locations will be staked for domestic water and force main improvements.
- B. Contractor will be responsible for scheduling Engineer to have improvements staked. A 48-hour minimum notice to Engineer will be required. Restaking will be paid for by the Contractor at the Engineer's current Hourly Rates.

1.4 EASEMENTS AND RIGHTS-OF-WAY

- A. The easements (temporary or permanent) and rights-of-way for the pipelines will be provided by Owner. Contractor shall confine his construction operations within the limits indicated on the drawings. Contractor shall use due care in placing construction tools, equipment, excavated materials, and pipeline materials and supplies in order to avoid damage to property and interference with traffic.
- B. Bidders are advised that easements not obtained by Owner prior to award of contract will be obtained by the Power of Eminent Domain and will be available within 60 days from date of issuance of Notice to Proceed. Bidders shall not seek any compensation from Owner as a result of Owner not having all easements within 60 days from issuance date of Notice to Proceed.
- C. Easements (temporary or permanent) across private property are indicated on the drawings. Contractor shall set stakes to mark the boundaries of construction easements across private property. Contractor shall furnish, without charge, competent persons from his force and such tools, stakes, and other materials as may be required to stake out the boundaries of construction easements. The stakes shall be protected and maintained until completion of construction and cleanup.

- D. Contractor shall not enter any private property outside the designated construction easement boundaries without written permission from the owner of the property. Contractor shall provide one (1) copy of such written permission to the Owner and Engineer.

1.5 OPERATION OF EXISTING FACILITIES

- A. Contractor shall provide temporary facilities and make temporary modifications as necessary to keep the existing facilities in operation during the construction period.
- B. Prior to connecting to the existing water and sewer system, Contractor shall coordinate with the Owner and Engineer.

1.6 LOCATION OF EXISTING UTILITIES

- A. Prior to beginning work, Contractor shall notify all existing utility companies and have all existing utilities located.
- B. All utility conflicts shall be brought to the attention of the Engineer immediately. Engineer will promptly review utility conflicts and advise Contractor as to how to proceed.

1.7 NOTICES TO OWNERS AND AUTHORITIES

- A. Contractor shall, as provided in General Conditions, notify Owners of adjacent property and utilities when prosecution of the work may affect them.
- B. When it is necessary to temporarily deny access to property, or when any utility service connection must be interrupted, Contractor shall give notice sufficiently in advance to enable the affected persons to provide for their needs. Notices will conform to any applicable local ordinance and, whether delivered orally or in writing, will include appropriate information concerning the interruption and instructions on how to limit inconvenience caused thereby.
- C. Utilities and other concerned agencies shall be contacted at least 48 hours prior to cutting or closing streets or other traffic areas or excavating near underground utilities or pole lines.

1.8 LINES AND GRADES

- A. All work shall be done to the lines, grades and elevations shown on the construction drawings.
- B. Owner will periodically check the lines and grades for compliance with the construction drawings. Any discrepancy will be brought to the attention of the Owner, Engineer and Contractor immediately and will be resolved prior to proceeding with additional construction. This check does not relieve Contractor from providing his own quality control.

1.9 UNFAVORABLE CONSTRUCTION CONDITIONS

- A. During unfavorable weather, wet ground, or other unsuitable construction conditions, Contractor shall confine his operations to work, which will not be affected adversely by such conditions. No portion of the work shall be constructed under conditions, which would affect adversely the quality or efficiency thereof, unless special means or precautions are taken by Contractor to perform the work in a proper and satisfactory manner. No additional cost will be made for such special means taken by the Contractor.

- B. Contractor shall review local weather forecasts and take necessary precautions to remove or relocate equipment, materials, supplies, etc. when precipitation is predicted which may result in the inundation of the work area. Contractor will not make a claim against the Owner or Engineer in the event a rainfall event or events occur and the Contractor's equipment, materials, supplies temporary work areas or completed work are damaged or lost due to flooding or other disaster. It is the Contractor's responsibility to repair or replace any lost or damaged item resulting from such flooding or such other disaster.

1.10 CLEAN-UP

- A. Contractor shall keep the premises free at all times from accumulations of waste materials and rubbish.
- B. Contractor shall neatly stack construction materials such as concrete forms, pipe, etc. when not in use. Contractor shall promptly remove spattered concrete, asphalt, oil, paint, corrosive liquids, and cleaning solutions from surfaces to prevent marring or other damage.
- C. Volatile wastes shall be properly stored in covered metal containers and removed daily.
- D. Wastes shall not be buried or burned on the site or disposed of into storm drains, sanitary sewers, streams, or waterways. All wastes shall be removed from the site and disposed of in a manner complying with local ordinances and anti-pollution laws.
- E. Adequate cleanup will be a condition for recommendation of progress payment applications.

1.11 REFERENCE STANDARDS

- A. Reference to standards, specifications, manuals or codes of any technical society, organization, or association, or to the laws regulations of any governmental authority, whether such reference be specified or by implication, shall mean the latest standard specification, manual, code or laws or regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated. However, no provision of any referenced standard, specifications, manual, or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of Owner, Contractor, Engineer, or any of their Consultants, agents, or employees from those set forth in the Contract Documents, nor shall it be effective to assign to Engineer, or any of Engineer's Consultants, agents, or employees, any duty or authority to supervise or direct the furnishing of performance of the work.

1.12 PRECONSTRUCTION CONFERENCE

- A. Prior to commencement of work at the site, a Preconstruction conference will be held at a mutually agreed time and place. The conference shall be attended by:
 - 1. Contractor and his superintendent.
 - 2. Principal Subcontractors.
 - 3. Representatives of principal Suppliers and manufacturers as appropriate.
 - 4. Engineer and his Resident Project Representative.
 - 5. Representative of Owner.
 - 6. Governmental representatives as appropriate.
 - 7. Others as required by Contractor, Owner, or Engineer.

- B. Unless previously submitted to Engineer, Contractor shall bring to the conference a preliminary schedule for each of the following:
 - 1. Progress
 - 2. Shop drawings and other submittals.

- C. The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The agenda will include:
 - 1. Contractor's preliminary schedules.
 - 2. Transmittal, review, and distribution of Contractor's submittals.
 - 3. Processing Applications for Payment.
 - 4. Maintaining record documents.
 - 5. Critical work sequencing.
 - 6. Field decisions and Change Orders.
 - 7. Use of premises, storage areas, security, housekeeping, and Owner's needs.
 - 8. Material deliveries and priorities.
 - 9. Contractor's assignments for safety and first aid.

- D. Engineer will preside at the conference and will arrange for keeping the minutes and distributing the minutes to all persons in attendance.

1.13 PROGRESS MEETINGS

- A. Contractor shall schedule and hold regular progress meetings at least monthly and at other times as requested by Engineer or required by progress of the Work. Contractor, Engineer, and all Subcontractors active on the site shall be represented at each meeting. Contractor may at his discretion request attendance by representatives of his Suppliers, manufacturers, and other subcontractors.

- B. Meeting minutes will be prepared and distributed by the Engineer. The purpose of the meetings will be to review the progress of the work, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems, which may develop.

1.14 CONTINGENCY ALLOWANCES

- A. Use the contingency allowance only as directed for the Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

- B. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.

- C. At Project closeout, credit unused amounts remaining in the contingency allowance to the Owner by Change Order.

1.15 TESTING AND INSPECTION

- A. The Owner will be responsible for providing personnel to verify test results performed by the Contractor.

- B. The Contractor shall test all work as specified in the Contract Documents.

- C. The Contractor shall furnish all apparatus and personnel required to conduct the testing and pay for all costs connected therewith.
- D. When required by the Contract Documents, geotechnical or other independent testing is required, the Owner will pay for said services; however, whenever retesting is required due to failed testing, Contractor will be responsible for payment of retesting fees.

1.16 SITE ADMINISTRATION

- A. Contractor shall be responsible for all areas of the site used by him and all Subcontractors in the performance of the work. Contractor will exert full control over the actions of all employees and other persons with respect to the use and preservation of property and existing facilities, except such controls as may be specifically reserved to Owner or others. Contractor has the right to exclude from the site all persons who have no purpose related to the work or its inspection.

1.17 OSHA'S REVISED STANDARD FOR EXCAVATION

- A. Contractor shall be responsible for complying with OSHA'S revised standard for excavation, as amended. See sheets OSHA-1 and OSHA-2 at end of this section.

1.18 STORMWATER INSPECTIONS

- A. Contractor shall inspect all erosion control measures on a weekly basis and within 24 hours of a 0.5-inch rainfall event (within a 24-hour period) and complete the STORMWATER INSPECTIONS FOR GENERAL PERMIT NCG010000 –LAND DISTURBING ACTIVITIES (Form attached at end of Section).
 - 1. Contractor shall maintain a file of said report and submit copies of report to Owner and Engineer on a monthly basis.
- B. Any repairs or required maintenance on erosion control measures noted during inspection are to be made prior to continuing with any construction activities.

END OF SECTION 01015

NOTE: The registered Professional Engineer referred to in this document is the RPE secured by the Contractor and not the design RPE for this water or sewer project.

FACT SHEET: OSHA'S REVISED STANDARD FOR EXCAVATIONS
29 CFR PART 1926 OCTOBER 31, 1989

I. SCOPE

Covers all open excavations; defines excavation to include trenches.

II. GENERAL REQUIREMENTS

Protection of employees in excavations against cave-ins except when the excavation is in stable rock or less than five feet deep and examination by a competent person provides no evidence that a cave-in should be expected; and against falling rock, soil or material by use of an 'adequate' system. -The latter operation includes scaling to remove loose rock or soil, installation of protective barricades and other 'equivalent protection. Material or equipment which might fall or roll into an excavation must be kept at least two feet from the edge of excavations, or have retaining devices, or be prevented from falling with a combination of both precautions.

Daily inspections of excavations, adjacent areas, and protective systems by a competent person and the removal of exposed employees if-evidence –of possible cave-ins, failure of protective systems, hazardous atmospheres, or other hazardous conditions until necessary precautions have been taken.

Removal of, or neutralization of surface encumbrances which may create a hazard.

Estimate location of underground installations (sewer, telephone, electrical, fuel and other lines; storage tanks, etc.) prior to digging; pinpoint actual locations as estimated locations are approached.

Ramps, runways, ladders or stairs as means of access/egress must be within 25 feet of an employee work area if a trench is four feet or more deep.

Warning system for mobile equipment including barricades, hand or mechanical signals, or stop logs.

Testing and Controls for hazardous atmospheres including emergency rescue equipment and daily inspections for potentially hazardous conditions by a 'competent person'. Controls include respirators or additional ventilation, if needed, and individually attended lifelines during descent into bell-bottom pier holes or similar excavations.

-Support systems such as shoring & bracing or underpinning to ensure the stability of adjacent structures such as buildings, walls or sidewalks.

III. REQUIREMENTS FOR PROTECTIVE SYSTEMS

Sloping and benching systems - four options:

1. A slope of 34 degrees or less, in lieu of soil classification. A slope of this gradation or less is considered safe for any type of soil.
2. Maximum allowable slopes and allowable configurations for sloping and benching systems will be determined through use of Appendices A (Soil Classification) and B (Sloping and Benching).
3. Designs of sloping or benching shall be selected from and be in accordance with data provided in written form, the text to identify: Criteria that affect the selection, the limits of use of the data and

sufficient explanatory data as necessary to assist in making a correct choice of a protective system.

4. At least one copy of the tabulated data identifying the Registered Professional Engineer who approved the information shall be maintained at the job site during the time the work is being carried out.
5. Excavations can be designed by a Registered Professional Engineer, put in written form and kept at the work site, but must include, at least, the magnitude and configuration of the slopes determined to be safe for the project and the name of the RPE who approved the plan.

Support, shield and other protective systems - four options:

1. Designs for timber shoring in trenches set in accordance with the conditions and requirements determined by using Appendices A and C (timber shoring for trenches). For aluminum hydraulic shoring Appendices A and D can be used if manufacturer's tabulated data is not available.
2. Designs using manufacturer's tabulated data may be used, deviation allowed only with specific, written approval of the manufacturer.
3. Designs using other tabulated data may be used provided the data is in writing and includes: Explanatory information to aid the user in making a selection, the criteria determining the selection, and the limits on the use of the data. At least one copy of the information, including the identity of the RPE, kept at the work Site during construction of the protective system.
4. Design by a Registered Professional Engineer. Design systems not using any of the three previously cited options must be approved by a RPE, shall be in writing and include the identity of the RPE and details such as sizes, types and configurations of the materials to be used. At least one copy of the plan is to be at the job site during construction.

The standard allows an employer to use a trench box or shield that is either designed or approved by a registered professional engineer (RPE), or is based on tabulated data prepared or approved by an RPE. The standard allows construction workers to remain inside trench shields that are being repositioned, provided that the shields are moved horizontally only and the shields are not lifted.

According to the new standard, information necessary for the safe installation, placement, use and removal of any trench support system must be available at the work site at all times, but a written log or record of inspections is not necessary.

This final standard goes into effect 60 days after publication in the Federal Register.

STORMWATER INSPECTIONS FOR GENERAL PERMIT NCG010000 – LAND DISTURBING ACTIVITIES

PROJECT: _____
MONITORING FOR THE WEEK BEGINNING: _____

RAINFALL:

Date Of Rain	Amount (inches)	Initials

By this signature, I certify (in accordance with Part II Section B, 10 of the NCG010000 permit) that this report is accurate and complete to the best of my knowledge:

(Signature of Permittee or Designee)

EROSION AND SEDIMENTATION CONTROL FACILITIES INSPECTED: (At least once [twice, if on 303(d) listed stream for construction related parameters*] per seven calendar days Or within 24 hours of a rainfall of 0.5 inches per 24 hours)

Facility Identification	Date of inspection	Operating Properly (Y/N)	Describe corrective actions taken (may need to attach additional information)

OBSERVATIONS OF RUNOFF AT STORMWATER DISCHARGE OUTFALLS: (At least once [twice, if on 303(d) listed stream for construction related parameters *] per seven calendar days Or within 24 hours of a rainfall of 0.5 inches per 24 hours)

Stormwater Discharge Outfall Identification	Date	Clarity	Floating solids	Suspended Solids	Oil sheen	Other obvious indicators of stormwater pollution (list & describe)	Visible sediment leaving the site? (Y/N)	If yes, describe actions taken to prevent future releases (may need to attach additional information)	Describe measures taken to clean up sediment outside of the disturbed limits (may need to attach additional information)

Clarity: Choose the number which best describes the clarity of the discharge where 1 is clear and 10 is very cloudy
 Floating Solids: Choose the number which best describes the amount of floating solids in the discharge where 1 is no solids and 10 the surface is covered in floating solids
 Suspended Solids: Choose the number which best describes the amount of suspended solids in the discharge where 1 is no solids and 10 is extremely muddy
 Oil Sheen: Is there an oil sheen in the stormwater discharge? Y or N

* 303(d) listed streams for construction related parameters – The latest approved list may be obtained from the Division of Water Quality, or from the following website location:
<http://h2o.emr.state.nc.us/su/construction303d>

SECTION 01025 – MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Divisions 1-16 Specification Sections, apply to this Section.

1.2 SUMMARY

This Section specifies the measurement and payment of the contract unit prices for the project.

The pay items listed below apply to Contract 1.

Related Sections include the following:

1. "Bid Form" for unit price quantities and bid amounts.
2. Division 1 Section "Application for Payment".
3. Division 1 Section "Alternates".
4. Division 2 – SANITARY SEWER SPECIFICATIONS – all Sections.

1.3 GENERAL

- A. The bid items shown in the Bid Form have been created solely for the purpose of comparison of bids and for use in the preparation of monthly Applications for Payment. Quantities shown thereon must be considered as approximate only.
- B. Basis for payment and unit of measurement for the work under this contract shall be in accordance with the following and shall include furnishing all labor, tools, equipment and materials required to construct the improvements in the manner specified including but not limited to all types of excavation, trenching, shoring, pumping, pipe installation, testing, backfilling, repairs, surface restoration and all other items necessary to complete the work as specified.
- C. All work shown on the plans herein specified or implied in any way on the drawings or specifications shall be done regardless of whether or not the work is specifically defined in any bid item.
- D. The non-utilization or partial utilization of any bid item shall not serve as a claim for any contract or unit price adjustment as the Contractor shall be paid the unit price bid for the number of units actually incorporated and accepted into the work.
- E. Items listed in this section are included only if listed in the proposal for each contract. If a pay item is not listed in the proposal, then it is not a part of that contract even though it may be listed in this section 01025.
- F. Payment and measurement will be based on this Section.

1.4 PAY ITEMS

A. Back Creek #2 Lift Station Renovation – Lump Sum

Back Creek #2 is a Renovation. The contractor shall provide and install all materials, parts, wiring conduit, temporary systems and power to keep the existing station in service until the renovation is complete, accepted by the City and placed into service. The contractor shall provide all equipment, personnel and any other components necessary to complete the work, including but not limited to new black vinyl fence, 16' rolling gate, 12' swing gate and 4' walk through gate, temp fence to secure site, fence removal and relocation/reinstallation as shown on plans, maintenance of existing station and answering all trouble/alarm calls for station w/in one hour, stabilization stone, clearing, grubbing, grading, dewatering and backfill as required, erosion control, site and access road – 8" ABC gravel, 8" ABC gravel and set-up inside fence, bypass pumping, water tight wet well and valve vault hatches, site maintenance, all electrical work, conduit, wiring, all concrete work including pads for all equipment, all controls, aluminum grating & elevated platform, 42" aluminum handrails and steps, aluminum shelter (color by owner) over platform - 7' min clearance, bracing and supports, removal of existing controls, hoist and fan, seal hole for fan with gasketed aluminum non-skid plate to at least 300 PSF, all seeding and mulching, phone line connection, SCADA meeting the same specs as Graham's current SCADA and connection to Graham's existing SCADA, standby generator, power to all equipment as required; factory start up and test of equipment, alarm, (all items are to be complete in place) and all other pump station items and incidentals to place Back Creek #2 back into service, materials and work shown on plans and in the specifications for a lump sum price.

B. Off Site Borrow

1. Borrow material will be based on the actual number of cubic yards of borrow material incorporated and accepted into the work and based on truck tickets provided by the Contractor. The volume of the truck tickets will be established by the Engineer based on measurements of the actual truck volume. The tickets are to be given to the project inspector at the time of delivery of the borrow material.
2. Payment will be made at the contract unit price per cubic yard for "Borrow Material" and will be full compensation for all work described in the contact documents.
3. No additional payment will be made for removal and disposal of existing material, placement, compaction, delivery or other work required to complete the work since the work is considered to be included in the contract unit price.

PART 2 - PRODUCT (As applicable above)

END OF SECTION 01025

SECTION 01027 - APPLICATIONS FOR PAYMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Divisions 1 and 2 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.
- B. Related Sections: The following Sections contain requirements that relate to this Section.
 - 1. "Bid Form" for unit price quantities and bid amounts.
 - 2. Division 1 Section "Application for Payment".
 - 3. Division 1 Section "Alternates".
 - 4. SPECIFICATIONS – all Divisions

1.3 SCHEDULE OF VALUES

- A. The estimated quantities and unit prices established on the Bid Form shall be the basis for the schedule of values.
- B. Format and Content: The Application for Payment shall consist of two (2) components. The first shall be a summary sheet and the second will be an itemized quantity and value sheet.
 - 1. The following information shall be on the summary sheet:
 - a. Identification:
 - 1) Project name and location
 - 2) Name and address of Engineer
 - 3) Project number
 - 4) Contractor's name and address
 - 5) Date of submittal
 - 6) Application for Payment Number and Period Covered
 - b. Summary of Payment Request
 - 1) Contract sum
 - 2) Construction to date
 - 3) Less retainage
 - 4) Amount construction to date
 - 5) Plus material inventory
 - 6) Gross amount due
 - 7) Percent complete

- c. **Certification Statements**
 - 1) Contractor to certify that work has been completed in accordance with Contract Documents, that all amounts have been paid for items which previous Applications for Payments were issued and payments received, and that the current payment is now due. Funds hereby received will be used to pay herein listed items to the extent needed.
 - 2) Certification statement is to be notarized.
 - 3) Engineers certification statement.
 - a) In our opinion, the above application for payment by the contractor is a substantially correct statement of performance in accordance with the Contract Documents and the contractor is entitled to payment as requested.
2. The following information shall be on the itemized quantity sheet:
 - a. Identification:
 - 1) Project name and location
 - 2) Name of Engineer
 - 3) Project number
 - 4) Contractor's name
 - 5) Application for payment number and period covered.
 - b. Arrange the scheduled values in tabular form with separate columns to indicate the following information:
 - 1) Item number
 - 2) Description of work
 - 3) Scheduled quantity and unit
 - 4) Unit price and scheduled value
 - 5) Previous quantity and amount
 - 6) Current quantity and amount
 - 7) To date quantity and amount
 - 8) Remaining quantity and amount
 - 9) Totals for previous, current, to date and remaining amounts
 - c. A material inventory statement is to be provided for which payment request includes stored materials not incorporated into the work. The following information is to be provided.
 - 1) Project name and location
 - 2) Date
 - 3) Item description
 - 4) Previous on hand quantity
 - 5) Delivered quantity
 - 6) Quantity incorporated into work
 - 7) Quantity on hand this application
 - 8) Unit price
 - 9) Amount due
 - 10) Copies of statements or invoices from suppliers shall be submitted.
 - d. See Sample Application for Payment Sheet # 01027 – 6 & 7.

1.4 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by the Engineer and paid for by the Owner.
 - 1. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.
- B. Payment-Application Times: The date for each progress payment is the 25th day of each month. The period covered by each Application for Payment starts on the day following the end of the preceding period.
- C. Payment-Application Forms: Use forms approved by the Engineer for Applications for Payment which includes the information described in Section 1-3.
- D. Application Preparation: Complete every entry on the form. Include notarization and execution by a person authorized to sign legal documents on behalf of the Contractor. Verify quantities with inspector. The Engineer will return incomplete applications without action.
 - 1. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.
- E. Transmittal: Submit 4 signed and notarized original copies of each Application for Payment to the Engineer. One copy shall be complete, including waivers of lien and similar attachments, when required.
 - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information related to the application, in a manner acceptable to the Engineer.
- F. Initial Application for Payment: Administrative actions and submittals, that must precede or coincide with submittal of the first Application for Payment, include the following:
 - 1. List of subcontractors.
 - 2. List of principal suppliers.
 - 3. Contractor's Construction Schedule (preliminary if not final).
 - 4. Certificates of insurance and insurance policies.
 - 5. Performance and payment bonds.
 - 6. Shop drawings and product data sheets.
- G. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment.
 - 1. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
 - 2. Administrative actions and submittals that shall precede or coincide with this application include:
 - a. Warranties (guarantees) and maintenance agreements.
 - b. Final cleaning.
 - c. Application for consent of surety.

- d. List of incomplete Work, recognized as exceptions to Engineer's Certificate of Substantial Completion.
- H. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include the following:
1. Completion of Project closeout requirements.
 2. Completion of items specified for completion after Substantial Completion.
 3. Ensure that unsettled claims will be settled.
 4. Ensure that incomplete Work is not accepted and will be completed without undue delay.
 5. Transmittal of required Project construction records to the Owner.
 6. Proof that taxes, fees, and similar obligations were paid.
 7. Removal of temporary facilities and services.
 8. Removal of surplus materials, rubbish, and similar elements.

1.5 RETAINAGE

- A. See EJCDC Article 6 - Payment Procedures, Page 00500-3.

1.6 STORED MATERIALS

- A. Materials and equipment not incorporated in the Work (but delivered, suitably stored and accompanied by documentation satisfactory to OWNER as provided in paragraph 14.2 of the General Conditions) will be paid for at the rate of 95% of its value (with the balance being retainage), as shown by manufacturer's invoices with the amount not to exceed any applicable Bid price or schedule of values amount for the material or equipment.
- B. See paragraph 1.3B subparagraph 2 c. of this section for information to be submitted with Applications for Payment.

1.7 SALES TAX STATEMENT

- A. Sales tax statement shall accompany all Applications for Payment. If no sales tax was paid during the application period, contractor shall submit sales tax statement stating no sales tax was paid. Sales tax statement shall have the following information:
1. Identification:
 - a. Project name and location
 - b. Name of engineer
 - c. Project number
 - d. Contractor's name and address
 - e. Date
 - f. Period covered
 2. Sales Tax Information:
 - a. Invoice date and number
 - b. Supplier
 - c. County material purchased
 - d. Net cost
 - e. State tax amount

-
- f. County tax amount
3. Certification Statement
- a. I hereby certify that the above listed materials have been or will be used on the subject project and that the information provided is correct to the best of my knowledge.
4. See sample sales tax sheet Page 01027-8

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

alley, williams, carmen & king, inc.
engineers and architects
740 chapel hill road
burlington, north carolina 27215



APPLICATION FOR PAYMENT NO. _____

For the period _____ to _____

ARCH./ENG. PROJECT No. _____

DATE: _____

PROJECT: _____

CONTRACTOR: _____

LOCATION: _____

CONTRACT FOR: _____

CONTRACT DATE: _____

TO (Owner):

┌ _____ └ _____

┌ _____ └ _____

Application is made for Payment, as shown below, and as itemized in the attached pages in connection with this Contract.

CONTRACT SUM.....	\$ _____
Construction to Date.....	\$ _____
Less: _____ % Retainage.....	\$ _____
Total Construction to Date.....	\$ _____
Plus: _____ % Material Inventory...	\$ _____
GROSS AMOUNT DUE.....	\$ _____
Less: Previous Payments.....	\$ _____
NET AMOUNT DUE.....	\$ _____
Percentage Complete _____ %	

State of:
County of:

The undersigned certifies that the Work herein has been completed in accordance with the Contract Documents, that all amounts have been paid for items for which previous Applications for Payment were issued and payments received, and that the current payment is now due. Funds hereby received will be used to pay herein listed items to the extent needed.

Contractor

Address

By _____ Date _____

Subscribed and sworn to before me this

_____ day of _____, 20__

Notary Public:

My Commission Expires:

In our opinion, the above application for payment by the contractor is a substantially correct statement of performance in accordance with the contract documents and the contractor is entitled to payment as requested.

ALLEY, WILLIAMS, CARMEN & KING, INC.

By _____ Date _____

This document is not negotiable. It is payable only to the payee named herein and its issuance, payment and acceptance are without prejudice to any rights of the Owner or Contractor under their Contract

alley, williams, carmen & king, inc.
 engineers and architects
 740 chapel hill road
 burlington, north carolina 27215



APPLICATION FOR PAYMENT NO. _____ **FOR THE PERIOD** _____ **to** _____

Project _____ **ARCH./ENG. PROJECT No.** _____

ITEM NO.	DESCRIPTION OF ITEMS	UNIT	QUANTITIES			UNIT PRICE	TOTAL AMOUNT
			PREVIOUS	CURRENT	TOTAL		
TOTAL/SUB-TOTAL.....							

alley, williams, carmen & king, inc.
 engineers and architects
 740 chapel hill road
 burlington, north carolina 27215



Statement of SALES TAX PAID on Materials used for:

Project _____ Contract for _____

 _____ Period Ending _____

Date	Supplier	County	Invoice No.	Material Invoiced	Net Cost	N.C. Tax	County Tax
TOTALS							

I hereby certify that the above listed material is to be used on the subject project and that the information and quantities are correct to the best of my knowledge.

Name _____ Date _____

Company _____

Address _____

SECTION 01039

COORDINATION AND MEETINGS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and other Division 1 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Coordination and project conditions.
- B. Staking.
- C. Preconstruction conference.
- D. Progress meetings.
- E. Equipment electrical characteristics and components.
- F. Cutting and Patching.

1.3 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of the various Sections of the Specifications in compliance with the requirements of the General Conditions to ensure efficient and orderly sequence of installation of interdependent construction elements.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing to, and placing in service, such equipment.
- C. Coordinate space requirements, supports, and installation of mechanical and electrical Work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion.
- F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.4 STAKING

- A. Engineer has provided base line reference control and staking plan and bench mark at the site. Engineer will stake one time all manholes, water line, shelter, appurtenances and provide offset hubs and cut sheets. All other staking to be provided by Contractor.
- B. Confirm drawing dimensions and elevations.
- C. Establish elevations, lines, and levels from reference points, utilizing recognized engineering survey practices.
- D. During construction, furnish stakes and competent Engineer's helpers for checking elevations, lines, and levels deemed necessary by Engineer.

1.5 PRECONSTRUCTION CONFERENCE

- A. Owner will schedule a conference after Notice of Award.
- B. Attendance Required: Owner, Engineer, Contractor, Contractor's Superintendent, and major Subcontractors.
- C. Agenda:
 - 1. Submission of insurance certificates.
 - 2. Distribution of Contract Documents.
 - 3. Submission of list of Subcontractors, schedule of values, schedule of Shop Drawings and Sample Submittals, and progress schedule.
 - 4. Designation of personnel representing the parties in Contract, Engineer, and others as appropriate.
 - 5. Procedures and processing of field decisions, submittals, substitute and "or equals", applications for payments, Change Orders, and Contract closeout procedures.
 - 6. Scheduling.
 - 7. Use of premises by Owner and Contractor.
 - 8. Baseline staking and building offset layout.
 - 9. Security and housekeeping procedures.
 - 10. Procedures for testing.
 - 11. Procedures for maintaining record documents.
 - 12. Requirements for start-up of equipment.
 - 13. Inspection and acceptance of equipment put into service during construction period.
 - 14. Contractor's safety representative.
 - 15. Owner's safety policies and training.
- D. Engineer will record minutes and distribute copies within three working days after meeting to participants, and those affected by decisions made.

1.6 PROGRESS MEETINGS

- A. Engineer to schedule and administer meetings throughout progress of the Work at maximum monthly intervals or as otherwise deemed necessary by Owner or Engineer.
- B. Engineer to make arrangements for meetings, prepare agenda with copies for participants, preside at meetings, give 72 hours prior notice.
- C. Attendance Required: Contract 1 & 2: Contractor's job superintendent and office representative managing job, major subcontractors and suppliers, Owner, Engineer, as appropriate to agenda topics for each meeting.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of Work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems which impede planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of off-site fabrication and delivery schedules.
 - 7. Maintenance of progress schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress during succeeding work period.
 - 10. Coordination of projected progress
 - 11. Maintenance of quality and work standards.
 - 12. Effect of proposed changes on progress schedule and coordination.
 - 13. Other business related to Work.

PART 2 PRODUCTS

2.1 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Motors: NEMA MG1 Type. Specific motor type is specified in individual specification sections.
- B. Wiring Terminations: Provide terminal lugs to match brand circuit conductor quantities, sizes, and materials indicated. Size terminal lugs to NFPA 70, include lugs for terminal box.

PART 3 EXECUTION

3.1 CUTTING AND PATCHING

- A. Employ skilled and experienced installer to perform cutting and patching.
- B. Submit written request in advance of cutting or altering elements which affect:
 - 1. Structural integrity of element.
 - 2. Integrity of weather-exposed or moisture-resistant elements.
 - 3. Efficiency, maintenance, or safety of element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate contractor.
- C. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
 - 1. Fit the several parts together, to integrate with other Work.
 - 2. Uncover Work to install or correct ill-timed Work.
 - 3. Remove and replace defective and non-conforming Work.
 - 4. Remove samples of installed Work for testing.
 - 5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Execute work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- E. Cut masonry and concrete materials using masonry saw or core drill.
- F. Restore Work with new materials in accordance with requirements of Contract Documents.
- G. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
- I. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.
- J. Identify hazardous substances or conditions exposed during the Work to the Engineer for decision or remedy.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and other Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Submittal procedures.
- B. Schedule of values
- C. Construction progress schedules.
- D. Shop drawings
- E. Samples.
- F. Certificates.
- G. Manufacturer's instructions.

1.3 SUBMITTAL PROCEDURES

- A. Transmit each submittal with Engineer accepted form.
- B. Identify Project, Contractor, Subcontractor or Supplier; pertinent drawing and detail number, and specification section number, as appropriate.
- C. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of materials and equipment required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
- D. Schedule submittals to expedite the Project, and deliver to Engineer at business address. Coordinate submission of related items. **DELIVER SHOP DRAWINGS IN PAPER (3 COPIES) AND ELECTRONIC FORM**
- E. For each submittal for review, allow a minimum of 15 working days excluding delivery time to and from the Contractor.
- F. Identify variations from Contract Documents and material, equipment or system limitations which may be detrimental to successful performance of the completed Work.
- G. Provide space for Contractor and Engineer review stamps.
- H. When revised for resubmission, identify all changes made since previous submission.
- I. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- J. Submittals not requested will not be recognized or processed.

1.4 SCHEDULE OF VALUES

- A. Provide to the Engineer a Schedule of Values for determining construction progress.
- B. The Schedule shall include the following items at a minimum (As agreed upon by City Staff prior to issuing Notice to Proceed):
 - a. Mobilization
 - b. Site work
 - c. Concrete Structures

- d. Wet Well Installation
- e. Installation of bar screen and concrete structure
- f. Piping and valves
- g. Electrical and Control Panels
- h. Bypass Pumping
- i. Pumps and Pump Installation
- j. Shelter
- k. Maintenance of Existing Station

1.5 CONSTRUCTION PROGRESS SCHEDULES

- A. Each Contractor to develop and maintain progress schedule in compliance with all of the General Conditions, and the following:
 - 1. Submit four copies of preliminary progress schedule at preconstruction conference.
 - 2. Revise and resubmit as required.
 - 3. Submit revised schedule with each Application for Payment, identifying changes since previous version.
 - 4. Submit network analysis diagram using the critical path method, as outlined in Associated General Contractors of America (AGC) publication "The Use of CPM in Construction – A Manual for General Contractors and the Construction Industry".
 - 5. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.
 - 6. Indicate estimated percentage of completion for each item of Work at each submission.

1.6 SHOP DRAWINGS

- A. Submit working drawings of piping; detail drawings of steel reinforcing, both bars and mesh, showing size and arrangement; details of machinery, apparatus and materials; dimensional drawings, ladder-type schematic diagrams, connection diagrams and other data for all electrically operated equipment, and all communication, instrumentation, control and related equipment; and layout drawings of the complete electrical work. Drawings shall designate the complete installation and shall be suitable for coordinating work of the various trades. As a minimum, Shop Drawings are required for those items for Equipment and Material. Shop Drawings for additional items shall be submitted when deemed necessary by Engineer.
- B. Layout drawings for electrical work shall include all underground, concealed, and exposed conduits, and shall show locations and sizes of conduit runs, sizes and number of wires, pull and junction boxes, outlets, lighting fixtures, panelboards, motor starter switchboards, motor controls, switches, control stations, disconnects, etc., and will be used by Engineer to verify the location and size of conduit, wire and equipment. Layout drawings shall be submitted early. No work shall proceed until such drawings have been returned (with review stamp affixed) by Engineer.
- C. Shop Drawings shall include all information on electrical components and characteristics, appropriate curve data at various operating and efficiency levels, manufacturer's motor data sheets, hardware accessories. Electrical characteristics include electrical power supply required and electrical loading information. Shop Drawings will not be reviewed and returned until all such information is received.
- D. Submit the number of copies which the Contractor requires, plus two copies which will be retained by the Engineer. The Engineer will accept electronic submittals in PDF form in lieu of hard copies. Shop Drawing submittals in the form of prints, such as piping layouts, steel reinforcing, structural steel, miscellaneous metals, electrical layouts, etc., at Contractor's option, may include two copies – one reproducible transparency and one opaque reproduction. The reproducible transparency will be returned with Engineer's comments noted. The use of reproducible transparencies is encouraged whenever possible.
- E. Contractor may utilize contract Drawings with necessary details marked thereon for electrical conduit layout drawings. However, the drawings must have Contractor's title block in lieu of Engineer's title block.
- F. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturer's standard data to provide information specific to this Project.
- G. For factory primed and factory finished materials and equipment to be field painted, indicate coatings manufacturer and type; for completely factory finished materials and equipment not to be field painted, indicate coatings manufacturer and type, and include full range of manufacturer's standard colors for finish color selection by Owner.

- H. After review, distribute in accordance with the Submittal Procedures article above and provide copies for record documents described in Section 01700 – Contract Closeout.

1.7 SAMPLES

- A. Submit Samples to illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices, and, for finishes, submit Samples from the full range of manufacturer’s standard colors, textures, and patterns for Owner selection. Coordinate Sample submittals for interfacing work.
- B. Include identification on each Sample, with full Project information.
- C. Submit the number of Samples which the Contractor requires, plus two which will be retained by Engineer. Samples are required for those items as specified in individual Specifications Sections. Samples for additional items shall be submitted when deemed necessary by Engineer.
- D. Reviewed Samples which may be used in the Work are indicated in individual specification sections.
- E. Samples will not be used for testing purposes unless specifically stated in the specification section.

1.8 CERTIFICATES

- A. When specified in individual specification section, submit certification by the manufacturer, installation/application subcontractor, or the Contractor to Engineer, in quantities specified for Shop Drawings.
- B. Indicate material or equipment conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or equipment but must be acceptable to Engineer.

