

CONTRACT DOCUMENTS
AND
TECHNICAL SPECIFICATIONS
FOR
SITE IMPROVEMENTS
AT
PECAN GROVE PHASE TWO AND THREE
JOHNSTON COUNTY, NORTH CAROLINA
2014-016

WATER SYSTEM OWNER: Johnston County Water Department
309 East Main Street
Smithfield, N.C. 27577

OWNER/DEVELOPER: Coastal Piedmont Developers, LLC
803 East Main Street
Havelock, N.C. 28532

CONSULTING ENGINEER: John G. Thomas, PE
Thomas Engineering, P.A.
1316-B Commerce Drive
P.O. Box 1309
New Bern, N.C. 28563-1309
(252) 637-2727 Office
(252) 636-2448 Fax
johnthomas@thomasengineeringpa.com



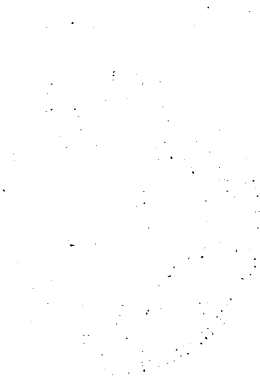


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The North Carolina Department of Transportation "Standard Specifications for Roads and Structures", most current edition, by referenced are hereby made part of these Contract Documents, more particularly, but not limited to, by Section as follows are:

CLEARING AND GRUBBING	SECTION 200
ROADWAY EXCAVATION	SECTION 225
BORROW EXCAVATION	SECTION 230
EMBANKMENTS	SECTION 235
DITCH EXCAVATION	SECTION 240
EXCAVATION OF SILT DETENTION DEVICES	SECTION 245
PROOF ROLLING	SECTION 260
PIPE INSTALLATION	SECTION 300
CONCRETE PIPE CULVERTS	SECTION 310
BCCSP CULVERTS	SECTION 324
BCCSP ARCH CULVERTS	SECTION 326
CONCRETE STRUCTURES	SECTION 420
SLOPE PROTECTION	SECTION 462
FINE GRADING SUBGRADE, SHOULDERS, & DITCHES	SECTION 500
AGGREGATE BASE COURSE	SECTION 520
SHOULDER CONSTRUCTION	SECTION 560
MOBILIZATION	SECTION 800
DISPOSAL OF WASTE AND DEBRIS	SECTION 802
CONCRETE CURB & GUTTER	SECTION 846
DITCH LINER	SECTION 851
TRAFFIC ISLANDS & MEDIANS	SECTION 852
RIP RAP	SECTION 868
TEMPORARY SEEDING	SECTION 881
SILT CHECK DAMS	SECTION 892
TEMPORARY SILT FENCE	SECTION 893
STONE FOR EROSION CONTROL	SECTION 895
MATERIALS	DIVISION 10

INVITATION TO BID

Notice is given hereby Coastal Piedmont Developers, LLC will accept bids for construction of Site Improvements at Pecan Grove Phase Two and Three, in Johnston County, North Carolina according to Drawings and Specifications prepared by THOMAS ENGINEERING, PA.

Bids will be received at the office of the ENGINEER until: 5 pm local time, July 28, 2016. Emailed proposals sent to the Engineer below are acceptable.

Bids will be opened by the Owner and Engineer at a later date.

ENGINEER: Thomas Engineering, PA
1316-B Commerce Drive
P.O. Box 1309
New Bern, N.C. 28563-1309
Office: (252) 637-2727
Fax : (252) 636-2448
Email: johnthomas@thomasengineeringpa.com

Bona fide bidders may secure copies of the proposed Contract Documents from the Office of the Engineer.

ENGINEER: Thomas Engineering, PA
1316-B Commerce Road
P.O. Box 1309
New Bern, N.C. 28563-1309
Office: (252) 637-2727
Fax : (252) 636-2448
Email: johnthomas@thomasengineeringpa.com

The Owner reserves the right to reject any or all bids and to waive irregularity in the bids and in the bidding.

The Owner also reserves the right to award separate contracts to different contractors for the "Street and Drainage Improvements" and the "Water System Improvements".

END OF INVITATION TO BID

SITE EXAMINATION (EXISTING UTILITIES)

Before submitting his bid, each bidder must visit the site to familiarize himself with local conditions that may in any manner affect performance of the work. Existing utilities may or may not be shown on the drawings. Contractor shall be responsible for discovery of existing underground installations, in advance of excavating, by contacting all local utilities and by prospecting. Contractor shall exercise extreme caution when working around all existing utilities and shall take all necessary precautions to prevent disruption of services to customers.

PROPOSAL (BID)

PROPOSAL of _____
(herein after called "BIDDER"), organized and existing under the laws
of the State of North Carolina doing business as
_____ (insert "a corporation", "a
partnership", or "an individual" as applicable).

OWNER: Coastal Piedmont Developers, LLC
803 East Main Street
Havelock, N.C. 28532

IN compliance with your Advertisement for Bids, BIDDER hereby
proposes to perform all the specified items of work necessary to
complete Site Improvements at Pecan Grove Phase Two and Three, in
Johnston County, North Carolina in strict accordance with the
Contract Documents, within the time set forth therein, and at the
prices stated below.

Bidder acknowledges receipt of the following Addendum:

THE undersigned hereby proposes to do all the work and to furnish all
tools, machinery, apparatus, labor, and materials required in exact
accordance with the terms of the Instruction to Bidders,
General Conditions, Supplementary General Conditions, Plans,
Specifications, Form of Contract contained herein and this Proposal.

THE undersigned has carefully examined the site of the work, and has
informed himself fully in respect of the conditions of the place
where the work is to be performed, and has examined the plans and
specifications for the work, the proposed contract, and the contract
documents relating thereto, has examined all special provisions,
labor requirements, and other matters relating thereto.

THE undersigned will provide all necessary tools, machinery,
apparatus, and all means necessary to do all of the work and will
furnish all of the labor and materials necessary to complete such
contract to be entered into in the manner prescribed in the Contract
Documents.

IT is understood that the Owner reserves the right to reject all bids
or award the contract to the low, responsive, responsible bidder. The
Owner also reserves the right to award separate contracts to
different contractors for the "Street and Drainage Improvements" and
the "Water System Improvements".

ON being awarded a construction contract, the undersigned will execute a contract for the construction of the work described in conformity with the Contract Documents in the form hereto attached.