1.9 MANUFACTURER’S INSTRUCTIONS

- A. Submit one copy of manufacturer’s printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing as received by Contractor to Engineer and a duplicate copy to the Owner.
- B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and other Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Quality assurance – control of installation.
- B. Tolerances.
- C. References and standards.
- D. Testing services.
- E. Manufacturer's field services.
- F. Examination.
- G. Preparation.

1.3 QUALITY ASSURANCE – CONTROL OF INSTALLATION

- A. Monitor quality control over Suppliers, manufacturers, materials, equipment, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturer's instructions, including each step in sequence.
- C. Should manufacturer's instructions conflict with Contract Documents, manufacturer's instructions shall take precedence.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform Work by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure materials and equipment in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.4 TOLERANCES

- A. Monitor fabrication and installation tolerance control of materials and equipment to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturer's tolerances. Should manufacturer's tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.
- C. Adjust materials and equipment to appropriate dimensions; position before securing in place.

1.5 REFERENCES AND STANDARDS

- A. For materials, equipment, or workmanship specified by association, trade, or other consensus standards, complies with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

- B. Conform to reference standard by date of issue current on date for receiving bids, except where a specific date is established by code.
- C. Obtain copies of standards where required by specification sections.
- D. Neither the contractual relationships, duties, nor responsibilities of the parties in Contract nor those of the Engineer shall be altered from the Contract Documents by mention or inference otherwise in any reference document.
- E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction, or other entity applicable to the context of the text provision. Refer to the "Encyclopedia of Associations", published by Gale Research Co., available in most libraries.

1.6 TESTING SERVICES

- A. Owner will appoint, employ, and pay for specified services of an independent firm to perform testing.
- B. The independent firm will perform tests and other services specified in individual specification sections and as required by the Engineer.
- C. Testing and source quality control may occur on or off the project site.
- D. Reports will be submitted by the independent firm to the Engineer and Contractor, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
- E. Contractor shall cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
 - 1. Notify Engineer and independent firm prior to expected time for operations requiring services.
 - 2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
- F. Contractor shall be responsible for, and shall pay for:
 - 1. Additional testing expenses resulting from Contractor's failure to advise Engineer and independent firm hours in advance of operations.
 - 2. Additional testing expenses resulting from changes in Contractor's schedule after independent firm has been notified that testing is required, canceled, or modified.
- G. Testing does not relieve Contractor to perform Work to contract requirements.
- H. Re-testing required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Engineer. Payment for re-testing will be charged to the Contractor by deducting testing charges from the Contract Price.

1.7 MANUFACTURER'S FIELD SERVICES

- A. When specified in individual Specifications Sections, require material or equipment suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, and quality of workmanship as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.
- C. Prior to leaving the Project and for each visit, complete a Manufacturer's Service Representative's Report. Copies of the Report will be available for use on the Project.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.

- C. Examine and verify specific conditions described in individual specification sections.
- D. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- E. Complete motor circuit, feeder circuit, ground, and DC hypotential tests required under Division 16 prior to any operational testing of appurtenant equipment.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

END OF SECTION

SECTION 01500 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Divisions 1-16 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes requirements for construction facilities and temporary controls, including temporary utilities, support facilities, and security and protection.
- B. Temporary utilities include, but are not limited to, the following:
 - 1. Temporary electric power and light.
 - 2. Telephone service.
 - 3. Sanitary facilities, including drinking water.
 - 4. Storm drainage.
- C. Support facilities include, but are not limited to, the following:
 - 1. Field offices and storage sheds. (Optional).
 - 2. Construction aids and miscellaneous services and facilities.
- D. Security and protection facilities include, but are not limited to, the following:
 - 1. Temporary fire protection.
 - 2. Barricades, warning signs, and lights.
 - 3. Environmental protection.

1.3 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:
 - 1. Building code requirements.
 - 2. Health and safety regulations.
 - 3. Utility company regulations.
 - 4. Police, fire department, and rescue squad rules.
 - 5. Environmental protection regulations.
 - 6. Manual Uniform Traffic Control Devices
- B. Standards: Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations," ANSI A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library "Temporary Electrical Facilities."

1. **Electrical Service:** Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70 "National Electric Code."

C. **Inspections:** Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.4 PROJECT CONDITIONS

A. **Conditions of Use:** Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.

B. **Traffic Control:** Contractor shall provide traffic control measures in accordance with NCDOT standard details, as shown on Construction Drawings, and in accordance with NCDOT regulations. All traffic control devices shall be in condition satisfactory to NCDOT personnel and Engineer for the intended use of the device.

PART 2 - PRODUCTS

2.1 MATERIALS

A. **General:** Provide new materials. If acceptable to the Engineer, the Contractor may use undamaged, previously used materials in serviceable condition. Provide materials suitable for use intended.

B. **Water:** Provide potable water approved by local health authorities.

2.2 EQUIPMENT

A. **Temporary Toilet Units:** Provide self-contained, single-occupant toilet units of the chemical, aerated recirculation, or combustion type. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.

B. **Fire Extinguishers:** Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.

1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.
 - 1. Arrange with company and existing users for a time when service can be interrupted, if necessary, to make connections for temporary services.
 - 2. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.
 - 3. Obtain easements to bring temporary utilities to the site where the Owner's easements cannot be used for that purpose.
 - 4. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner or Engineer. Neither the Owner nor Engineer will accept cost or use charges as a basis of claims for Change Orders.
- B. Temporary Telephones: Provide temporary telephone service throughout the construction period for all personnel engaged in construction activities.
 - 1. Provide mobile telephone for construction crew foreman.
- C. Sanitary facilities include temporary toilets and drinking-water fixtures. Comply with regulations and health codes for the type, number, location, operation, and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.
 - 1. Provide toilet tissue, paper cups, and similar disposable materials for each facility. Provide covered waste containers for used material.
- D. Drinking-Water Facilities: Provide containerized, tap-dispenser, bottled-water drinking-water units, including paper supply.
- E. Temporary Drainage Provisions: Contractor shall provide for the drainage of storm water and such water as may be applied or discharged on the site in performance of the work. Drainage facilities shall be adequate to prevent damage to the work, the site, and adjacent property.

3.3 SUPPORT FACILITIES INSTALLATION

- A. Field Offices: Not required.
- B. Temporary Paving: Not required for temporary facilities.
- C. Construction Aids: Contractor for each Section shall furnish, install, maintain, and operate all construction aids required by him and his Subcontractors in the performance of the work, except as otherwise provided herein.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations."
 - 1. Locate fire extinguishers where convenient and effective for their intended purpose.
 - 2. Maintain unobstructed access to fire extinguishers and other access routes for fighting fires.
- B. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting, including flashing red or amber lights.
- C. Security Enclosure and Lockup: Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
 - 1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.
- D. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result. Restrict use of noise-making tools and equipment to hours that will minimize complaints from persons or firms near the site.
 - 1. Contractor shall take responsible measures to avoid unnecessary noise. Such measures shall be appropriate for the normal ambient sound levels in the area during working hours. All construction machinery and vehicles shall be equipped with practical sound muffling devices, and operated in a manner to cause the least noise consistent with efficient performance of the work.
 - 2. Contractor shall take reasonable measures to prevent unnecessary dust. Earth surfaces subject to dusting shall be kept moist with water or by application of a chemical dust suppressant. When practicable, dusty materials in piles or in transit shall be covered to prevent blowing.
 - 3. Contractor shall prevent the pollution of drains and watercourses by sanitary wastes, sediment, debris, and other substances resulting from construction activities. No sanitary wastes will be permitted to enter any drain or watercourse other than sanitary sewers. No sediment, debris, or

other substance will be permitted to enter sanitary sewers, and reasonable measures will be taken to prevent such materials from entering any drain or watercourse.

- E. Traffic Control: Provide traffic control protection to traveling public and workers in accordance with NCDOT, and OSHA requirements. All traffic control operations shall be conducted in a method that will minimize impacts to the traveling public.
 - 1. Contractor will be allowed to close the lane adjacent to the curb when work operations require work within the shoulder area.
 - 2. Contractor shall relocate temporary traffic control devices as work progresses along shoulder.
 - 3. Contractor shall remove temporary traffic control devices at the end of each days work operations. Temporary signs are to be laid face down or removed when not in use.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Termination and Removal: Unless the Engineer requests that it be maintained longer, remove each temporary facility when the need has ended, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are the Contractor's property.
 - 2. Remove temporary roads not intended for or acceptable for integration into permanent use. Where the area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil in the area. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at the temporary entrances, as required by the governing authority.

END OF SECTION 01500

SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and other Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Products.
- B. Transportation and handling.
- C. Storage and protection.
- D. Product options.
- E. Substitutes and "or equal" items.
- F. Equipment and Material Checklist.

1.3 PRODUCTS

- A. Do not use secondhand or salvaged materials and equipment whether removed from existing premises or from another source.
- B. Provide interchangeable components of the same manufacture for components being replaced.

1.4 TRANSPORTATION AND HANDLING

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to insure that products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.5 STORAGE AND PROTECTION

- A. Store and protect products in accordance with manufacturer's instructions.
- B. Store with seals and labels intact and legible.
- C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- D. For exterior storage of fabricated products, place on sloped supports above ground.
- E. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- F. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- G. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- H. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.
- I. Provide lubricants and perform initial lubrication and all subsequent lubrication until Substantial Completion. Lubricants and lubrication shall be in accordance with equipment manufacturer's instructions.

1.6 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming Manufacturers: Products of manufacturers named in the Specifications or included by Addenda as an "or equal" prior to receipt of Bids, no options or substitutions allowed except as permitted under following Article 1.7.

1.7 SUBSTITUTES AND "OR EQUAL" ITEMS

- A. Engineer will consider requests for substitute and "or equal" items after date of Owner-Contractor Agreement only if the specified item becomes unavailable through no fault of Contractor.
- B. Submit written application for use of substitute and "or equal" items. Written application shall be by completion of an APPLICATION FOR USE OF "OR EQUAL" ITEM or an APPLICATION FOR USE OF SUBSTITUTE ITEM, as applicable and as included at the end of this Section.

1.8 EQUIPMENT AND MATERIAL CHECKLIST

- A. Refer to EQUIPMENT AND MATERIAL CHECKLIST at end of this Section (pages CL-1 thru CL-4) for items requiring shop drawings, manufacturer's start-up services, spare parts, and operation and maintenance manuals. Requirements over and above those included in the General Conditions and this and other Sections of Division 1 shall be as included in the individual specification sections.
- B. Equipment and Material Shop Drawing List:
 - a. Frame, Grates, Ring & Cover
 - b. Chain Link Fence
 - c. Gates
 - d. Pipe, Fittings, Valves, Etc. (all materials)
 - e. Generator and Automatic Transfer Switch
 - f. Control Panels, Controls, Components, Etc.
 - g. Transducer and Frog Stick
 - h. Shelter
 - i. Electrical – LED Lights, Boxes, Breakers, Conduits, Control Panels, Wiring etc
 - j. Raised Platform for Control Panels and Hand Rails
 - k. Electrical Conduit
 - l. Hatches

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 01610

GENERAL EQUIPMENT STIPULATIONS

1. **SCOPE.** All equipment furnished and installed under this Section shall conform to the general stipulation set forth in this section, except as otherwise specified in other sections. Drawings and general provisions of the contract, including General Conditions, Supplementary General Conditions and other Division 1-16 Specification Sections apply to this Section.
2. **COORDINATION.** Contractor shall coordinate all details of the equipment with other related parts of the Work, including verification that all structures, piping, wiring, and equipment components are compatible. Contractor shall be responsible for all structural and other alterations in the Work required to accommodate equipment differing in dimensions or other characteristics from that contemplated in the Contract Drawings or Specifications.
3. **WORKMANSHIP AND MATERIALS.** Contractor shall guarantee all equipment against faulty or inadequate design, improper assembly or erection, defective workmanship or materials, and leakage, breakage or other failure. Materials shall be suitable for service conditions.

All equipment shall be designed, fabricated and assembled in accordance with recognized and acceptable engineering and shop practice. Individual parts shall be manufactured to standard sizes and gauges so that repair parts, furnished at any time, can be installed in the field. Like parts of duplicate units shall be interchangeable. Equipment shall not have been in service at any time prior to delivery, except as required by tests.

4. **LUBRICATION.** Equipment shall be adequately lubricated by systems which require attention no more frequently than weekly during continuous operation. Lubrication systems shall not require attention during start-up or shutdown and shall not waste lubricants.

Lubricants of the types recommended by the equipment manufacturer shall be provided in sufficient quantities to fill all lubricant reservoirs and to replace all consumption during testing, start-up and operation prior to acceptance of equipment by Owner. Unless otherwise specified or permitted, the use of synthetic lubricants will not be acceptable.

Lubrication facilities shall be convenient and accessible. Oil drains and fill openings shall be easily accessible from the normal operating area or platform. Drains shall allow for convenient collection of waste oil in containers from the normal operating area or platform without removing the unit from its normal installed position.

5. **SAFETY GUARDS.** All belt or chain drives, fan blades, couplings and other moving or rotating parts shall be covered on all sides by a safety guard. Safety guards shall be fabricated from 16 USS gauge or heavier galvanized or aluminum-clad sheet steel or ½ inch mesh galvanized expanded metal. Each guard shall be designed for easy installation and removal. All necessary supports and accessories shall be provided for each guard. Supports and accessories, including bolts, shall be galvanized. All safety guards in outdoor locations shall be designed to prevent the entrance of rain and dripping water.
6. **ANCHOR BOLTS.** Equipment suppliers shall furnish suitable anchor bolts for each item of equipment. Anchor bolts, together with templates or setting drawings, shall be delivered sufficiently early to permit setting the anchor bolts when the structural concrete is placed. Anchor bolts shall comply with the anchor bolts and expansion anchors sections and, unless otherwise specified, shall have a minimum diameter of ¾ inch.

Unless otherwise indicated or specified, anchor bolts for items of equipment mounted baseplates shall be long enough to permit 1 ½ inches minimum of grout, or as required by the manufacturer, beneath the baseplate and to provide adequate anchorage into structural concrete.

7. SHOP PAINTING. All steel and iron surfaces shall be protected by suitable paint or coatings applied in the shop. Surfaces which will be inaccessible after assembly shall be protected for the life of the equipment. Exposed surfaces shall be finished, thoroughly cleaned, and filled as necessary to provide a smooth, uniform base for painting. Electric motors, speed reducers, starters, and other self-contained or enclosed components shall be shop primed or finished with high-grade, oil-resistant enamel suitable for top coating in the field with alkyd enamel. Coating shall be suitable for the environment where equipment is installed.

Surfaces to be painted after installation shall be prepared for painting as recommended by the paint manufacturer for the intended surface, and then shop painted with one or more coats of the specific primer. Unless otherwise specified, the shop primer for steel and iron surfaces shall be Ameron "Amercoat 185HS Universal Primer", Cook "391-N-167 Barrier Primer", Kop-Coat "340 Gold Primer", Tnemec "37-77 Chem-Prime", or Valspar "13-R-28 Chromox Primer".

Machined, polished, and nonferrous surfaces which are not to be painted shall be coated with rust-preventive compound, Houghton "Rust Veto 344" or Rust-Oleum "R-9".

8. EQUIPMENT LABELS. All electric equipment, including panels and enclosures shall be approved by the Underwriters Laboratory Inc. and have the UL Label displayed.

END OF SECTION

Project Special Provisions

1. **Wet Well Coating**
The complete interior of the wet well, as well as the base plate and bolts shall be coated with Raven 405 epoxy coating. The coating thickness shall be per the manufacturer's recommendation for new concrete wastewater structures.
2. **Safety**
The contractor shall follow all OSHA guidelines related to construction safety and follow industry, locate, state and other standards related to safety.
3. **Contractor Responsibilities (General)**
The contractor shall be responsible for construction on the pump station site and the access drive to the site, including the related pipe installations and all testing. The contractor shall be responsible for installing, maintaining and removing erosion control measures in connection with contract # 1.
3. **Section 01039 Page 2 1.4 Staking.**
The Engineer will stake one time all Shelter, generator, and fence. Additional or restaking will be paid for or provided by the contractor.
4. **Division 11 Equipment 11060 Pump Controls and Division 16 Electrical.**
All electrical components that have either a NEMA or IEC rating shall be NEMA rated. IEC rated components will not be acceptable.
5. **Construction Plans Sheet 9 - Electrical Riser Notes.**
Add to Note 17. The panel covers shall contain hardware to allow the cover to be opened with tool less fasteners (w/o tools). The control panel door shall be a continuous piano hinge. The control panel door shall have a heavy duty 3-point latching mechanism operated by pad locking panel.
6. **Construction Plans Sheet 3-Site Plan.**
The concrete pad for the generator shall be 12" thick with #5 rebar 12" each way 3" from the bottom of the pad. The finished dimensions shall be as recommended by the manufacturer with a minimum 1' clear around the exterior dimensions of the generator.
7. **Construction Plans Sheet 9 - Pump Station Electrical Details**
Electrical Specifications:
Add to Note 18 the following: Coordinate with Phone Company to provide telephone line to pump control panel. Provide Auto dialer / SCADA compatible with existing City of Graham equipment.

Electrical Riser Notes:
Note 5 – Delete the following sentence: Auto dialer shall alert Authority of generator warnings.

Add the following to note 5: The generator shall have sufficient contacts (two minimum) to communicate with the SCADA system that is compatible with the City of Graham.
8. **Raised Platform for Control Panels**
The contractor shall provide a raised platform constructed from Aluminum to elevate control panels above the floodplain. Contractor shall provide sealed structural drawings when submitting shop drawings for approval.
9. **The Pump Station Contractor shall supply and install all equipment listed below in the control panel. Include all costs in the Pump Station Lump Sum Price.**

See section 11060 of the specifications.

10. General Provisions

The City of Graham Standard Specifications and Details shall be used should any items not be covered in these specifications. Should any item appear to be in conflict the more restrictive shall be used. The Engineer will make the final determination on any discrepancy.

SECTION 01650 – START-UP

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and other Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Starting equipment and systems.
- B. Manufacturer's start-up services.
- C. Testing, adjusting and balancing.

1.3 STARTING EQUIPMENT AND SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Engineer seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up with Contractor's personnel in accordance with manufacturer's instructions.

1.4 MANUFACTURER'S START-UP SERVICES

- A. Furnish competent factory trained service representatives to supervise or inspect the installation; test, align, adjust and calibrate the equipment and systems as necessary; and instruct plant personnel in their operation and maintenance (Manufacturer's Start-Up Services).
- B. Submit qualifications of manufacturer's service representative to Engineer 30 days in advance of arrival on Project. Manufacturer's service representative subject to approval of Engineer.
- C. Notify Engineer a minimum of 72 hours prior to the arrival of the service representatives on the Project.
- D. Prior to leaving the Project and for each visit, manufacturer's service representative shall complete a Manufacturer's Service Representative's Report. Copies of the Report will be available for use on the Project.
- E. Owner shall have the right to audio/video tape all sessions regarding equipment and system operation and maintenance instructions.
- F. Manufacturer's start-up services shall be provided as required until operation of the equipment is satisfactory to Engineer at no additional cost to Owner.

1.5 TESTING, ADJUSTING, AND BALANCING

- A. Employ independent firm to perform soils, and pavement testing and other services as specified.
- B. Reports will be submitted by the independent firm to Engineer indicating observations and results of tests and indicating compliance or non-compliance with the requirements of the Contract Documents.

PART 2 PRODUCTS – Not used.

PART 3 EXECUTION – Not used.

END OF SECTION

SECTION 01700 - CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Divisions 1-16 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Project record document submittal.
 - 3. Operation and maintenance manual submittal.
 - 4. Submittal of warranties.
 - 5. Final cleaning.
- B. Closeout requirements for specific construction activities are included in the appropriate Sections.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.
 - 1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete.
 - a. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
 - b. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
 - 2. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
 - 3. Submit record drawings, damage or settlement surveys, property surveys, and similar final record information.
 - 4. Discontinue and remove temporary facilities from the site, along with construction tools, and similar elements.
 - 5. Complete final cleanup requirements.
- B. Inspection Procedures: On receipt of a request for inspection, the Engineer will either proceed with inspection or advise the Contractor of unfilled requirements. The Engineer will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
 - 1. The Engineer will repeat inspection when requested and assured that the Work is substantially complete.
 - 2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.4 FINAL ACCEPTANCE

- A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.
1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted.
 2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
 3. Submit a certified copy of the Engineer's final inspection list of items to be completed or corrected, endorsed and dated by the Engineer. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Engineer.
 4. Submit consent of surety to final payment (see attached sample at end of Section).
 5. Submit Contractor's Affidavit of Payment of Debts and Claims (see attached sample at end of Section).
 6. Submit Contractor's Affidavit of Release of Liens (see attached sample at end of Section).
 7. Submit a final liquidated damages settlement statement, if any.
 8. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- B. Reinspection Procedure: The Engineer will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Engineer.
1. Upon completion of reinspection, the Engineer will prepare a certificate of final acceptance. If the Work is incomplete, the Engineer will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
 2. If necessary, reinspection will be repeated.

1.5 RECORD DOCUMENT SUBMITTALS

- A. General: Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for the Engineer's reference during normal working hours.
- B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
1. Mark record sets with red erasable pencil.
 - a. Show distance between centers of manholes to the nearest tenth of a foot.
 - b. Show centerline invert elevations to the nearest hundredth of a foot.
 - c. Show top elevation of manhole to nearest tenth of a foot.
 - d. Show vent elevation to nearest tenth of a foot.
 - e. Show correct stationing for manholes.
 - f. Show horizontal angles between manholes to the nearest quarter of a minute.
 2. Note related change-order numbers where applicable.
 3. Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.
- C. Record Specifications: Maintain one complete copy of the Project Manual, including addenda. Include with the Project Manual one copy of other written construction documents, such as Change Orders and modifications issued in printed form during construction.

1. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
 2. Give particular attention to substitutions and selection of options and information on concealed construction that cannot otherwise be readily discerned later by direct observation.
 3. Note related record drawing information and Product Data.
 4. Upon completion of the Work, submit record Specifications to the Engineer for the Owner's records.
- D. Record Product Data: Maintain one copy of each Product Data submittal. Note related Change Orders and markup of record drawings and Specifications.
1. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site and from the manufacturer's installation instructions and recommendations.
 2. Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation.
 3. Upon completion of markup, submit complete set of record Product Data to the Engineer for the Owner's records.
- E. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to the Engineer for the Owner's records.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. Remove waste, surplus materials, excess spoil, rubbish, erosion control measures and construction facilities from the site.
- B. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.

END OF SECTION 01700

**CONSENT OF SURETY
COMPANY TO FINAL
PAYMENT**

- OWNER
- ENGINEER
- CONTRACTOR
- SURETY
- OTHER

PROJECT: City of Graham
Back Creek No. 2 Lift Station Renovations
AWCK Project No. 15082

Agreement Date: _____

TO: City of Graham
201 South Main Street
Graham, North Carolina 27253

CONTRACTOR: _____

In accordance with the provisions of the Agreement between the Owner and Contractor as indicated above,
the (here insert name and address of Surety Company)

SURETY COMPANY

on bond of (here insert name and address of Contractor)

CONTRACTOR

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall
not relieve the Surety Company of any of its obligations to (here insert name and address of Owner)

OWNER

as set forth in the said Surety Company's bond.

IN WITNESS WHEREOF,
the Surety Company has hereunto set its hand this _____ day of _____, 20__

Surety Company

Attest
(Seal)

Signature of Authorized Representative

Title

**CONTRACTOR'S
AFFIDAVIT OF
RELEASE OF LIENS**

- OWNER
- ENGINEER
- CONTRACTOR
- SURETY
- OTHER

PROJECT: City of Graham
Back Creek No. 2 Lift Station Renovations
AWCK Project No. 15082

Agreement Date: _____

TO: City of Graham
201 South Main Street
Graham, North Carolina 27253

CONTRACTOR: _____

State of: _____

County of: _____

The undersigned, pursuant to the General Conditions of the Construction Contract; hereby certifies that to the best of his knowledge, information and belief, except as listed below, the Release or Waivers of Liens attached hereto include the Contractor, all Subcontractors, all suppliers of materials and equipment, and all performers of work, labor or services who have or may have liens against any property of the Owner arising in any manner out of the performance of the Agreement referenced above.

EXCEPTIONS: (If none, write "NONE". If required by the Owner, the Contractor shall furnish bond satisfactory to the Owner for each exception).

SUPPORTING DOCUMENTS ATTACHED
HERETO:

1. Contractor's Release of Waiver of Liens, conditional upon receipt of final payment.

CONTRACTOR: _____

Address: _____

BY: _____

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

Notary Public: _____

My Commission Expires: _____

**CONTRACTOR'S
AFFIDAVIT OF PAYMENT
OF DEBITS AND CLAIMS**

OWNER
ENGINEER
CONTRACTOR
SURETY
OTHER

PROJECT: City of Graham
Back Creek No. 2 Lift Station Renovations
AWCK Project No. 15082

Agreement Date: _____

TO: City of Graham
201 South Main Street
Graham, North Carolina 27253

CONTRACTOR: _____

State of: _____

County of: _____

The undersigned, pursuant to the General Conditions of the Construction Contract; hereby certifies that, except as listed below, Contractor has paid in full or has otherwise satisfied all obligations for all materials and equipment furnished, for all work, labor and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Agreement referenced above for which the Owner or his property might in any way be held responsible.

EXCEPTIONS: (If none, write "NONE". If required by the Owner, the Contractor shall furnish bond satisfactory to the Owner for each exception).

SUPPORTING DOCUMENTS ATTACHED
HERE TO:

- 1. Consent of Surety to Final Payment
- 2. Contractor's Affidavit of Release of Liens

The following supporting documents should be attached hereto if required by the Owner:

- 1. Contractor's Release of Waiver of Liens, conditional upon receipt of final payment.

CONTRACTOR: _____

Address: _____

BY: _____

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

Notary Public: _____

My Commission Expires: _____

SECTION 01740 - WARRANTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section

1.2 SUMMARY

- A. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor

1.3 WARRANTY REQUIREMENTS

- A. The Contractor shall guarantee that if any materials, equipment or workmanship covered by these specifications and the accompanying drawings proves defective within one (1) year after final acceptance, such defects shall be made good by Contractor without cost to the Owner

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01740

SECTION 02010 - SUBSURFACE INVESTIGATION

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Soils investigation report.
 - 1. A soil investigation report has not been prepared for the Back Creek #2 Lift Station.
- B. Use of data:
 - 1. Bidders should visit the site and acquaint themselves with existing conditions.
 - 2. Prior to bidding, bidders may make their own subsurface investigations to satisfy themselves as to site and subsurface conditions, but such investigations may be performed only under time schedules and arrangements approved in advance by the Engineer.

1.2 QUALITY ASSURANCE

- A. A soil engineer may be retained by the Owner to observe performance of work in connection with excavating, trenching, filling, backfilling, and grading, and to perform compaction tests.
- B. Readjust work performed that does not meet technical or design requirements, but make no deviation from the Contract Documents without specific and written approval from the Engineer.

END SUBSURFACE INVESTIGATION

SECTION 02230 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1-16 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:

- 1. Existing Utilities.
- 2. Clearing and grubbing.
- 3. Pavement removal.

- B. Related Sections include the following:

- 1. Division 1 Section "Measurement and Payment" for schedule of unit prices. (N/A)
- 2. Division 1 Section "Construction Facilities and Temporary Controls" for temporary utilities, temporary construction and support facilities, temporary security and protection facilities, and environmental protection measures during site operations.
- 3. Division 2 Section "Trenching for Utilities" for soil materials, excavating, backfilling, trenches and grading the easement areas.
- 4. Division 2 Section "Lawns and Grasses" for finish grading, including placing and preparing topsoil for lawns and planting.
- 5. Division 2 Section "Erosion Control" for temporary erosion control measures.

1.3 MATERIALS OWNERSHIP

- A. Except for materials indicated to be stockpiled or to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from the site.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Locate and clearly flag trees and vegetation to remain.
- C. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Engineer or Owner of property if damage occurs outside easements shown on drawings.

3.2 EXISTING UTILITIES

- A. The contractor shall be responsible for making a field inspection of existing utilities prior to the bid opening. The Contractor shall be responsible for any damage to existing utilities resulting from his work. Approximate locations are shown on the plan view of each sheet.
- B. The contractor shall excavate and expose all existing underground lines in advance of trenching operations to assure that there will be no conflicts with the proposed grade and alignment. All water and sewer connections damaged during construction shall be repaired by the Contractor.
- C. The contractor shall comply with the Underground Damage Prevention Act, G.S. Chapter 87.

3.3 CLEARING AND GRUBBING

- A. The work of clearing and grubbing shall consist of the cutting, removal and satisfactory disposal of all vegetation and surface debris within the temporary easement as shown on the plans.
 - 1. Trees inside the temporary construction easement but outside the permanent easement will not be required to be removed. The contractor may at his option leave in place a tree which in contractor's opinion will not interfere with trench excavation or backfilling operations. If tree is damaged to an extent as to destroy the value for shade or other landscaping purposes the tree shall be removed and disposed of by contractor without additional compensation, when so directed by the Engineer.
- B. Clearing and grubbing operations shall be completed sufficiently in advance of trenching operations as may be necessary to prevent any of the debris from clearing and grubbing operations from interfering with the trench excavation or backfilling operations.
- C. All work shall be performed in a manner which will cause a minimum of soil erosion. The contractor shall perform such erosion control work, temporary or permanent as may be directed by the Engineer, in order to satisfactorily minimize erosion resulting from clearing and grubbing operations.
- D. The contractor shall conduct his operations in a manner to prevent limb, bark, or root injuries to trees, shrubs, or other types of vegetation that are to remain growing and also to prevent damage to adjacent property. When any such injuries unavoidably occur, all rough edges of scarred areas shall first be made reasonably smooth in accordance with generally accepted horticultural practice, and the scars then thoroughly covered with an asphaltum base tree paint. Any such plants that are damaged by any construction operations to such an extent as to destroy their value for shade or other landscape purposes shall be cut and disposed of by the contractor, without extra compensation, when so directed by the Engineer.
- E. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers not exceeding 8-inch loose lifts when using large, self-propelled equipment (CAT 815, Etc). When using small Rammax type equipment, layers shall not exceed 6-inch loose lifts. Loose lifts shall not exceed 4-inches when using hand operated plate tamps or jumping jacks. Each layer shall be compacted to a minimum density of 95% of the maximum dry density unless otherwise directed by the Engineer. Refer to geotechnical report for additional requirements.

3.4 PAVEMENT REMOVAL

- A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. All pavement to be removed shall be marked for cutting by chalk line or other acceptable method. After marking, bituminous pavement shall be cut to its full depth to a neat and true line along the mark. Concrete pavement shall be sawed to a minimum depth necessary for a smooth cut when broken out. Saw-cut faces vertically.
 2. The cuts should be the width of the required trench (a minimum width of fifty-four (54") inches, unless otherwise directed by the Engineer) plus one (1) foot of pavement removal on each side of the trench.
 3. All pavement cuts shall be removed from the site of the work and shall not be used to backfill trenches. Following compaction of the backfill material, ten (10") inches of ABC stone shall be placed and compacted within all excavated areas and brought to an elevation as determined in the field by the Engineer.
 - a. Contractor shall maintain all pavement cuts with ABC stone temporarily as necessary until the pavement cut is replaced with pavement.

3.5 DISPOSAL

- A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off Owner's easement.

END OF SECTION 02230

SECTION 02240 - DEWATERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1-16 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes construction dewatering.
- B. Related Sections include the following:
 - 1. Division 1 Section "Construction Facilities and Temporary Controls."
 - 2. Division 2 Section "Trenching for Utilities" for excavating, backfilling, and site grading.
 - 3. Division 2 Section "Excavation Support and Protection."

1.3 PERFORMANCE REQUIREMENTS

- A. Dewatering Performance: Design, provide, test, operate, monitor, and maintain a dewatering system of sufficient scope, size, and capacity to control ground-water flow into excavations and permit construction to proceed on dry, stable subgrades.
 - 1. Work includes removing dewatering system when no longer needed.
 - 2. Maintain dewatering operations to ensure erosion is controlled, stability of excavations and constructed slopes is maintained, and flooding of excavation and damage to structures are prevented.
 - 3. Prevent surface water from entering excavations by grading, dikes, or other means.
 - 4. Accomplish dewatering without damaging existing buildings adjacent to excavation.

1.4 PROJECT CONDITIONS

- A. Regulatory Requirements: Comply with water disposal requirements of authorities having jurisdiction.
- B. Existing Utilities: Do not interrupt utilities serving facilities occupied by the Owner or others unless permitted in writing by the Engineer and then only after arranging to provide temporary utility services according to requirements indicated.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
 - 1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.
 - 2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.
- B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

3.2 DEWATERING

- A. Provide an adequate system to lower and control ground water to permit excavation, pipe installation, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of sewers, and other excavations.
 - 1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
- B. Dispose of water removed from excavations in a manner to avoid endangering public health, property, and portions of work under construction or completed. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.
- C. Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.

END OF SECTION 02240

SECTION 02260 - EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1-16 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes excavation support and protection systems.
- B. Related Sections include the following:
 - 1. Division 1 Section "Construction Facilities and Temporary Controls."
 - 2. Division 2 Section "Trenching for Utilities" for excavating and backfilling.

1.3 PERFORMANCE REQUIREMENTS

- A. Design, provide, monitor, and maintain an anchored and braced excavation support and protection system capable of resisting soil and hydrostatic pressure and supporting sidewalls of excavations.
 - 1. Work includes removing excavation support and protection systems when no longer needed.
 - 2. Prevent surface water from entering excavations by grading, dikes, or other means.
 - 3. Install excavation support and protection systems without damaging existing buildings, pavements, and other improvements adjacent to excavation.

1.4 SUBMITTALS

- A. Shop Drawings: An excavation support and protection system for excavations which exceed twenty (20') feet in depth shall be prepared by or under the supervision of a qualified professional engineer. System design and calculations must be acceptable to authorities having jurisdiction.

1.5 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by the Owner or others unless permitted in writing by the Engineer and then only after arranging to provide temporary utility services according to requirements indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials need not be new but must be in serviceable condition.
- B. Structural Steel: **ASTM A 36** (ASTM A 36M).
- C. Steel Sheet Piling: **ASTM A 328** (ASTM A 328M) or **ASTM A 572** (ASTM A 572M)
- D. Wood Lagging: Wood lagging shall be designed in accordance with the current version of the AASHTO LRFD Bridge Design Specifications and shall be sealed by a professional engineer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.
 - 1. Shore, support, and protect utilities encountered.
- B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
- C. Locate excavation support and protection systems clear of permanent construction and to permit forming and finishing of concrete surfaces.
- D. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure excavation support and protection systems remain stable.
- E. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

3.2 REMOVAL AND REPAIRS

- A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils and damaging structures, pavements, facilities, and utilities.
 - 1. Remove excavation support and protection systems to a minimum depth of 48 inches below overlying construction and abandon remainder.
 - 2. Repair or replace, as approved by Engineer, adjacent work damaged or displaced by removing excavation support and protection systems.

END OF SECTION 02260

SECTION 02321 – TRENCHING AND EXCAVATING FOR UTILITIES AND STRUCTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1-16 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:

- 1. Excavating and backfilling for trenches and/or structures.

- B. Related Sections include the following:

- 1. Division 1 Section "Measurement and Payment" for a schedule of unit prices.(N/A)
- 2. Division 1 Section "Construction Facilities and Temporary Controls."
- 3. Division 2 Section "Site Clearing" for site stripping, grubbing, removing topsoil, and protecting trees to remain.
- 4. Division 2 Section "Dewatering" for lowering and disposing of ground water during construction.
- 5. Division 2 Section "Excavation Support and Protection."
- 6. Division 2 Section "Rock Excavation" for removal of rock and backfilling trench.
- 7. Division 2 Section "Lawns and Grasses" for seeding and mulching disturbed areas.
- 8. Division 3 Section "Cast-in-Place Concrete" for concrete placement.

1.3 DEFINITIONS

- A. Backfill: Soil materials used to fill an excavation.

- 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe, or beside a structure to 3 ft. above bottom of excavation.
- 2. Final Backfill: Backfill placed over initial backfill to fill a trench or pit.

- B. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.

- C. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.

- D. Classification of Excavated Materials: No classifications of excavated materials will be made except for Rock Excavation as defined in Division 2 of these specifications. Excavation and trenching work shall include the removal and subsequent handling of all materials excavated or otherwise removed in the performance of the contract work, regardless of the type, character, composition, or condition thereof.

- E. Fill: Soil materials used to raise existing grades.

1.4 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Engineer and then only after arranging to provide temporary utility services according to requirements indicated:

- 1. Notify Engineer not less than two days in advance of proposed utility interruptions.
- 2. Do not proceed with utility interruptions without Engineer's written permission.

3. Contact utility-locator service for area where Project is located before excavating.
- B. Traffic: Do not interfere with or close public or private roadways or driveways without permission of governing authorities. Work within the rights-of-way of public roadways shall be done in accordance with requirements and provisions of the permits issued by the agencies for the construction within their respective rights-of-way.
- C. If materials are encountered that are suspected of being hazardous or toxic, the Contractor shall notify the Engineer immediately. If hazardous or toxic materials are present, the Engineer will issue a work change directive in accordance with Division 1 "Modification Procedure".

PART 2 - PRODUCTS

2.1 FILL MATERIALS

- A. Earth Backfill: Excavated earth material free of cinders, frozen materials, ashes, refuse, boulders, rocks or organic materials. Rocks three (3") inches or larger shall be excluded from the backfill for at least three (3') feet above the top of pipe. Boulders and stone with a dimension of six (6") inches shall be excluded from all backfill.
- B. Granular Backfill: Gravel or crushed stone meeting the requirements of Section 1005 of the North Carolina Department of Transportation Standard Specifications for Roads and Structures, latest edition. Standard size shall be #57 unless otherwise noted on the plans or contract documents.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by trenching operations.
- B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways. Comply with approved erosion control plan and make necessary repairs, corrections, etc. within 5 days after each rainfall event. Should the site come under any order of the Land Quality Section, the contractor shall take all immediate efforts to put the site into full compliance within the time period specified in such order.
- C. Provide barricades, warning signs, and warning lights around open excavations as necessary to prevent injury to persons.
- D. The Contractor is solely responsible for determining the potential for injury to persons and damage to property and for executing the work to prevent injury and damage.
- E. Do not allow excavation subgrades and soil to be subjected to freezing temperatures, frost or excessive water.

3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding within easement limits, and from flooding Project site and surrounding areas.
- B. Protect work area from softening, undermining, washout, and damage by rain or water accumulation.
 - I. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.
 - C. If trench bottom soils are disturbed or loosened by the upward seepage of water or an uncontrolled flow of water, the affected areas shall be excavated and replaced with stabilization stone. No separate payment will be made for stabilization stone.
 - D. Water shall be disposed of in a manner as not to be a menace to the public health and in accordance with applicable local regulations and State Environmental Protection Division standards and permits.
- 3.3 EXPLOSIVES
- A. Explosives: The Contractor shall assume sole responsibility for the effects of explosives and comply with the requirements of "Rock Excavation" of these specifications.
- 3.4 EXCAVATION, GENERAL
- A. General: Excavation includes the removal of any materials necessary to achieve the required elevations and includes:
 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials. Refer to geotechnical report for acceptable soil materials to use as fill material.
 2. Unnecessary Excavation: The expense of materials outside of limits indicated shall be borne by the Contractor.
 3. Approval of Subgrade: The adequacy of the subgrade shall be subject to the inspection and approval of the Engineer before installation of the pipeline or structures.
- 3.5 EXCAVATION FOR STRUCTURES
- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
- 3.6 EXCAVATION FOR UTILITY TRENCHES
- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
 - B. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
 1. Clearance: 12 inches on each side of pipe or conduit.
 - C. Trench Bottoms: Excavate trenches 6 inches deeper than bottom of pipe elevation to allow for bedding course. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade. Hand excavate for bell of pipe.

1. Unsuitable Subgrade: Where unsuitable materials are encountered below the excavation limits, they shall be removed and disposed of to the level of suitable material. Areas so excavated shall be backfilled with stabilization stone.
2. Trench Length: The Contractor shall not have open in excess of two hundred (200') feet of trench at any one time.

3.7 STORAGE OF SOIL MATERIALS

- A. Contractor may stockpile excess backfill material in areas acceptable to the engineer and Contractor provided stockpile has adequate erosion control devices to prevent off-site sedimentation. The stockpile is to be located such that surface water will drain away from stockpile. Contractor shall be responsible for removing any excess soil from stockpile not incorporated into the project. If soil is placed on pavement, provide 2" of rock dust over pavement prior to placing soil. No additional payment will be made for this material.

3.8 UTILITY TRENCH BACKFILL

- A. Place and compact bedding course on trench bottoms. Bedding course shall consist of granular backfill for all gravity piping and either sand (ASTM C33) or rock screenings for pressurized piping. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- B. After the pipe is installed, granular backfill shall be placed evenly and carefully around and over the pipe to assure that backfill material is distributed properly and to maintain the proper grade and alignment. The remainder of the trench shall be backfilled with suitable excavated earth material. Rocks three (3") inches or larger shall be excluded from backfill for at least three (3') feet above the top of pipe. Boulders and stone with dimensions greater than six (6") inches shall be excluded from the backfill.
- C. Fill voids with approved backfill materials while shoring and bracing, and as sheeting is removed.
- D. Place and compact final backfill of satisfactory soil material to match existing grade on either side of trench.

3.9 COMPACTION OF BACKFILLS AND FILLS

- A. Place backfill and fill materials in uniform layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
 1. Outfalls: Twelve (12") inches of pipe subgrade and subsequent lifts: 95 percent.
 2. Sidewalk areas and road shoulders: Twelve (12") inches of pipe subgrade and subsequent lifts: 95 percent.
 3. All other paved areas and around structures: Twelve (12") inches of pipe/structure subgrade and subsequent lifts: 98 percent.
- C. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within -3 to +2 percent of optimum moisture content in sidewalk and all other paved areas.
- D. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

3.10 GRADING

- A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes and to prevent ponding. Comply with compaction requirements and grade to provide a smooth transition between adjacent existing grades.

3.11 FIELD QUALITY CONTROL

- A. The Engineer will observe compaction methods and techniques while backfilling is in progress. If in the opinion of the Engineer the Contractor is not compacting the soil in accordance with these specifications, then the Engineer will engage a qualified geotechnical engineering testing agency to perform field quality-control testing.
- B. The Contractor will allow the testing agency to inspect backfill layers. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
 - 1. Paved Areas or around structures: At subgrade and at each compacted fill and backfill layer, at least one test for every 2500 sq. ft. or less of paved area, but in no case fewer than three tests.
 - 2. Trench Backfill: At each compacted initial and final backfill layer, at least one test for each 500 feet or less of trench length, but no fewer than two tests.
- D. When testing agency reports that fills or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.
- E. The Owner will pay for all initial tests and proctors; however, cost of retests will be paid by the Contractor.

3.12 PROTECTION AND MAINTENANCE

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and recompact.
- C. Where settling occurs before Project warranty period elapses, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.13 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's easement.
- B. Contractor shall dispose of excess waste material to a site having an approved erosion control plan and current permit from either a local agency having jurisdiction or from NCDENR, Land Quality Section. If

site does not have an approved plan and current permit, then Contractor shall be responsible for preparing plan and obtaining permit. Payment of any fees will be paid by the Contractor.

END OF SECTION 02321

SECTION 02322 - ROCK EXCAVATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1-16 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the drilling, blasting, excavating, removing and disposing of rock from trenches or pits and includes the backfill replacement material.
- B. Related Sections include the following:
 - 1. Division 1 Section "Measurement and Payment" for a schedule of unit prices.
 - 2. Division 2 Section "Trenching For Utilities" for excavating, backfilling and shaping.
 - 3. Division 2 Section "Dewatering" for lowering and disposing of ground water during construction.
 - 4. Division 2 Section "Excavation Support and Protection."

1.3 DEFINITIONS

- A. Rock Excavation: Solid, ledge rock in place which in the opinion of the Engineer, cannot be removed practically without the use of drilling and blasting.
 - 1. Rock excavation includes removal and disposal of solid rock, boulders over 1/2 cu. yd., ledge rock, rock-hard cementitious deposits and other materials or obstructions which cannot be dislodged and excavated with modern, heavy-duty, track-mounting excavating equipment defined as follows:
 - a. For trenches less than 10' in width or pits in excess of 20' in either length or width: Caterpillar Model 320 or equivalent hydraulic excavator.
 - b. Materials which can be removed with the above specified equipment will not be considered as rock and no extra payment will be allowed for such removal.
- B. Replacement Material: Soil material to be used to replace excavated rock material.
 - 1. Material stockpiled from utility trench operations suitable for use as backfill material.
 - 2. Satisfactory soil material imported from off-site for use as backfill material.

1.4 PROJECT CONDITIONS

- A. No Blasting is allowed within the Piedmont Natural Gas Easement.
- B. The Contractor will select an independent, qualified blasting consultant to inspect the blast site and any structures within a 1,000-foot radius of the blasting location. The consultant shall provide sufficient written and photographic documentation to accurately reflect the pre-blast condition of the structure.

- C. Provide vibration-recording instruments to record peak particle velocity (2.0 inches per second maximum allowable), air overpressure (133 decibels maximum allowable) and frequency (15-hertz minimum allowable).
- D. A post-blast inspection shall be performed upon the completion of blasting.

1.5 CONSTRUCTION REQUIREMENTS

- A. The Contractor shall obtain a blasting permit, prior to performing any blasting operations.
- B. The approval of the Engineer shall be obtained before any blasting of rock takes place. The Engineer may fix the hours of blasting if he deems it necessary. The Contractor shall conduct a pre-blast survey and provide the report to the City of Graham and the Engineer.
- C. All applicable Federal, State, and Local regulations pertaining to transporting, storing, and using explosives shall be met.
- D. The Contractor shall take all necessary precautions to protect life and property while engaged in blasting operations. Where there exists the danger of rock or overburden being thrown by a blast, an approved type of blasting mat shall be used. The Engineer will approve the blasting mat for type of construction but not for adequacy. No blasting will be allowed unless a galvanometer is used to check cap circuits.
- E. The blasting consultant shall provide vibration recording instruments for use on the initial shots and any other places within one thousand feet (1,000') of a utility, structure, or property which could be damaged by vibration, concussion, or falling rock, the Contractor shall be required to keep a blasting log containing the items listed in Item "G" below in order to determine/verify proper blasting procedures. The Contractor shall provide the Engineer a copy of the monitoring report for the Engineer's file. These instruments shall be of the type which records on direct reading tape the three components of velocity.
- F. Overpressure (concussion) shall be recorded on direct recording tape on equipment specifically designed for impact-type overpressure from blasting.
- G. The blasting consultant shall maintain an accurate log of each shot, listing as a minimum the following data:
 - 1. Date.
 - 2. Time.
 - 3. Weather conditions including temperature and humidity.
 - 4. Station number or other reference to base line survey data.
 - 5. Manufacturer and type of explosive.
 - 6. Method of detonation.
 - 7. Total weight of explosive per shot.
 - 8. Number of delays.
 - 9. Number of holes.
 - 10. Hole depth.
 - 11. Depth to surface of rock (if unexposed during drilling).
 - 12. Amount of explosive per hole number.
 - 13. Total weight of explosive per delay.
 - 14. Amount of stemming.
 - 15. Type and amount of blast matting.
 - 16. A sketch of the hole pattern, with hole numbers for each shot.

This blasting log shall be made available to the Engineer upon request and shall be kept in an orderly manner. Compliance of the contractor with these specifications does in no way relieve him of legal liabilities relative to blasting operation. All blasting operations will be conducted in strict accordance with existing ordinances and accepted safe practices relative to the storage and use of explosives.

- H. All blasting operations will be conducted in such a manner to control the effect on the surrounding area. The following limits will be used for all blasting:

Maximum Allowable Peak Particle Velocity:	2.0 inches per second
Maximum Allowable Air Overpressure:	133 decibels
Minimum Allowable Frequency:	15 hertz

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 TRENCH OR PIT WIDTH

- A. Pipe or structure clearance in rock shall be a minimum of 6 inches below the grade line of the pipe or structure and 12 inches on each side of the nominal diameter of the pipe or structure. Additional excavation outside these limits for excavation required to comply with OSHA regulations or to install shoring, bracing or trench box shall not be considered in computation of rock quantities.

3.2 REPLACEMENT MATERIAL

- A. The Contractor shall provide replacement material either from previously stockpiled trench excavation materials or borrow material to backfill over and around the pipe or structures as specified in Division 2, Section "Trenching for Utilities" and such cost will be included in the unit price bid for rock excavation.

PART 4 – BASIS OF PAYMENT

- A. Measurement of rock will be on a cubic yards basis as verified by the engineer or the city representative on site.
- B. Underruns or overruns of estimated contract quantities shall not be the basis for any claims made by the contractor against the owner or Engineer and the contract unit price and payment will be full compensation for all work covered by this article regardless of the quantity of actual rock excavation encountered, including replacement material.

END OF SECTION 02322

SECTION 02530 - SANITARY SEWERS

PART 1- GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1-16 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes sanitary sewers and necessary appurtenances for the sanitary sewer installation.
- B. Related Sections include the following:
 - 1. Division 1 Section "Measurement & Payment" for a schedule of unit prices.(N/A)
 - 2. Division 2 Section "Trenching for Utilities" for excavating, backfilling and shaping.
 - 3. Division 3 Section "Cast-in-Place Concrete" for concrete structures and reaction blocking.
 - 4. Division 3 Section "Precast Concrete Structures" for concrete manholes and structures.

1.3 SUBMITTALS

- A. Product Data: For the following:

- 1. Sanitary Sewer Pipe

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect pipe, pipe fittings, and seals from dirt and damage.

1.5 PROJECT CONDITIONS

- A. Locate existing structures and piping to be closed, abandoned or connected to.
- B. Connection to Existing Facilities: Do not interrupt the flow of sewer through the existing sewer mains until the following conditions are complied with:
 - 1. Contractor to prepare a written description detailing how by-pass pumping will be achieved and maintained during the connection process. Plans shall also include provisions for back-up pumping measures in the event the initial pumps were to fail.
 - 2. Connections may not begin until written approval of the Engineer has been maintained.

PART 2 - PRODUCTS

2.1 DUCTILE IRON PIPE AND FITTINGS

- A. Materials:

Ductile iron pipes shall conform to AWWA/ANSI C-151/A21.51. **All Ductile Iron pipe shall be Class 50.**

- 1. Flanges for ductile iron pipe shall be in accordance with AWWA C115 and bolts, gaskets and installation shall be in accordance with AWWA C115, Appendix A, requirements.

2. Joints for ductile iron pipe and fittings shall be push-on, rubber gasketed joints in accordance with the applicable requirements of AWWA C111/ANSI A21.11. Standard push-on joints shall have a deflection capability of not less than three degrees. Special deflection bells shall have a deflection capability of not less than four degrees. The pressure rating for push-on joints shall be a minimum of 350 psi.
 3. The exterior of ductile iron pipe, specials, and fittings shall be coated with an asphaltic coating in accordance with AWWA C151, Section 51-9. The finished coating shall be smooth, continuous and strongly adherent to the pipe.
 4. Restrained joints for ductile iron pipe and fittings shall be American Flex Ring, Griffin-Snap Lok, or US Pipe – T.R. Flex.
 5. The bolts and nuts for flanged fittings and mechanical joints shall meet the requirements of ASTM A307.
- B. Fittings: Ductile Iron Fittings shall meet all requirements of AWWA/ANSI C110/A21.10 and will be of the mechanical joint type.
1. The interior and exterior coatings shall be the same as specific for ductile iron pipe.
 2. Fittings shall have a minimum pressure rating of 350 psi.
 3. Rubber gaskets joints shall conform to AWWA/ANSI C111/A21.11.
- C. Interior Lining – Cement lining – standard in accordance with ANSI/AWWA C104/A21.4.

PART 3- EXECUTION

3.1 GENERAL

- A. Care shall be taken in loading, transporting, and unloading to prevent injury to the pipe or coatings. Pipe or fittings shall not be dropped. All pipe or fittings shall be examined before laying, and no piece shall be installed which is found to be defective. Any damage to the pipe coatings shall be repaired as directed by the Engineer.
- B. Pipe and fittings shall be subjected to a careful inspection just prior to being laid or installed. If any defective pipe is discovered after it has been laid it shall be removed and replaced with a sound pipe in a satisfactory manner at no additional expense to the Owner. All pipe and fittings shall be thoroughly cleaned before laying, shall be kept clean until they are used in the work, and when installed or laid, shall conform to the lines and grade required.
- C. Underground piping shall slope uniformly between manholes.
- D. Contractor shall exercise extreme care when constructing piping to protect from damage all existing underground utilities, and all existing structures.

3.2 INSTALLATION

- A. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements. Maintain swab or drag in line, and pull past each joint as it is completed.
- B. Pipe shall be installed using bedding, as shown in the Contract Documents, and in accordance with requirements of Industry Standard Specifications except as otherwise provided herein. A firm, even bearing throughout the length of the pipe shall be constructed by tamping bedding material at the sides of the pipe

up to the elevation designated by the bedding type. Bell holes shall be hand excavated to insure uniform bearing along the pipe barrel. Pipes will be laid with bell on the uphill end of the pipe.

- C. Prior to being lowered into the trench, each pipe will be inspected by the crew foreman. Faulty pipe shall be rejected and removed from the work site. Pipes having any defects which are insufficient to cause the rejection of the pipe will be laid so as to bring defects in the top half of the sewer, observing such special directions as the Engineer may give with reference thereto. All pipes shall be sound and clean before laying. When laying is not in progress, including lunchtime, the open ends of the pipe shall be closed by watertight plug or other approved means.
- D. No pipe will be stockpiled or temporarily laid out within ten (10) feet of excavation in earth or within thirty (30') feet of rock which must be blasted for removal. All pipes will be protected against injury from falling rock when blasting.
- E. The pipe and fittings will be laid in the trench so that after the sewer is completed the invert of the pipe will conform accurately to the line and grade shown on the plan or as revised by the Engineer.
- F. Whenever the Engineer's drawings show, or for other reasons it may be necessary to change from one pipe type to another, the Contractor will furnish a donut or a flexible coupling with two stainless steel clamps, recommended by pipe manufacturers, to make the joint. A brick and mortar collar will be constructed around all joints where couplings or donuts are used unless otherwise recommended by the manufacturers.
- G. When cutting pipe is required, the cutting shall be done by machine, leaving a smooth cut at right angles to the axis of the pipe. Cut ends of pipe to be used with a bell shall be beveled to conform to the manufactured spigot end. Lining shall be undamaged.
- H. Joints:
 - 1. Push-on joints shall be made in strict accordance with the manufacturer's instructions. Pipe shall be laid with bell ends looking ahead. A rubber gasket shall be inserted in the groove of the bell end of the pipe, and the joint surfaces cleaned and lubricated. The plain end of the pipe is to be aligned with the bell of the pipe to which it is to be joined, and pushed home with a jack or by other means. After joining the pipe, a metal feeler shall be used to make certain that the rubber gasket is correctly located.
 - 2. Couplings shall be placed on pipe and lubricated in accordance with manufacturer's recommendation. Pipes shall be aligned and carefully pushed together. Gasket shall be in the desired position after jointing. Invert grade of pipe shall be carefully rechecked after jointing. Any discrepancies in grade shall be corrected.
- I. Trenches shall be kept dry at all times during the laying of the pipe. At the conclusion of each day's work, the open end of the pipe shall be securely closed to prevent the entrance of water, mud, rodents, vermin, etc.
 - 1. Dewater trench as necessary to maintain dry laying conditions.
- J. The Contractor shall arrange, if requested, for the pipe manufacturer to furnish information and supervise the installation of at least the first five (5) joints of pipe installation.
- K. The Contractor shall carefully regulate his equipment and construction operations such that the loading of the pipe does not exceed the loads for which the pipe is designed and manufactured. Any pipe damaged during construction operations shall be replaced at the Contractor's expense.

3.3 BEDDING OR SEWER PIPE

- A. General: All sanitary sewer pipe shall be provided with a firm uniform bed of granular backfill material, No. 57 stone, to fully support the pipe along its entire length. The stone shall have a minimum depth of at least six (6") inches.

B. Ductile Iron Pipe

1. Provide granular backfill material, No. 57 stone, (Class 'C' Bedding), from bottom of pipe to a depth of 1/8 diameter of pipe where the depth of cover is less than 16 feet.
2. Provide granular backfill material, No. 57 stone, (Class 'A' Bedding), from bottom of pipe to top of pipe where cover is greater than 16 feet but less than 24 feet.

3.4 FIELD QUALITY CONTROL

- A. Clear interior of piping and structures of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed.
- B. Place plug in end of incomplete piping at end of day and when work stops. Flush piping between manholes and other structures to remove collected debris. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after backfill is in place, and again at completion of Project.

1. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Crushed, broken, cracked, or otherwise damaged piping.
 - c. Infiltration: Water leakage into piping.
 - d. Exfiltration: Water leakage from or around piping.
2. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
3. Reinspect and repeat procedure until results are satisfactory.

3.5 TESTING GRAVITY SEWERS

- A. The Contractor shall test all gravity sewer mains in accordance with one of the following methods described in this section. The test method to be performed by the Contractor shall be approved and verified by the Engineer.
- B. Contractor shall furnish all labor, materials, equipment and apparatus required to perform gravity sewer testing.
- C. Engineer shall be present for all testing. Contractor to schedule test time with Engineer; however, Contractor shall give Engineer at least 24 hour notice of test time. Engineer will document all testing and distribute copies of test results to Contractor and Owner.
- D. Low Pressure Air Testing
1. All air testing shall be in accordance with ASTM C-828-86 or latest revision.
 2. Air leakage testing of installed system shall be performed with a continuous monitoring gauge no less than 4 inches \pm (4") in diameter with minimum divisions of 0.10 psi and an accuracy of \pm 0.04 psi. All air used shall pass through a single, above ground control panel visible to the Project Representative during the testing.
 3. Determine the groundwater elevation and determine the average groundwater head above the section of line being tested. Adjust the following test pressures by adding 0.43 psi per foot of groundwater head.

4. Pressurize the system to 4.0 psi (greater than average groundwater pressure). Throttle the air supply to maintain that constant pressure for at least 2 minutes. The air pressure supply shall then be disconnected from the system or shut off.
 - a. Do not enter the manhole during test.
 - b. Do not exceed 9.0 psi in the system.
5. Observe the continuous monitoring gauge while decreasing the pressure to no less than 3.5 psi (greater than groundwater pressure). At a reading of 3.5 psi, or any convenient observed pressure reading between 3.5 psi and 4.0 psi, timing shall commence with a stop watch or other timing device that is at least 99.8% accurate.
6. Measure the time interval for pressure to drop 1.0 psi.
 - a. If the time, shown in the following Table 1 for the designated line size and length, elapses before the air pressure drops 1.0 psi, the section undergoing test may be discontinued once the prescribed time has elapsed even though the 1.0 psi drop has not occurred.
 - b. If pressure drops 1.0 psi before the appropriate time shown in the Table 1 has elapsed, the air loss rate shall be considered excessive and the section of pipe has failed the test.

Table 1 Minimum Test Times For Various Pipe Sizes

<u>Pipe Diameter (Inches)</u>	<u>Time (Minutes/100 ft.)</u>
12	1.8
24	3.6
30	4.8
42	7.3

7. If the section fails the air test, the Contractor shall determine at his own expense the source, or sources of leakage, and shall repair or replace all defective materials and workmanship. Repeat procedure until results are satisfactory.

E. Infiltration/Exfiltration Testing

1. The Engineer will determine the type of test required for each section after the ground water table has been measured by the Contractor. The following general criteria will govern the type of test to be conducted.
 - a. Wherever the ground water table is measured to be not less than 3' above the top of the pipe throughout the full length in the section being tested, an infiltration test may be used.
 - b. Wherever the ground water table is measured to be less than 3' above the top of the pipe at the highest point in the section being tested, an exfiltration test may be used.
2. When conditions are suitable for testing the pipe by an infiltration test, test the pipe and manholes in sections not longer than 1,000 feet in length by the following procedures.
 - a. Install a watertight plug with a 2" tapped connection in the pipe just upstream of the manhole at the low end of the section being tested. The tap shall be in the plug at or above the centerline of the carrier pipe and the entire installation shall cause all water flowing through the carrier pipe to pass through the tap. Install a short section of pipe in the tap as required to catch and measure the water flowing through the carrier pipe with a calibrated container.
 - b. Install a watertight plug in the carrier pipe just upstream of the manhole at the high end of the section being tested.

- c. Allow the flow from infiltration to stabilize and become relatively constant in the 2" pipe. Fill the calibrated container with the flow and record the fill time with a stopwatch.
 - d. Recheck the ground water table to assure the level is still more than 3' above the invert of the pipe at the highest point in the section being tested.
 - e. The pipe and manholes will have passed the test if the infiltration does not exceed a flow rate of 10 gallons per day per inch of pipe diameter per mile of length.
 - 1.) This criteria shall be computed for each section of pipe by measuring the amount of time required to add one gallon of water to a container unless otherwise directed by the Engineer.
3. When conditions are suitable for testing the pipe by an exfiltration test, test the pipe and manholes in sections not longer than 1,000 feet in length by the following procedures:
- a. Install a watertight plug in the carrier pipe just upstream of the manhole at the low end of the section being tested. The plug should be securely anchored or blocked since it will be subjected to hydrostatic pressures.
 - b. Install a watertight plug in the carrier pipe just upstream of the manhole at the upper end of the section being tested.
 - c. Fill the section of pipe including interim manholes with water until the water level in the manhole at the high end of the section is approximately 3' above the top of the pipe. Care should be taken during filling to assure that no air has been trapped in the pipe. For each foot that the average ground water table is above the bottom invert of the pipe, add 1' to the water level at which the line is tested. Where the measured ground water table is found to be 3' or more above the top of the carrier pipe, the Engineer may require an alternative testing procedure.
 - d. After filling, allow the section to stand for a period of 4 hours or longer as required to assure that the pipe and manhole walls are saturated. Add water as required to maintain the water level in the upstream manhole at least 3' above the top of the pipe.
 - e. After the pipe and manhole walls are saturated, add water as required to bring the water level to 3.5' above the top of the pipe in the upstream manhole. Recheck the ground water table and make any necessary adjustments to the test level.
 - f. Mark the water level in the upstream manhole on the manhole wall and allow the section to sit for one (1) hour.
 - g. Then, quickly add water to the system and measure the amount of water required to bring the water level back to the mark previously placed on the manhole wall.
 - h. The section of pipe will have passed the test if the exfiltration rate does not exceed 10 gallons per day per inch of pipe diameter per mile of length.
4. If, for any reason, a section of pipe fails either of the tests procedures previously outlined or any substitute test procedure approved by the Engineer, the Contractor shall locate the defective materials and/or installation and make any necessary repairs. After the corrective actions have been taken, the section of pipe shall be retested subject to the same provisions or requirements outlined above.
- a. No sealant shall be used in the newly installed sewers to correct leaks without prior approval of the Engineer. The extent and type of repair which may be allowed shall be subject to the approval of the Engineer.

END OF SECTION 02530

SECTION 02540 – SEWER FORCE MAINS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1-16 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes sanitary sewers and necessary appurtenances for the sanitary sewer installation.
- B. Related Sections include the following:
 - 1. Division 1 Section "Measurement & Payment" for a schedule of unit prices.(N/A)
 - 2. Division 2 Section "Trenching for Utilities" for excavating, backfilling and shaping.
 - 3. Division 3 Section "Cast-in-Place Concrete" for concrete structures and reaction blocking.
 - 4. Division 03 Section "Precast Concrete Structures" for concrete manholes and structures.

1.3 SUBMITTALS

- A. Product Data: For the following:
 - 1. Pipe valve boxes, air release valves

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect pipe, pipe fittings, and seals from dirt and damage.

1.5 PROJECT CONDITIONS

- A. Locate existing structures and piping to be closed, abandoned or connected to.
- B. Connection to Existing Facilities: Do not interrupt the flow of sewer through the existing sewer mains until the following conditions are complied with:
 - 1. Contractor to prepare a written description detailing how by-pass pumping will be achieved and maintained during the connection process. Plans shall also include provisions for back-up pumping measures in the event the initial pumps were to fail.
 - 2. Connections may not begin until written approval of the Engineer has been maintained.

PART 2 - PRODUCTS

2.1 DUCTILE IRON PIPE AND FITTINGS

A. Materials:

Ductile iron pipes shall conform to AWWA/ANSI C-151/A21.51. All pipes shall have a minimum pressure of 350 psi. **All Ductile Iron Pipe shall be a minimum of class 52. Carrier Pipe used for the railroad crossing shall be class 56. The contractor shall comply with all requirements and Encroachments of the North Carolina Rail Road and the North Carolina Department of Transportation.**

1. Flanges for ductile iron pipe shall be in accordance with AWWA C115 and bolts, gaskets and installation shall be in accordance with AWWA C115, Appendix A, requirements.
2. Joints for ductile iron pipe and fittings shall be push-on, rubber gasketed joints in accordance with the applicable requirements of AWWA C111/ANSI A21.11. Standard push-on joints shall have a deflection capability of not less than three degrees. Special deflection bells shall have a deflection capability of not less than four degrees. The pressure rating for push-on joints shall be a minimum of 350 psi.
3. The exterior of ductile iron pipe, specials, and fittings shall be coated with an asphaltic coating in accordance with AWWA C151, Section 51-9. The finished coating shall be smooth, continuous and strongly adherent to the pipe.
4. Restrained joints for ductile iron pipe and fittings shall be American Flex Ring, Snap Lok, or US Pipe – T.R. Flex. Mega lugs will not be allowed on fittings for restrained joint pipe.
5. The bolts and nuts for flanged fittings and mechanical joints shall meet the requirements of ASTM A307.

B. Fittings: Ductile Iron Fittings shall meet all requirements of AWWA/ANSI C110/A21.10 and will be of the mechanical joint type.

1. The interior and exterior coatings shall be the same as specific for ductile iron pipe.
2. Fittings shall have a minimum pressure rating of 350 psi.
3. Rubber gaskets joints shall conform to AWWA/ANSI C111/A21.11.

C. Interior Lining – Cement lining – standard in accordance with ANSI/AWWA C104/A21.4.

2.2 PVC PIPE AND FITTINGS

A. Materials:

Polyvinyl chloride pipe shall conform to AWWA Specification C900, "Polyvinyl Chloride (PVC) Pressure Pipe, 4-inch through 12-inch for water", unless otherwise designated on the plans or special provisions. The pipe shall be Class 200 (cast iron O.D.) suited for a working pressure of 200 p.s.i. at 73°F and shall be dimension requirements of DR14. Pipe shall be manufactured from clean, virgin, NSF approved Class 12454-A or 12454-B PVC conforming to requirements of ASTM D1784 (latest revision).

For pipeline larger than 12-inch, polyvinyl chloride pipe shall conform to AWWA Specification C905, "Polyvinyl Chloride (PVC) Pressure Pipe, 14-inch through 36-inch for water", unless otherwise designated on the plans or special provisions. The pipe shall be Class 235 (cast iron O.D.) suited for a working pressure of 235 p.s.i. at 73°F and shall be dimension requirements of DR18. Pipe shall be manufactured from clean, virgin, NSF approved Class 12454-A or 12454-B PVC conforming to requirements of ASTM D1784 (latest revision).

Provisions must be made for contraction and expansion at each joint with a rubber ring and integral thickened bell as part of each joint. Pipe shall be supplied in 20-foot lengths. A non-toxic lubricant shall be used to assemble all pipe and fittings.

Each length of pipe shall have marked on the exterior the appropriate manufacturer and pipe specification information. Prior to installation of any pipe on the project, the Contractor shall be required to furnish in writing the proper certification from the manufacturer or a recognized testing agency that the pipe fulfills every requirement of the specifications set forth above.

- B. Fittings: Ductile Iron Fittings shall meet all requirements of AWWA/ANSI C110/A21.10 and will be of the mechanical joint type.
 - 1. The interior and exterior coatings shall be the same as specific for ductile iron pipe.
 - 2. Fittings shall have a minimum pressure rating of 350 psi.
 - 3. Rubber gaskets joints shall conform to AWWA/ANSI C111/A21.11.

PART 3 - EXECUTION

3.1 GENERAL

- A. Care shall be taken in loading, transporting, and unloading to prevent injury to the pipe or coatings. Pipe or fittings shall not be dropped. All pipe or fittings shall be examined before laying, and no piece shall be installed which is found to be defective. Any damage to the pipe coatings shall be repaired as directed by the Engineer.
- B. Pipe and fittings shall be subjected to a careful inspection just prior to being laid or installed. If any defective pipe is discovered after it has been laid it shall be removed and replaced with a sound pipe in a satisfactory manner at no additional expense to the Owner. All pipe and fittings shall be thoroughly cleaned before laying, shall be kept clean until they are used in the work, and when installed or laid, shall conform to the lines and grade required.
- C. Underground piping shall slope uniformly between manholes.
- D. Contractor shall exercise extreme care when constructing piping to protect from damage all existing underground utilities, and all existing structures.

3.2 INSTALLATION

- A. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other

- installation requirements. Maintain swab or drag in line, and pull past each joint as it is completed.
- B. Pipe shall be installed using bedding, as shown in the Contract Documents, and in accordance with requirements of Industry Standard Specifications except as otherwise provided herein. A firm, even bearing throughout the length of the pipe shall be constructed by tamping bedding material at the sides of the pipe up to the elevation designated by the bedding type. Bell holes shall be hand excavated to insure uniform bearing along the pipe barrel. Pipes will be laid with bell on the uphill end of the pipe.
 - C. Prior to being lowered into the trench, each pipe will be inspected by the crew foreman. Faulty pipe shall be rejected and removed from the work site. Pipes having any defects which are insufficient to cause the rejection of the pipe will be laid so as to bring defects in the top half of the sewer, observing such special directions as the Engineer may give with reference thereto. All pipe shall be sound and clean before laying. When laying is not in progress, including lunchtime, the open ends of the pipe shall be closed by watertight plug or other approved means.
 - D. No pipe will be stockpiled or temporarily laid out within ten (10) feet of excavation in earth or within thirty (30') feet of rock which must be blasted for removal. All pipe will be protected against injury from falling rock when blasting.
 - E. The pipe and fittings will be laid in the trench so that after the sewer is completed the invert of the pipe will conform accurately to the line and grade shown on the plan or as revised by the Engineer.
 - F. When cutting pipe is required, the cutting shall be done by machine, leaving a smooth cut at right angles to the axis of the pipe. Cut ends of pipe to be used with a bell shall be beveled to conform to the manufactured spigot end. Lining shall be undamaged.
 - G. Joints:
 - 1. Push-on joints shall be made in strict accordance with the manufacturer's instructions. Pipe shall be laid with bell ends looking ahead. A rubber gasket shall be inserted in the groove of the bell end of the pipe, and the joint surfaces cleaned and lubricated. The plain end of the pipe is to be aligned with the bell of the pipe to which it is to be joined, and pushed home with a jack or by other means. After joining the pipe, a metal feeler shall be used to make certain that the rubber gasket is correctly located.
 - 2. Couplings shall be placed on pipe and lubricated in accordance with manufacturer's recommendation. Pipes shall be aligned and carefully pushed together. Gasket shall be in the desired position after jointing. Invert grade of pipe shall be carefully rechecked after jointing. Any discrepancies in grade shall be corrected.
 - H. Trenches shall be kept dry at all times during the laying of the pipe. At the conclusion of each day's work, the open end of the pipe shall be securely closed to prevent the entrance of water, mud, rodents, vermin, etc.
 - 1. Dewater trench as necessary to maintain dry laying conditions.
 - I. The Contractor shall arrange, if requested, for the pipe manufacturer to furnish information and supervise the installation of at least the first five (5) joints of pipe installation.

- J. The Contractor shall carefully regulate his equipment and construction operations such that the loading of the pipe does not exceed the loads for which the pipe is designed and manufactured. Any pipe damaged during construction operations shall be replaced at the Contractor's expense.

3.3 BEDDING OR SEWER PIPE

- A. General: Sewer force main will not be required to have bedding unless the subgrade is unstable and stone is needed to support the pipe. In such case use #57 stone at a depth to provide a firm and adequate bedding or a minimum of (6") six inches.

- B. Ductile Iron Pipe

- 1. Provide granular backfill material, No. 57 stone, (Class 'C' Bedding), from bottom of pipe to a depth of 1/8 diameter of pipe where the depth of cover is less than 16 feet.
- 2. Provide granular backfill material, No. 57 stone, (Class 'A' Bedding), from bottom of pipe to top of pipe where cover is greater than 16 feet but less than 24 feet.

- C. PVC Pipe

- 1. Provide granular backfill material, No. 57 stone, (Class 'C' Bedding), from bottom of pipe to a depth of 1/8 diameter of pipe where the depth of cover is less than 16 feet.
- 2. Provide granular backfill material, No. 57 stone, (Class 'A' Bedding), from bottom of pipe to top of pipe where cover is greater than 16 feet but less than 24 feet.

3.4 FIELD QUALITY CONTROL

- A. Clear interior of piping and structures of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed.

- 1. Place plug in end of incomplete piping at end of day and when work stops.
- 2. Flush piping between manholes and other structures to remove collected debris.

- B. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after backfill is in place, and again at completion of Project.

- 1. Defects requiring correction include the following:

- a. Alignment: Less than full diameter of inside of pipe is visible between structures.
- b. Crushed, broken, cracked, or otherwise damaged piping.
- c. Infiltration: Water leakage into piping.
- d. Exfiltration: Water leakage from or around piping.

- 2. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
- 3. Reinspect and repeat procedure until results are satisfactory.

3.5 TESTING FORCE MAINS

- A. The Contractor shall pressure test all force mains in accordance with water main standards.

- B. Contractor shall furnish all labor, materials, equipment and apparatus required to perform force main testing.
- C. Engineer shall be present for all testing. Contractor to schedule test time with Engineer; however, Contractor shall give Engineer at least 24 hour notice of test time. Engineer will document all testing and distribute copies of test results to Contractor and Owner.

The Contractor shall plug and brace the end of the force main in the discharge manhole for testing. The Contractor will test and check valves in the valve vault. The Contractor will provide a test port for testing or pressuring the force main and plug the port when testing is completed. The Contractor will test each valve once the force main pressure test is complete.