THE undersigned agrees, that if awarded the contract, he will commence work not later than the date set by the Engineer in the Notice to Proceed, and that he will complete all items of work within 120 calendar days from the date of the notice in respect thereof.

The undersigned recognizes that the Owner will suffer financial loss if the Work is not completed within the Contract Time. The undersigned agrees to be liable for and shall pay the Owner the following amounts under Owner's Damages, and Engineer's Charges, all as liquidated damages, and not as a penalty.

Owner's Damages \$200.00/day
Engineer's Charges \$100.00/day
Total Liquidated Damages ...\$300.00/day

Liquidated damages will be assessed for the above listed amounts for each and every day the work remains incomplete after the Contract Time expires.

THE successful bidder will be requested to submit a construction schedule and a schedule of estimated monthly progress payments prior to the preconstruction conference.

BIDDER agrees to perform all the work described in the CONTRACT DOCUMENTS for the following unit prices (Bid prices shall include sales tax and all other applicable taxes and fees.)

Phase Two Street and Drainage Improvements

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Temporary Gravel Construction Entrance	2	ea		
2	Clearing and Grubbing	0.75	ac		
3	Permanent Seeding & Mulching	6	ac		
4	Temporary Silt Fence	350	lf		
5	Temporary Gravel and Rip Rap Check Dam	10	ea		
6	Temporary Coir Fiber Wattle	18	ea		
7	Temporary Sediment Traps w/ Removal Post Construction	3	ea		
8	Pipe Outlet Protection	12	ea		
9	Matting	10000	sy		
10	Excavation: Site Grading	1	ls		
11	Excavation: Swales/Ditching (0'-4')	650	lf		
12	15" RCP Storm Sewer	16	lf		
13	18" RCP Storm Sewer	136	lf		

14	18" RCP Flared End Section	6	ea		
15	24" RCP Storm Sewer	32	lf		
16	24" RCP Flared End Section	2	ea		
17	36" RCP Storm Sewer	48	lf		
18	36" NCDOT Precast Concrete Endwall - Detail R7	2	ea		
19	6" Compacted Aggregate Base Course	6,100	sy		
20	1.5" SF9.5A Asphalt Surface Coarse	5,850	sy		
Total Phase Two Street and Drainage Improvements					

Old Fairground Road Widening (SR 1309)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Tree Removal	10	ea		
2	Remove Concrete/Masonry Wall	1	ls		
3	Temporary Silt Fence	80	lf		
4	Pipe Outlet Protection	2	ea		
5	Temporary Coir Fiber Wattle	1	ea		
6	Permanent Seeding and Mulching	0.5	ac		
7	Grading	1	ls		
8	18" RCP Storm Sewer	16	lf		
9	5" B 25.0B Asphalt Base Coarse	1150	sy		
10	3-1/2" I 19.0B Asphalt Intermediate Coarse	1150	sy		
11	1-1/2" SF9.5B Asphalt Surface Coarse (Overlay)	3975	sy		
12	Pavement Marking & Symbols	1	ls		
13	6" PVC Class 200 SDR 21 Water Mains	1025	lf		
14	6" Gate Valve & Box	3	ea		
15	6" DIP MJ Fittings	8	ea		
Total Old Fairground Road Widening (SR 1309)					

Phase Two Water System Improvements

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Cut 6" x 6" x 2" DIP Tee MJ into Existing Line	1	ea		
2	2" SCH 40 PVC Offsite Sewer Mains	1,325	lf		
3	2" PVC Class 200 SDR 21 Water Mains	1,020	lf		
4	6" PVC Class 200 SDR 21 Water Mains	1,765	lf		
5	6" Ductile Iron Pipe Water Mains	60	lf		
6	4" Ductile Iron Encasement	40	lf		
7	6" x 6" x 2" DIP Tee MJ	1	ea		
8	6" x 2" Reducer	1	ea		
9	6" DIP MJ Fittings	12	ea		
10	2" Gate Valve & Box	2	ea		
11	6" Gate Valve & Box	4	ea		
12	Valve/Blowoff Markers	12	ea		
13	2" End of Line Blow Off Assembly	3	ea		

14	Fire Hydrant Assembly	3	ea		
15	3/4" Single Water Service (Main Side of Street)	22	ea		
16	3/4" Single Water Service (Across Street)	13	ea		
17	3/4" Single Water Service (On existing 4" Main)	2	ea		
18	3/4" Single Water Service (Installed by Dry Bore - Dixon Rd)	1	ea		
19	Install Electric Conduit	5	ea		
20	Marker Balls	28	ea		
Total Phase Two Water System Improvements					

Phase Three Street and Drainage Improvements

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Temporary Gravel Construction Entrance	1	ea		
2	Permanent Seeding & Mulching	0.5	ac		
3	Temporary Gravel and Rip Rap Check Dam	2	ea		
4	Temporary Coir Fiber Wattle	1	ea		
5	Temporary Skimmer Sediment Basins w/ Removal	1	ea		
6	Pipe Outlet Protection	2	ea		
7	Matting	1750	sy		
8	Excavation: Site Grading	1	ls		
9	Excavation: Swales/Ditching (0'-4')	300	lf		
10	18" RCP Storm Sewer	64	lf		
11	18" RCP Flared End Section	2	ea		
12	6" Compacted Aggregate Base Course	1,150	sy		
13	1.5" SF9.5A Asphalt Surface Coarse	1,100	sy		
Total Phase Three Street and Drainage Improvements					

Phase Three Water System Improvements

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
14	12" Steel Encasement (J&B)	60	lf		
15	2" PVC Class 200 SDR 21 Water Mains	350	lf		
16	6" PVC Class 200 SDR 21 Water Mains	100	lf		
17	6" x 2" Reducer	1	ea		
18	6" DIP MJ Fittings	4	ea		
19	6" Gate Valve & Box	1	ea		
20	Valve/Blowoff Markers	3	ea		
21	2" End of Line Blow Off Assembly	1	ea		
22	Fire Hydrant Assembly	1	ea		
23	3/4" Single Water Service (Main Side of Street)	6	ea		
24	Install Electric Conduit	2	ea		
25	Marker Balls	5	ea		
Total Phase Three Water System Improvements					

The undersigned hereby designates his office to which such notice of acceptance may be mailed, telegraphed, or delivered:

THIS bid may be withdrawn at any time prior to the scheduled time for the opening of bids or any authorized postponement thereof.