- D. All ductile iron fittings and other force main components subject to hydrostatic thrust shall be securely anchored by use of concrete thrust blocks poured in place, unless otherwise directed by the Engineer. The reaction areas required for these thrust blocks shall be determined by the job conditions and shall conform to Section 12 AWWA C-600.

Material for reaction blocking shall be a minimum of 3000 PSI.

- E. Blowoffs. The Contractor shall provide a temporary blowoff.
- F. Testing of Force Main. All force mains before final acceptance shall be tested by filling the line with water, care being taken to expel all air. A pressure of 150 psi shall be applied to the line at the test pump and shall be maintained at that pressure for a minimum period of 2 consecutive hours. All defective material found shall be replaced by the Contractor. All leaking joints shall be made tight. The pipe installation will not be accepted unless and until the leakage, evaluated on the pressure test of 150 psi for a minimum of 2 hours, does not exceed 1.0 gallons per day per mile of pipe per inch of nominal diameter. Test pump shall be provided by the Contractor and approved by the Engineer.

The Contractor may use filtered creek water to fill the force main and wet well for testing. Do not allow trash, debris, stones, mud, etc. in the force main.

In general the pressure test and the leakage test shall be performed in the manner set forth in Section 13 of AWWA Standard C-600, except that the Contractor shall furnish his own pressure gauges. The pressure test and the leakage test shall be performed by the Contractor.

- G. Chlorination of Force Main. A chlorination test will not be required on the force main.

END OF SECTION 02530

SECTION 02630 - STORM DRAINAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1-16 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes storm drainage piping for culvert crossings.
- B. Related Sections include the following:
 - 1. Division 1 Section "Measurement and Payment" for a schedule of unit prices.
 - 2. Division 2 Section "Trenching for Utilities".
 - 3. Division 2 "Dewatering".
 - 4. Division 2 "Excavation Support and Protection".

1.3 SUBMITTALS

- A. Product Data: Reinforced Concrete Pipe (RCP)

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect pipe and seals from dirt and damage.

PART 2 - PRODUCTS

2.1 REINFORCED CONCRETE PIPE (RCP)

- A. All storm drainage pipe shall be reinforced concrete pipe and shall meet the requirements of AASHTO M170 for Class III RCP.
- B. Joint materials shall be flexible plastic and meet the requirements of AASHTO M198 for Type B flexible plastic gaskets.

2.2 RIP RAP

Stone for Rip Rap shall be of a hard, durable nature and shall be placed as shown on the drawings or as directed by the Engineer. All stone shall meet the approval of the Engineer and shall be of the following classes:

- (1) Class A Rip Rap. Stone shall vary in size from 2" to 6".
- (2) Class B Rip Rap. Stone shall vary in size from 5" to 15".
- (3) Class 1 Rip Rap. Stone shall vary in weight from 5 to 200 pounds and 30% shall weigh a minimum of 60 pounds and no more than 10% shall weigh less than 15 pounds.
- (4) Class 2 Rip Rap. Stone shall vary in weight from 25 pounds to 250 pounds. 60% shall weigh a minimum of 100 pounds and no more than 5% shall weigh less than 50 pounds.

All rip rap shall be in accordance with NCDOT specifications.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Division 2 Section "Trenching for Utilities."

3.2 INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals according to manufacturer's written instructions and other installation requirements.
- C. Comply with Division 2 "Trenching for Utilities" requirements for excavating and backfilling storm sewer pipes.
- D. Pipe installation shall comply with NCDOT Standard Specifications for Roads and Structures, latest edition.
- E. Install rip rap at inlet and outlet of storm sewer pipes to the lengths, depths and widths indicated on the plan or as directed by the Engineer.

3.3 BEDDING

- A. All storm sewer pipes twenty-four (24") inches in diameter or less shall have a minimum of 4" No. 57 clean stone provided underneath the pipe.

- B. All storm sewer pipes larger than twenty-four (24") inches in diameter shall have a minimum of 6" No. 57 clean stone provided underneath the pipe.

3.4 FIELD QUALITY CONTROL

- A. Clear interior of piping and structures of dirt and superfluous material as work progresses.
 - 1. In large, accessible piping, brushes and brooms may be used for cleaning.
 - 2. Flush piping between manholes and other structures to remove collected debris, if required by authorities having jurisdiction.
- B. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after backfill is in place, and again at completion of Project.
 - 1. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Crushed, broken, cracked, or otherwise damaged piping.
 - 2. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 - 3. Reinspect and repeat procedure until results are satisfactory.

END OF SECTION 02630

SECTION 02821 - GATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1-16 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Related Sections include the following:

- 1. Division 3 Section "Cast-in-Place Concrete" for concrete post footings.

1.3 PROJECT CONDITIONS

- A. Contractor shall install fence gate in accordance with typical gate drawing attached at end of section.
- B. Contractor shall install fence gate where shown on the drawings or as directed by the Engineer.
- C. Existing barb wire fence and posts shall be reworked such that integrity of existing fence is maintained and use of fence is not altered.
- D. Where electric fences are encountered, Contractor shall provide conduits, junction boxes, electrical wire and necessary appurtenant items to provide an electric current from one side of the fence to the other as indicated in accordance with typical gate drawing attached at end of section.
- E. Contractor shall use materials of equal or better quality to match the existing materials where the gate is to be installed.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Fence Gate: The fence gate shall be to the dimensions shown on the drawing attached at the end of this section. All materials shall be galvanized steel.
- B. Fence Post: Minimum diameter shall be 6-inches and be pressure treated creosote post. The minimum length shall be 8-feet.
- C. Concrete shall have a minimum strength of 2,500 psi @ 28 days.

- D. All wire, barbwire, posts, etc. shall be of equal or better quality materials as the materials which will be connected to.
- E. All electrical components shall be in accordance with National Electric Code.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions for compliance with requirements for work, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Stake locations of fence lines, gates, and terminal posts.

3.3 INSTALLATION, GENERAL

- A. General: Install fencing, gates and posts in line with existing fence.
- B. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacing indicated, in firm, undisturbed or compacted soil.
- C. Post Setting: Set posts in concrete footing. Protect portion of posts aboveground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during placement and finishing operations until concrete is sufficiently cured.

3.4 FENCE INSTALLATION

- A. Install wire at intervals of existing wire fence. Pull wire taut and secure to post.

3.5 GATE INSTALLATION

- A. General: Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

3.6 ELECTRIC FENCE INSTALLATION

- A. Excavate trench for conduit (18" minimum depth). Install conduit in accordance with National Electric Code. Backfill trench in accordance with Division 2 specifications.

- B. Mount junction boxes to gate post and conduit. Connect existing electric wire to junction box and install new THHN wire through conduit and connect to junction box on opposite end of gate. Make all electrical connections necessary to provide a complete electric circuit.

3.7 ADJUSTING

- A. Gate: Adjust gate to operate smoothly, easily, and quietly, free from binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

END OF SECTION 02821

SECTION 02825 - LAWNS AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1-16 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Ground Preparation.
 - 2. Furnishing and applying lime and fertilizer.
 - 3. Seeding and mulching.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Measurement and Payment" for schedule of unit prices.
 - 2. Division 2 Section "Site Clearing" for protection of existing trees and planting, topsoil stripping and stockpiling, and site clearing.
 - 3. Division 2 Section "Trenching for Utilities".

1.3 SUBMITTALS

- A. Certification of grass seed from seed vendor for each grass-seed mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver seed, limestone and fertilizer in original sealed, labeled, and undamaged containers. Store in dry containers and in accordance with manufacturer's recommendations.

1.5 COORDINATION AND SCHEDULING

- A. The Contractor shall seed and mulch all disturbed areas within 2 weeks after the trench has been installed and the trench backfilled. Where ingress and egress routes require utilization of an area where the trench has been backfilled a ten (10') foot wide strip on the high side of the easement may remain unseeded. Once the ingress and egress location is no longer required for access, unseeded strip shall be seeded and mulched within 15 calendar days.

PART 2 – PRODUCTS

2.1 SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with the Association of Official Seed Analysts' "Rules for Testing Seeds" for purity and germination tolerances.

2.2 LIME

- A. Lime: Commercial grade agricultural limestone in the form of dolomitic limestone.

2.3 FERTILIZER

- A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea-form, phosphorous, and potassium in the following composition:

- 1. Composition: 10 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.

2.4 MULCHES

- A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat.
- B. Fiber Mulch: Biodegradable dyed-wood cellulose-fiber mulch, nontoxic, free of plant growth- or germination-inhibitors, with maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.
- C. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application, nontoxic and free of plant growth - or germination-inhibitors. Minimum tack rate is 10#/1,000 sq. ft.

2.5 EROSION-CONTROL MATERIALS

- A. Blankets: Biodegradable wood or straw, or fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches long.
 - 1. North American Green S150 or equal.

PART 3- EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive seeding for compliance with requirements and for conditions affecting performance of work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 GROUND PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
- B. Limit subgrade preparation to areas that will be planted in the immediate future.
- C. Loosen subgrade to a minimum depth of 4 inches by plowing, disking and harrowing until these areas are friable and well pulverized. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter detrimental to final grading, proper bonding or the proper growth of the planting. If the prepared surface becomes eroded as a result of rain or for any other reason, or becomes crusted before the seed is sown, the surface shall again be placed in a condition suitable for seeding.

3.3 LIME APPLICATION

- A. After the area to be seeded has been brought to finished grade, lime shall be uniformly distributed at a rate of 4,000 pounds per acre over the seeding area with a mechanical spreader.

3.4 FERTILIZER APPLICATION

Commercial fertilizer grade 10-10-10 shall then be distributed uniformly at the rate of 1,000 pounds per acre and shall be uniformly mixed with the soil to a depth of at least 4 inches by disking, harrowing or by other methods acceptable to the Engineer.

- B. Fertilizer shall not be applied when the wind makes it difficult to get satisfactory distribution.

3.6 SEEDING

- A. The seed shall be a mixture as shown in the table below, and shall be applied at the rates shown in the table:

<u>Season</u>	<u>Kinds of Seed</u>	<u>Pounds Per Acre</u>
November 1 - January 31	Tall Fescue	100
	Rye (Grain)	50
February 1 - April 30	Tall Fescue	80
	Bluegrass	60
May 1 - July 31	Tall Fescue	70
	Weeping Lovegrass	20
August 1 - October 31	Tall Fescue	100
	Sudan Hybrid	50

The seed shall be uniformly sown by approved mechanical power drain drills, or in small areas, by mechanical hand seeders. The seeds shall be covered and compacted to a depth of 1/8 to 1/2 inch by means of a cultipacker and an empty traffic roller or another roller weighing less than 3 tons. Broadcast seeding shall not be done when the wind makes it difficult to get satisfactory distribution.

3.6 HYDROSEEDING

- A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogenous slurry suitable for hydraulic application.
 - 1. Mix slurry with nonasphaltic tackifier.
 - 2. Apply slurry uniformly to all areas to be seeded in a 1-step process. Apply mulch at the minimum rate of 1500 lb per acre (16.5 kg per 100 sq. m) dry weight but not less than the rate required to obtain specified seed-sowing rate.
 - 3. Apply slurry uniformly to all areas to be seeded in a 2-step process. Apply first slurry application at the minimum rate of 500 lb per acre (5.5 kg per 100 sq. m) dry weight but not less than the rate required to obtain specified seed-sowing rate. Apply slurry cover coat of fiber mulch at a rate of 1000 lb per acre (11 kg per 100 sq. m).

3.7 MOISTURE

Seed shall not be sown unless the soil has the optimum moisture content or more through a depth of at least 4 inches, nor shall it be sown when there is frost in the ground. The Owner has the authority to postpone seeding at any time when weather and moisture conditions are not favorable.

3.8 MULCH

All areas to be seeded shall be uniformly mulched in a continuous blanket immediately after seeding using Wheat straw at a minimum of 2 1/2 tons per acre. The rate of application will correspond to a depth of at least one inch and not more than one and one half inches, according to the texture and moisture content of the mulch material. It is intended that mulch shall allow some sunlight to penetrate and air to circulate, at the same time shading the ground, reducing erosion and conserving soil moisture. The Contractor shall take steps necessary to prevent loss of mulch or bunching of mulch as caused by the wind. All mulch shall be tacked per DOT standards.

3.9 MAINTENANCE

- A. The Contractor shall maintain all seeded and mulched areas in a satisfactory condition until final acceptance of the work. This includes repairing washes that occur, and the application of additional seed, installation of additional lime, and/or fertilizing and watering as needed.

3.10 STAND OF GRASS

- A. If, after a suitable growth period, a satisfactory stand of grass is not evident, the unsatisfactory areas shall be reseeded, including any additional ground preparation, liming and fertilizing necessary, using the type of seed specified. A stand of grass is defined as a full cover, over the areas seeded and mulched, with grass that is alive and growing.

END OF SECTION 02930

SECTION 02832

CHAIN LINK FENCING

1. SCOPE. This section covers chain link fencing and gates. Fencing shall be provided in the alignment indicated on the drawings at the following location(s):
 - a. Around the perimeter of the lift station.
2. FENCE TYPE. Fencing shall conform to the details indicated on the drawings and shall be of the following general types.
 - 2.01 Plant Perimeter. Plant perimeter fencing shall consist of galvanized or aluminum coated steel fabric, with a top rail, bottom tension wire, and three strands of barbed wire mounted on 45 degree extension arms. The fabric height shall be 6 feet for plant perimeter fencing. The upper strand of barbed wire shall be approximately 12 inches out from the fence and 12 inches above the top of the fabric. Posts shall be set in concrete.
3. MATERIALS.
 - 3.01 Steel Fencing. All steel or malleable iron parts and accessories shall be hot-dip galvanized or aluminum coated after fabrication and **Black vinyl coating**

Fabric	9 gauge, 2 inch mesh; galvanized ASTM A392, Class 2, or aluminum coated, ASTM A491; knuckled selvage on top, twist selvage on bottom. Black vinyl coating .
Posts	Steel pipe, ASTM F669, Group IC, with ASTM F1234, Type B interior and exterior protective coating.
Line Posts For 6 Foot Fencing	2-3/8 inch OD pipe, 3.12 lb. per ft.
Terminal Posts For 6 Foot Fencing	2-7/8 inch OD pipe, 4.64 lb. per ft.
Gate Posts	Gate or leaf 6 ft. or less, 2-7/8 inch OD pipe, 4.64 lb. per ft.; gate or leaf over 6 ft., 4 inch OD pipe, 6.56 lb. per ft.; gate or leaf over 13 ft. 6-5/8 inch OD pipe, 18.97 lb. per ft.; gate or leaf over 18 ft., 8-5/8 inch OD pipe, 28.55 lb. per ft.
Top Rails	1-5/8 inch OD steel pipe, 1.40 lb. per ft.
Rail Couplings	Sleeve type, 6 inches long, ASTM F626.
Bracing	Pipe brace same as top rail, with 3/8 inch diameter steel rod truss and tightener.
Post Tops	Pressed steel, malleable iron with pressed steel extension arm, or one-piece aluminum casting, ASTM F626.
Barbed Wire	Galvanized, ASTM A121, Class 2, or aluminum coated, ASTM A585, Type I; two 12-1/2 gauge steel wires with four-point barbs.
Stretcher Bars	Steel, ASTM F626, 3/16 inch by 3/4 inch, or equivalent area.

Fabric Ties	Aluminum bands or wires, ASTM F626.
Gate Frames	Steel tubing, 1-7/8 inch OD, 2.28 lb. per ft.
Tension Wire	ASTM A824, galvanized or aluminum coated oil spring wire, 7 gauge.
Handrail-Setting Cement	Minwax "Super Por-Rok Cement" or Master Builders "Set 45".
3.02 <u>Aluminum Alloy Fencing.</u>	
Fabric	6061-T94 wire, 6 gauge, 2 inch mesh, knuckled selvage top and bottom.
Posts	ASTM B429, 6063-T6, Schedule 40 pipe.
Line Posts	2-3/8 inch OD, 1.26 lb. per ft.
Terminal Posts (End, Corner and Pull)	2-7/8 inch OD, 2.00 lb. per ft.
Gate Posts	Gate or leaf 6 ft. or less, 2-7/8 inch OD pipe, 2.00 lb. per ft.; gate or leaf over 6 ft., 4 inch OD pipe, 3.00 lb. per ft.; gate or leaf over 13 ft. 6-5/8 inch OD pipe, 6.56 lb. per ft.; gate or leaf over 18 ft., 8-5/8 inch OD pipe, 9.88 lb. per ft.
Top Rails	ASTM B429, 6063-T6, Schedule 40 pipe, 1-5/8 inch OD, 0.79 lb. per ft.
Rail Couplings	Outside type, 6 inches long, ASTM F626.

4. GATES. Gates shall be swing type (except where noted as a sliding gate – all components shall be heavy duty industrial components), hanged to swing 180 degrees from closed to open, complete with frames, latches, stops, keepers, hinges, braces and three strands of barbed wire. Barbed wire will be required for plant perimeter gates only. Gate leaves shall have intermediate members and diagonal truss rods as required for rigid construction and shall be free from sag or twist. When adjacent fence has barbed wire, gates shall be fitted with vertical extension arms or shall have frame end members extended to carry barbed wire. Joints between frame members shall be made by welding or by means of heavy fittings, and shall be rigid and watertight. Gate fabric shall be same as fence fabric and shall be attached to frame ends by stretcher bars, bolt hooks, or other mechanical means.

Hinges shall be heavy pattern with large bearing surfaces and shall not twist or turn under the action of the gate. Latches shall be plunger bar type, full gate height, and arranged to engage the gate stop, except single gates less than 10 feet wide shall be provided with a forked latch. Latches shall be arranged for padlocking with the padlock accessible from both sides of the gate. Stop shall consist of a roadway plate with anchor set in concrete and arranged to engage plunger. Keepers shall consist of mechanical devices for securing and supporting the free end of the gate when in the full open position.

Gates shall be installed so that they cannot be removed without disassembly of the hardware. Hardware attachment bolts shall be pinned so that removal will be difficult.

5. FENCE CONSTRUCTION. The installed fence shall conform to the alignment and finish grade indicated. All posts shall be plumb. Unless otherwise indicated on the drawings, posts shall be spaced approximately 10 feet apart for plant perimeter fencing. Where necessary, the fence grade shall be adjusted to fit the ground contour by slipping the fence fabric links. Ground surface irregularities shall be graded as required to maintain not more than 2 inches clearance below the bottom of the fence fabric.

Where the fencing is supported by a concrete structure, posts shall be set in sleeves that provide at least ¼ inch clearance all around. Sleeves shall be fabricated from Schedule 40 black steel pipe and hop-dip galvanized after fabrication. Sleeves shall be 5 inches long unless otherwise indicated on the drawings. Sleeves shall be rigidly supported in accurate alignment in the forms and shall be positioned vertically so that the top of the sleeve is approximately ½ inch below the finish concrete surface. Posts shall be wedged in accurate alignment, and the annular space between posts and sleeves shall be filled with handrail-setting cement to the top of the steel sleeve. Filling of the remaining space with sealant, as indicated on the drawings, is covered in the caulking section.

Where posts are set in earth, concrete foundations 36 inches deep shall be provided. If bedrock is encountered, post excavation shall be continued to the 36 inch depth or 18 inches into the bedrock, whichever is less. Concrete foundations shall be circular in horizontal sections, not less than 10 inches in diameter for line posts, and with a diameter not less than the post OD plus 9 inches for a terminal and gate posts, except that foundations in bedrock shall be a minimum of 6 inches larger than the outside dimension of the post. Foundations shall extend above the ground surface and shall be crowned approximately one inch. Concrete for foundations shall conform to the cast-in-place concrete section. Each foundation shall be cured for at least 72 hours before further work is done on the post.

Top rails, bottom rails, and bottom tension wires shall be installed before the fabric. Top and bottom rails shall be furnished in at least 18 foot lengths and shall be securely connected to gate and terminal posts. Tension wires shall be installed approximately 6 inches above grade and shall be attached to each post and securely anchored at terminal and gate posts. Straight runs between braced posts shall not exceed 1,500 feet. A terminal post shall be provided at each change in slope.

Fabric shall be attached to the top rail, bottom rail, and bottom tension wire at 24 inches centers, and to the line posts at 15 inch centers. Barbed wire shall be fastened to each extension arm by internal clips or external fabric ties. Stretcher bars shall be provided at each gate and terminal post. Each stretcher bar shall be threaded through the fabric and anchored to the post at 15 inch centers by positive mechanical means.

Each gate and terminal post shall be braced by a horizontal pipe brace and an adjustable truss extending to an adjacent line post. Corner posts shall be braced in both directions.

Fabrics shall be stretched taut and anchored so that a pull of 150 pounds at the middle of a panel will not lift the bottom of the fabric more than 6 inches.

All surfaces of aluminum which will be in contact with concrete, mortar, or dissimilar metals shall be given a heavy coat of coal tar paint.

6. DRAWINGS AND DATA. Complete detail drawings and specifications for the fence, gates, and accessories shall be submitted in accordance with the submittals sections.
7. See construction plans – site and utility plan for fence dimensions. In the event of any discrepancies, use the most heavy duty or larger size material.
8. All materials and parts shall be used for heavy duty industrial applications.

END OF SECTION

SECTION 03100

CONCRETE FORMWORK

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.
- B. Openings for other work.
- C. Form accessories.
- D. Form stripping.

1.3 PRODUCTS INSTALLED BUT NOT SUPPLIED UNDER THIS SECTION

- A. Embedded items including, but not limited to, inserts, sleeves, wall castings, wall thimbles, gate guides, anchors, and anchor bolts, as shown or specified to be embedded.

1.4 DESIGN REQUIREMENTS

- A. Design, engineer and construct formwork, shoring and bracing to comply with code requirements; resultant concrete to conform to required shape, line and dimension.

1.5 QUALITY ASSURANCE

- A. Comply with ACI 301, ACI 318, and ACI 347.

PART 2 PRODUCTS

2.1 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faces, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimum number of form marks.
 - 1. Plywood: U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood", Class 1, Exterior Grade or better, mill-oiled and edge sealed, with each piece bearing legible inspection trademark.
- B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.

2.2 FORMWORK ACCESSORIES

- A. Form Ties: Factory fabricated removable or snap-off metal type, designed to prevent form deflection and to prevent spalling concrete upon removal. Units to leave no metal closer than 1-1/2 inches to surface.
- B. Form Release Agent: Colorless mineral oil which will not stain concrete, or absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete including curing compound, sealer, or waterproofing.
- C. Corners: Chamfered strip type, 3/4 x 3/4 inch size; maximum possible lengths.
- D. Dovetail Anchor Slot: Galvanized steel, 22 gage thick, foam filled slots, nail holes for securing to concrete formwork.
- E. Waterstop: Polyvinyl chloride, minimum 1,750 psi tensile strength, minimum -40 degrees F working temperature, 6 inch wide, 3/16 inch thick, maximum possible lengths, ribbed profile, preformed corner sections, heat welded jointing.
- F. Special Waterstop: Polyvinyl chloride, minimum 1,750 psi tensile strength, minimum -40 degrees F working temperature, 9 inch wide, 3/8 inch thick, 1/2 inch I.D. minimum center bulb, maximum possible lengths, ribbed profile, heat welded jointing.
- G. Preformed Plastic Adhesive Waterstop (PPAWS): Federal Specification SS-SS-210A; single component self-sealing plastic adhesive type, extruded rope form between two protective silicone treated papers, 1 inch square cross section, 1 inch lap slice, furnish with primer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with Drawings.

3.2 EARTH FORMS

- A. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete. Earth forms subject to Engineer's approval.

3.3 ERECTION - FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements; comply with ACI 301. Use selected materials to obtain required finishes.
- B. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances; comply with ACI 347.
- C. Align joints and make watertight.
- D. Obtain approval before framing openings in structural members which are not indicated on Drawings.
- E. Provide chamfer strips on all external corners, and on other edges as indicated.
- F. Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before concrete is placed. Retighten forms and bracing after concrete placement, if required.
- G. Set edge forms or bulkheads and intermediate screed pins or strips for slabs to obtain required elevations and contours in finished slab surface.

3.4 APPLICATION – FORM RELEASE AGENT

- A. Clean reused forms of concrete residue. Repair and patch as required returning forms to acceptable surface condition.
- B. Apply form release agent on formwork prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply form release agent where concrete surfaces will receive special finishes which are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.5 JOINTS, INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Provide formed openings where required for items to pass through concrete work.
- B. Locate and set in place items which will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.
- D. Install accessories straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- E. Install waterstops continuous without displacing reinforcement. Install waterstop a minimum of 2 inches clear of reinforcing steel.
- F. Provide waterstop at all joints where shown; at all joints in tank, flume and building bottom slabs; at all joints in walls and in slabs with water or earth on one side and a dry work area or an exposed surface on the other; at all vertical joints in walls (except those with earth on both sides).
- G. Locate and install construction joints to not impair strength and appearance of the structure as indicated or as approved by Engineer.
- H. Provide keyways at least 1-1/2 inches deep in construction joints in walls, slabs, and between walls and footings.
- I. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints, except as otherwise indicated.

3.6 FORMWORK TOLERANCES

- A. Comply with ACI 301, Table 4.3.1, and ACI 347.

3.7 FORM REMOVAL

- A. Fabricate form for easy removal without hammering or prying against concrete surfaces.
- B. Forms not supporting weight of concrete such as sides of beams, walls, and columns, and similar parts may be removed after curing for 24 hours at not less than 50 degrees F. Concrete shall be sufficiently hard to not be damaged by form removal operations.
- C. Do not remove forms or bracing which support slabs and beams until field cured cylinder strength has reached 3,000 psi.

END OF SECTION

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Reinforcing steel bars, wire fabric and accessories for cast-in-place concrete and precast concrete.

1.3 SHOP DRAWINGS

- A. Submit original shop drawings prepared for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of concrete reinforcement. Include special reinforcement required for openings through concrete structures.

1.4 QUALITY ASSURANCE

- A. Comply with ACI 301.
- B. Provide Engineer with access to precast plant to facilitate inspection of reinforcement. Provide notification of commencement and duration of shop fabrication in sufficient time to allow inspection.
- C. Design reinforcement for precast under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of North Carolina.

PART 2 PRODUCTS

2.1 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615, 60 ksi yield grade, deformed billet steel bars, unfinished; or ASTM A616, 60 ksi yield grade, deformed rail steel bars, unfinished.
- B. Dowel Bar Replacement (D.B.R.): Threaded bars and couplers to develop at least 125 percent of the yield strength of the bar; unified coarse threads, no tapered threads; flanged coupler with nail holes for form attachment; Dayton Superior, Williams Form Engineering, or as approved.
- C. Welded Wire Fabric: ASTM A185, plain wire.

2.2 ACCESSORIES

- A. Chairs, Bolsters, Bar Supports, and Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions.

2.3 FABRICATION

- A. Comply with CRSI Manual of Practice and ACI SP-66. No welding of reinforced bars unless authorized in writing by Engineer.

PART 3 EXECUTATION

3.1 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position. Comply with CRSI's recommended practice for placing reinforcing bars.
- B. Do not displace or damage vapor barrier.
- C. Accommodate placement of formed openings. Provide additional reinforcement as required.
- D. Unless noted otherwise, maintain concrete cover for reinforcement as follows:

<u>Item</u>	<u>Coverage</u>
Beams	1-1/2 inch
Supported Slabs and Joists	1-1/2 inch
Column Ties	1-1/2 inch
Walls (exposed to weather or backfill)	2 inch
Footings and Concrete Formed against Earth	3 inch
Slabs on Fill	3 inch
Footings or Slabs on Mud Mat	2 inch

- E. On mud mat, use steel bar chairs or other approved supports.
- F. Do not field cut reinforcement without Engineer's permission.
- G. Do not bend reinforcement after embedment in hardened concrete.
- H. Clean reinforcement of loose rust, mill scale, ice, earth, and other material which affect bond with concrete.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Cast-in-place concrete.
- B. Control, expansion and contraction joint devices associated with concrete work, including joint sealants.
- C. Grouts.

1.3 COORDINATION OF CONCRETE SUPPORTS FOR EQUIPMENT AND PIPING

- A. The Contractor for Section 1 shall be responsible for providing concrete pipe supports, equipment pads, housekeeping pads, and concrete pads in new structures to accommodate work under Sections 1, 2, 3, 4 and 5.

1.4 QUALITY ASSURANCE

- A. Comply with ACI 301 unless specifically noted otherwise.
- B. Maintain one copy of ACI 301 on site.
- C. Acquire cement and aggregate from same source for all work.
- D. Comply with ACI 305R when concreting during hot weather.
- E. Comply with ACI 306R when concreting during cold weather.

1.5 DEFINITIONS

- A. Exposed: Exposed to view by persons responsible for operation or maintenance of the structure, including, but not limited to, all tank and flume interior wall surfaces.

1.6 SUBMITTALS

- A. Laboratory Test Results: Submit laboratory test reports for concrete materials and mix design test.
- B. Materials Certificates: Provide materials certificates signed by manufacturer and Contractor, certifying that each material item complies with, or exceed, specified requirements in lieu of materials laboratory test reports when permitted by Engineer.
- C. Submit in quantities specified for Shop Drawings; follow Section 01300.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement: ASTM C150, Type 1 – Normal Portland type. Use one brand of cement throughout project, unless approved by Engineer.
- B. Fine and Coarse Aggregates: ASTM C33 (normal weight aggregate); materials containing deleterious substances (spalling causing) are not acceptable.

- C. Water: Clean and not detrimental to concrete.

2.2 ADMIXTURES

- A. Air Entrainment: ASTM C260; Master Builders Micro-Air, or as approved.
- B. Chemical: ASTM C494 Type A – Water Reducing, Type B – Retarding, Type C – Accelerating, Type D – Water Reducing and Retarding, Type E – Water Reducing and Accelerating, Type F – Water Reducing, High Range, Type G – Water Reducing, High Range and Retarding; containing no chlorides.
- C. Fly Ash: ASTM C618 Class F; loss on ignition less than 6 percent.

2.3 ACCESSORIES

- A. Bonding Agent: Latex emulsion.
- B. Special Bonding Agent: Water-based epoxy resin/Portland cement.
- C. Vapor Retarder: 6 mil thick clear polyethylene film.
- D. Non-Shrink Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 5000 psi in 28 days.
- E. Epoxy Grout: 2-component epoxy resin bonding system capable of developing a minimum bond strength of 1100 psi in 48 hours; ASTM C881, Type N, Grade 3, Class B and C.

2.4 JOINT DEVICES AND FILLER MATERIALS

- A. Joint Filler Type A: ASTM D994; Asphalt impregnated fiberboard or felt.
- B. Joint Filler Type B: ASTM D1752; Premolded sponge rubber fully compressible with recovery rate of minimum 95 percent.
- C. Sealant: Follow Section 07900.

2.5 CONCRETE MIX

- A. Concrete Proportions: Comply with ACI 301, 3.9.
- B. Class I Concrete: Provide concrete to the following criteria:
 - 1. Compressive Strength (7 day): 3200 psi.
 - 2. Compressive Strength (28 day): 4000 psi.
 - 3. Water/Cement Ratio (maximum): 0.50 by weight.
 - 4. Air Entrained: 6 percent, ± 1 percent.
 - 5. Fly Ash Content: Maximum 25 percent of cement content.
 - 6. Slump (maximum): 3 inches (due to water).
 - 7. High Range Water Reducer: Add at site to increase slump to 6 inches, $\pm 1-1/2$ inches.
 - 8. Grout for leveling or to start wall lifts shall be of similar proportions to the mortar in the Class I concrete as approved by Engineer.
- C. Class II Concrete: Provide concrete to the following criteria:
 - 1. Compressive Strength (28 day): 2500 psi.
 - 2. Fly Ash Content: Maximum 25 percent of cement content
 - 3. Slump (maximum): 6 inches
- D. Mudmat Concrete: Provide concrete to the following criteria:
 - 1. Compressive Strength (28 day): 1000 psi.
 - 2. Fly Ash Content: Maximum 25 percent of cement content
- E. Grout: Provide concrete to the following criteria:
 - 1. Compressive Strength (28 day): 4000 psi.
 - 2. Proportions similar to Class I concrete.
 - 3. 100 percent of coarse aggregate must pass 1/2 inch sieve.

2.6 CEMENT-BASE AGGREGATE TYPE COATING

- A. Federal Spec. TT-P0035 (ARMY-CE); use with bonding agent.

PART 3 EXECUTION

3.1 GENERAL

- A. Use Class I concrete for structural concrete and concrete for pavements, sidewalks and equipment bases; use Class II concrete for fillets and fills, and where indicated.
- B. Install vapor retarder under interior building slabs on grade. Lap joints minimum 6 inches and seal watertight by taping edges and ends.
- C. Cut contraction joints within 18 hours after placing. Cut 1/4 depth of slab thickness. If joint pattern not shown, provide joints not exceeding 15 feet in either direction and located to provide uniform slabs.
- D. Slope positively floors containing sumps, gutters, or floor drains.
- E. Provide 3 inch thick mudmats under all foundations and base slabs unless noted otherwise.
- F. Construct isolation joints in slabs on grade at points of contact between slabs on grade and vertical surfaces such as column pedestals, foundation walls, or as indicated. Use joint filler B and a sealant as specified in Section 07900 unless noted otherwise.
- G. Verify construction joints, waterstop, and reinforcement are acceptable.

3.2 PLACING CONCRETE

- A. Comply with ACI 301 and the following:
 - 1. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.
 - 2. Deposit concrete in forms in horizontal layers not deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
 - 3. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Comply with ACI 309 for equipment and procedures for consolidation of concrete.
 - 4. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.
- B. When Class I concrete arrives at the Project with slump below 3 inches, water may be added only if neither the maximum permissible water-cement ratio nor the maximum slump is exceeded. Slump adjustment, with water, shall be made only one time.
- C. Start wall lifts with 2 to 3 inches of grout.
- D. Placement of concrete under water is not permitted.
- E. Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
 - 1. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Bring slab surfaces to correct level with straight edge and strikeoff. Use bullfloats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
 - 3. Maintain reinforcing in proper position during concrete placement operations.
- F. Cold Weather Placing: Comply with ACI 305 and the following to protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures:
 - 1. When air temperature has fallen to or is expected to fall below 40 degrees F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F and not more than 80 degrees F at point of placement.
 - a. Maintain concrete within this temperature range for not less than 7 days.

2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials or against cold reinforcing steel.
 3. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.
- G. Hot Weather Placing: Comply with ACI 305 and the following when hot weather conditions exist that would seriously impair quality and strength of concrete:
1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F. Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water. Use of liquid nitrogen to cool concrete is Contractor's option.
 2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
 3. Fog spray forms, reinforcing steel, and subgrade just before concrete is placed.
 4. Use water-reducing retarding admixture (Type D) when required by high temperatures, low humidity, or other adverse placing conditions.

3.3 REPAIR OF DEFECTIVE AREAS

- A. Use manufactured non-shrink cementitious materials specifically formulated for patching concrete in conjunction with a compatible bonding material. The complete repair procedure along with a list of all materials to be used must be submitted to and approved by Engineer before any repair work is started.
- B. Preparation of defective areas to be approved by Engineer prior to patching.
- C. Tie Holes: Thoroughly and liberally coat with a bonding agent and then thoroughly fill with a non-shrink cementitious material using a plunger type or other mechanical injecting device to force mortar through holes passing through walls.
- D. Repair surface defects, including tie holes, immediately after form removal.
- E. Remove honeycombed and other defective concrete down to sound concrete.

3.4 CONCRETE FINISHING

- A. Concrete Floor Surfaces: Follow Section 03346.
- B. Formed Concrete Surfaces: Smooth form finish as described in ACI 301, 10.2.2, and no form marks greater than 1/16 inch in relief, unless otherwise specified.
- C. Formed Concrete Surfaces Not Exposed and Not to be Waterproofed as Specified in Section 07110: Rough form finish, at Contractor's option.
- D. Exposed Formed Surfaces of Slabs: Smooth form finish with all offsets and unevenness due to form arrangement ground smooth.
- E. Prepare concrete surfaces to be waterproofed as specified in Section 07100 in strict accordance with the waterproofing manufacturer's instructions. On surfaces to be waterproofed, defects shall include, but not be limited to, voids, air holes and honeycomb that the normal application of waterproofing will not fill or otherwise seal effectively.
- F. Exposed Interior Concrete Surfaces: Applied finish of cement-base aggregate type coating; applied to concrete with a smooth form finish; first coat to be by heavy brush at two pounds per square yard, second coat at same rate and sponge floated.
- G. Exposed Exterior Concrete Surfaces, Including Tank Interiors From Top to Two Feet Below Normal Water Surface: Cork floated finish as described in ACI 301, 10.3.3, or an applied finish of cement-base aggregate type coating.
- H. Related Unformed Surfaces, Including Tops of Walls: Strike smooth after concrete is placed and float to a texture consistent with that of the formed surfaces.

3.5 CURING AND PROTECTION

- A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

- B. Concrete Surfaces: Follow Section 03370.

3.6 FIELD QUALITY CONTROL

- A. Tests of cement and aggregates may be performed to ensure conformance with specified requirements.
- B. Tests of concrete slump, air content and strength will be made at the direction of Engineer.
- C. Tests of soil compaction will be made at the direction of Engineer.
- D. Advise the designated testing agency sufficiently in advance of, but not less than 24 hours before, operations to allow for completion of quality tests and for the assignment of personnel.
- E. Contractor responsible for additional testing expenses incurred for the purpose of making, transporting, or testing field cured cylinders.
- F. In addition to the requirements of Chapter 18 of ACI 301, those parts of a structure which will contain water during service shall be substantially watertight. Before the units are placed in service, repair all cracks and defects which impair watertightness and eliminate any leakage into or out of the structure. After proper cleaning and disinfecting, if required, fill the water containment structures with water to their maximum level, and allow the water to remain for 24 hours with associated valves and appurtenances tightly closed. During this time, the water level, as measured by a hook gage or other approved measuring device, shall not drop vertically more than a distance of 1/2 inch. If this test fails, pump out the structure and make such repairs as required to achieve the desired watertightness. Upon completion of repairs, thoroughly clean and disinfect, if required, the affected areas. Repeat watertightness test until the above specified watertightness is achieved or Engineer's approval is obtained.

END OF SECTION

SECTION 03346

CONCRETE SLAB FINISHING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Finishing.
- B. Surface treatment with sealer and slip resistant coatings.

1.3 QUALITY ASSURANCE

- A. Comply with ACI 301.

1.4 COORDINATION

- A. Coordinate the Work with concrete floor placement and concrete floor curing.

PART 2 PRODUCTS

2.1 SEALERS

- A. Sealer Type A: ASTM C309, clear, transparent, acrylic sealing compound with 30 percent minimum solids.
- B. Sealer Type B: Clear, penetrating liquid sodium silicate sealer.

2.2 SLIP RESISTANT TREATMENT

- A. Slip Resistant Finish: Natural aggregate, non-metallic dry-shake material.

PART 3 EXECUTION

3.1 FLOOR FINISHING

- A. Trowel finish concrete floor surfaces in accordance with ACI 301, 11.7.3, Class A tolerances, unless subsequently specified otherwise. Bottom slabs of water containment structures and slabs on which backfill will be placed shall have floated finish as described in ACI 301, 11.7.2. Exterior concrete traffic surfaces shall have a non-slip broom finish as described in ACI 301, 11.7.4.
- B. Care shall be taken not to destroy the entrained air in the surface of the concrete in areas exposed to freezing and thawing. Concrete in liquid containment structures that are not enclosed in a heated structure are considered to be exposed to freezing and thawing.
- C. In areas with floor drains, maintain design floor elevation at walls; slope surfaces uniformly to drains as indicated on drawings.

3.2 FLOOR SURFACE TREATMENT

- A. Apply slip resistant finish on interior concrete stair treads and pedestrian ramps and all exterior stairs treads, platforms, landings, and pedestrian ramps. Apply at a rate of 25 pounds per 100 square feet. Imbed in concrete surface. Broadcast application is unacceptable.
- B. Apply sealer Type A on interior concrete surfaces subject to any foot or mechanized traffic. Surfaces shall receive an initial application after curing operations have been completed and a second application upon completion of construction and thorough cleaning.
- C. Apply sealer Type B on exterior concrete horizontal surfaces, not including bottom slabs of water containment structures unless noted otherwise. Sealer shall be applied in two applications three days apart and shall be rinsed off with water every 24 hours for two days after each application to wash away excess alkali and foreign matter which has migrated to the surface.

3.3 TOLERANCES

- A. Maximum Variation of Surface Flatness for Exposed Concrete Floors: 1/8 inch in 10 feet.
- B. Correct defects on surfaces intended to support floor covers by grinding. Correct defects in all exposed floors by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same tolerances.

END OF SECTION

SECTION 03370

CONCRETE CURING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Initial and final curing of horizontal and vertical concrete surfaces.

1.3 SUBMITTALS

- A. Submit proposed method of curing if differently than subsequently specified methods.

1.4 QUALITY ASSURANCE

- A. Comply with ACI 301 and ACI 302.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Membrane Curing Compound: ASTM C309, Type 1-D, Class B, clear with fugitive dye which disappears approximately 24 hours after exposure to sunlight; Spray-Cure Safe Cure Clear, Euclid Chemical Company Durez DR, or as approved. Curing compound shall be compatible with coatings (including sealer, waterproofing, bonded cementitious topping, or floor tile) which are to be applied to the concrete surface.
- B. Absorptive Mats: Burlap-polyethylene, minimum 8 oz/sq yd bonded to prevent separation during handling and placing.
- C. Water: Potable, not detrimental to concrete.

PART 3 EXECUTION

3.1 HORIZONTAL SURFACES

- A. Cure floor surfaces in accordance with ACI 301 using any of the following accepted procedures.
 - 1. Spraying: Spray water over floor slab areas and maintain wet for 7 days.
 - 2. Absorptive Mat: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place for 7 days.
 - 3. Membrane Curing Compound: Pavement, walks, and curbs only.

3.2 VERTICAL SURFACES

- A. Cure surfaces using any of the following accepted procedures.
 - 1. Formwork: Keep forms in place for 7 days.
 - 2. Spraying: Spray water over surfaces and maintain wet for 7 days.
 - 3. Membrane Curing Compound.

3.3 PROTECTION OF FINISHED WORK

- A. Do not permit traffic over unprotected floor surface.
- B. When the mean daily outdoor temperature is less than 40 degrees F, Contractor shall, not less than 24 hours prior to placement, submit to Engineer for review arrangements for heating, covering, insulating or housing the concrete work, in accordance with ACI 301, 12.3.1.
- C. When the rate of evaporation of surface moisture from concrete as estimated from Figure 2.1.4 of ACI 305R-91, "Recommended Practice for Hot Weather Concreting", exceeds 0.15 lb/sq ft/hr, the measure of ACI 301, 12.3.2 shall be put into practice.

END OF SECTION

SECTION 03410 - PRECAST CONCRETE STRUCTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1-16 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes precast concrete structures and necessary appurtenances for the precast concrete structure installation.
- B. Related Sections include the following:
 - 1. Division 1 Section "Measurement and Payment" for schedule of unit prices. (N/A)
 - 2. Division 2 Section "Trenching for Utilities" for excavating, backfilling and shaping.
 - 3. Division 2 Section "Sanitary Sewers" for sewer installation.

1.3 SUBMITTALS

- A. Product Data: For the following:
 - 1. Precast Concrete Structures
 - 2. Manhole Rings and Covers
- B. Design Mix Reports and Calculations: For each class of concrete used to fabricate the precast concrete structures.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Precast sections may be provided with lifting notches on the inside face of walls to facilitate handling. Lifting notches shall not be more than 3 inches deep; holes extending through the wall will not be acceptable.
- B. Precast sections shall be handled carefully and shall not be bumped or dropped. Hooks shall not come in contact with joint surfaces.
- C. Precast sections shall not be delivered to the project site until the sections have attained a minimum strength of at least 80 percent of the specified design strength or a minimum of seven days whichever is greater.
- D. The date of manufacture shall be identified on all precast sections.

PART 2 - PRODUCTS

2.1 PRECAST STRUCTURES

A. Materials:

1. Concrete shall conform to ASTM C478 and the following:
 - a. Compressive Strength: 5000 psi minimum at 28 days
 - b. Air Content: 4 percent minimum
 - c. Alkalinity: Adequate to provide a Life Factor, $A_z = \text{Calcium}$
 - d. Cementitious Materials: Minimum of 564 pounds per C.Y.
 - e. Coarse Aggregates: ASTM C33. Sound, crushed, angular granitic stone only. Smooth or rounded stone shall not be used.
 - f. Fine Aggregates: ASTM C33. Free from organic impurities.
 - g. Chemical Admixtures: ASTM C494. Calcium chloride or admixtures containing calcium chloride shall not be used.
 - h. Air Entraining Admixtures: ASTM C260
2. Reinforcing steel shall be ASTM A615 Grade 60 deformed bar, ASTM A82 wire or ASTM A185 welded wire fabric.
3. Lift loops shall be ASTM A416 steel strand. Lifting loops made from deformed bars are not allowed.
4. Flexible joint sealants shall be butyl rubber based conforming to Federal Specification SS-S-210A, AASHTO M-198, Type B - Butyl Rubber and as follows: maximum of 1% volatile matter and suitable for application temperatures between 10 and 100 degrees F.
5. Nonshrink grout interior patching of all penetrations shall be as follows:
 - a.) Cormix Supreme
 - b.) L & M "Crystex"
 - c.) Masterbuilders "Masterflow 713 Grout"
 - d.) Masterbuilders "Set Grout"
 - e.) Savereisen Cements "F-100 Level Fill Grout"
 - f.) UPCO "Upcon Supcr Flow"
 - g.) U.S. Grout "Five Star Grout"
6. Manhole rings and covers shall be equal to those shown on the plans and will conform to ASTM A48, Class 30B for gray cast iron materials. All castings shall be watertight and thoroughly coated with an asphaltic varnish and be as manufactured by:
 - a.) Dewey Brothers, Inc.
 - b.) Vulcan Foundry, Inc.
 - c.) U.S. Foundry and Manufacturing Corporation

7. Manhole steps shall conform to OSHA standards and shall be resistant to corrosion by hydrogen sulfide and other sewer gases. Steps shall be provided in bases, risers, cones, transition cones, and transition top sections aligned vertically on 16" centers. Steps shall be secured to the wall with a compression fit in tapered holes or cast in place. Steps shall not be vibrated or driven into freshly cast concrete or grouted in place. The steps shall be Copolymer Polypropylene Plastic reinforced with a 1/2" diameter grade 60 bar and have serrated tread and tall end lugs. Step pullout strength shall be 2000 lbs. minimum when tested according to ASTM C497.

B. Fabrication and Manufacturing:

1. Precast component fabrication and manufacturers shall conform to the following:
 - a.) Precast manufacturing shall be in conformance with ASTM C478. Inside slab finishes resulting from casting against forms shall be free of any defects and honey comb. Exterior slab surfaces shall have a float finish. Small surface holes, normal color variations, normal form joint marks, and minor depressions, chips and spalls may be tolerated. Dimensional tolerance shall be those set forth in the appropriate references and specified below.
 - b.) Joint surfaces between bases, risers, and cones shall be manufactured to the joint surface design and tolerance requirements of ASTM C361. The maximum slope of the vertical surface shall be 2 degrees. The maximum annular space at the base of the joint shall be 0.10". The minimum height of the joint shall be 4". Joint shall be smooth, uniform, and sharp edged.
 - c.) Lift inserts shall be sized for a precision fit with the lift devices, shall comply with OSHA 1926.704, and shall not penetrate through the manhole wall.
 - d.) Step holes shall be cast or drilled in the bases, risers, and cones to provide a uniform step spacing of 16" with the first step being 16" from the top of the cones. Cast step holes shall be tapered to match the taper of the steps.
2. Precast base sections shall be cast monolithically without construction joints.
3. Precuts riser sections shall have a minimum lay length of 16".
4. Precast flat slab top sections shall have a manhole access with an inside diameter of 24" and shall be designed for HS-20 traffic loadings as defined in ASTM C890. Items to be cast into special flat slab tops shall be sized to fit within the manhole ID and the top and bottom surfaces.
5. Precast grade rings may be used to adjust ring and covers to finished grade. No more than 8 vertical inches of grade rings will be allowed per manhole. Grade rings shall conform to ASTM C478 and shall be no less than 4 inches in height.
6. Pipe to manhole connectors shall conform to ASTM C923.

7. Joints between precast components shall be sealed internally between the tongue and the groove and the following:
 - a.) Internal seals shall consist of an o-ring gasket conforming to ASTM C443, installed according to the manufacturer's recommendation.
 - b.) Internal seals may consist of a profile gasket conforming to ASTM C-443 and C-361, installed according to manufacturer's recommendation. Note: The Contractor may, at his option, use butyl rubber in addition to o-ring or profile gasket along the bottom groove of each section to help in sealing.
8. Lifting devices for handling precast components shall be provided by the precast manufacturer and shall comply with OSHA Standard 1926.704.

PART 3 - EXECUTION

3.1 GENERAL

- A. Care shall be taken in loading, transporting and unloading precast concrete structures. Structures shall be subjected to a careful inspection prior to installation. Any damaged area shall be repaired to the satisfaction of the engineer or removed from the project if damaged beyond repair at no additional cost to the owner.
- B. All precast structures shall be thoroughly cleaned before installation and kept clean until placed into service.
- C. Precast structures shall be installed where indicated on the construction drawings and in accordance with field staking cut sheets provided by the engineer.
- D. Contractor shall exercise extreme care when installing precast structures to protect existing underground utilities and existing structures from damage.

3.2 INSTALLATION

- A. All precast structures shall be provided with a uniform bed of granular backfill material, No. 57 stone, a minimum of 6" inches deep to fully support the precast structure. The bedding shall extend a minimum of 6 inches beyond the outside dimensions of the precast structure.
- B. Precast structures shall be set to be vertical and with sections in true alignment with a 1 inch maximum tolerance.
- C. Interior lift holes shall be plugged and grouted with materials specified in Part 2.
- D. Pipes shall be connected to precast structures and boots shall be tightened in accordance with manufacturer's recommendations. Non shrink grout shall be provided around pipe ends such that a uniform flow and constant grade through structures will be provided.

- E. O-ring rubber joints shall be provided at all joints to provide a watertight joint.
- F. All structures shall be set to top elevations shown on plans but in no event shall be less than 2 feet above finish grade.
- G. Vent piping shall be installed where indicated and to the elevations shown on the construction drawings.

3.3 TESTING

- A. The Contractor shall vacuum test all new sewer manholes for leakage in the presence of the Engineer.

The Contractor shall furnish all labor, equipment, and any appurtenant items necessary to satisfactorily perform the vacuum test. All testing equipment shall be approved for vacuum testing manholes.

A vacuum of 10 inches of mercury shall be drawn and the vacuum pump shut off. With the valves closed, the time for the vacuum to drop to 9 inches of mercury shall not be less than that shown in the table below:

Manhole Depth	Diameter of Manhole		
	48" Dia.	60" Dia.	72" Dia.
10 Ft. or Less	60 Sec.	75 Sec.	90 Sec.
>10 Ft. But <15 Ft.	75 Sec.	90 Sec.	105 Sec.
>15 Ft. But <25 Ft.	90 Sec.	105 Sec.	120 Sec.

(Times shown are minimum elapsed times for a drop in vacuum of 1 inch or mercury.)

If the manhole fails the initial test, necessary repairs shall be made with an approved non-shrink group while the vacuum is still being drawn. Retesting shall proceed and continue until a satisfactory test is accomplished.

END OF SECTION 03410

SECTION 05120
STRUCTURAL STEEL

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Structural steel framing members.
- B. Base plates.
- C. Grouting under base plates.
- D. Guard Posts.

1.3 QUALITY ASSURANCE

- A. Fabricate structural steel members in accordance with AISC Code of Standard Practice.
- B. Design connections not detailed on the Drawings under direct supervision of a Registered Professional Structural Engineer experienced in design of this work and licensed in the state where the Project is located.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Structural Steel Members: ASTM A36.
- B. Structural Tubing: ASTM A500, Grade B.
- C. Pipe: ASTM A53, Grade B.
- D. Bolts, Nuts, and Washers: ASTM A325 bolts, ASTM A563 nuts.
- E. Anchor Bolts: Follow Section 05501.
- F. Welding Materials: AWS D1.1; type required for materials being welded.
- G. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 5,000 psi at 28 days; Master Builders Masterflow 713, U.S. Grout Corp., Five Star, or as approved.
- H. Guard Posts:
 - 1. Posts: 6 inch diameter x 7'-0" long black steel, meet requirements of ASTM A36.
 - 2. Concrete: Class II Concrete: Follow Section 03301.
 - 3. Paint: Exterior grade alkyd enamel, yellow.
- I. Shop and Touch-Up Primer: Follow Section 09900.
- J. Touch-Up Primer for Galvanized Surfaces: SSPC 20 Type I Inorganic.

2.2 FABRICATION

- A. Shop joints shall be welded.
- B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
- C. Fabricate connections for bolt, nut, and washer connectors.
- D. Connections shall be framed beamed connections.

- E. Burning holes and notches in members will not be permitted, except when authorized in writing by the Engineer.
- F. The contact surfaces of joints shall be free of oil, paint, or any foreign matter.

2.3 FINISH

- A. Prepare structural component surfaces in accordance with SSPC SP-6.
- B. Shop prime structural steel members. Do not prime surfaces that will be field welded, in contact with concrete, and high strength bolted. Follow Section 09900.
- C. Galvanize structural steel members where indicated to ASTM A123.

PART 3 EXECUTION

3.1 ERECTION

- A. Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- B. Field weld components as indicated on Drawings.
- C. Field connect members with threaded fasteners; torque to required resistance. Connections shall develop full strength of members.
- D. Do not field cut or alter structural members without approval of Engineer.
- E. After erection, prime welds, bolts, abrasions, and surfaces damaged or not shop primed or galvanized, except surfaces to be in contact with concrete.
- F. Repair damage to galvanized coating; comply with ASTM A780, Zinc Rich Paints.
- G. Grout under base plates and supports with materials in Section 03300. Trowel grouted surface smooth, finish neatly to 45 degrees.
- H. Position anchor bolts as indicated.

3.2 GUARD POST INSTALLATION

- A. Install steel pipe as shown in Drawings.
- B. Set posts in concrete footing crowned to shed water, with pipe completely filled with concrete.
- C. Paint guard post exterior above ground level with two coats.

END OF SECTION

SECTION 05140

STRUCTURAL ALUMINUM

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Structural aluminum members, H Beams, Channels, Angles, Bars, and Plates.

1.3 QUALITY ASSURANCE

- A. Fabricate structural aluminum members in accordance with The Aluminum Association.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Structural Aluminum: ASTM B308, 6061-T6.
- B. Structural Tubing and Pipe: ASTM B429, 6061-T6.
- C. Bolts, Nuts, and Washers: Stainless steel, ASTM F593 bolts, ASTM F594 nuts.
- D. Anchor Bolts: ASTM F593.
- E. Welding Materials: AWS D1.1; type required for materials being welded.

2.2 FABRICATION

- A. Weld all shop connections in accordance with AWS D1.2-90.
- B. Connections shall be framed beam connections, except as shown on the drawings.
- C. Structural aluminum shall be new, unused, and free of defects and imperfections.

2.3 FINISH

- A. All surfaces of aluminum in contact with steel or concrete shall be coated with a bitumastic material.

PART 3 EXECUTION

3.1 ERECTION

- A. Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- B. Field weld components as indicated on Drawings.
- C. Field connect members with threaded fasteners; torque to required resistance.
- D. Do not field cut or alter structural members without approval of Engineer.
- E. Contact surfaces within all connections shall be free of all oil, paint, or other foreign matter.
- F. All bolts for connections and anchors shall be of Type 316 stainless steel.

END OF SECTION

SECTION 05500

METAL FABRICATIONS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Shop fabricated ferrous metal items:
 - 1. Pump Base Plates.
- B. Shop fabricated aluminum items:
 - 1. Ladders.
 - 2. Platforms.

1.3 REGULATORY REQUIREMENTS

- A. Ladders shall be constructed and installed in accordance with applicable OSHA requirements and ANSI A14.3.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

- A. Steel Sections: ASTM A36.
- B. Steel Tubing: ASTM A500, Grade B.
- C. Plates: ASTM A283.
- D. Bolts, Nuts, and Washers: Type 316 stainless steel.
- E. Anchor Bolts and Expansion Anchors: Follow Section 05501.
- F. Welding Materials: AWS D1.1; type required for materials being welded.
- G. Gaskets: Neoprene rubber.
- H. Shop and Touch-Up Primer: Follow Section 09900.
- I. Touch-Up Primer for Galvanized Surfaces: SSPC 20 Type II Organic zinc rich.

2.2 MATERIALS - ALUMINUM

- A. Extruded Aluminum: ASTM B221, Alloy 6061-T6.
- B. Sheet Aluminum: ASTM B209, Alloy 6061-T6.
- C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210, Alloy 6061-T6.
- D. Aluminum-Alloy Bars: ASTM B211, Alloy 6061-T6.
- E. Bolts, Nuts, and Washers: Type 316 stainless steel.
- F. Anchor Bolts and Expansion Anchors: Follow Section 05501.
- G. Welding Materials: AWS D1.1; type required for materials being welded.
- H. Gaskets: Neoprene rubber.
- I. Bituminous Coating: SSPC – Paint 12, solvent-type bituminous mastic, normally free of sulfur, compounded for 15 mil dry film thickness per coat.

2.3 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Continuously seal joined members by continuous welds.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- G. Provide slots in weir plates for adjustment, as indicated.
- H. Ladders: Follow ANSI A14.3; minimum concentrated live load of 300 lbs. welded assembly.

2.4 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 60 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 60 inches.

2.5 FINISHES - STEEL

- A. Prepare surfaces to be primed in accordance with SSPC SP-6 for nonimmersion service, and SP-10 for immersion service.
- B. Do not prime surfaces in direct contact with concrete or where field welding is required.
- C. Prime paint items with one coat. Use bituminous paint on surfaces in contact with concrete.
- D. Structural Steel Members: Galvanized after fabrication to ASTM A123. Provide minimum 1.25 oz/sq ft galvanized coating.
- E. Non-structural Items: Galvanized after fabrication to ASTM A123. Provide minimum 1.25 oz/sq ft galvanized coating.
- F. No cutting, welding or drilling of components will be permitted after galvanizing.

2.6 FINISHES - ALUMINUM

- A. Mill finish.
- B. Apply one coat of bituminous paint to aluminum surfaces in contact with cementitious or dissimilar materials.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal and aluminum where site welding is required.
- B. Supply items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections.

3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects, and at the elevations indicated.
- B. Provide for the erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Provide neoprene gasket between concrete surfaces and weir plates and troughs.
- D. Field weld components as indicated on Drawings.
- E. Perform field welding in accordance with AWS D1.1.
- F. Obtain approval prior to site cutting or making adjustments not scheduled.
- G. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.4 ITEM FINISH SCHEDULE

- A. Ladder: Aluminum; mill finish.

END OF SECTION

SECTION 05501

ANCHOR BOLTS AND ANCHORS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Anchor bolts.
- B. Expansion anchors.
- C. Sleeve anchors.
- D. Adhesive anchors.

PART 2 PRODUCTS

2.1 ANCHOR BOLTS CAST IN CONCRETE

- A. Comply with ASTM A304 stainless steel.
- B. 4 inch minimum hook.

2.2 ELECTRICAL METALLIC TUBING (EMT)

- A. General Requirements:
 - 1. All anchors are to be type 316 stainless steel.
- B. Expansion Anchors:
 - 1. Manufacturers:
 - a. Hilti Corporation, Kwik Bolt II.
 - b. The Rawlplug Company, Inc., Rawl-stud.
 - c. ITW Ramset/Red Head, Trubolt Wedge Anchor.
 - d. Or as approved.
 - 2. Comply with Federal Specification FF-S-325 Group II, Type 4, Class 1.
 - 3. Minimum Embedment: 4-1/2 inches, unless otherwise indicated.
- C. Sleeve Anchors:
 - 1. Manufacturers:
 - a. Hilti Corporation, Sleeve Anchor.
 - b. The Rawlplug Company, Inc., Lok/Bolt.
 - c. ITW Ramset/Red Head, Dynabolt Sleeve Anchor.
 - d. Or as approved.
 - 2. Comply with Federal Specification FF-S-325 Group II, Type 3, Class 3.
- D. Adhesive Anchors:
 - 1. Manufacturers:
 - a. The Rawlplug Company, Inc., Foil-Fast.
 - b. ITW Ramset/Red Head, Epcon System, Ceramic 6 Epoxy.
 - c. Or as approved.
 - 2. Injection Gel:
 - a. Two component structural epoxy.
 - b. Comply with ASTM C881.

3. Screen Tubes:
 - a. Use with hollow base materials.
 - b. Stainless steel screen.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's instructions.
- B. Use expansion anchors in pre-cast or cast-in-place concrete.
- C. Use sleeve anchors in masonry work.
- D. Use adhesive anchors where indicated.

END OF SECTION

SECTION 05520

HANDRAILS AND RAILINGS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Aluminum pipe handrails, posts and fittings.
- B. Kick plates.
- C. Chain.

1.3 DESIGN REQUIREMENTS

- A. Railing assembly, wall rails, and attachments shall be capable of simultaneously withstanding a horizontal load of 50 pounds per linear foot applied at the top rail and a vertical load of 100 pounds per linear foot or a 200 pound concentrated load at any point or direction along the top rail.
- B. Posts:
 - 1. Single unspliced length.
 - 2. Spacing: Maximum 5'-0" center-to-center.
- C. Rails:
 - 1. Top Rail: Continuous wherever possible, attached to a minimum of three posts.
 - 2. Lower Rails: Single unspliced length between posts.
- D. For exterior railing, make provisions for expansion.
- E. Comply with OSHA and state and local codes.
- F. All new railing shall be surface mounted.

1.4 SUBMITTALS FOR REVIEW

- A. Provide certified test results showing design requirements compliance.
- B. Test Data: Base assembly test results.
- C. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
- D. Samples: Submit one sample with connections at line posts, corner post, skewed connections, chain and chain hardware, kickplate, and base connections.

PART 2 PRODUCTS

2.1 ALUMINUM RAILING SYSTEM

- A. Rails: 1-1/2 inch diameter, Schedule 40, 6061-T6 or 6063-T5 aluminum alloy, extruded tubing.
- B. Posts: 1-1/2 inch diameter, Schedule 80 or Schedule 40 with solid aluminum inserts (minimum 18 inches long), 6061-T6 aluminum alloy, extruded tubing.
- C. Fittings: Elbows, T-shapes, wall brackets, escutcheons; machined aluminum.
- D. Mounting: Adjustable brackets and flanges.
- E. Splice Connectors: Concealed spigot cast or machined aluminum.
- F. Fasteners: Stainless steel screws.

- G. Kick Plates: 6063-T5 aluminum alloy; 1/4" x 4" plate, or 4" x 1" x 1/8" channel; with anchors or brackets.
- H. Chain: 3/16 inch welded 316 stainless steel; provide stainless steel swivel eye snaps and threaded eyebolts.
- I. Grout: Non-shrink, non-metallic type; U.S. Grout Corporation, Five Star, W.R. Meadows, Inc., Sealtight 588 Grout, or as approved.
- J. Post Filler (for Schedule 80 post): Closed-cell polyethylene foam rod; 2 inch diameter by 4-1/2 inch long.
- K. Adhesive: Structural epoxy.
- L. Aluminum Surfaces: Two step anodized to clear color, Architectural Class I, minimum 0.7 mil thickness.
- M. Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.

2.2 FABRICATION

- A. Fit and shop assemble components in largest practical sizes for delivery to site.
- B. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.
- C. Provide anchors, floor flanges required for connecting railings to structure.
- D. Assemble joints by mechanical fasteners or by interior connector sleeves and epoxy structural adhesive.
- E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- F. Exterior Components: Drill condensate drainage holes at bottom and low point of members at locations that will not encourage water intrusion. For Schedule 80 posts set in concrete, insert post filler at bottom of post.
- G. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- H. Accurately form components to suit stairs and landings, to each other and to building structure.
- I. Accommodate for expansion and contraction of members and building movement without damage to connections or members.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Installation in accordance with manufacturer's instructions.
- B. Install components plumb and level, straight and true, accurately fitted, free from distortion or defects.
- C. Anchor railings to structure with floor flanges.
- D. Set post into prepared holes in concrete. Fill remaining space between post and hole with grout.
- E. Conceal bolts and screws whenever possible.
- F. Assemble with spigots and sleeves to accommodate tight joints and secure installation.
- G. Install toe plates straight and true with not more than 1/4 inch clearance above floor.

END OF SECTION

SECTION 05531

GRATINGS AND FLOOR PLATES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Formed aluminum floor gratings
- B. Flat surface floor plating.
- C. Perimeter closure.

1.3 PERFORMANCE AND SIZE REQUIREMENTS

- A. Design Live Load: Uniform load of 300 lb/sq ft minimum; concentrated load of 450 lbs.
- B. Panel Size Limits: Maximum surface area of 16 sq ft, maximum weight of 40 lbs., unless approved by Engineer.
- C. Floor Plate Deflection Limits: 1/100.

1.4 SUBMITTALS

- A. Product Data: Provide span and deflection tables.

1.5 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings.

PART 2 PRODUCTS

2.1 GRATING

- A. Material: Extruded aluminum alloy 6063-T6.
- B. Top Surface:
 - 1. Punched rectangular openings; 3" x 19/32".
 - 2. Continuous raised longitudinal ridges for skid resistance.
- C. Thickness: As required to meet design limits.
- D. Accessories:
 - 1. Grating Frames: Provide on all sides of grating resting on concrete; fabricated from 1/4 inch aluminum alloy 6061-T6; provide anchors 16 inches on center; miter and weld corners.
 - 2. Hold-Downs: Provide hold-downs to secure grating to frame.
 - 3. Perimeter Banding: Same material as grating; provide across end of bearing bars, along any cut sides, and on all sides of cutouts.

2.2 FLOOR PLATE

- A. Material: Aluminum alloy 6061-T6.
- B. Surface Pattern: Raised safety tread.

- C. Thickness: Minimum 1/4 inch; provide aluminum stiffening ribs welded to underside of plate as required to comply with design loads.
- D. Accessories:
 - 1. Frames: Provide on all sides of plate when resting on concrete; fabricated from minimum 1/4 inch thick aluminum alloy 6061-T6. Provide anchors on 16 inch centers; miter and weld corners.

2.3 FINISHES

- A. Aluminum: Mill finish.
- B. Bituminous Coating: SSPC-Paint 12, solvent type, bituminous mastic, normally free of sulfur, compounded for 15 mil dry film thickness per coat.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that opening sizes and dimensional tolerances are acceptable.
- B. Verify that supports are correctly positioned.

3.2 INSTALLATION

- A. Install components in accordance with manufacturer's instructions.
- B. Mechanically cut finish surfaces. Do not flame cut.
- C. Anchor by bolting through saddle clips.
- D. Install perimeter banding flush with top of grating and surrounding construction.
- E. Secure to prevent movement.

END OF SECTION

SECTION 09900

PAINTING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. This Section includes surface preparation, field painting and finishing of exposed interior and exterior items and surfaces provided under Contract 1.
- B. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified under other sections.
- C. Paint exposed surfaces whether or not substrate is designated in schedules but would normally be painted, except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is not specifically mentioned, paint the same as similar adjacent materials or surfaces. If color or finish is not designated, the Owner will select from standard colors or finishes available.
- D. Painting includes field painting exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.
- E. See Painting Schedule Article 3.9 for surfaces to be painted.
- F. See Article 3.8 for Paint Systems Schedule.

1.3 SUBMITTALS

- A. Samples: Submit two samples illustrating range of colors available for each surface finishing product scheduled.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable code for flame and smoking rating requirements for finishes.
- B. All chemicals, substances, and materials added to or brought in contact with water in or intended to be used in a public water system or used for the purpose of treating, conditioning, altering, or modifying the characteristics of such water shall be shown by either the manufacturer, distributor, or purveyor to be non-toxic and harmless to humans when used in accordance with the formulation and concentration as specified by the manufacturer, and shall conform with the American National Standards Institute/National Sanitation Foundation (ANSI/NSF) standard 60 or 61. Any organization certified by the American National Standards Institute may certify in writing that a product conforms to these standards.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container label to include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

- B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- C. Minimum Application Temperatures for Latex Paints: 50 degrees F for Interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions. Surface temperature must be at least 5 degrees F greater than the dew point.
- D. Minimum Application Temperatures for Varnish and Similar Finishes: 50 degrees F for Interior or exterior, unless required otherwise by manufacturer's instructions. Surface temperature must be at least 5 degrees F greater than the dew point.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. The Sherwin Williams Company.
- B. The Glidden Company.
- C. Tnemec Company, Inc.
- D. Kop-Coat (Division of Carboline, Inc.).
- E. Or as approved.
- F. Refer to Article 3.8 for Paint Systems Schedule.

2.2 MATERIALS

- A. Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating; good flow and brushing properties; capable of drying or curing free of streaks or sags.
- B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality. Use products compatible with painting materials and approved by paint manufacturer.
- C. Paint materials and equipment shall be compatible in use.
- D. Primer, Intermediate, and Finish coats shall all be from the same coatings manufacturer. Prime coats shall be compatible with and appropriate for use on surface to be coated.

2.3 FINISHES

- A. Refer to schedule at end of section for surface finish schedule.
- B. Colors will be selected by Owner's Representative from manufacturer's standard colors.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready for application of materials in accordance with the product manufacturer's instructions.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Measure moisture content of surfaces using appropriate method as recommended by the coating manufacturer. Do not apply finishes unless moisture content of surfaces is below the coating manufacturer's acceptable maximums.

3.2 TESTING OF PAINT ON EXISTING SURFACE FINISH

- A. Where paint is to be applied over existing finished surface, apply a test application.

- B. Allow test application to dry overnight. If wrinkling or lifting occurs after overnight drying, application of new paint over existing finished surface will not be allowed. With the approval of the Engineer, use one of the following alternatives:
 - 1. Remove existing coating and apply complete system as described in Paint Schedule Article 3.9.
 - 2. Apply intermediate barrier coat material that is compatible with both the existing finish and the new topcoat and will ensure bonding of new paint to existing surface finish.
 - 3. Substitute a different coating material that is compatible with and will adhere to existing surface finish.
- C. Cost of test application shall be borne by the Contractor.

3.3 PREPARATION

- A. Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing. Mask nameplates, descriptive data on pumps, motors and other equipment. Removed item shall be reinstalled by workmen skilled in the trades involved.
- B. Correct defects and clean surfaces which affect work of this section.
- C. Remove existing coatings that exhibit poor adhesion or unacceptable surface defects.
- D. Seal marks which may bleed through surface finishes with sealer recommended by paint manufacturer.
- E. If mildew is encountered, remove by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
- G. Concrete Floors: Remove contamination in accordance with ASTM D4258 Standard Practice for Surfacing Cleaning Concrete for Coating. Achieve required surface profile by acid etching per ASTM D4260, or by mechanical abrasion per ASTM D4259.
- H. Copper Surfaces Scheduled for a Paint Finish: Remove contamination by steam, high pressure water, or solvent washing. Apply manufacturer's recommended primer immediately following cleaning.
- I. Where surfaces are coated with bituminous coating that is not compatible with paint material, remove bituminous coating with abrasive blasting.
- J. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
- K. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply manufacturer's recommended primer.
- L. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: Clean surfaces in accordance with ASTM D4261 "Standard Practice for Surface Cleaning Concrete Unit Masonry for Coating".
 - 1. Concrete surfaces shall be fully aged and loose, powdery, crumbly concrete shall be dressed down to a firm, sound hard substrate.
 - 2. Masonry work shall be allowed to cure a minimum of 28 days before application of any coating materials.
- M. Uncoated Steel and Iron Surfaces:
 - 1. Welded areas shall be ground smooth per NACE Standard RP 0178.
 - 2. Use abrasives for blast cleaning that are clean, uniformly graded, and free of oil, soluble salts, chlorides, or foreign matter which could contaminate the blasted surface. Size the abrasive to produce an anchor pattern profile height as required by the coating manufacturer.
 - 3. Metal surfaces to be painted, and not factory primed, shall be field abrasive blasted in accordance with NACE-3 (SSPC-SP6), commercial blast, for nonimmersion service; and in accordance with NACE-2 (SSPC-SP10), near white blast, for immersion service, unless a higher degree of surface preparation is required by the manufacturer.
- N. Shop Primed Steel Surfaces:
 - 1. For non-submerged metal surfaces, remove loose primer and rust in accordance with SSPC-SP2 Hand Tool Cleaning or SSPC-SP3 Power Tool Cleaning. Feather edges to make touch-up patches inconspicuous. Clean surfaces in accordance with SSPC-SP1 Solvent cleaning. Prime bare steel surfaces.
 - 2. Retouch damaged areas of shop primed items with compatible primer.
 - 3. Contractor shall be responsible for compatibility of shop primer with field finish coats.
 - 4. For submerged metal surfaces, remove shop primer and blast clean to SSPC-SP10 Near White Blast Clean. Apply primer as specified.
- O. Plastic and Fiberglass: Solvent wipe and scuff sand, apply test sample prior to application to ensure adhesion.
- P. Metal Doors Scheduled for Painting: Seal top and bottom edges with primer.

3.4 APPLICATION

- A. Do not apply materials until representative samples of surface preparation are approved by the Engineer and an authorized representative of the manufacturer.
- B. Comply with manufacturer's instructions and recommendations.
- C. Do not thin materials, except to comply with manufacturer's instructions and recommendations.
- D. Apply coatings to all surfaces with special attention to hard-to-reach areas such as between the legs of back to back angles. Apply coat to achieve the specified dry film thickness.
- E. Do not apply finishes to surfaces that are not dry.
- F. Deficiencies in film or coating thickness shall be corrected by the application of an additional coat(s) of material at the expense of the Contractor.
- G. Apply each coat to a uniform finish.
- H. Special attention shall be given to insure that edges, corners, crevices and welds, receive a film or coating thickness equivalent to that of adjacent surfaces. At no time will wet on wet applications be permitted. The finished surfaces shall be free from runs, drips, ridges, waves, laps, brush marks and variations in color, texture and finish.
- I. Apply each coat of paint slightly darker than the preceding coat unless otherwise approved.
- J. Sand surfaces lightly between coats as required to achieve required finish.
- K. Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.