ATTEST:

DATE: _____

CONTRACTOR

BY _____

TITLE: _____

ADDRESS: _____

SEAL

DATE

LICENSE NO. _____

NOTICE OF AWARD

Dated _____, 20__

TO: _____
(BIDDER)

OWNER'S PROJECT NUMBER: _____

PROJECT: _____

OWNER'S CONTRACT NUMBER _____

CONTRACT FOR: _____

(Name of Contract as it appears in the Bidding Documents)

You are notified that your Bid dated _____, 20__ for the
above Contract has been considered. You are the apparent successful
bidder and have been awarded a contract for

(Indicate total Work, alternates or sections of Work awarded)

The Contract Price of your contract is _____
Dollars (\$_____).

Three copies of each of the proposed Contract Documents (except
Drawings) accompany this Notice of Award. Three sets of the Drawing
will be delivered separately or otherwise made available to you
immediately. You must comply with the following conditions precedent
within fifteen days of the date of this Notice of Award, that is by
_____, 20__.

1. You must deliver to the OWNER three fully executed counterparts
of the Agreement including all the Contract Documents. This
includes the triplicate sets of Drawings. Each of the Contract
Documents must bear your signature on (the cover) (every) page.
2. You must deliver with the executed Agreement the Contract
Security (Bonds) as specified in the Instructions to Bidders
(paragraph 17). General Conditions (paragraph 5.1) and
Supplementary Conditions (paragraph SC-5.1).
3. (List other conditions precedent).

Failure to comply with these conditions within the time specified will entitle OWNER to consider your bid abandoned, to annul this Notice of Award and to declare your Bid Security forfeited.

Within ten days after you comply with those conditions, OWNER will return to you one fully signed counterpart of the Agreement with the Contract Documents attached.

OWNER: _____

TITLE: _____

SIGNATURE: _____

Copy to ENGINEER (Use Certified Mail, Return Receipt Requested)

CONTRACT
(AGREEMENT)

This CONTRACT, made the _____ day of _____ by and between _____,

hereinafter called the "Contractor", and **Coastal Piedmont Developers, LLC**,
hereinafter called the "Owner".

WITNESSETH, That the contractor and Owner, for the consideration stated herein,
agree as follows:

ARTICLE I, SCOPE OF WORK: The Contractor shall perform everything required to be performed and shall provide and furnish all of the labor, materials, necessary tools, expendable equipment, and all utility and transportation services required to perform and complete in a workmanlike manner all of the work required for **Site Improvements for Pecan Grove Phase Two and Three** in strict accordance with the drawings and specifications, including any and all addenda, prepared by THOMAS ENGINEERING, P.A., acting and in these Contract Documents, referred to as the "ENGINEER", which drawings and specifications are made a part of this contract, and strict compliance with the Contractor's Bid and the other Contract herein mentioned which are a part of this Contract and other contract constituting a part hereof.

ARTICLE II, THE CONTRACT PRICE:

The Owner shall pay to the Contractor for the performance of this Contract, subject to any additions or deductions provided herein, in current funds, the contract prices computed as follows:

CONTRACTOR agrees to perform all the work described in the CONTRACT DOCUMENTS for the following unit prices shown in the Bid Schedule (prices shall include sales tax and all other applicable taxes and fees):

Phase Two Street and Drainage Improvements

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Temporary Gravel Construction Entrance	2	ea		
2	Clearing and Grubbing	0.75	ac		
3	Permanent Seeding & Mulching	6	ac		
4	Temporary Silt Fence	350	lf		
5	Temporary Gravel and Rip Rap Check Dam	10	ea		
6	Temporary Coir Fiber Wattle	18	ea		
7	Temporary Sediment Traps w/ Removal Post Construction	3	ea		
8	Pipe Outlet Protection	12	ea		
9	Matting	10000	sy		
10	Excavation: Site Grading	1	ls		
11	Excavation: Swales/Ditching (0'-4')	650	lf		
12	15" RCP Storm Sewer	16	lf		
13	18" RCP Storm Sewer	136	lf		
14	18" RCP Flared End Section	6	ea		
15	24" RCP Storm Sewer	32	lf		
16	24" RCP Flared End Section	2	ea		
17	36" RCP Storm Sewer	48	lf		

18	36" NCDOT Precast Concrete Endwall - Detail R7	2	ea		
19	6" Compacted Aggregate Base Course	6,100	sy		
20	1.5" SF9.5A Asphalt Surface Coarse	5,850	sy		
Total Phase Two Street and Drainage Improvements					

Old Fairground Road Widening (SR 1309)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Tree Removal	10	ea		
2	Remove Concrete/Masonry Wall	1	ls		
3	Temporary Silt Fence	80	lf		
4	Pipe Outlet Protection	2	ea		
5	Temporary Coir Fiber Wattle	1	ea		
6	Permanent Seeding and Mulching	0.5	ac		
7	Grading	1	ls		
8	18" RCP Storm Sewer	16	lf		
9	5" B 25.0B Asphalt Base Coarse	1150	sy		
10	3-1/2" I 19.0B Asphalt Intermediate Coarse	1150	sy		
11	1-1/2" SF9.5B Asphalt Surface Coarse (Overlay)	3975	sy		
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13	6" PVC Class 200 SDR 21 Water Mains	1025	lf		
14	6" Gate Valve & Box	3	ea		
15	6" DIP MJ Fittings	8	ea		
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3	2" PVC Class 200 SDR 21 Water Mains	1,020	lf		
4	6" PVC Class 200 SDR 21 Water Mains	1,765	lf		
5	6" Ductile Iron Pipe Water Mains	60	lf		
6	4" Ductile Iron Encasement	40	lf		
7	6" x 6" x 2" DIP Tee MJ	1	ea		
8	6" x 2" Reducer	1	ea		
9	6" DIP MJ Fittings	12	ea		
10	2" Gate Valve & Box	2	ea		
11	6" Gate Valve & Box	4	ea		
12	Valve/Blowoff Markers	12	ea		
13	2" End of Line Blow Off Assembly	3	ea		
14	Fire Hydrant Assembly	3	ea		
15	3/4" Single Water Service (Main Side of Street)	22	ea		
16	3/4" Single Water Service (Across Street)	13	ea		
17	3/4" Single Water Service (On existing 4" Main)	2	ea		