3.5 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Paint shop primed equipment.
- B. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- C. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are prefinished.
- D. Paint interior surfaces of air ducts, and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint, to visible surfaces. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
- E. Paint exposed conduit and electrical equipment occurring in finished areas.
- F. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
- G. Color code equipment, piping, conduit, and exposed duct work in accordance with requirements indicated.
- H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.6 FIELD QUALITY CONTROL

- A. Wet Film Thickness: Monitor during application of each successive coat.
- B. Dry Film Thickness: Measure the thickness of each coat applied using non-destructive dry film thickness gages. Calibrate gages and perform thickness measurements in accordance with SSPC-PA2. Disputes, regarding coating thickness applied, shall be resolved by use of a Tooke Gage (destructive scratch gage) to the extent required. Repair damage created by destructive testing using the complete coating system specified.
- C. Inspection Devices: The Contractor shall possess, use, and make available for use by the Owner, Inspection devices in good working order for dry film thickness measurement. Furnish, with the Inspection device, U.S. Department of Commerce, National Bureau of Standards certified thickness calibration plates to verify accuracy of the dry-film thickness gages.

3.7 CLEANING

- A. Collect waste material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

3.8 PAINT SYSTEMS SCHEDULE

A. Unless otherwise specified, products of The Sherwin Williams Company are listed. Equivalent products of other manufacturers specified in Article 2.1 are acceptable.

SUBSTRATE		DESCRIPTION	DRY MILS
A. CONCRETE AND CONCRETE BLOCK - INTERIOR WALLS AND CEILINGS	Prime Coat	Epoxy Ester Masonry Filler/Sealer B61W2	10 - 15
	First Coat	Tile-Clad High Solids B62 WZ Series/B60VZ70	2.5 - 4
	Second Coat	Tile-Clad High Solids B62 WZ Series/B60VZ70	2.5 - 4
	Final DFT		15 - 23
B. CONCRETE FLOORS AND WALLS IN CHEMICAL CONTAINMENT AREAS	Prime Coat	Armorseal 1000 Marine & Industrial Coating (Clear) B67Q1000 / B60VQ1000 Clear	3 - 3.7
	First Coat	Armorseal II Polyester Aliphatic Urethane Coating B65Q Series / B60QV110	3 - 3.5
	Second Coat	Armorseal II Polyester Aliphatic Urethane Coating B65Q Series / B60QV110	3 - 3.5
	Final DFT		9 - 10.7
C. METAL - EXTERIOR NON-SUBMERGED	Prime Coat	Recoatable Epoxy Primer B67H5 / B67V5	3 - 6
	First Coat	Hi-Solids Polyurethane (Low VOC) B65W301 / B60V30	3 - 4
	Second Coat	Hi-Solids Polyurethane (Low VOC) B65W301 / B60V30	3 - 4
	Final DFT		9 - 14
D. METAL - INTERIOR NON-SUBMERGED	Prime Coat	Recoatable Epoxy Primer B67H5 / B67V5	3 - 6
	First Coat	Tile-Clad Hi-Solids B62WZ Series / B60VZ70	2.5 - 4
	Second Coat	Tile-Clad Hi-Solids B62WZ Series / B60VZ70	2.5 - 4
	Final DFT		8 - 14
E. METAL - SUBMERGED, SPLASH OR VAPOR ZONE (POTABLE WATER)	Prime Coat	Hi-Solids Catalyzed Epoxy B62W201 / B60V20	5 - 6
	First Coat	Hi-Solids Catalyzed Epoxy B62H200 / B60V20	5 - 6
	Second Coat	Hi-Solids Catalyzed Epoxy B62W201 / B60V20	5 - 6
	Final DFT		15 - 18
F. INTERIOR WOODWORK NATURAL STAINED	First Coat	Stain, Color as directed	1 - 2
	Second Coat	Sanding Sealer, sanded	1 - 2
	Third Coat	Gloss Varnish, sanded	1 - 2
	Fourth Coat	Satin Finish	1 - 2

G. DRYWALL	Prime Coat	ProMar 200 Latex Wall Primer B28W200	1 - 2
	First Coat	Water Based Catalyzed Epoxy - Gloss B70 Series / B60V15	2.5 - 3
	Second Coat	Water Based Catalyzed Epoxy - Gloss B70 Series / B60V15	2.5 - 3
	Final DFT		6 - 8
H. PLASTIC AND FIBERGLASS	Prime Coat	DTM Acrylic Gloss Coating B66 Series	2.5 - 4
	First Coat	DTM Acrylic Gloss Coating B66 Series	2.5 - 4
	Second Coat		
	Final DFT		5 - 8
I. INSULATED PIPING	Prime Coat	ProMar 200 Latex Wall Primer B28W200	1 - 2
	First Coat	Metalatex Semi-Gloss Coating B42W101	1.5 - 4
	Second Coat		
	Final DFT		2.5 - 6

3.9 PAINTING SCHEDULE

- A. The following painting schedule indicates the surfaces to be painted using the materials previously specified in Article 3.8 for the type of surface and conditions of service.
- B. Colors will be selected by the Owner from standard color charts at the time of construction.
- C. The last part of this painting schedule is a color code for the painting of new piping and existing piping which is connected to new piping; extend paint to the end of the existing piping at walls, pumps, fixtures, and other terminations. Except where otherwise noted in the painting schedule, work also includes insulated piping, and electrical conduits and appurtenances. The painting of piping and electrical conduit shall include the painting of all appurtenances in the respective piping lines (valves, operators, metal supports, etc.) and conduit runs (boxes, etc.). The painting of piping shall also include the painting of valves, fabricated gates, sluice gates, floor stands, operators, wall castings and other items not installed directly in a pipe line.
 - 1. Pump Station: All submerged or exposed piping and steel surfaces, except stainless steel.

END OF SECTION

SECTION 11060

PUMP CONTROLS

PART 1 – GENERAL

1.1 Related Documents

- A. Drawings and general provisions of the contract, including General Conditions, Supplementary Conditions and Division 1-16 Specifications Sections, apply to this section.

1.2 Section Includes:

- A. Control Panel with Wet Well Level Sensing Controls

PART – 2 PRODUCTS

2.1 Control Panels

Furnish and install one (1) pump motor control panel for pump motors and auxiliary accessories for manual and automatic operation. The panel enclosure shall be NEMA Type (4X) – (Stainless Steel) weather proof for operation on 480 volts 3 phase, 60 hertz power supply. Enclosure shall include dead front outer door and inner barrier cover plate. Motor control components shall be sized to operate remotely located submersible pump motors of 15 horsepower at 1780 RPM. All components shall be NEMA compliant. IEC components are not acceptable.

The motor control panel shall include the following for each pump motor: Solid state reduced voltage soft starters with shorting contactors , a motor protector circuit breaker, a motor starting contactor, a test-off-auto selector switch for automatic or manual mode control and a unit running light (green). Automatic mode control is supplied through remotely located liquid level sensors with normally open contacts. The pump control manufacturer shall have a minimum of 5 years experience with providing similar panels.

One (1) control circuit transformer – line voltage primary – fused 120v intrinsically safe float relay for back-up floats. See Electrical Plans – Sheet 7 of 18 for additional details.

A set of liquid level control relays control the automatic mode through remotely located liquid level sensors. The liquid level controller shall respond to 5 level sensors and pilot control circuits of auxiliary equipment.

- a. A set of liquid level control relays control the automatic mode through remotely located liquid level sensors. The liquid level controller shall respond to 5 levels of operation from the sensors. “Frog Stick” switch N.O. Nema 7 to be pipe mounted. Provide a submersible level transducer for the following (S1-S5) - :
- b. Kelly American Level RAT Transducer

Sensor: S1: All Pumps Stop-Low Water Level
S2: Lead Pump Start

S3: Lag Pump Start
S4: High Water Alarm
S5: Low Water Alarm

At high water, low water, lag pump start, power failure or seal failure conditions, provide automatic telephone dialer to a remote location.

Provide automatic “Frog Stick” back up for all transducer levels (S1-S5) for redundant operations on the “Frog Stick”. Transducer shall switch to “Frog Stick” upon activation of high water alarm on the “Frog Stick”. Provide sch 80 PVC pipe for transducer. Core wet well top to pull transducer for servicing, cleaning, etc.

An Automatic electric alternator shall be provided to: equalize wear and usage of the pumps, alternate operational sequence of pumps on successive starts.

A moisture detection system for each motor will be furnished. The system will incorporate panel-mounted components and two (2) moisture-sensing probes mounted in the oil chamber of the motor between the mechanical deals. Should water enter this chamber it will actuate the moisture probes signaling the panel mounted components consisting of alarm light (amber) and identified with legend plate “seal leak”.

Motor mounted thermal devices are a series connected automatic reset normally closed circuit. When excessive heat occurs it causes the thermostat to open stopping the motor.

Use terminal strips for all connections.

The control panel shall also include the following:

- a. High water relay with thermals for “Frog Stick” switch and a remote alarm.
- b. Weatherproof high water alarm dome light (red LED).
- c. High water alarm horn with silence button. (Install silence button on outside of cabinet.
- d. The addition of moisture detection relay with automatic motor shutdown feature to the standard seal leak detection system.
- e. Elapsed pump running time meters – six (6) digits – reading hours and tenths.
- f. Test buttons-one (1) for each float switch.
- g. 200W cabinet heater with thermostat control.
- h. 120V GFI Receptacle.
- i. Lighting and electrical surge protection devices for all control circuits and pump motors.
- j. Overload reset button for each motor.
- k. Pump runs indicator for each pump motor showing that there is power to motor.
- l. 120V cabinet fan with thermostat control.
- m. Install Contregra Model SM702C controller for 2 pumps
- n. Install an ATC Diversified Duplex Alternator Model # 120 ACE (SOSO) for back-up “Frog Stick” control circuits.
- o. Provide window in control panel door for viewing lights, switches, hour meters, and wet well liquid level indicator.
- p. The contract panel and all electrical components shall have an U. L. label.
- q. All Components shall have its own circuit breaker.
- r. Provide a cycle counter for each pump.
- s. Provide 2 spare fuses for each fuse in the control panel.
- t. Verbatim VSS-16C Auto Dialer, Verbatim 302VSS-16C Compatible with and Connected to City of Graham SCADA.
- u. Kelly American Level RAT Transducer
- v. Incoming Electrical Voltage Indicator

STATION START-UP:

All suppliers of major equipment shall have a minimum of 8-hour start-up time in their proposal and 4 hours for an inspection at the end of the 12 months warranty period. The owner has the right to withhold final payment to the contractor for the 12 month warranty inspections.

- a. Approval Procedure. Upon satisfactory review of the proposed equipment suppliers initial engineering data by the Engineer, the equipment offered shall be approved conditionally, and released to production.
- b. Contractor's Liability. Should equipment selected by the contractor fail to pass the field test and consequently be ordered removed from the job site by the Engineer, it shall be at the contractor's expense. The contractor shall incur all costs for removal of sub-standard equipment, the procurement of new equipment, the installation of the new equipment, and shall be subject to any penalties or damages specified herein due to his failure to meet a project completion date.
- c. Guarantee. The manufacturer of the lift station shall guarantee it to be of quality construction, free from defects in material and workmanship.

The equipment, apparatus and parts furnished shall be guaranteed for a period of one (1) year, excepting only those items that are normally consumed in service, such as light bulbs, oil, grease, packing, gaskets, O-rings, etc. The lift station manufacturer shall be solely responsible for the guarantee of the station and all components.

The warranty will become effective upon the acceptance by the Owner.

Major components, such as station structure, pumps, pump motors, etc., failing to perform as specified by the engineer; or as represented by the manufacturer or proven defective in service during the guarantee period; shall be replaced, repaired or satisfactory modified by the manufacturer without cost of parts or labor to the owner.

- d. Coordinate start-up so that the contractor, electrical contractor, manufacturer's representatives, etc., are all present during start-up.

PART 3 – INSTALLATION

- A. Install as instructed by the Manufacturer.
- B. Test equipment prior to start-up.
- C. Provide a start-up technician for 8-hour day minimum and 4 hours at 12 months.

END OF SECTION

SECTION 13300

PROCESS GAUGES AND METERS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Pressure gauges and pressure gauge taps.

1.3 ENVIRONMENTAL REQUIREMENTS

- A. Do not install instrumentation when areas are under construction, except for required rough-in, taps, supports and test plugs.

PART 2 PRODUCTS

2.1 PRESSURE GAUGES

- A. Manufacturers:
 - 1. Trerice, Model 450.
 - 2. Ashcroft, Division of Dresser Industries.
 - 3. U.S. Gauge.
 - 4. Marsh.
 - 5. Equivalent products of other manufacturers will be considered.
- B. Gauge: ASME B40.1, UL 393 or UL 404 drawn steel case, phosphor bronze bourdon tube, rotary brass or stainless steel movement, brass socket, with front recalibration adjustment, black scale on white background.
 - 1. Case: Cast aluminum or reinforced polypropylene with phosphor bronze bourdon tube, weather, fume and dustproof enclosure.
 - 2. Size: 6 inch diameter.
 - 3. Mid-Scale Accuracy: 1/2 percent.
 - 4. Scale and Graduations: See Schedule.
 - 5. Assemble process gauges with diaphragm seals and fill with liquid at the factory.

2.2 PRESSURE GAUGE TAPPINGS

- A. Water Gauges: Connect each gauge with 1/2 inch sensor lines, brass ball valves for shut-off and blow-off, and pulsation dampener.
- B. Pressure Switches: Provide gauge and tapping for each pressure switch in sensing line with pulsation dampener and brass ball or needle valves for shut-off and blow-off.
- C. Gauge Cock: Tee or level handle, brass for maximum 200 psig, as manufactured by Trerice, Model 865.
- D. Pulsation Dampener: Pressure snubber, brass with 1/4 inch connections, as manufactured by Trerice, Model 870-1.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install pressure gauge for each process pump with tap at discharge of pump. Pipe to gauge.
- C. Install pressure gauges with diaphragm seals or pulsation dampeners. Provide gauge cock to isolate each gauge. Extend nipples to allow clearance from insulation.
- D. Provide instruments with scale ranges selected according to service with largest appropriate scale.
- E. Install gauges and thermometers in locations where they are easily read from normal operating level. **Install 45 degrees off vertical.**
- F. Adjust gauges and thermometers to final angle, clean windows and lenses, and calibrate to zero.
- G. Install re-set water meters with isolating valves on inlet and outlet. Provide full line-size valve bypass with globe valve around re-set water meter.

END OF SECTION

SECTION 16111

CONDUIT

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Metallic Conduit.
- B. Electrical metallic conduit.
- C. Flexible metal conduit.
- D. Liquid-tight flexible metal conduit.
- E. Nonmetallic conduit.
- F. Fittings and conduit bodies.
- G. Expansion/Deflection Coupling

1.3 DESIGN REQUIREMENTS

- A. Conduit Size: ANSI/NFPA 70.

1.4 PROJECT RECORD DOCUMENTS

- A. Accurately record actual routing of all conduits larger than 2 inch.

1.5 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Verify routing and termination locations of conduit prior to rough-in.
- C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

PART 2 PRODUCTS

2.1 METALLIC CONDUIT **METAL CONDUIT IS NOT ALLOWED FOR THIS PROJECT UNLESS IT IS ALUMINUM OR STAINLESS STEEL.**

- A. Rigid Steel Conduit: Federal Specification WWC581D, ANSI C80.1, U.L. approved, threaded, hot dipped galvanized conduit. Electroplated conduit is not accepted.
- B. Intermediate Metal Conduit (IMC): Hot dip galvanized inside and out. Electroplated conduit is not acceptable.
- C. Conduit Bodies and Fittings:
 - 1. Use threaded hub, galvanized, malleable iron conduit bodies and fittings.
 - 2. Copper free aluminum fittings are not acceptable.
 - 3. 1-1/2 inch and Larger: Mogul size.

2.2 ELECTRICAL METALLIC TUBING (EMT)

- A. U.L. labeled, mild steel electrically welded, galvanized thin wall conduit complying with NEC requirements, produced in accordance with ANSI C80.3 and Federal Specification WWC563.
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel or malleable iron, indenter type.
 - 1. Wet Locations: Use compression type.
 - 2. Dry Locations: Use set screw or compression type.

2.3 FLEXIBLE METAL CONDUIT NOT ALLOWED FOR THIS CONTRACT

- A. Description: Interlocked galvanized steel construction.
- B. Fittings: Insulated throat double grip saddle type; steel or malleable iron.

2.4 LIQUID-TIGHT FLEXIBLE METAL CONDUIT NOT ALLOWED FOR THIS CONTRACT

- A. Description: Interlocked flexible galvanized steel construction with a liquid-tight PVC jacket
- B. Fittings: Insulated throat type; steel or malleable iron.

2.5 NONMETALLIC CONDUIT Schedule 80 PVC only

- A. Description: PVC Schedule 80, 90 degrees C. conductors, UL listed, sunlight resistant, and conforming to NEMA TC-2 and UL-651 standards.
- B. Fittings and Conduit Bodies: NEMA TC-3, sunlight resistant.

2.6 EXPANSION/DEFLECTION COUPLINGS FOR METALLIC COUPLING NOT ALLOWED FOR THIS CONTRACT

- A. Description: Coupling with insulating inner sleeve, integral hub bushings, flexible copper grounding strap and overall watertight, flexible neoprene outer jacket with stainless steel jacket clamps.
- B. Locations: Where conduits pass through expansion joints. Where axial contraction or expansion, angular misalignment, or parallel misalignment of rigid conduit is likely to occur.
- C. Movement accommodated without damaging conduit or conductors:
 - 1. Axial expansion or contraction up to 3/4 inch.
 - 2. Angular misalignment of the axis of coupled conduit runs in any direction to 30 degrees.
 - 3. Parallel misalignment of the axis of coupled conduit runs in any direction to 3/4 inch.

2.7 EXPANSION/DEFLECTION COUPLINGS FOR METALLIC COUPLING COUPLING NOT ALLOWED FOR THIS CONTRACT

- A. Manufacturers: O-Z/Gedney Type WSK Thruwall and Floor Seals or as approved.
- B. Wall Sleeve: High Strength PVC pipe, epoxy coated steel pipe, or high strength polyethylene pipe.
- C. Bodies and Pressure Clamps: Hot dip galvanized malleable iron. Provide two bodies and pressure clamps for each wall sleeve.
- D. Sealing Grommet: Neoprene. Provide one for each body and pressure clamp assembly.
- E. Pressure Rings: PVC coated steel. Provide two for each sealing grommet.
- F. Bolts: Hot dip galvanized.

2.8 MECHANICAL TYPE SEAL

- A. Follow Section 13512.

PART 3 PRODUCTS

3.1 INSTALLATION

- A. General Conduit Installation:
 - 1. Install conduit in accordance with NECA "Standard of Installation".

2. Minimum Size: 3/4 inch trade size unless otherwise specified. Minimum 1 inch trade size for underground conduit.
3. Ground and bond conduit; see Section 16170.
4. Identify conduit; see Section 16195.
5. Use suitable caps to protect installed conduit against entrance of dirt and moisture.
6. Do not install steel conduit in contact with aluminum where exposed to moisture.
7. Unless otherwise specified in Division 1, where necessary to cut holes through existing walls, for raceways, make necessary repairs to building structures. Match existing construction.
8. Cut conduit square using saw or pipe cutter; de-burr cut ends.
9. Field Cut Threads: Use conduit dies. Clean of all cuttings and oil; coat with a cold galvanizing compound.
10. Threaded Joints: Coat threads with Kopr-Shield Conduit Sealing Compound by Thomas & Betts Company, STL Thread Lubricant by Crouse-Hinds Company, or equivalent products.
11. Nonmetallic Conduit Joints: Wipe nonmetallic conduit dry and clean before joining. Apply cleaner/primer as recommended by cement manufacturer. Apply full even coat of cement to entire area inserted in fitting. Use cement as recommended by manufacturer. Allow joint to cure for a minimum of 20 minutes before disturbing.
12. Do not allow moisture traps. Provide junction box with drain fitting at low points in conduit system.
13. Provide suitable pull string in each empty conduit except sleeves and nipples.
14. Provide suitable expansion coupling every 50 feet for straight runs of nonmetallic rigid conduit exceeding 50 feet in length.
15. Exposed conduit on building exteriors is not allowed unless approved by the Engineer.

B. Conduit Use:

1. Underground Installations, Concrete-encased:
 - a. Minimum Size: 1 inch trade size.
 - b. Use for all underground conduits containing service laterals, service entrances, building feeders and for all conduit underneath a structural floor slab or mud mat.
 - c. More Than 5 Feet From Foundation Wall: Schedule 80 PVC conduit or Duct Type EB tubing.
 - d. Less Than 5 Feet From Foundation Wall: Rigid steel or intermediate metal conduit.
 - e. Bends Greater Than 45 Degrees: Use rigid steel or intermediate metal conduit for bend.
 - f. See Section 16118.
2. Underground Installations, Direct-buried:
 - a. Minimum Size: 1 inch trade size.
 - b. Use for all underground conduits containing service laterals, service entrances, building feeders and for all conduit underneath a structural floor slab or mud mat.
 - c. More Than 5 Feet From Foundation Wall: Schedule 80 PVC conduit or Duct Type EB tubing.
 - d. Less Than 5 Feet From Foundation Wall: Rigid steel or intermediate metal conduit.
 - e. Bends Greater Than 45 Degrees: Use rigid steel or intermediate metal conduit for bend.
3. Outdoor Locations, Exposed Above Grade: Rigid steel or intermediate metal conduit.
4. In Slab or Poured Wall Above Grade:
 - a. Schedule 40 PVC conduit.
 - b. Place transitions within concrete.
 - c. Maximum Size: 1-1/2 inches trade size.
 - d. Minimum Concrete Cover on Conduit: 2 inches.
 - e. Minimum Clearance Between Adjacent Conduits: 1-1/2 inches
 - f. Bends Greater Than 45 Degrees: Use rigid steel or intermediate metal conduit for bend.
5. Indoor Locations:
 - a. Finished Areas: Conceal conduit.
 - b. Below Grade: Do not conceal conduit.
 - c. Corrosive Areas: Schedule 80 PVC conduit. Place transitions immediately outside of corrosive area.
 - d. Block and Stud Walls: Electrical metallic tubing.
 - e. Ceramic Glazed Clay Tile Walls: Schedule 40 PVC. 1/2 inch minimum trade size.
 - f. Above Suspended Ceilings: Electrical metallic tubing.
 - g. All Other Exposed Conduit: Rigid steel or intermediate metal conduit.

C. Conduit Routing:

1. Separate conduits carrying instrumentation wiring from conduits carrying power wiring by at least 6 inches.
2. Maintain 12 inch clearance between conduit and surfaces with temperatures exceeding 104 degrees F.
3. Route conduits around areas indicated for gratings, future openings, foundations, and other obstructions to avoid tripping hazards and future conflicts.
4. Exposed Conduit: Route parallel and perpendicular to walls.
5. Above Drop Ceilings: Route parallel and perpendicular to walls.
6. Concealed Conduit: Route point-to-point.

D. Conduit Bends:

1. Use factory elbows for 90 degree bends in metal conduit larger than 2 inches.
2. No bend shall be greater than 90 degrees.
3. Use conduit bodies to make sharp changes in direction.
4. Medium and High Voltage Raceways:
 - a. Bend Radius: Not less than 48 inches. Place at end of run.
 - b. Conduit Runs Less Than 125 Feet in Length: No more than the equivalent of two 90 degree bends between pull points.
 - c. Conduit Runs 125 to 500 Feet in Length: No more than the equivalent of four 90 degree bends between pull points.
 - d. Conduit Runs Over 500 Feet in Length: No bends.

E. Conduit Supporting and Hanging:

1. Arrange supports to prevent misalignment during wiring installation.
2. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
3. Group related conduits and support using conduit rack.
4. Construct conduit racks using steel channel and provide space on each for 25 percent additional conduits.
5. Fasten conduit supports to building structure and surfaces; follow Section 16190.
6. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.
7. Do not attach conduit to ceiling support wires.
8. Arrange conduit to maintain headroom and present neat appearance.
9. Support conduits away from walls that are likely to condensate.

F. Conduit Terminations:

1. Terminate conduit with insulated bushings.
2. Bring conduit to shoulder of fittings; fasten securely.
3. Use insulated grounding bushings with bonding jumpers for conduit terminations containing conductors #8 AWG or larger or to boxes with concentric or eccentric knockouts.
4. Use concentric hubs to terminate conduit to sheet metal boxes in damp and wet locations.

G. Conduit Entrances Below Grade:

1. Use wall seals where conduit penetrates foundation walls.
2. Provide watertight installation.
3. Wall Seals: Set sleeves in formwork at proper elevation prior to concrete pour. Boxing out of forms for later placement is not acceptable.
4. Mechanical Type Seals: Core opening, install conduit and seal.
5. Slope underground conduits such that any water in conduit drains away from building.
6. Provide pullbox with 1 inch trade size PVC drain in bottom to nearest sump for all below grade conduit entrances into buildings. Make all conduit terminations to pullbox inside of box and higher than conduit entering from outdoors.

3.2 MANUFACTURER'S START-UP SERVICES

- A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods; see Section 07270.

END OF SECTION

SECTION 16123

BUILDING WIRE AND CABLE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Building wire and cable.
- B. Underground feeder and branch circuit cable.
- C. Service entrance cable.
- D. Instrumentation wire and cable.
- E. Wiring connectors and connections.

1.3 SUBMITTALS

- A. Test Reports: Indicate procedures and values obtained.

1.4 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions. Include wire and cable lengths within 10 feet.
- C. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

1.5 COORDINATION

- A. Determine required separation between cable and other work.
- B. Determine cable routing to avoid interference with other work.

PART 2 PRODUCTS

2.1 BUILDING WIRE AND CABLE

- A. Manufacturer:
 - 1. Okonite Company.
 - 2. Rome Cable Corporation.
 - 3. Cablec Corporation.
 - 4. Or as approved.
- B. Description: Single conductor insulated wire.
- C. Conductor: Stranded copper.

- D. Insulation Voltage Rating: 600 Volts.
- E. Insulation: ANSI/NFPA 70; Type XHHW or THWN insulation for feeders and branch circuits larger than 6 AWG; Type XHHW or THWN insulation for feeders and branch circuits 6 AWG and smaller.

2.2 UNDERGROUND FEEDER AND BRANCH CIRCUIT CABLE

- A. Manufacturer:
 - 1. Okonite Company.
 - 2. Rome Cable Corporation.
 - 3. Cablec Corporation.
 - 4. Or as approved.
- B. Description: ANSI/NFPA 70, Type UF.
- C. Conductor: Copper.
- D. Insulation Voltage Rating: 600 Volts.

2.3 SERVICE ENTRANCE CABLE

- A. Manufacturer:
 - 1. Okonite Company.
 - 2. Rome Cable Corporation.
 - 3. Cablec Corporation.
 - 4. Or as approved.
- B. Description: ANSI/NFPA 70, Type USE.
- C. Conductor: Copper.
- D. Insulation Voltage Rating: 600 Volts.
- E. Insulation: Type RHW.

2.4 SHIELDED INSTRUMENTATION CABLE

- A. Manufacturer: Beldon or as approved.
- B. Description: NFPA 70, Type CL3R, two conductor cable.
- C. Conductor: Tinned, stranded cable.
- D. Shielding: 100 percent foil with 22 AWG tinned, stranded copper drain wire.
- E. Insulation Voltage Rating: 300 Volts.
- F. Insulation: Type PVC.

2.5 WIRING CONNECTORS

- A. Wire Sizes 10 AWG and Smaller:
 - 1. Splices and Taps: Use 3M Scotchlok Type Y & R insulated spring connectors.
 - 2. Terminals: Use Thomas & Betts Stakon Series RA, RB and RC insulated terminals. Use locking fork type for connection to terminal blocks and ring type for motor terminations.
- B. Wire Sizes 8 AWG through 500 MCM:
 - 1. Splices: Use Thomas & Betts Series 54000 barrel-type 2-way compression connector.
 - 2. Taps: Use Thomas & Betts Series 54000 color-keyed C-type compression connector.
 - 3. Pigtails: Use Thomas & Betts Series 54000 color-keyed cable joint-type compression connector.
 - 4. Lugs: Use Thomas & Betts Series 54000 color-keyed long barrel-type lug compression connector. Use one hole-type for motor terminations and wire sizes 8 AWG to 1/0 AWG. Use two hole-type for wire sizes 2/0 AWG and larger.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that mechanical work likely to damage wire and cable has been completed.

3.2 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.

3.3 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Use solid conductor for feeders and branch circuits 12 AWG and smaller.
- C. Use stranded conductors for control circuits.
- D. Use conductor not smaller than 12 AWG for power and lighting circuits.
- E. Use conductor not smaller than 14 AWG for control circuits and for discrete type instrumentation wiring.
- F. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 100 feet.
- G. Pull all conductors into raceway at same time.
- H. Use suitable wire pulling lubricant for building wire 4 AWG and larger.
- I. Provide a properly-sized equipment grounding conductor in all raceways.
- J. Neatly train and lace wiring inside boxes, equipment and panelboards.
- K. Clean conductor surfaces before installing lugs and connectors.
- L. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- M. After making splice or tap, tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.
- N. Use connector sealing pack for all connections in outdoor or underground boxes or in bases of lighting poles.
- O. Do not splice shielded instrumentation cable.
- P. Do not terminate shielded instrumentation cable shield at field device. Trim shield and sleeve with heat shrink tubing. Prevent shield from coming in contact with conductive surfaces at field device.

3.4 INTERFACE WITH OTHER PRODUCTS

- A. Identify wire and cable; see Section 16195.
- B. Identify each conductor with its circuit number or other designation indicated on Drawings.

3.5 FIELD QUALITY CONTROL

- A. Inspect wire and cable for physical damage and proper connection.

END OF SECTION

SECTION 16130

BOXES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Wall and ceiling outlet boxes.
- B. Pull and junction boxes.

PART 2 PRODUCTS

2.1 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
 - 1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2 inch male fixture studs where required.
 - 2. Ceiling Boxes: Flush, 4x4x1-1/2 inch.
 - 3. Mounted in Block Walls: Flush, 3-1/2 inches deep with square corners and no ears.
- B. Nonmetallic Outlet Boxes: NEMA OS 2.
- C. Cast Boxes: NEMA FB 1, Type FD with threaded hubs. Provide gasketed cover by box manufacturer.
- D. Wall Plates for Finished Areas: See Section 16140.

2.2 PULL AND JUNCTION BOXES

- A. Pull and Junction Boxes: 4 inches square and 1-1/2 inches deep, minimum.
- B. Sheet Metal Boxes: NEMA OS 1. NEMA 12 rating minimum.
 - 1. Material: Galvanized sheet steel, 14 gauge minimum.
 - 2. Cover: Attached by continuous hinge along one side. Clamped shut by Type 304 or better stainless steel clamps and screws.
 - 3. Factory Finish: Rust inhibitive primer, with two coats of manufacturer's standard enamel, except for concealed galvanized boxes.
- C. Surface Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface mounted junction box:
 - 1. Material: Galvanized cast iron.
 - 2. Cover: Furnish with ground flange, neoprene gasket and stainless steel cover screws.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify locations of floor boxes and outlets in prior to rough-in.
- B. Cooperate with other trades to avoid conflict between the locations of conduit, outlets, equipment, ducts, plumbing and other building components.

3.2 INSTALLATION

- A. Install boxes in accordance with NECA “Standard of Installation”.
- B. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.
- C. Install Boxes so that box covers are accessible at all times.
- D. Set wall mounted boxes at elevations to accommodate mounting heights.
- E. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Adjust box location up to 10 feet if required to accommodate intended purpose.
 - 1. Verify locations with Engineer prior to installation, if adjustment exceeds maximum specified above.
- F. Orient boxes to accommodate wiring devices.
- G. Maintain headroom and present neat mechanical appearance.
- H. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- I. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.
- J. Install boxes to preserve fire resistance rating of partitions and other elements; follow Section 07270.
- K. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- L. Locate outlet boxes to allow luminaries to be positioned as shown on reflected ceiling plan.
- M. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
- N. Use flush mounting outlet box in finished areas.
- O. Locate flush mounting box with oversize coverplate in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
- P. Do not install flush mounting box back-to-back in walls; provide minimum 6 inches separation. Provide minimum 24 inches separation in acoustic rated walls.
- Q. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
- R. Use stamped steel bridges to fasten flush mounting outlet box between studs.
- S. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- T. Use adjustable steel channel fasteners for hung ceiling outlet box.
- U. Do not fasten boxes to ceiling support wires.
- V. Support boxes independently of conduit.
- W. Use gang box where more than one device is mounted together. Do not use sectional box.

- X. Use gang box with plaster ring for single device outlets.
- Y. Use cast outlet box in exterior locations and wet locations.
- Z. Lighting Outlet Spacing: Space equally, with the distance from the wall to the first row of outlets one-half the distance between outlets, except when ceiling construction prohibits spacing.
- AA. Set floor boxes level.
- BB. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

3.3 INTERFACE WITH OTHER PRODUCTS

- A. Maintain isolation of separate conduits by installing separate pull boxes or sectionalized pull boxes for each conduit.
- B. Support boxes mounted on walls that are likely to condensate away from the wall using unistrut.
- C. Coordinate installation of outlet boxes for equipment connections.

3.4 ADJUSTING

- A. Adjust flush-mounting outlets to make front flush with finished wall material.
- B. Install knockout closures in unused box openings.

3.5 CLEANING

- A. Clean interior of boxes to remove dust, debris and other material.
- B. Clean exposed surfaces and restore finish.

END OF SECTION

SECTION 16140
WIRING DEVICES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Wall switches.
- B. Receptacles.
- C. Device plates and decorative box covers.

1.3 SPARE PARTS

- A. Furnish two of each style, size and finish wall plate.

PART 2 PRODUCTS

2.1 WALL SWITCHES

- A. Manufacturers:
 - 1. Hubbell.
 - 2. Arrow Hart.
 - 3. Bryant.
 - 4. Or as approved.
- B. Description: NEMA WD 1, heavy-duty, AC only general-use snap switch with toggle handle.
- C. Color:
 - 1. Unfinished Areas: Grey.
 - 2. Finished Areas: To be selected from manufacturer's standard colors.

2.2 RECEPTACLES

- A. Manufacturers:
 - 1. Hubbell.
 - 2. Arrow Hart.
 - 3. Bryant.
 - 4. Or as approved.
- B. Description: NEMA WD 1, heavy-duty general use receptacle.
- C. Color:
 - 1. Unfinished Areas: Grey.
 - 2. Finished Areas: To be selected from manufacturer's standard colors.
- D. Configuration: NEMA WD 6, type as specified and indicated.

- E. Single and Duplex Convenience Receptacles: Type 5-20.
- F. GFCI Receptacles: Duplex convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements.
- G. Telephone Jack: See Section 16741.

2.3 WALL PLATES

- A. Decorative and Jumbo Cover Plates: Nylon. Color to be selected from manufacturer's standard colors.
- B. Weatherproof Wall Switch Cover Plates: Clear silicone rubber bubble plate.
- C. Weatherproof Convenience Receptacle Cover Plate: Gasketed cast aluminum with hinged gasketed device cover.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that outlet boxes are installed at proper height.
- B. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- C. Verify that branch circuit wiring installation is completed, tested and ready for connection to wiring devices.

3.2 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean debris from outlet boxes.

3.3 INSTALLATION

- A. Install in accordance with NECA "Standard of Installation".
- B. Install devices plumb and level.
- C. Install switches with OFF position down.
- D. Install receptacles with grounding pole on top.
- E. Use feed-through installation to protect downstream receptacles where multiple GFI receptacles share the same branch circuit in the same room. Label downstream receptacles as GFI protected.
- F. Connect wiring devices grounding terminal to branch circuit equipment grounding conductor.
- G. Install decorative plates on switch, receptacle and blank outlets in finished areas.
- H. Connect wiring devices by wrapping conductor around screw terminal.
- I. Use jumbo size plates for outlets installed in masonry walls.
- J. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

3.4 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate locations of outlet boxes provided under Section 16130 to obtain mounting heights specified and indicated on Drawings.
- B. Install wall switch 48 inches above finished floor.
- C. Install convenience receptacle 18 inches above finished floor.
- D. Install convenience receptacle 48 inches above finished floor in unfinished areas.
- E. Install convenience receptacle 6 inches above backsplash of counter.
- F. Install telephone jack 18 inches above finished floor.
- G. Install telephone jack for side-reach wall telephone to position top of telephone at 54 inches above finished floor.

3.5 FIELD QUALITY CONTROL

- A. Inspect each wiring device for defects.
- B. Operate each wall switch with circuit energized and verify proper operation.
- C. Verify that each receptacle device is energized.
- D. Test each receptacle device for proper polarity.
- E. Test each GFCI receptacle device for proper operation.
- F. Verify that each telephone jack is properly connected and circuit is operational.