18	3/4" Single Water Service (Installed by Dry Bore - Dixon Rd)	1	ea		
19	Install Electric Conduit	5	ea		
20	Marker Balls	28	ea		
Total Phase Two Water System Improvements					

Phase Three Street and Drainage Improvements

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Temporary Gravel Construction Entrance	1	ea		
2	Permanent Seeding & Mulching	0.5	ac		
3	Temporary Gravel and Rip Rap Check Dam	2	ea		
4	Temporary Coir Fiber Wattle	1	ea		
5	Temporary Skimmer Sediment Basins w/ Removal	1	ea		
6	Pipe Outlet Protection	2	ea		
7	Matting	1750	sy		
8	Excavation: Site Grading	1	ls		
9	Excavation: Swales/Ditching (0'-4')	300	lf		
10	18" RCP Storm Sewer	64	lf		
11	18" RCP Flared End Section	2	ea		
12	6" Compacted Aggregate Base Course	1,150	sy		
13	1.5" SF9.5A Asphalt Surface Coarse	1,100	sy		
Total Phase Three Street and Drainage Improvements					

Phase Three Water System Improvements

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
14	12" Steel Encasement (J&B)	60	lf		
15	2" PVC Class 200 SDR 21 Water Mains	350	lf		
16	6" PVC Class 200 SDR 21 Water Mains	100	lf		
17	6" x 2" Reducer	1	ea		
18	6" DIP MJ Fittings	4	ea		
19	6" Gate Valve & Box	1	ea		
20	Valve/Blowoff Markers	3	ea		
21	2" End of Line Blow Off Assembly	1	ea		
22	Fire Hydrant Assembly	1	ea		
23	3/4" Single Water Service (Main Side of Street)	6	ea		
24	Install Electric Conduit	2	ea		
25	Marker Balls	5	ea		
Total Phase Three Water System Improvements					

ARTICLE III, TIME OF COMPLETION: The Contractor agrees to complete the work included under this contract within the time indicated below after notice to proceed with the work:

120 CONSECUTIVE CALENDAR DAYS

ARTICLE IV, Liquidated Damages: The undersigned recognizes that the Owner will suffer financial loss if the Work is not completed within the Contract Time. The undersigned agrees to be liable for and shall pay the Owner the following amounts under Owner's Damages, and Engineer's Charges, all as liquidated damages, and not as a penalty.

Owner's Damages \$200.00/day
Engineer's Charges \$100.00/day
Total Liquidated Damages ...\$300.00/day

Liquidated damages will be assessed for the above listed amounts for each and every day the work remains incomplete after the Contract Time expires.

ARTICLE V, COMPONENT PARTS OF THIS CONTRACT: This contract consist of the following component parts, which are as fully a part of this contract as if herein set out verbatim or, if not attached, as if hereto attached:

1. Contract (Agreement)
2. Insurance Certificate
3. Change Orders
4. General Conditions
5. Special Conditions
6. Drawings prepared by THOMAS ENGINEERING, PA
entitled Site Improvements for Pecan Grove Phase Two and Three dated 4/20/2016.
7. Specifications prepared by THOMAS ENGINEERING, PA
entitled Site Improvements for Pecan Grove Phase Two and Three dated 4/20/2016.

ARTICLE VI - PAYMENT PROCEDURES: Contractors shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by the ENGINEER as provided in the General Conditions. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Application for Payment as recommended by ENGINEER, on or about the 10th day of each month during construction as provided below. All progress payments will be on the basis of the progress of the work measured by the schedule of values provided for in paragraph 14.1 of the General Conditions.

Prior to Substantial Completion progress will be in an amount equal to 90% of the work completed, and 90% of materials and equipment not incorporated in the work but delivered and suitably stored, less in each case the aggregate of payments previously made. Upon Substantial Completion, Owner shall pay an amount sufficient to increase payments to CONTRACTOR to 95% of the contract price, less such amounts as ENGINEER shall determine in accordance with paragraph 14.16 of the General Conditions. Upon final completion and acceptance of the work in accordance with paragraph 14.16 of the General Conditions, Owner shall pay the remainder of the Contract paragraph 14.16.

The Road and Drainage Improvements work under this Contract will not be accepted until such time as the North Carolina Department of Transportation has issued a letter stating that the subject roads have been initially constructed to meet the

minimum standards of the North Carolina Department of Transportation for
Subdivision Roads.

The Water System Improvements work under this Contract will not be accepted until
such time as the Johnston County Water Department has accepted the water system.

IN WITNESS WHEREOF, the parties hereto have signed this agreement in triplicate.
One counterpart each has been delivered to OWNER, CONTRACTOR, and ENGINEER. All
portions of the Contract Documents have been signed or identified by OWNER and
CONTRACTOR or by ENGINEER on their behalf.

This Agreement will be effective on _____

CONTRACTOR _____

By _____

ATTEST _____

Address for giving notices:

License Number: _____

OWNER: **Coastal Piedmont Developers, LLC**

By: _____

ATTEST: _____

Address for giving notices:

803 East Main Street
Havelock, N.C. 28532

NOTICE TO PROCEED

DATE: _____

To: _____
(Contractor)

PROJECT: _____

CONTRACT FOR: _____

You are notified that the Contract Time under the above contract will commence to run on _____. By that date, you are to start performing the Work and your other obligations under the Contract Documents. The dates of Substantial Completion and Final Completion are set forth in the Agreement;

Before you may start any Work at the site, you and OWNER must each deliver to the other (with copies to ENGINEER) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents.

Also before you may start any Work at the site, you must
(add other requirements)

Work at the site must be started by _____
as indicated in the Contract Documents.

(Owner)

By _____

(Authorized Signature)

(Title)

Copy to ENGINEER
(Use Certified Mail,
Return Receipt Requested)

INSURANCE CERTIFICATE

APPLICATION FOR PAYMENT NO. _____

To _____ (OWNER)
Contract for _____ Dated _____.
OWNER'S Project No. _____ ENGINEER'S Project No. _____
For Work accomplished through the date of _____.

ITEM	CONTRACTOR'S Schedule of Values			Work Completed	
	Unit Price	Qty	Amount	Qty.	Amt.
	\$		\$		\$
TOTAL					
(Orig. Contract)			\$		\$
C.O.#1					
C.O.#2					
Accompanying Documentation					
			GROSS AMT DUE	\$	
			LESS % RETAINAGE	\$	
			AMT DUE TO DATE	\$	
			LESS PAYMENTS	\$	
			AMT DUE THIS APPL.	\$	

CONTRACTOR'S Certification

The undersigned CONTRACTOR certifies that (1) all previous progress payments received from OWNER on account of Work done under the Contract referred to above have been applied to discharge in full all obligations of CONTRACTOR incurred in connection with Work covered by prior Applications for Payment numbered 1 through _____ inclusive; and (2) title to all materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to OWNER at time of payment free and clear of all liens, claims, security interests and encumbrances (except such covered by Bond acceptable to OWNER).

Dated _____, 20____
CONTRACTOR

By _____

ENGINEER'S Recommendation

This application (with accompanying documentation) meets the requirements of the Contract Documents and payment of the above AMOUNT DUE THIS APPLICATION is recommended.

Dated _____, 20____
ENGINEER

By _____

CHANGE ORDER

Dated _____

OWNER'S Project No. _____ ENGINEER'S Project No. _____

Project _____

CONTRACTOR _____

Contract For _____ Contract Date _____

To: _____

CONTRACTOR

You are directed to make the changes noted below in the
subject Contract:

OWNER

By _____

Dated _____, 20 _____

Nature of the Changes

Enclosures:

These changes result in the following adjustments of Contract
Price and Contract Time:

Contract Price Prior to This Change Order \$ _____

Net (Increase) (Decrease) Resulting
from this Change Order \$ _____

Current Contract Price Including
This Change Order \$ _____

Contract Time Prior to This Change Order _____
(Days or Date)

Net (Increase) (Decrease) Resulting from
This Change Order _____
(Days)

Current Contract Time Including
This Change Order _____
(Days or Date)

The Above Changes Are Approved:

ENGINEER

By _____

Date _____, 20__

The Above Changes Are Accepted:

CONTRACTOR

By _____

Date _____, 20__

CERTIFICATE OF SUBSTANTIAL COMPLETION

OWNER'S Project No. _____ ENGINEER'S Project No. _____

Project _____

CONTRACTOR _____

Contract for _____ Contract Date _____

This Certificate of Substantial Completion applies to all
Work under the Contract Documents or to the following
specified parts thereof:

To _____
OWNER

And To _____
CONTRACTOR

The Work to which this Certificate applies has been inspected
by authorized representatives of OWNER, CONTRACTOR and
ENGINEER, and that Work is hereby declared to be
substantially complete in accordance with the Contract
Documents on

Date of Substantial Completion

A tentative list of items to be completed or corrected is
attached hereto. This list may not be all-inclusive, and the
failure to include an item in it does not alter the
responsibility of CONTRACTOR to complete all the work in
accordance with the Contract Documents. When this Certificate
applies to a specified part of the Work the items in the
tentative list shall be completed or corrected by CONTRACTOR
within _____ days of the above date of Substantial Completion.

The date of Substantial Completion is the date upon which all guarantees and warranties begin, except as follows:

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities and insurance shall be as follows:

RESPONSIBILITIES:

OWNER: _____

CONTRACTOR: _____

The following documents are attached to and made a part of this Certificate:

Executed by ENGINEER on _____, 20____

ENGINEER

By _____

The CONTRACTOR accepts this Certificate of Substantial

Completion on _____, 20____

CONTRACTOR

By _____

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly By



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Professional Engineers**
Professional Engineers in Private Practice



**American Society
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GENERAL CONDITIONS

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's 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.A 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. The General Requirements pertain to all sections 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 in connection with the Work.

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. *Related Entity* -- An officer, director, partner, employee, agent, consultant, or subcontractor.

37. *Resident Project Representative*--The authorized representative of Engineer who may be assigned to the Site or any part thereof.

38. *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.

39. *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.

40. *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.

41. *Shop Drawings*--All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

42. *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.

43. *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.

44. *Subcontractor*--An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

45. *Substantial Completion*--The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

46. *Successful Bidder*--The Bidder submitting a responsive Bid to whom Owner makes an award.

47. *Supplementary Conditions*--That part of the Contract Documents which amends or supplements these General Conditions.

48. *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 any Subcontractor.

49. *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.

50. *Unit Price Work*--Work to be paid for on the basis of unit prices.

51. *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.

52. *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 following words or terms are not defined but, when used in the Bidding Requirements or Contract Documents, have the following 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 requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective 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 which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 - 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*

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.

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 may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to Owner.

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, or Engineer, or any of, their Related Entities, 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 may discover 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 any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, Contractor shall 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 knew or reasonably should have known 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, code, or instruction (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 or other individual or entity performing or furnishing all of the Work under a direct or indirect contract with Contractor, 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 Engineer's consultants, including electronic media editions; or
2. reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaption by Engineer.

B. The prohibition 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. Copies of data furnished by Owner or Engineer to Contractor or 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 of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Contract Documents; and

2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Contract Documents.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. 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 Related Entities 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 at or contiguous to the Site 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, Owner and Engineer, and any of their Related Entities shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *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; 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:* Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the Engineer in the preparation of the Contract Documents.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. 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 Related Entities 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.

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 to Contractor written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim 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, 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, 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 current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent must be accompanied by a certified copy of the agent's authority to act.

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 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 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.

5.04 *Contractor's Liability Insurance*

A. Contractor shall purchase and maintain such liability and other 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, include as additional insured (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, 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 completed operations insurance;

4. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;

5. 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);

6. 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

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment.

a. 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, 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 an insured or additional insured;

2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, 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 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 additional insured to whom a certificate of insurance has been issued.

B. Owner shall purchase and maintain such boiler and machinery 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, 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 an insured or additional insured.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with 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 additional insured 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 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 to be listed as insureds or additional insureds (and the officers, directors, 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 additional insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, 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 to be listed as insured or additional insured (and the officers, directors, 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, 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, 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 insureds, 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. The superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or received from the superintendent shall be binding on Contractor.

6.02 *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;

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,

3) it has a proven record of performance and availability of responsive service; and

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 that 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 in 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 or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and
 - c) whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
- 3) will identify:
 - a) all variations of the proposed substitute item from that specified , and
 - b) available engineering, sales, maintenance, repair, and replacement services;
- 4) and 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 either a Change Order for a substitute or an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.