3.6 ADJUSTING

- A. Adjust devices and wall plates to be flush and level.

3.7 CLEANING

- A. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION

SECTION 16160

CABINETS AND ENCLOSURES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. General requirements for all control panel construction.

1.3 SHOP DRAWINGS

- A. Provide catalog sheets on all equipment provided, including full model number of all components, listing of optional features being provided, voltage ratings, dimensional data, and manufacturer product specifications.
- B. Provide schematics and wiring diagrams representing all terminals, wiring, and components located within the panel; develop diagrams and drawings utilizing CAD software. Follow NFPA 79, Chapter 2-2, Diagrams.
 - 1. Provide ladder-logic diagrams with cross-referencing scheme for each relay and output device; include numbering string down power side of diagram.
 - 2. Utilize ANSI Y32.2 symbols for all field devices.
 - 3. Show functional descriptor for each device or component.
 - 4. Show alphanumeric reference for all conductors and terminals.
 - 5. Show connections to devices located external to the panel in phantom.
- C. If control panel includes a programmable logic controller (PLC), provide PLC schematics for all I/O modules; follow format guidelines established in Appendix D of NFPA 79. Identify Rack, Group, and Module. Show position of all dip switch settings.
- D. Construction and Assembly: Provide information on the enclosure type, wall thickness, dimensions, doors, gaskets, finish, and structural support members.
- E. Panel Layout Drawings: Provide layout of panel interior and front panel mounted devices, showing location of all equipment, relays, power supplies, terminal strips, and wire channels. Follow format guidelines established in Appendix D of NFPA 79.
- F. Installation Details: Provide footprints of panels and enclosures to show location of all conduit entrances. Provide information on panel anchoring and supports.

1.4 RECORD DOCUMENTS

- A. Submit all diagrams and drawings from the shop drawing submittal. Incorporate all field changes using CAD software. Submit floppy diskette containing all finalized drawing files.

PART 2 PRODUCTS

2.1 OPERATING CONDITIONS

- A. Provide products suitable for operation under the following conditions B through H.
- B. Ambient Operating Temperature: As indicated; otherwise, 5 to 40 degrees C for indoor enclosures, -25 to 40 degrees C for outdoor enclosures.
- C. Altitude: As indicated; otherwise, up to 3300 feet.
- D. Supply Voltage: As indicated, otherwise, 90 to 110 percent of rated voltage, ± 2 percent of rated frequency, and up to 10 percent of total RMS sum of the second through the fifth harmonics plus 2 percent RMS sum of the sixth through the thirtieth harmonics.

- E. Radio Frequency Voltages: As indicated; otherwise, 2 percent RMS above 10 kHz.
- F. Impulse Voltage: As indicated; otherwise, 200 percent peak voltage up to 1 microsecond duration with a rise time of 500 nanoseconds to 500 microseconds.
- G. Voltage Drop: As indicated; otherwise, reduction of 50 percent of peak voltage for 1/2 cycle or 20 percent for one cycle. More than 1 second between successive reductions.
- H. Micro-interruption: As indicated; otherwise, supply disconnected or at zero voltage for 3 ms at any random time in cycle. More than 1 second between successive reductions.

2.2 ENCLOSURES

- A. Manufacturer:
 - 1. Hoffman.
 - 2. Electromate.
 - 3. Or as approved.
- B. Conform to requirements of NEMA 250.
- C. Construction: As indicated; otherwise, NEMA 1, minimum for indoor enclosures; NEMA 4 for outdoor enclosures; NEMA 7 for enclosures located in hazardous areas.
- D. Sheet Steel: Minimum 14 gauge thickness. Provide stiffeners, angles, and supports for components.
- E. Corrosion Resistant Metallic Enclosures: Stainless Steel
- F. Covers: As indicated; otherwise, continuous hinge and gasketed. Include stainless steel quick release latches and stainless steel padlock hasp.
- G. Finishing:
 - 1. Painted Steel Panels: Finished with manufacturer's standard enamel over phosphatized surfaces inside and out; interior color to be white.
 - 2. Stainless Steel Panels: Unpainted smooth brushed finish.

2.3 ELECTRIC CONTROLS AND RELAYS

- A. Provide control switches, indicating lights, and relays; follow Section 16902.

2.4 POWER SUPPLIES

- A. Provide a disconnect and overcurrent protection for the incoming supply circuit.
- B. Provide control power transformers and power supplies for circuits and equipment rated at voltages other than the incoming supply circuit. Include overcurrent protection for all power supplies. Provide control power transformers; follow Section 16902.

2.5 MOTOR CONTROLLERS

- A. Follow Section 16481. Include ambient compensated overload protection, disconnect, and motor circuit short circuit protection.

2.6 WIRING

- A. Power Wiring: Stranded copper, MTW or THWN, minimum size No. 14 AWG, 600 volt insulation.
- B. Discrete Signal Wiring: Stranded copper, MTW, minimum size No. 16 AWG, 600 volt insulation.
- C. Analog Signal Wiring: Two conductor stranded copper cable, Type CL3R. 100 percent foil shielding with 22 AWG tinned, stranded copper drain wire. 300 volt-rated PVC insulation.
- D. Insulation Color Code:
 - 1. Black: Line, load, and control circuits at line voltage.
 - 2. Red: AC control circuit at less than line voltage.
 - 3. Blue: DC control circuits.
 - 4. Yellow: Control circuits energized from an external source.
 - 5. Green: Equipment ground.
 - 6. White: Neutral or grounded circuit conductor.

- E. Provide terminal blocks for external wiring connections. Provide two spare terminals after every ten terminals. In addition, provide two spare terminals at the top and two spare terminals at the bottom of every terminal strip.
- F. Group and support conductors. Provide channel duct or plastic spiral wrap.

2.7 IDENTIFICATION DETAILS

- A. Provide enclosure, wire, and component identification; see Section 16195.

PART 3 EXECUTION

3.1 FABRICATION

- A. Size enclosure to provide 20% spare space on panel back plate. Calculate spare space as the difference between the total surface areas of the back plate less the foot-print surface area of all equipment mounted to the back plate.
- B. Mount equipment within enclosure such that all status and diagnostic indicators are visible from the door side of the enclosure.
- C. Do not mount equipment or terminal strips on panel interior top, sides, or bottom unless approved by Engineer. Exception: Interior panel light may be mounted to the panel top.
- D. If control panel includes a PLC, arrange input/output cards in the PLC rack in the following left to right, top to bottom sequence: AC voltage discrete inputs, AC voltage discrete outputs, dc voltage discrete inputs, dc voltage discrete outputs, dc voltage/current analog inputs, dc voltage/current analog outputs. Provide spare slot between each type of card as space in rack allows, unless otherwise indicated in the drawings.

3.2 INSTALLATION

- A. Install enclosures and boxes plumb. Anchor securely to wall and structural supports at each corner. Provide 1/2 inch space between equipment and mounting surface.
- B. Provide housekeeping pad.
- C. Paint and refinish areas damaged during shipment, storage, and installation. Use manufacturer's standard finish.

3.3 DEMONSTRATION

- A. Provide complete functional testing of all cabinets, enclosures, circuits, and included equipment.

3.4 PROTECTION OF FINISHED WORK

- A. Lock out equipment until it is ready for demonstration.

END OF SECTION

SECTION 16170

GROUNDING AND BONDING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Grounding electrodes and conductors.
- B. Equipment grounding conductors.
- C. Bonding.

1.3 PERFORMANCE REQUIREMENTS

- A. Grounding System Resistance: 25 ohms.

PART 2 PRODUCTS

2.1 ROD ELECTRODE

- A. Manufacturer: Copperweld Corporation or as approved.
- B. Material: Copper-clad steel.
- C. Diameter: 3/4 inch
- D. Length: 10 feet.

2.2 EXOTHERMIC CONNECTIONS

- A. Manufacturers:
 - 1. Cadweld
 - 2. Burndy
 - 3. Or as approved

2.3 GROUNDING ELECTRODE CONDUCTOR

- A. Material: Stranded copper.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that final backfill and compaction has been completed before driving rod electrodes.

3.2 INSTALLATION

- A. Install rod electrodes at locations indicated. Install additional rod electrodes as required to achieve specified resistance to ground.
- B. Bond grounding electrode conductor to rod electrode nearest to service entrance. Bond remaining rod electrodes to grounding ring.
- C. Provide bonding to meet Regulatory Requirments.
- D. Provide isolated grounding conductor for circuits indicated.
- E. Equipment Grounding Conductor: Provide separate, insulated conductor withing each raceway. Terminate each end on suitable lug, bus, or bushing.

3.3 INTERFACE WITH OTHER PRODUCTS

- A. Interface with lighting protection system; see Section 16670.

3.4 FIELD QUALITY CONTROL

- A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.
- B. Ground Resistance Test: See Section 16960.

END OF SECTION

SECTION 16180

EQUIPMENT WIRING SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Electrical connections to equipment specified under other sections.
- B. Provide power and control wiring including conduit, wire, relays, switches and other devices necessary to properly operate equipment as specified, as shown on the drawings and as required for Owner's use.
- C. Work includes connection and interwiring of equipment and devices, unless connection and interwiring is specified as included under another section.
- D. Refer to electrical and mechanical drawings for quantities and locations of the respective equipment, including field mounted devices to be hooked up to the respective equipment.

1.3 COORDINATION

- A. Obtain and review shop drawings, product data, and manufacturer's instruction for equipment furnished under other sections.
- B. Determine connection locations and requirements.
- C. Sequence rough-in of electrical connections to coordinate with installation schedule for equipment.
- D. Sequence electrical connections to coordinate with start-up schedule for equipment.

PART 2 PRODUCTS

2.1 GENERAL

- A. Comply with equipment and device manufacturer's recommendations and instructions for connections and interwiring and size, type, and quantity of conductors.
- B. Verify that manufacturer's requirements meet regulatory requirements and requirements for proper installation and operation of equipment.

2.2 CORDS AND CAPS

- A. Attach Plug Construction: Conform to NEMA WD 1.
- B. Configuration: NEMA WD6; match receptacle configuration at outlet provided for equipment.
- C. Cord Construction: ANSI/NFPA 70, Type SO multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
- D. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

PART 3 PRODUCTS

3.1 EXAMINATION

- A. Verify that equipment is ready for electrical connection, wiring, and energization.

3.2 MANUFACTURER'S START-UP SERVICES

- A. Make electrical connections in accordance with equipment manufacturer's instructions.
- B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.
- C. Make wiring connections using wire and cable with insulation suitable for temperatures encountered in heat producing equipment.
- D. Provide receptacle outlet where connection with attachment plug is indicated. Provide cord and cap where field-supplied attachment plug is indicated.
- E. Provide suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- F. Install disconnect switches, controllers, control stations, and control devices as indicated.
- G. Modify equipment control wiring with terminal block jumpers as indicated.
- H. Provide interconnecting conduit and wiring between devices and equipment where indicated.
- I. Make sure connections are proper, secure and tight.
- J. Secure and properly support wire bundles.

END OF SECTION

SECTION 16180

EQUIPMENT WIRING SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Electrical connections to equipment specified under other sections.
- B. Provide power and control wiring including conduit, wire, relays, switches and other devices necessary to properly operate equipment as specified, as shown on the drawings and as required for Owner's use.
- C. Work includes connection and interwiring of equipment and devices, unless connection and interwiring is specified as included under another section.
- D. Refer to electrical and mechanical drawings for quantities and locations of the respective equipment, including field mounted devices to be hooked up to the respective equipment.

1.3 COORDINATION

- A. Obtain and review shop drawings, product data, and manufacturer's instruction for equipment furnished under other sections.
- B. Determine connection locations and requirements.
- C. Sequence rough-in of electrical connections to coordinate with installation schedule for equipment.
- D. Sequence electrical connections to coordinate with start-up schedule for equipment.

PART 2 PRODUCTS

2.1 GENERAL

- A. Comply with equipment and device manufacturer's recommendations and instructions for connections and interwiring and size, type, and quantity of conductors.
- B. Verify that manufacturer's requirements meet regulatory requirements and requirements for proper installation and operation of equipment.

2.2 CORDS AND CAPS

- A. Attach Plug Construction: Conform to NEMA WD 1.
- B. Configuration: NEMA WD6; match receptacle configuration at outlet provided for equipment.
- C. Cord Construction: ANSI/NFPA 70, Type SO multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
- D. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

PART 3 PRODUCTS

3.1 EXAMINATION

- A. Verify that equipment is ready for electrical connection, wiring, and energization.

3.2 MANUFACTURER'S START-UP SERVICES

- A. Make electrical connections in accordance with equipment manufacturer's instructions.
- B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.
- C. Make wiring connections using wire and cable with insulation suitable for temperatures encountered in heat producing equipment.
- D. Provide receptacle outlet where connection with attachment plug is indicated. Provide cord and cap where field-supplied attachment plug is indicated.
- E. Provide suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- F. Install disconnect switches, controllers, control stations, and control devices as indicated.
- G. Modify equipment control wiring with terminal block jumpers as indicated.
- H. Provide interconnecting conduit and wiring between devices and equipment where indicated.
- I. Make sure connections are proper, secure and tight.
- J. Secure and properly support wire bundles.

END OF SECTION

SECTION 16190
SUPPORTING DEVICES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Miscellaneous supports for conduit and equipment.
- B. Anchors and fasteners.

PART 2 PRODUCTS

2.1 PRODUCT REQUIREMENTS

- A. Materials and Finishes: Provide adequate corrosion resistance.
- B. Provide materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduit. Consider weight of wire in conduit when selecting products.
- C. Anchors and Fasteners: Follow Section 05501. Use methods most appropriate for and compatible with substrate. Do not use methods which will cause structural damage.
 - 1. Concrete Structural Elements
 - a. Precast insert system
 - b. Expansion anchors
 - c. Self-drilling anchors
 - d. Epoxied anchors
 - 2. Steel Structural Elements
 - a. Beam clamps
 - b. Welded fasteners
 - 3. Hollow Masonry, Plaster, and Gypsum Board Partitions
 - a. Toggle bolts
 - b. Hollow wall fasteners
 - 4. Solid Masonry
 - a. Expansion anchors
 - b. Preset inserts
 - 5. Sheet Metal: Sheet metal screws.
 - 6. Wood Elements: Wood screws or lag bolts.
 - 7. Fiberglass Elements: Stainless steel bolts.
- D. Channel Framing Supports: Use channel framing for equipment support.
 - 1. Minimum Size: 1 5/8 inch channel.
 - 2. Hardware: Stainless steel.
 - 3. Indoor, Dry Locations: Use galvanized steel channel framing.
 - 4. Indoor, Damp and Corrosive Locations: Use aluminum or fiberglass channel framing where suitable for weight of supported equipment. Otherwise, use stainless steel channel framing.
- E. Bolts, brackets and other miscellaneous hardware shall be fabricated from stainless steel.

PART 3 PRODUCTS

3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Provide anchors, fasteners and supports in accordance with NECA "Standard of Installation".
- C. Rigidly support fixtures and equipment from the building structure.
- D. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.
- E. Do not use spring steel clips and clamps.
- F. Do not use powder-actuated anchors.
- G. Obtain permission from Architect/Engineer before drilling or cutting structural members.
- H. Fabricate supports from channel framing. Use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.
- I. Install surface-mounted cabinets and panelboards with minimum of four anchors.
- J. In wet and damp locations channel framing supports to stand cabinets and panelboards one inch off of surface.
- K. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.
- L. Touch-up field cut ends of galvanized steel supports with galvanizing repair paint.

END OF SECTION

SECTION 16195

ELECTRICAL IDENTIFICATION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Nameplates and labels.
- B. Wire and cable markers.
- C. Component markers.
- D. Conduit markers and tags.
- E. Underground warning tape.

PART 2 PRODUCTS

2.1 NAMEPLATES AND LABELS

- A. Nameplates:
 - 1. Description: Engraved three-layer laminated plastic, black letters on white background unless otherwise indicated.
 - 2. Locations: Each electrical distribution and control equipment enclosure. Each communication cabinet. Each motor control center.
 - 3. Letter size:
 - a. Use 1/8 inch letters for identifying individual equipment and loads unless otherwise indicated.
 - b. Use 1/4 inch letters for identifying grouped equipment and loads unless otherwise indicated.
- B. Labels: Embossed adhesive tape, with 3/16 inch black letters on white background unless otherwise indicated.

2.2 WIRE MARKERS

- A. Description: Plastic sleeve type wire markers.
- B. Locations: Every splice, terminal and connection.
- C. Connection Legends: Provide typed connection legend as part of the record drawings to relate the code identification of each wire, junction, and termination with respect to corresponding devices, panels, terminals, and connections installed under this Contract.

2.3 COMPONENT MARKERS

- A. Description: Permanently affixed tape or engraved nameplate uniquely identifying each control device within an enclosure with a number or code corresponding to the circuit design.
- B. Locate: On or adjacent to each control device and visible from panel front.

2.4 CONDUIT MARKERS AND TAGS

- A. Manufacturers:
 - 1. W.H. Brady Company.
 - 2. Seton.

3. Or as approved.
- B. Description: Pressure sensitive vinyl, or plastic coated cloth marker not less than 2-1/4 inches wide and 9 inches long with lettering not less than 1 inch high.
- C. Location: Furnish markers for each exposed conduit longer than 10 feet.
- D. Spacing: 20 feet on center.
- E. Color: Orange with black lettering.
- F. Legend:
 1. 480 Volt System: 480 VOLTS.
 2. 240 Volt System: 240 VOLTS.
 3. 208 Volt System: 208 VOLTS.
 4. Telephone System: TELEPHONE
 5. Instrumentation System: INSTRUMENTATION
 6. Intrinsically Safe System: INTRINSICALLY SAFE.
- G. Conduit Tag: White on orange plastic tag, rectangular, 2-1/2 inches by 3-1/2 inches minimum.

2.5 UNDERGROUND WARNING TAPE

- A. Manufacturers:
 1. W.H. Brady Company.
 2. Seton.
 3. Or as approved.
- B. Description: 2 inch wide plastic tape, detectable type, colored red with suitable warning legend describing buried electrical lines.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Degrease and clean surfaces to receive nameplates and labels.

3.2 APPLICATION

- A. Install nameplates and labels parallel to equipment lines.
- B. Secure nameplate to equipment front using stainless steel screws.
- C. Secure nameplate to inside surface of door on panelboard that is recessed in finished locations.
- D. Identify each exposed conduit longer than 10 feet with conduit marker. Space markers 20 feet on center.
- E. Identify feeders, branch circuits, and service entrance conductors by phase and system voltage using colored electrical tape.
 1. Phase A, 480 Volt System: Brown
 2. Phase B, 480 Volt System: Orange
 3. Phase C, 480 Volt System: Yellow
 4. Phase A, 208 Volt System: Red
 5. Phase B, 208 Volt System: Black
 6. Phase C, 208 Volt System: Blue
- F. Provide wire tags on all panelboard feeders and branch circuits to correspond with the circuit breaker identification number assigned to protect the feeder or branch circuit.
- G. Identify underground conduits using underground warning tape. Install one tape per trench at 6 inches below finished grade.
- H. Tag concealed conduits. Indicate source and destination of conduit.
- I. Attach tags to each conduit stub using laminated wire or self-locking nylon tie that will not deteriorate.

3.3 FIELD QUALITY CONTROL

- A. Verify that every identification marker corresponds with the respective terminal or connection code identification.
- B. Except for common connections, do not duplicate numbers, symbols, colors, prints in the building.

END OF SECTION

SECTION 16421

UTILITY SERVICE ENTRANCE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Service racks.
- B. Metering transformer cabinets.
- C. Meter bases
- D. Poles.

1.3 SYSTEM DESCRIPTION

- A. System Characteristics:
 - 1. 480 volts.
 - 2. Three phase.
 - 3. 3-wire.
 - 4. 60 Hertz.

1.4 QUALITY ASSURANCE

- A. Utility Company: Duke Energy Company
 - 1. Address: 1205 N. Main Street, Burlington, NC 27215
 - 2. Telephone Number: 336-222-5561
 - 3. Contact Name: Robert L. Parrish
- B. Perform work in accordance with Utility Company written requirements.
- C. Maintain one copy of each document on site.

1.5 PRE-INSTALLATION MEETING

- A. Convene pre-installation meeting two weeks prior to commencing work of this section. Review service entrance requirements and details with Utility Company representative.

1.6 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on Utility Company drawings.

PART 2 PRODUCTS

2.1 METERING TRANSFORMER CABINETS

- A. Manufacturer: Square D Company or as approved.

- B. Description: Sheet metal cabinet with hinged door, conforming to Utility Company requirements, with provisions for locking and sealing.
- C. Size: As required by Utility.

2.2 METER BASES

- A. Meter base will be furnished by Utility Company.
- B. Description: Meter base rated 200 and 600 amperes or as required, continuous duty with the following features:
 - 1. 4 jaws.
 - 2. Closing manual circuit type.
 - 3. Screw type bypass.

2.3 POLES

- A. Manufacturers:
 - 1. Forest Products Division of the Koppers Company, Inc.
 - 2. Estes and Sons.
 - 3. Or as approved.
- B. Descriptions:
 - 1. Class: Class III treated Southern Pine, treated Douglas Fir or treated Western Red Cedar.
 - 2. Straightness: No more than 3 inches of deviation from butt to tip of pole.
 - 3. Treatment: Pressure impregnated pentachlorophenol and finished in a soft pastel brown color.
 - 4. Height: Selected to provide level mounting heights of the top secondary conductors on each pole.
 - 5. Include guys, anchors, half-round guy markers, weatherheads, conduits, conductors, bonding and grounding, all as specified, shown on the drawings, or required.
 - 6. All metallic material, hardware, etc., installed on poles must be hot-dipped galvanized.

PART 3 EXECUTION

3.1 PREPARATION

- A. Arrange with Utility Company to obtain permanent electric service to the Project.
- B. Coordinate service installation work with Owner to minimize downtime of existing facilities.

3.2 INSTALLATION

- A. Install weatherheads and meter base as required by Utility Company.
- B. Provide temporary service to maintain existing facilities.

END OF SECTION

SECTION 16691

TRANSIENT SURGE PROTECTION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Surge arrestors.

PART 2 PRODUCTS

2.1 SURGE ARRESTORS

- A. Type: 120/240 VAC, Single Phase, 3-Wire:
 - 1. Manufacturer: Advanced Protection Technologies Model TE/1000P, or as approved.
 - 2. Response Time: Under one nanosecond.
 - 3. Transient Control: "MOV" technology to clamp transients to a safe level.
 - 4. Indicator Light: Unit shall include indicator light to indicate when unit is operational.
 - 5. Maximum Single Impulse Current: 80 kA per phase with 8x20 microsecond test waveform.
 - 6. Maximum Let-Through Voltage: 420 volts line-to-neutral, 420 volts neutral-to-ground, with Category B test waveform.
 - 7. Pulse Life: Minimum of 2000 occurrences of Category C impulses.
 - 8. Guarantee: Provide minimum 5-year manufacturer's warranty.
- B. Type: 120/208 VAC, Three Phase, 4-Wire:
 - 1. Manufacturer: Advanced Protection Technologies Model TE/2000P, or as approved.
 - 2. Response Time: Under one nanosecond.
 - 3. Transient Control: "MOV" technology to clamp transients to a safe level.
 - 4. Indicator Light: Unit shall include indicator light to indicate when unit is operational.
 - 5. Maximum Single Impulse Current: 80 kA per phase with 8x20 microsecond test waveform.
 - 6. Maximum Let-Through Voltage: 420 volts line-to-neutral, 420 volts neutral-to-ground, with Category B test waveform.
 - 7. Pulse Life: Minimum of 2000 occurrences of Category C impulses.
 - 8. Guarantee: Provide minimum 5-year manufacturer's warranty.
- C. Type: 480 VAC, Three Phase, 3-Wire:
 - 1. Manufacturer: Advanced Protection Technologies Model TE/5000P, or as approved.
 - 2. Response Time: Under one nanosecond.
 - 3. Transient Control: "MOV" technology to clamp transients to a safe level.
 - 4. Indicator Light: Unit shall include indicator light to indicate when unit is operational.
 - 5. Maximum Single Impulse Current: 80 kA per phase with 8x20 microsecond test waveform.
 - 6. Maximum Let-Through Voltage: 760 volts line-to-ground, with Category B test waveform.
 - 7. Pulse Life: Minimum of 2000 occurrences of Category C impulses.
 - 8. Guarantee: Provide minimum 5-year manufacturer's warranty.

PART 3 PRODUCTS

3.1 INSTALLATION

- A. Install in accordance with applicable standards and manufacturer's recommendations and instructions.

END OF SECTION

SECTION 16741

TELEPHONE SERVICE, PATHWAYS, AND WIRING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1-16 Specifications Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Telephone service entrance raceway.
- B. Equipment and terminal backboards.
- C. Telephone cabinets.
- D. Premises wiring and outlets.

1.3 SYSTEM DESCRIPTION

- A. Telephone Service Pathway: Rigid steel conduit.
- B. Service Pathway Route: From point of utility connection at termination cabinet.
- C. Premises Wiring: Complete from telephone equipment to each outlet, using specified wire and cable.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with Utility Company written requirements.
- B. Maintain one copy of each document on site.

1.5 COORDINATION

- A. Coordinate the materials and work of this section with Section 16760.

PART 2 PRODUCTS

2.1 TELEPHONE TERMINATION CABINETS

- A. Manufacturers:
 - 1. Square D Company.
 - 2. Or as approved.
- B. Cabinet Boxes: Galvanized steel with removable endwalls. Provide telephone termination backboard inside cabinet for mounting telephone termination devices.
- C. Cabinet Fronts: Steel, flush type with concealed trim clamps, concealed hinge, and flush lock keyed to match branch circuit panelboard.
- D. Finish: Gray baked enamel.
- E. Connecting Block: Size for current project requirements, plus a minimum of 50% spare.

2.2 TELEPHONE TERMINATION BACKBOARDS

- A. Material: Fire-retardant treated plywood.
- B. Size: Minimum 3/4 inch thick. Height and width as required to accommodate wiring and equipment to be installed on board.

2.3 TELEPHONE WIRE AND CABLE

- A. See Section 16760.

2.4 TELEPHONE JACKS

- A. See Section 16760.

PART 3 EXECUTION

3.1 PREPARATION

- A. Arrange with Utility Company to obtain telephone service to the Project.
- B. Coordinate service installation work with Owner to minimize downtime of existing facilities.

3.2 INSTALLATION

- A. Prior to installation of equipment finish paint termination backboards with durable white enamel; follow Section 09900.
- B. Support raceways, backboards, and cabinets. Follow Section 16190.
- C. Install termination backboards plumb, and attach securely to building wall at each corner.
- D. Install cabinets and trim plumb and securely attached to building wall.
- E. Install surface mounted cabinet.
- F. Install pullwire in each empty telephone conduit over ten feet in length or containing a bend.
- G. Mark backboard and cabinet with the legend "TELEPHONE".
- H. Terminate both ends of all wires and tag both ends.
- I. Notify telephone company at appropriate time to enable them to perform their tasks.
- J. Install telephone jack 18 inches above finished floor.
- K. Install telephone jack for side-reach wall telephone to position top of telephone at 54 inches above finished floor.
- L. Install telephone jack for forward-reach wall telephone to position top of telephone at 48 inches above finished floor.

END OF SECTION



STAFF REPORT

SUBJECT:	PROPOSED ELECTRIC VEHICLE CHARGING STATION
PREPARED BY:	AARON HOLLAND, ASSISTANT CITY MANAGER

REQUESTED ACTION:

Approve resolution to accept grant funds for proposed Electric Vehicle (EV) Charging Infrastructure Project.

BACKGROUND/SUMMARY:

City staff applied and was recently awarded \$10,000 from Duke Energy to install a dual port electric charging station. The approved site for the station is located in the City parking lot at the corner of E. Elm Street and Marshall Street.



The proposed EV Charging Infrastructure Support Project is structured to provide direct financial support to Duke Energy customers who wish to install and own charging stations at locations where an EV can be charged for several hours. Such deployments are expected to support EV drivers by providing more available and convenient access to charging solutions, improving range confidence and vehicle utilization, and thereby increasing the environmental benefits associated with electric transportation.

FISCAL IMPACT:

The City would be reimbursed up to the approved awarded amount of \$10,000 by Duke Energy. After year one, there will be an additional network fee that will be addressed through future year operating budget requests.

STAFF RECOMMENDATION:

Staff's recommendation is to use the \$10,000 in grant funds to purchase and install a dual-port bollard unit in the City's parking lot at the corner of E. Elm Street and Marshall Street.

SUGGESTED MOTION(S):

I move we approve the resolution authorizing the City Manager to accept \$10,000 in reimbursement grant funds from Duke Energy Carolinas LLC.

**RESOLUTION AUTHORIZING ACCEPTANCE OF ELECTRIC VEHICLE GRANT FUNDS
FROM DUKE ENERGY CAROLINAS, LLC**

WHEREAS, Duke Energy is required to spend \$3,000,000 to implement environmental mitigation projects in the State of North Carolina designed to reduce air emissions from reduced vehicle emissions or reduced use of fossil-fueled electricity generation; and

WHEREAS, the City of Graham was awarded \$10,000 from Duke Energy Carolinas, LLC to install a dual port electric charging station to be located in the City parking lot at the corner of E. Elm Street and Marshall Street.;

WHEREAS, the proposed Electric Vehicle Charging Infrastructure Support Project is structured to provide direct financial support to Duke Energy customers who wish to install and own charging stations at locations where an EV can be charged for several hours.; and

WHEREAS, local businesses can benefit by capturing electric vehicle driver dollars as they spend money in the downtown while waiting for their vehicles to charge;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF GRAHAM THAT the City Manager is authorized to accept a payment of \$10,000 from Duke Energy Carolinas, LLC that will be utilized to pay the installation of a plug-in electric vehicle charging station.

Adopted this the 7th day of February, 2017.

Jerry Peterman - Mayor

ATTEST:

Darcy Sperry, City Clerk

REIMBURSEMENT AGREEMENT
FOR
PLUG-IN ELECTRIC VEHICLE CHARGING STATION PROJECTS

This Reimbursement Agreement for Plug-In Electric Vehicle Charging Station Projects (this “**Agreement**”) is made and entered into as of this 9th day of December, 2016 (the “**Effective Date**”), by and between Duke Energy Carolinas, LLC (“**Duke Energy**”), and City of Graham (“**Performing Party**”). Each of Duke Energy and Performing Party may be referred to herein as a “**Party**” and collectively as “**Parties**”.

RECITALS:

WHEREAS, as set forth in that certain Consent Decree entered into by Duke Energy on October 20, 2015 (the “**Consent Decree**”), Duke Energy is required to spend \$3,000,000 to implement environmental mitigation projects in the State of North Carolina designed to reduce air emissions from reduced vehicle emissions or reduced use of fossil-fueled electricity generation;

WHEREAS, of the aggregate amounts required to be spent pursuant to the Consent Decree, Duke Energy has allocated up to \$1,000,000 for the reimbursement of costs incurred by certain Duke Energy customers to purchase and install electric vehicle charging stations;

WHEREAS, this project is designed to provide direct financial support to Duke Energy customers (and, in certain instances, customers of those customers) that wish to install and own electric vehicle charging stations, including, without limitation, the charge ports associated therewith (collectively, the “**Charging Stations**”) and require assistance funding such purchase and installation;

WHEREAS, the Performing Party has expressed a desire to procure and install certain Charging Stations and has requested that Duke Energy reimburse the Performing Party for the costs it incurs to procure, construct and install such Charging Stations; and

WHEREAS, Duke Energy has agreed to reimburse the Performing Party for the costs it incurs to procure, construct and install the Charging Stations in the manner set forth herein;

NOW THEREFORE, in consideration of the recitals, the mutual promises and conditions set forth in this Agreement and other good and valuable consideration, Duke Energy and Performing Party agree as follows:

AGREEMENT

1. **Project**. The Performing Party covenants to Duke Energy that the Performing Party shall, in accordance with the terms and conditions set forth herein, (a) purchase and install all Charging Stations for each Project (as defined below) set forth on Exhibit A and (b) continue own, operate and maintain such Charging Stations after the purchase and installation thereof. The Performing Party shall be responsible for all ongoing costs of ownership associated with each Charging Station, including, but not limited to, associated energy, maintenance, repair and connectivity costs.

2. **Project Descriptions and Requirements**.

a. Project Descriptions. Exhibit A further describes each project to be completed by the Performing Party hereunder and specifically sets forth the general locations at which the Charging Stations are permitted to be installed, the aggregate number of charge ports to be installed at each such location, and the aggregate amount of funds reserved by Duke Energy for such project (collectively, a “**Project**”). Exhibit B contains a map detailing the approved locations for each Project. The Performing Party may only install the Charging Stations at an approved location and shall not change or modify the location of any Project (outside of the approved locations) or the aggregate number of charge ports to be installed at any Project without the prior written consent of Duke Energy.

b. Charging Station Requirements.

(i) All Charging Stations purchased by the Performing Party shall be new and unused and shall be owned by the Performing Party.

(ii) The Performing Party shall install proper signage at each Project location indicating that parking spaces at which any charge port is located are for “Plug-In Electrical Vehicle Use Only.”

(iii) The Charging Stations shall be either AC level 1 (provided cord set is hardwired), AC level 2, or DC Fast Charge and shall be installed at locations designed to support charging of plug-in electric vehicles while parked for several hours.

(iv) The location of each Project must be well-lit and safe, shall be in compliance with the Americans with Disabilities Act, and shall meet all requirements of Exhibit C.

(v) Each Project shall be located in an area reasonably accessible to the public and may not be located in a privately owned parking lot or in a Park N Ride lot.

3. Term. This Agreement will commence on the Effective Date and continue until the third (3rd) anniversary of the date the last Reimbursement is made hereunder or until otherwise terminated earlier pursuant to this Agreement. The Performing Party hereby acknowledges that all Projects must be completed in their entirety by no later than December 31, 2017 and that all Reimbursement Requests (as defined below), together with all required supporting information, must be received by no later than March 31, 2018. Any Reimbursement Request received after such date shall not be eligible for reimbursement hereunder without the prior consent of Duke Energy.

4. Award Amount. Subject to the terms and conditions set forth herein, Duke Energy will reimburse the Performing Party for the Eligible Costs (as defined herein) directly incurred by the Performing party to complete each Project; provided, however, that in no event shall the aggregate amount reimbursed by Duke Energy hereunder exceed the “Funds Reserved” amount contained in Exhibit A (such amount, the “**Maximum Reimbursement Amount**”). The payment made by Duke Energy to the Performing Party is sometimes referred to herein as the “**Reimbursement**.” The actual amount of the Reimbursement may be less than any component of the Maximum Reimbursement Amount.

5. Use of Funds. The Performing Party shall apply the Reimbursement solely and exclusively towards approved Eligible Costs.

6. Reimbursement Procedures. Subject to the terms and conditions of this Agreement, the Performing Party shall be reimbursed for work completed for each Project in the following manner.

a. Eligible Costs. The Reimbursement may be made to reimburse the Performing Party for Eligible Costs for each Project. For purposes of this Agreement, the term “**Eligible Costs**” shall mean only those costs associated with the procurement, construction, and installation of the Charging Stations, including, but not limited to, reasonable costs associated with placing the Charging Stations in service, including the charging station equipment, installation labor, related materials and supplies, permitting fees, and utility service extension costs, which costs the Performing Party has paid in full as evidenced by cancelled checks, payment confirmations or other similar documentation. For the avoidance of doubt, in no event shall any costs associated with network connectivity or data subscriptions be considered Eligible Costs hereunder and all such costs shall be deemed to be outside of the scope of this Agreement and not subject to reimbursement by Duke Energy. The Performing Party shall review all invoices and evidences of payment prior to requesting reimbursement from Duke Energy and shall ensure the accuracy thereof prior to providing such invoices and evidences of payment to Duke Energy. Duke Energy may reject the request for Reimbursement if it fails to demonstrate that all such costs are Eligible Costs or if it fails to conform to the requirements of this Agreement. The Reimbursement under this Agreement shall be payable only after Eligible Costs are approved by Duke Energy.

b. Reimbursement Request. Promptly, but no more than 90 days following completion of the purchase, installation, and commissioning of the Charging Infrastructure for any Project, the Performing Party shall submit to Duke Energy a reimbursement request with respect to all Eligible Costs incurred and paid by the Performing Party in connection with such Project (a “**Reimbursement Request**”). By submitting the Reimbursement Request, the Performing Party is certifying that the costs are accurate, eligible for reimbursement, have been paid in full by the Performing Party and are consistent with the terms and conditions of the Agreement. At the written request of Duke Energy, the Performing Party shall provide Duke Energy with such other information and materials as Duke Energy may reasonably require to substantiate the Performing Party’s right to the Reimbursement.

c. Payments. Subject in all respects to Section 6.d below, Duke Energy shall review and approve the Reimbursement as soon as practicable, but not later than forty-five (45) days after the complete Reimbursement Request has been received, provided that complete and accurate supporting documentation has been submitted to Duke Energy.

d. Maximum Reimbursement Amount. Under no circumstances shall the Reimbursement made by Duke Energy hereunder exceed any component of the Maximum Reimbursement Amount. All costs incurred by the Performing Party in excess of any component of the Maximum Reimbursement Amount shall not be subject to reimbursement hereunder.