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 item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the 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 anything in the Contract Documents 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 an additional insured 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, and Engineer,, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, 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, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, 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

primary 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, 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. 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. 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 , 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).

D. 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 acceptable 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*: Contractor shall also submit Samples to Engineer for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals.

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 determined and verified:

a. all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

- b. the suitability of all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;
 - c. all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto; and
 - d. shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.
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 Drawing's 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 Related Entities 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, 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 respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.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, 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 via 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, a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of Engineer and the others whose work will be affected. The duties and 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 actions or inactions.

C. Contractor shall be liable to Owner and any other contractor for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's 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 in respect of 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 in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by Engineer in preparing the Contract Documents.

8.06 *Insurance*

A. Owner's responsibilities, if any, in 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 in 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. If and to the extent Owner has agreed to furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents, Owner's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

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 and will not be changed without written consent of Owner and Engineer.

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 believe 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.

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.B.

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

10.05 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 Time 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 include only the following items, and shall not include any of the costs itemized in Paragraph 11.01.B.

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, 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, 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, expresses, 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 and 11.01.B.

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 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 Paragraph 12.01.C.2.a 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 the Related Entities of each of them 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. All 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, inspecting, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's Site safety procedures and programs so that they may comply therewith as applicable.

13.03 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 said 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, it must, if requested by Engineer, be uncovered 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 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 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 on the Site 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, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and to 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. that there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

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 corrects to Owner's satisfaction the reasons for such action.

3. If it is subsequently determined that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1.

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 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 will certify to Owner and Engineer that such part of the Work is substantially complete and request Engineer to issue a certificate of Substantial Completion 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.7;
 - 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 or Owner's property might in any way be responsible 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 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 their 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.

SPECIAL CONDITIONS

- a) The Special Conditions and the Technical Specifications bound herewith shall be subject to all the requirements of the General Conditions, and shall be used in conjunction with them as a part of the Contract Documents.
- b) Any and all conflicts, duplications and questions related to the two (2) sets of Conditions shall be directed to the Engineer in writing for clarification. The most restrictive set and/or item within the sets shall prevail.

SPECIFICATIONS DIVISIONS

- a) The separation of these Specifications into Divisions is not intended to control the Contractor in dividing the work among subcontractors, nor to limit the scope of work performed by any trade under a given division.
- b) The Engineer will not attempt to settle any difference between the Contractor and his subcontractors as to the inclusion of work or material item.
- c) It shall be the Contractor's entire responsibility to properly coordinate and complete the work described in the Specifications whether performed by the Contractor or subcontractors, if any.

PRIOR WORK

- a) The Staking: Horizontal and vertical alignment field staking will be provided by the Engineer. Any unnecessary staking or re-staking will be done by the Engineer at the expense of the Contractor. Whenever the Contractor is unsure of the staking, he shall contact the Engineer for clarification and direction.

EXECUTION

- a) Disposal of Waste: Excess soils generated from the street and ditch excavation shall be placed within the project area as directed by the Engineer. All other waste and debris shall be disposed of by the Contractor offsite at Contractor expense.
- b) Water installation, materials, and practices shall meet the requirements of the Johnston County Water Department.
- c) A preconstruction meeting will be required prior to beginning work between the Johnston County representative, the Contractor, and the Owner's Engineer.
- d) The use of crushed concrete is acceptable to use as the aggregate base course. The contractor shall provide the necessary tests for each stock pile source used and the selected material shall meet the North Carolina Departments of Transportation requirements for ABC.

e) Road Sub-grade Proof-Roll: After complying with the minimum compaction requirements, and prior to placement of the aggregate base course, the Contractor shall perform a proof-roll of the compacted sub-grade. The proof-roll shall be conducted using a partially loaded dump truck (50 ton minimum gross weight) in the presence of both the Engineer and an NCDOT representative. Areas that are non yielding will be approved, areas that are yielding shall be corrected and retested. The aggregate base course shall be placed within 48 hours of passing the proof-roll, otherwise, the test shall be redone.

f) Road Aggregate Base Course Testing: Prior to placement of the asphalt surface course, the Contractor shall perform a proof-roll of the compacted aggregate base course. The proof-roll shall be conducted using a partially loaded dump truck (50 ton minimum gross weight) in the presence of the Engineer. Areas that are non yielding will be approved, areas that are yielding shall be corrected and retested. The contractor shall assist the Engineer in verifying the depth of the aggregate base course at locations to be selected by the Engineer. The asphalt surface course shall be placed within 48 hours of passing the proof-roll, otherwise, the test shall be redone. Also, prior to placement of the asphalt surface course, aggregate base course density tests in accordance with the North Carolina Department of Transportation "Standard Specifications for Roads and Structures", most current edition, shall be performed by a geotechnical company approved by the Engineer and paid for by the Contractor. The Engineer or an NCDOT representative shall select the locations for testing and all reports shall be submitted to the Engineer.

g) Asphalt Surface Course Testing: Asphalt density tests in accordance with the North Carolina Department of Transportation "Standard Specifications for Roads and Structures", most current edition, shall be performed by a geotechnical company approved by the Engineer and paid for by the Contractor. The Engineer shall select the locations for testing and all reports shall be submitted to the Engineer..

h) As-built data will be recorded on a daily basis and as-built plans will be provided to the Engineer at the time of project completion.

SUPPLEMENTARY SPECIFICATIONS

North Carolina Department of Transportation "Standard Specifications for Roads and Structures" is hereby made part of these specifications.

SECTION 01025

MEASUREMENT AND PAYMENT

A. DESCRIPTION

1. This section covers the methods of payment for items of work under this contract and a general description of work to be included as part of each item.
2. The total Bid Price for each part of the Project shall cover all Work required by the Contract Documents. All cost in connection with the proper and successful completion of the Work, including furnishing all materials, equipment, supplies, and appurtenances; and performing all necessary labor and supervision to fully complete the Work shall be included in the unit and lump sum prices bid. All Work not specifically set forth as a pay item in the Bid Form shall be considered a subsidiary obligation of CONTRACTOR and all costs in connection therewith shall be included in the priced bid.

B. CONTRACT TYPE

1. This is a "UNIT PRICE" contract.

C. MEASUREMENTS

1. Final measurements shall be performed by the ENGINEER.
2. The Contractor shall provide a representative to assist the ENGINEER in performing final measurements.

D. METHOD OF PAYMENT

1. Final Payment shall be the sum of each of the unit prices multiplied by the final measurement for the corresponding item.

E. SCHEDULE OF UNIT PRICE ITEMS

1. Gravel Construction Exit: This item includes grading, furnishing and installing geo-textile and gravel, maintenance and removal. This item will be measured and paid for at the contract unit price per each gravel construction exit installed.
2. Clearing and Grubbing: This item will be measured and paid for at the contract unit price per acre. All measurement of clearing and grubbing will be made horizontally. This item also includes the removal and proper disposal of the existing asphalt and base on Bettye Grisham Lane that falls within the project area. Minor "Clearing and Grubbing" includes mowing, stripping, and disking

all areas designated as preparation to receive fill material to be placed on the lots.

3. Temporary Silt Fence: This item includes grading, furnishing and installing posts, wire fence, fabric, anchors, and bracing, maintenance and removal. This item will be measured and paid for at the contract unit price per linear foot of silt fence installed.
4. Temporary Sediment Trap: This item includes stone, temporary seeding, minor grading, maintenance, and removal. This item will be measured and paid for at the contract unit price per each temporary sediment trap installed.
5. Temporary Gravel and Rip Rap Check Dam: This item includes rip-rap, washed stone, temporary seeding, minor grading, maintenance, and removal. This item will be measured and paid for at the contract unit price per each temporary gravel and rip rap check dam installed.
6. Temporary Hardware Cloth and Gravel Inlet Protection: This item includes hardware cloth, posts, washed stone, maintenance, and removal. This item will be measured and paid for at the contract unit price per each temporary hardware cloth and gravel inlet protection installed.
7. Pipe Outlet Protection: This item includes grading, geo-textile, rip-rap, and maintenance until final project acceptance. This item will be measured and paid for at the contract unit price per each pipe outlet protection installed.
8. Temporary Seeding and Mulching: This item includes seedbed preparation; furnish, place and incorporate limestone, fertilizer, and seed; compact seedbed; furnish, place and secure mulch; mow; and perform other operations necessary for the establishment of vegetation from seed. This item will be measured and paid for at the contract unit price per acre seeded and mulched, measured along the surface of the ground completed and accepted.
9. Permanent Seeding and Mulching: This item includes seedbed preparation; furnish, place and incorporate limestone, fertilizer, and seed; compact seedbed; furnish, place and secure mulch; mow; and perform other operations necessary for the permanent establishment of vegetation from seed. This item will be measured and paid for at the contract unit price per acre seeded and mulched, measured along the surface of the ground completed and accepted.
10. Unclassified Excavation: This item includes the excavation, placement, and compaction or satisfactory disposal of all materials encountered within the limits of construction of the project that are not to be removed under another contract item. This item will be paid on a lump sum basis at the contract price for this item. No measurement will be made of material excavated, placed, and compacted or disposed of within the project limits.

11. Undercut Excavation: This item includes the excavation, placement, and compaction or satisfactory disposal of natural soil materials removed from a location below the sub-grade where fills are to be placed that has been determined by the Engineer to be undesirable in their location or condition. Undercut excavation will be measured as the actual in-place material removed and paid for at the contract unit price per cubic yard.
12. Borrow Excavation (Select Fill and Processed Fill): This item includes furnishing the source of borrow; excavation, hauling, placement, compaction, and testing. Borrow excavation will be measured "compacted in-place" and paid for at the contract unit price per cubic yard.
13. Ditch and Swale Excavation: This item includes the excavation, satisfactorily disposal of all materials excavated in the construction of ditches and swales, and the maintenance of the ditches and swales until project acceptance. This item will be measured and paid for at the contract unit price per linear foot of ditches and swales constructed.
14. Storm Sewer Pipe: This item includes furnishing of materials, and installation of drainage pipe at locations and size called for in the contract documents. This item will be measured and paid for at the contract unit price per linear foot of pipe incorporated into the completed and accepted work. Select bedding and backfill material shall be included in the cost of this item.
15. Catch Basins and Area Drains: This item includes furnishing of materials, and installation of drainage structures at locations and size called for in the contract documents. This item will be measured and paid for at the contract unit price for each structure incorporated into the completed and accepted work. Select bedding and backfill material shall be included in the cost of this item.
16. Concrete Curb and Gutter: This item includes providing all materials, placing all concrete, excavating and backfilling, forming, finishing, constructing and sealing joints, and all incidentals necessary to complete the work. This item will be measured along the surface of the top of curb and paid for at the contract unit price per linear foot of accepted in place work.
17. Concrete Valley Gutter: This item includes providing all materials, placing all concrete, excavating and backfilling, forming, finishing, constructing and sealing joints, and all incidentals necessary to complete the work. This item will be measured along the surface of the top of curb and paid for at the contract unit price per linear foot of accepted in place work.
18. Aggregate Base Course: This item includes constructing a base of an approved aggregate material hauled to the road, placed on the road, mixed, compacted and shaped in accordance with the lines, grades, depths, and typical sections shown

on the plans. The use of crushed concrete is acceptable to use as the aggregate base course. The contractor shall provide the necessary tests for each stock pile source used and the selected material shall meet the North Carolina Departments of Transportation requirements for ABC. This item will be measured and paid for at the contract unit price per square yard for each specified depth of accepted in place work.

19. Asphalt Surface Course: This item includes the construction of one or more courses of asphalt mixture placed on a prepared surface in accordance with the contract documents and in reasonably close proximity with the lines, grades thickness, and typical sections shown on the plans. This item will be measured and paid for at the contract unit price per square yard for each specified depth of accepted in place work.
20. Stormwater Pond: This item includes all materials and work necessary to construct the stormwater pond as shown on the plans. Work includes, but not limited to the work required for a completed facility, excavation and embankments construction, fine grading, temporary and permanent vegetative cover, outlet structure and outlet pipe, outlet pipe stabilization, emergency spillway, temporary surface water skimmer, vegetative shelf preparation and plantings, and perimeter fencing. This item will be measured and paid for at the contract unit price for each structure incorporated into the completed and accepted work. The inlet pipe will be paid for at the contract unit price per linear foot of pipe incorporated into the completed and accepted work.
21. Water Main Pipe: This item includes pipe, fittings not covered under unit price, blocking, trenching, embedment, backfill, dewatering, shoulder restoration, erosion control and testing, disinfection, and flushing. This item will be measured horizontally through valves, fittings, hydrants, and casing from the centerline of intersecting pipe or to the end of new lines, and paid for at the contract unit price per linear foot for each size and type listed of accepted in place work.
22. Valves: This item includes the valve, blocking and/or restrained joint, valve box, cover, concrete valve box ring, and extension stem if required. This item will be measured and paid for at the contract unit price for each valve incorporated into the completed and accepted work. This item does not include valves that are included in other items or assemblies.
23. Fittings: This item includes the fitting, and accessories, blocking and/or restrained joint. This item will be measured and paid for at the contract unit price for each fitting incorporated into the completed and accepted work. This item does not include valves that are included in other items or assemblies. Fittings not listed on the Bid Form shall be considered a subsidiary obligation of the Contractor and all costs in connection therewith shall be included in other related unit price items.