7. Performing Party Obligations.

a. Licenses and Permits. The Performing Party hereby certifies that, prior to the commencement of any work for any Project, it has secured, and shall maintain and renew all permits, licenses, approvals and certifications required by any party, including, without limitation, any owner of such Project location or governmental or regulatory agency, for proper execution and completion of such work.

b. Compliance with Laws. The Performing Party shall comply, and shall cause all of its subcontractors to comply, with all applicable state, Federal and local laws relating to each Project and any of the work related thereto.

c. Audit Rights. Performing Party shall, for at least three (3) years after the completion of any Project, keep and maintain such records or accounts of the Performing Party as are necessary to verify and support any and all charges paid for with respect to such Project using the Reimbursement. This includes verification that any and all material, services, labor, and other expenses incurred for such Project have been paid. All books and records shall be maintained in accordance with generally accepted accounting principles. Such books and records shall be made available, on mutually agreeable dates and times, at the Performing Party's facility for verification, copying, audit and inspection by representatives of Duke Energy. Any such audit shall be at Duke Energy's expense and conducted during the Performing Party's normal working hours; provided, however, that the Performing Party shall provide reasonable assistance necessary to enable Duke Energy to conduct such audit and shall not be entitled to charge Duke Energy for any such assistance.

d. Optional Data Collection. From time to time, Duke Energy may contact the Performing Party to participate in Duke Energy's data collection on PEV charging practices in order to better understand the needs of electric vehicle drivers. The Performing Party may elect to participate in such collection process its sole discretion but shall not be required to do so.

8. Representations and Warranties. The Performing Party hereby represents and warrants to Duke Energy that:

a. it is duly organized and validly existing under the laws of its jurisdiction of incorporation or formation and is qualified to do business in all other jurisdictions in which the nature of the business conducted by it makes such qualification necessary;

b. it has all requisite legal power and authority to carry on its business and to execute this Agreement and to perform the terms, conditions and provisions hereof, as evidenced pursuant to N.C. Gen. Stat. 160A-11, etc.;

c. the execution, delivery and performance of this Agreement have been duly authorized by all requisite corporate action;

d. this Agreement constitutes the legal, valid and binding obligation of it, enforceable in accordance with the terms hereof;

e. there is no action, suit, proceeding or order now pending or, to its knowledge, threatened against it before any government authority that could reasonably be expected to

materially and adversely affect the ability of the Performing Party to perform its obligations hereunder; and

f. it hereby ratifies, adopts, and agrees to all representations in the approved application and deliverables it has provided to Duke Energy during the proposal process and agrees to give prompt written notice to Duke Energy if there is any material change in these certifications or deliverables.

9. Performing Party Certifications.

a. The Performing Party has not otherwise committed to acquire or install associated electric vehicle charging stations (without project funding support) and is not using and shall not use any portion of the Reimbursement hereunder to satisfy any obligations that it may have under other applicable regulations or requirements of law.

b. The Performing Party is a retail or wholesale customer of Duke Energy or Duke Energy Progress, LLC (or is a customer of a wholesale customer of Duke Energy or Duke Energy Progress, LLC) and is located within the State of North Carolina.

10. Indemnification. To the maximum extent permitted by applicable law, the Performing Party shall indemnify, defend and hold harmless Duke Energy (including its parent, subsidiary and affiliate companies), its officers, employees, agents, and any other party with an ownership interest in the premises, from and against all liability, loss, costs, claims, damages, expenses, judgments, and awards, whether or not covered by insurance, in any way related to or arising or claimed to have arisen in whole or in part from the acts or omissions of the Performing Party, its employees, volunteers, subcontractors, agents or assignees in its performance of, or failure to perform under, this Agreement. This indemnification shall include all costs including attorney's fees reasonably incurred in pursuing indemnity claims under or enforcement of this Agreement. Performing Party waives all rights of recovery, including for contribution, against Duke Energy and its directors, officers, employees, affiliates and subcontractors for any matters to which this Section may apply. The provisions of this Section 10 shall survive the termination of this Agreement.

11. Insurance.

a. Without limiting any obligations or liabilities of the Performing Party under this Agreement, the Performing Party shall provide and maintain, and shall require its subcontractors to provide and maintain, for the term of this Agreement, at its own expense, insurance coverages, to the extent applicable, in forms and amounts no less than the following: (i) Workers' Compensation specific to the applicable statutory requirements for the work to be performed; (ii) Employer's Liability Insurance of not less than \$1,000,000 each accident/employee/disease; (iii) Commercial General Liability Insurance having an available limit of at least \$1,000,000 per occurrence/\$2,000,000 in the aggregate for contractual liability, personal injury, bodily injury to or death of persons, and/or loss of use or damage to property; (iv) Commercial/Business Automobile Liability Insurance (including owned, non-owned or hired autos) having an available limit of at least \$1,000,000 each accident for bodily injury, death, property damage, with any fellow employee exclusion removed, and contractual liability; and (v) Umbrella/Excess Liability insurance with available limits of at least \$1,000,000 per occurrence and follow form of the underlying

Employer's Commercial General and Auto Liability insurance, and provide at least the same scope of coverages thereunder.

b. All insurance policies provided and maintained by the Performing Party and each subcontractor shall: (i) be underwritten by insurers which are rated A.M. Best "A- VII" or higher; (ii) specifically include Duke Energy and its directors, officers, employees, affiliates, and subcontractors as additional insureds, with respect to Performing Party's or its subcontractors' acts, omissions, services, products or operations, whether in whole or in part, excluding, however, for Worker's Compensation/Employer's Liability and E&O; (iii) be endorsed to provide, where permitted by law, waiver of any rights of subrogation against Duke Energy and its directors, officers, employees, affiliates and subcontractors; (iv) provide that such policies and additional insured provisions are primary with respect to the acts, omissions, services, products or operations of Performing Party or its subcontractors, whether in whole or in part, and without right of contribution from any other insurance, self-insurance or coverage available to Duke Energy and its affiliates; and (v) contain a standard cross liability clause and separation of insured and severability of interest provisions except with respect to the limits of the insurer's liability. Evidence of such coverage shall be provided via Performing Party's certificate of insurance furnished to Duke Energy prior to the start of any work, upon any policy replacement or renewal and upon Duke Energy's request. All insurance policies shall provide that the insurer will provide at least thirty (30) days' written notice to the Performing Party, who in turn shall provide at least thirty (30) days' written notice to Duke Energy prior to cancellation or non-renewal of any policy (or ten (10) days' notice in the case of non-payment of premium). Performing Party's compliance with these provisions and the limits of insurance specified herein shall not constitute a limitation of Performing Party's liability or otherwise affect Performing Party's indemnification obligations pursuant to this Agreement.

12. Default and Termination.

a. If Duke Energy determines, in its sole discretion, that the Performing Party has failed to comply with any term or condition in this Agreement, Duke Energy may terminate this Agreement immediately upon written notice by Duke Energy to the Performing Party. If this Agreement is so terminated, the Performing Party shall be liable to repay to Duke Energy all of the Reimbursements distributed to it under this Agreement.

b. If notified by Duke Energy in writing that it is in violation of any of the terms, conditions or provisions of this Agreement, and a default has occurred, and Duke Energy elects not to terminate the Agreement immediately pursuant to Section 12.a above, the Performing Party shall have thirty (30) days from the date of such notification to remedy the default or, if Duke Energy believes the remedy will take in excess of thirty days to complete, the Performing Party shall have thirty days to satisfactorily commence a remedy of the causes preventing its compliance and curing the default situation. Expiration of the thirty days and failure by the Performing Party to remedy, or to satisfactorily commence the remedy of, the default whether payment of funds has been fully or partially made, shall result in Duke Energy at its discretion, declining to make any further payments to the Performing Party, or in the termination of this Agreement by Duke Energy. If this Agreement is terminated, the Performing Party shall be liable to repay to Duke Energy all of the Reimbursements made to it under this Agreement.

c. If Performing Party becomes insolvent, or fails generally to pay its debts as they become due, or admits in writing its inability to pay its debts as they become due, or makes a general assignment for the benefit of creditors; commences any case, proceeding or other action seeking reorganization, arrangement, adjustment, liquidation, dissolution or composition of itself or its debts or assets, or adopts an arrangement with creditors, under any bankruptcy, moratorium, rearrangement, insolvency, reorganization or similar law of the United States or any state thereof for the relief of creditors or affecting the rights or remedies of creditors generally, Duke Energy may terminate this Agreement immediately upon written notice by Duke Energy to the Performing Party.

d. Upon receipt of notice of termination from Duke Energy, the Performing Party shall immediately stop work on the terminated portion of the Agreement unless otherwise directed by Duke Energy. If so requested by Duke Energy, the Performing Party shall provide to Duke Energy a report with supporting information describing the status of any Project as of the date of such termination.

e. No remedy herein conferred upon or reserved by Duke Energy is intended to be exclusive of any other available remedy, but each and every such remedy shall be cumulative and shall be in addition to every other remedy given under this Agreement or now or hereafter existing at law or in equity. No delay or omission to exercise any right or option accruing to Duke Energy upon any default by the Performing Party shall impair any such right or option or shall be construed to be a waiver thereof, but any such right or option may be exercised from time to time and as often as may be deemed expedient by Duke Energy.

13. Miscellaneous.

a. Assignability. Neither this Agreement nor any right, interest or obligation hereunder may be assigned by the Performing party without the prior written consent of Duke Energy, and any attempt to do so shall be null, void and ineffective.

b. Governing Law. The laws of the State of North Carolina shall govern this Agreement, except that the North Carolina conflict of law provisions shall not be invoked in order to apply the laws of any other state or jurisdiction.

c. Disputes. The Parties shall attempt to resolve any claims, disputes and other controversies arising out of or relating to this Agreement (collectively, "**Disputes**") promptly by negotiation between executives who have authority to settle the Dispute and who are at a higher level of management than the persons with direct responsibility for administration of this Agreement. A Party may give the other Party written notice of a Dispute which has not been resolved in the normal course of business. Executives of both Parties shall meet at a mutually acceptable time and place, and as often as they reasonably deem necessary, to attempt to resolve the Dispute. All negotiations pursuant to this clause are to be deemed confidential and shall be treated as compromise and settlement negotiations for purposes of applicable rules of evidence. If the Dispute has not been resolved by negotiation within sixty (60) Days of the disputing Party's initial notice, then either Party may initiate litigation. Venue for any such action shall lie exclusively in the appropriate state or federal courts in and for the State of North Carolina. Performing Party and Duke Energy agree to relinquish and waive their rights to a trial by jury in any action brought hereunder.

d. Notices. All notices, requests, consents and other communications hereunder shall be in writing and shall be dispatched by nationwide overnight courier service, such as (without limitation) Federal Express, or by United States Certified Mail, Return Receipt Requested, postage prepaid, address to the parties as follows:

If to Duke Energy:

Duke Energy Carolinas, LLC
400 S. Tryon Street
14th Floor
Charlotte, NC 28202
Attn: Stacy Phillips
Email: stacy.phillips@duke-energy.com

With a copy to: (which will not constitute as notice)

Duke Energy Carolinas, LLC
550 S. Tryon Street
45th Floor
Charlotte, NC 28202
Attn: Andre Rose, Deputy General Counsel
Email: andre.rose@duke-energy.com

If to the Performing Party:

The City of Graham
P.O. Drawer 357
201 S. Main Street
Graham, NC 27253
Attn: Aaron Holland, Assistant City Manager
Email: aholland@cityofgraham.com

Notices under this Agreement shall be deemed given upon the earlier of the date of delivery or the date upon which delivery is refused. Any changes in the names or addresses set out in this Section 13.d, shall be through written notice in conformity with the requirements set forth herein.

e. Section Headings. The headings of the several sections of this Agreement are inserted solely for the convenience of reference and are not a part of and are not intended to govern, limit or aid in the construction of any term or provision of this Agreement.

f. Entire Agreement. This Agreement is the entire agreement between the parties hereto with respect to the subject matter hereof and supersedes all prior agreements between the parties. No claim of waiver, modification, consent or acquiescence with respect to any of the provisions of this Agreement shall be made against either party, except on the basis of a written instrument executed by and on behalf of such parties. The parties acknowledge and agree that the recitals provided above constitute an integral part of this Agreement and shall be given the same force and effect as any other provision in this Agreement.

g. Severability. If any provision of this Agreement or the application thereof to any person or circumstance shall be invalid or unenforceable to any extent, the remainder of this Agreement and the application of such provisions to other persons or circumstances shall not be affected thereby and shall be enforced to the greatest extent permitted by law.

h. Other Parties. Nothing in this Agreement shall be construed as giving any person, firm, corporation or other entity, other than the parties hereto, any rights, remedy or claim under or in respect to this Agreement or any provision thereof.

i. No Waiver. Neither the failure of either party to exercise any power given such party hereunder or to insist upon strict compliance by the other party with its obligations hereunder, nor any custom or practice of the parties at variance with the terms hereof, shall constitute a waiver of either party's right to demand exact compliance with the terms hereof.

j. Survival. All of the warranties, covenants and representations of Performing Party, including, but not limited to Section 8, shall survive the termination of this Agreement.

[Signatures on following page]

IN WITNESS WHEREOF, each of the Parties has caused this Agreement to be executed by its duly authorized representative as of the date first above written.

City of Graham

Duke Energy Carolinas, LLC

By: _____

Name: _____

Title: _____

By: _____

Name: Melisa Johns _____

Title: Vice President- Business and Product Development, Distributed Energy Technology

Exhibit A

Project Descriptions

Locations Approved by Duke Energy for Installation of Ports: East Elm Street and Marshall Street.

Quantity of Ports Awarded: 2

Funds Reserved: \$10,000

Exhibit B

Project Location Maps



Exhibit C

Accessibility Requirements

(See Attached)



ACCESSIBILITY

for Public Charging Stations

Governing Standards

As municipalities and businesses install publically available plug-in electric vehicle (PEV) charging stations, an important design requirement is to ensure accessibility for disabled users. In the United States, the accessibility of public facilities is mandated by the Americans with Disabilities Act (ADA) and is generally governed by three standards:

- The International Building Code (IBC);
- The American National Standards Institute's (ANSI) Standard A117.1 "Accessible and Usable Buildings and Facilities;" and
- The U.S. Department of Justice (DOJ) 2010 ADA Standards for Accessible Design.

ADA Guidance in North Carolina

Conversations with North Carolina city and county officials, as well as with accessibility code consultants at the North Carolina Department of Insurance (NC DOI), which is responsible for interpretation of North Carolina's building and related codes, have assisted in the development of the following guidelines. This is the best known guidance at this time for local officials and property owners who are preparing to install charging stations.

Public and private entities intending to install charging stations for public use have one major challenge: governing codes and standards do not yet specifically address PEV charging stations.

Some generic accessibility requirements for public infrastructure or services are easily assessed (for example, reach ranges for operable controls). However, the most common type of public charging is currently provided by adding charging hardware to an existing parking space. In many cases these new charging spaces are restricted for use by PEV owners. As a result, the primary purpose of the space



becomes fueling instead of parking. This can create confusion as to which accessibility requirements should apply and how they should be interpreted. While several requirements are simply undefined at this time, there are existing accessibility requirements for parking facilities that can be used as a guide.

Applicable Codes

The codes and standards governing accessibility at a given facility can vary depending on which codes have been adopted by the applicable state or local jurisdiction and by the type of facility. Title II facilities are state or local government facilities, and Title III facilities are public accommodations and commercial facilities.

In North Carolina, the local Authority Having Jurisdiction (AHJ) is responsible for enforcement of the applicable requirements¹:

- Title II and Title III facilities shall both comply with the 2012 ADA Standards² and the 2012 NC Building Code³, Chapter 11, which references the 2009 ANSI A117.1 Standard.

¹ NC Department of Insurance Access Update Newsletter, Vol. 3 Issue 2, August 2012

² Note that enforcement of the ADA Standards will be by the US DOJ

³ The 2012 NC Building Code is the 2009 International Building Code with NC amendments



Anticipating Code Updates

Site owners must keep in mind that the accessibility code does not function in the same manner as most other codes with regard to updates. Construction that pre-dates a building code revision is typically “grandfathered” in compliance with the code that was in effect at the time of construction. Instead, as the accessibility code is updated, facilities are generally required to upgrade to the current standard. It may be more cost effective to proactively provide accessible charging stations to reduce legal liability, and because future retrofits could cost significantly more than enhanced construction in the present.

The requirements and recommendations described herein are provided as guidance only – official compliance for any electric vehicle

Charging station installations may also be governed by regulations found in a local zoning ordinance or unified development ordinance.

The requirements and recommendations described herein are provided as guidance only – official compliance for any electric vehicle charging station is subject to the code enforcement of the local AHJ, which may be supported by a formal interpretation from the NC DOI. Where available, specific code references are provided.

Site Design

Electric vehicle charging hardware is technically referred to as “electric vehicle supply equipment,” or EVSE. For simplicity this document refers to parking spaces served by EVSE as “charging spaces,” and uses “charging hardware” to refer specifically to the EVSE and not to the charging space as a whole.

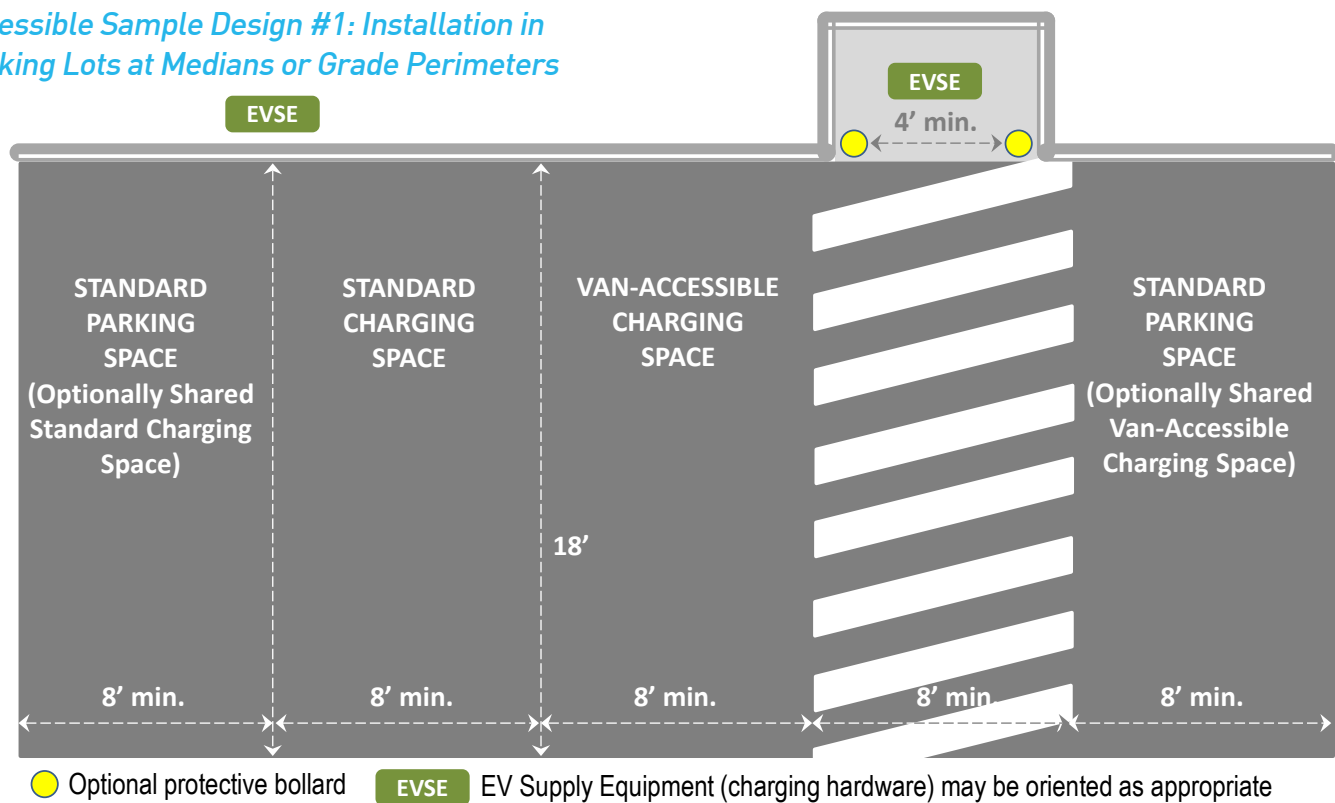
Number of Accessible Charging Spaces

On a given site the NC DOI views a contiguous group of charging spaces as a distinct parking facility, as described in NC Building Code (NCBC) 1106.1. Although there are no explicit requirements at this time for the number of charging spaces that must be accessible, it is recommended to follow the requirements for standard and van-accessible parking spaces presented in NCBC Table 1106.1 and Section 1106.5 (see Table 1).

Table 1.

Total Charging Spaces	Total Accessible Charging Spaces	Van-Accessible Charging Spaces
1-25	1	1
26-50	2	1
51-75	3	1
76-100	4	1
101-150	5	1
151-200	6	1
201-300	7	2

Accessible Sample Design #1: Installation in Parking Lots at Medians or Grade Perimeters



The first charging space that is installed should be sized for van-accessibility. A second accessible charging space is recommended when the 26th charging space is installed, and that second accessible charging space should be sized as a standard (non-van) accessible space. At least one space should be sized for van-accessibility out of every six accessible charging spaces that are present (1:6).

In some designs, a facility owner may install charging hardware such that it can be shared by a standard charging space and an accessible charging space. Such installations may be interpreted as satisfying the requirement for accessible charging spaces.

In multi-level parking structures, all charging spaces may be allowed to be located on one level. In parking facilities for buildings with multiple accessible entrances, charging spaces are not required to be dispersed. However, if charging spaces are provided in multiple locations for buildings with multiple accessible entrances, then accessible charging spaces must be provided at each location.

There is an exception to NCBC 1106.1 for certain types of fleet vehicle and motor pool parking facilities where lots accessed by the public are provided with an accessible passenger loading zone. Accessible passenger loading zones are addressed in NCBC 1106.7 and ANSI 503, where the basic requirements include a pull-up space that is a minimum eight feet wide by 20 feet long with an adjacent access aisle that is a minimum five feet wide by 20 feet long, marked so as to discourage parking in the aisle.

Layout of Accessible Charging Spaces

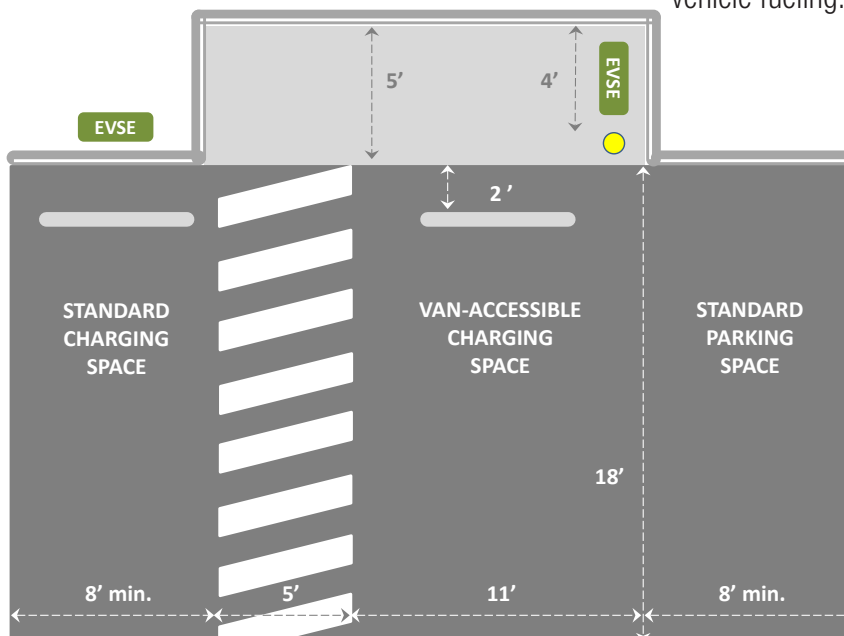
Layout and dimensions of accessible parking spaces are defined in ANSI 502. Accessible charging spaces should follow the same guidelines, namely that the first charging space, sized for van-accessibility, be a minimum 11 feet wide with an adjacent access aisle that is a minimum five feet wide. Alternately, the van-accessible parking space may be eight feet wide if the adjacent access aisle is at least eight feet wide, but the standard 11 foot width is preferred to provide more flexibility to the driver for positioning of the vehicle.

Any standard (non-van) accessible stalls must be a minimum eight feet wide with an adjacent access aisle that is at least five feet wide. In both cases, the minimum length of the parking spaces should be 18 feet. Note that local ordinances may require a longer space.

Accessible Routes

While the primary purpose of a charging space is vehicle fueling, it is also reasonable to expect that drivers may want to use a particular charging station due to its association with a specific building on a site. NCBC 1104.2 requires that at least one accessible route connect accessible buildings and other accessible elements or spaces that are on the same site.

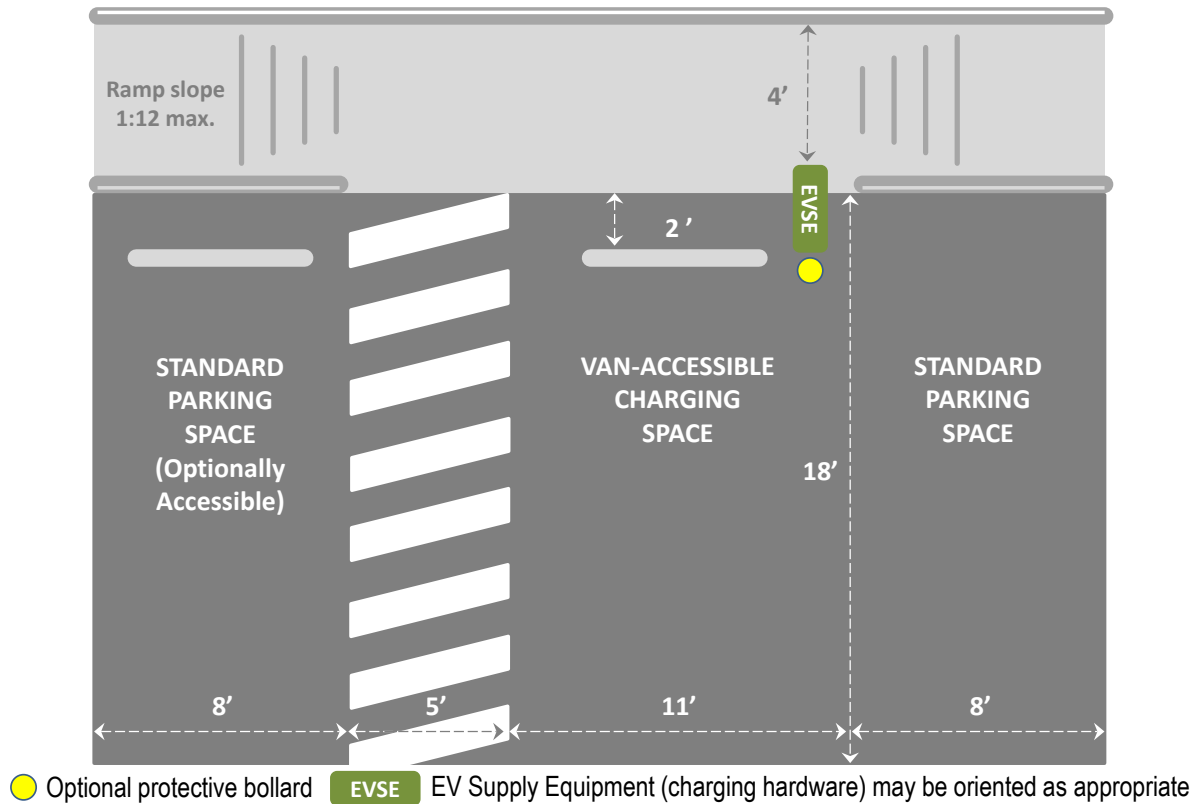
While accessible parking spaces must be on the shortest accessible route to the associated building entrance, accessible charging spaces may be on a longer route, because the primary purpose of the charging space is vehicle fueling.



Accessible Sample Design #2: Installation in Parking Lots at Medians or Grade Perimeters

● Optional protective bollard EVSE EV Supply Equipment (charging hardware) may be oriented as appropriate

Accessible Sample Design #3: Installation in Parking Lots at Sidewalk Boundaries



Note that NCBC 1104 requires an accessible route to be a fixed, firm, non-slip path of travel that is a minimum 48" wide, which exceeds the requirement in ANSI 403.5 for a 36" minimum width. Other key requirements for accessible routes include:

- A maximum running slope of 1:20 and maximum cross slope of 1:48, specified in ANSI 403.3.
- Any ramps or curb ramps present on an accessible route must comply with ANSI 405 and 406, respectively.

The addition of charging spaces to an existing parking facility will generally be interpreted as new construction, not an alteration. As a result, exceptions to the requirement for an accessible route due to disproportionality of costs are unlikely to be available unless they result from interpretation by the AHJ and/or NC DOI.

Parking facilities not associated with a specific building must provide an accessible route from the accessible charging space to an accessible pedestrian entrance to the parking facility per NCBC 1104.2.

While any requirement for an accessible route from an accessible charging space to an associated building may be subject to interpretation, it is clear that there must be an accessible route between the charging space and the charging hardware. The goal: ensure that once a PEV is maneuvered into the space, the driver can connect the charging cord to the vehicle charging inlet. It is acceptable for the driver to place the charging cord in or along that accessible route for the duration of the charging process.

However, charging stations should be positioned in such a manner that their cords WILL NOT block any sidewalk or obstruct any other accessible route while the cord is connected to a vehicle. It is possible that designs may be required to prevent or restrict such an impediment, especially if the accessible route (or access aisle, if applicable) serves a function or pathway beyond access to the charging hardware itself, e.g. complementary access to a building entrance or to a public way.

Availability for Use

It is not recommended to mark accessible charging spaces for the use of only disabled-marked vehicles because:

- The primary purpose of charging spaces is vehicle fueling; and
- The installation of accessible charging spaces does not reduce the number of required accessible parking spaces at the same site.

This model is similar to the provision of accessible hotel rooms governed by NCBC 1107.6, where accommodation is available for, but not limited to, use by disabled patrons. Charging station owners may choose to install signage that indicates “accessible priority” at accessible charging spaces, guiding non-disabled users to park in any available standard charging space before using an accessible charging space. Should the owner decide to mark accessible charging stalls for the use of disabled-marked vehicles only, NCBC 1110 and ANSI 502.7 define the related requirements.

Charging station owners may or may not choose to restrict the use of charging spaces to specific types of vehicles (e.g. PEVs only). Municipal station owners may establish ordinances defining the legal use of public charging spaces as well as the potential penalties for improper use, and commercial owners may define similar policies that are enforced at their discretion.

Finally, a site owner may choose to install charging hardware at a marked-accessible parking space, or to install charging hardware such that it can be shared between a marked-accessible parking space and another charging space. In such cases, the primary purpose of the marked space would remain the parking of disabled-marked vehicles. Such installations may be interpreted as satisfying the requirement for accessible charging spaces. In such cases, the NC DOI recommends that signage be provided to clarify that charging is not required in order to use the space. For example, “Accessible Parking. EV Charging is an Accessory Use” Or “EV Charging Optional.”

Charging Station Installation

Mounting Surface

The charging hardware may be mounted on a pedestal or attached to a pole, a wall or another vertical surface. Regardless of mounting style, the base should be at the same elevation as the parking surface, i.e. at street level. This significantly improves the ability to establish an accessible route from the hardware to the vehicle.

Consider alternatives for the orientation of the charging hardware. Depending on the charging space layout, the location of the access aisle and the associated accessible route, achieving accessibility may be more feasible by orienting the charging hardware at 45, 90 or 180 degrees to the charging space.

Operational Standards

Fuel dispensers are required to comply with ANSI 309 “Operable Parts” which includes three key elements:

1. Charging hardware must be installed with a clear floor space as defined in ANSI 305. A frontal approach on an accessible route will satisfy the typical clear floor space requirement (30” wide and 48” long), but the dimensions will vary if the approach is from the side (parallel), if the hardware is in an alcove, or if there are surrounding obstructions.
2. Operable parts must comply with the reach ranges specified in ANSI 308. The default unobstructed range of 15” minimum to 48” maximum applies to the charging connector at the end of the cord as well as to other operable controls on the charging hardware. Note that the 2011 National Electrical Code (NEC) Section 625 “Electric Vehicle Supply Equipment” requires minimum connector heights of 18” for indoor installations and 24” for outdoor installations, so compliance with the NEC should satisfy the minimum reach requirement for accessibility. The NEC maximum allowed height for the connector is also 48”. When hardware controls include the use of a display screen it is recommended

that owners assess the visibility of the display from a wheelchair seated position. ANSI 707.7 addresses display screens for Automatic Teller Machines and Fare Machines by requiring that the screen be visible from a point located 40" above the center of the clear floor space in front of the machine. That specification could be used as a model for assessing display screens on charging hardware if desired.

3. Gas pump nozzles are explicitly exempted from the maximum activating force requirement. This exemption may be interpreted to apply to electric charging connectors as well. This will likely only be a concern for high-power charging equipment.

Note that ANSI 707 "Automatic Teller Machines (ATMs) and Fare Machines) may apply to charging stations if they incorporate hardware and controls for assessing fees for the use of the charging space.

Protection

Curbs, bollards and wheel stops may be used to protect the charging hardware and/or delineate an accessible route. However, any of these protection devices may also obstruct access, introduce a trip hazard or make it more difficult to establish an accessible route from the charging space to the charging hardware.

It is recommended to simply install the minimum protection required.

Examples

Accessible Parking at a Public Library



Figure 1. Accessible public charging station at the Durham County Main Library, Durham, NC.

Several key design features are visible in Figure 1, which is a photograph of public charging stations at a county library:

- Provision of a van-accessible charging space (eight foot wide space with adjacent access aisle greater than eight feet wide)
- Provision of an accessible route from the parking space to the charging hardware that is greater than 48" in width
- Mounting of the charging hardware at street level and set back from the original curb line
- Mounting of the charging hardware such that it is not in the direct line of vehicle travel to reduce the need for protection by bollards
- Installation of bollards no closer than four feet to each other to avoid obstructing the accessible route
- Connection to an accessible route, from the charging space to the nearest entrance of the library, which is approximately 50 feet longer than the route from the farthest existing ADA-marked parking space at the site

Wheel stops were placed four feet from the curb to indicate an accessible route to the front of a parked vehicle. In retrospect, these wheel stops may be unnecessary, with omission providing drivers greater flexibility for vehicle positioning.

Accessible Parking at a Human Services Facility



Figure 2. Charging stations at the Durham County Human Services Complex, Durham, NC

Figure 2 shows the side view across charging spaces at a county human services facility. This installation uses the same design shown in Sample Design #1. While wheel stops can preserve an accessible route at the front of the charging space, note that omitting them gives drivers more flexibility in the ideal positioning of their vehicle.

Over-Protection Should be Avoided



Figure 3. Over-protection can hinder accessibility of charging stations.

Figure 3 shows charging hardware that has been installed with a two foot curb extension, protective bollards and wheel stops. Despite the adjoining access aisle and the sidewalk's generous width of nearly six feet, this charging hardware may not be deemed accessible due to the protective elements creating obstruction to the space. Furthermore, the space length has been reduced to less than 13 feet from the wheel stop to the end of the stripe, which may only accommodate compact vehicles.

On-Street Accessible Parking is Challenging



Figure 4. On-street van-accessible parking requires lots of adjacent space.

Figure 4 shows an example of van-accessible on-street parking. This space does not include PEV charging at this time, and would likely require additional curb removal at the front of the space to accommodate access to the charging hardware. Figure 4 illustrates the large amount of adjacent space required for an access aisle in this configuration. Typical adjoining sidewalks on existing streets may not be wide enough to accommodate this type of installation.



References

The national accessibility standards may be found online in several formats:

- [ANSI Standard A117.1-2009 “Accessible and Usable Buildings and Facilities”](#)
 - Viewable online (with no fee) at: http://publicecodes.cyberregs.com/icc/ansi/2009/a117p1/icc_ansi_2009_a117p1_cover.htm?bu=IC-P-2009-000025
 - Available for purchase in pdf, CD-ROM or soft cover format at: <http://www.iccsafe.org/Store/Pages/Product.aspx?id=9033S09>
- [DOJ 2010 ADA Standards for Accessible Design](#)
 - Available for download in pdf or html formats, along with companion guidance manual, at: http://www.ada.gov/2010ADAstandards_index.htm

Advanced Energy performed a national survey of EVSE-related accessibility guidelines and regulations as part of the research and discussion to establish requirements and recommendations for North Carolina. Two references stand out as key sources of information for any entity intending to address accessibility:

- [“EV Project: Accessibility at Public EV Charging Locations”](#)
 - Available at [http://www.theevproject.com/downloads/documents/EV Project - Accessibility at Public EV Charging Locations \(97\).pdf](http://www.theevproject.com/downloads/documents/EV%20Project%20-%20Accessibility%20at%20Public%20EV%20Charging%20Locations%20(97).pdf)
- [“Electric Vehicle Infrastructure: A Guide for Local Governments in Washington State”](#)
 - Available at <http://www.psrc.org/transportation/ev/model/guidance>



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