24. Fire Hydrant Assembly: This item includes the hydrant, hydrant tee, valve, valve box and cover, concrete valve box ring, joint restraint, and pipe between hydrant tee and hydrant. This item will be measured and paid for at the contract unit price for each Fire Hydrant Assembly incorporated into the completed and accepted work.
25. End of Line Blow Off Assembly: This item includes the necessary fittings, piping, valve, valve boxes and covers, concrete valve box ring, and joint restraint. This item will be measured and paid for at the contract unit price for each End of Line Blow Off Assembly incorporated into the completed and accepted work.
26. Water Services: This item includes the service saddle, corporation stop, tubing, angle stop, service tee if required, pressure reducer if required, and meter box. This item will be measured and paid for at the contract unit price for each water service incorporated into the completed and accepted work.
27. Electric Conduit Installation: This item includes installing electrical conduit of various sizes, conduit material provided by others, at the locations shown on the plans. This item will be measured and paid for at the contract unit price for each conduit crossing location incorporated into the completed and accepted work. Multiple conduits may be installed in each trench at each location.

END OF SECTION

TECHNICAL SPECIFICATIONS

SECTION 02100

CLEARING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Clear and grub the site as shown on the Drawings and specified herein.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Section 02220: Backfilling and compacting.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 PRODUCT HANDLING

- A. Comply with pertinent provisions of the General and Special Conditions.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Provide materials, not specifically described but required for proper completion of the work of this Section, as selected by the Contractor subject to the approval of the Engineer.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 PROTECTION

- A. Protect existing utilities indicated or made known.
- B. Protect trees and shrub, where indicated to remain, by providing a fence around the tree or shrub of sufficient distance away and of sufficient height so trees and shrubs will not be damaged in any way as part of this Work.
- C. Protection of persons and property:
 - 1. Barricade open depressions and holes occurring as part of this Work, and post warning lights on property adjacent to or with public access.
 - 2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
 - 3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by operations under this Section.
- D. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
- E. Maintain access to the site at all times.

3.3 CONSERVATION OF TOPSOIL

- A. After the area has been cleared of vegetation, strip the existing topsoil to the depth necessary to provide at least 6" depth of topsoil in areas shown on the Drawings to be turfed or planted, and to fill planters, without contamination with subsoils.
- B. Stockpile in an area clear of new construction.
- C. Maintain the stockpile in a manner which will not obstruct the natural flow of drainage.
 - 1. Maintain stockpile free from debris and trash.
 - 2. Keep the topsoil damp to prevent dust and drying out.

3.5 DISPOSAL

- A. General:
 - 1. Remove brush, grass, roots, trash, and other material from clearing operations.
 - 2. Dispose of away from site in a legal manner.
 - 3. Do not store or permit debris to accumulate on the job site.

3.6 UTILITIES

- A. Coordinate with utility companies and agencies as required.
- B. Where utility cutting, capping, or plugging is required, perform such work in accordance with requirements of the utility company or governmental agency having

jurisdiction.

END OF SECTION

SECTION 02221

EXCAVATING, BACKFILLING, AND COMPACTING FOR UTILITIES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Trench, backfill, and compact as specified herein and as needed for installation of underground utilities associated with the Work.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and other Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Use equipment adequate in size, capacity, and numbers to accomplish the work in a timely manner.
- C. In addition to complying with requirements of governmental agencies having jurisdiction, comply with the directions of the soil engineer.

1.3 PRODUCT HANDLING

- A. Comply with pertinent provisions of General and Special Conditions.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Fill and backfill materials:
 - 1. Provide soil materials free from organic matter and deleterious substances, containing no rocks or lumps over 6 inches in greatest dimension, and with not more than 15 percent of the rocks or lumps larger than 2-3/8 inches in their greatest dimension.
 - 2. Fill material is subject to the approval of the engineer, and is that material removed from excavations or imported from off-site borrow areas, predominantly granular, non-expansive soil free from roots and other deleterious matter.
 - 3. Do not permit rocks having a dimension greater than one inch in the upper twelve inches of fill.

4. Cohesionless material used for backfill: Provide sand free from organic material and other foreign matter, and as approved by the Engineer.

2.2 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 FINISH ELEVATIONS AND LINES

- A. Comply with pertinent provision of the General Conditions.

3.3 PROCEDURES

- A. Utilities: Comply with G.S. 87-102. Notice required prior to excavation -- except as provided in G.S. 87-106, before commencing any excavations in highways, public spaces or in private easements of a utility owner, a person planning to excavate shall notify each utility owner having underground utilities located in the proposed area to be excavated, either orally or in writing, not less than two (2) nor more than ten (10) working days prior to starting, of his intent to excavate. The contractor shall comply with G.S. 87-100 thru G.S. 87-114) "Underground Damage Prevention".
 1. Unless shown to be removed, protect active utility lines shown on the drawings or otherwise made known to the Contractor prior to trenching. If damaged, repair or replace at no additional cost to the Owner.
 2. If active utility lines are encountered, and are not shown on the Drawings or otherwise made known to the Contractor, promptly take necessary steps to assure that service is not interrupted.
 3. If service is interrupted as a result of work under this Section, immediately restore service by repairing the damaged utility at no additional cost to the Owner.
 4. If existing utilities are found to interfere with the permanent facilities being constructed under this Section, immediately notify the Engineer and secure his instructions.
 5. Do not proceed with permanent relocation of utilities

until written instructions are received from the Engineer.

- B. Protection of persons and property:
 - 1. Barricade open holes and depressions occurring as part of the Work, and post warning lights on property adjacent to or with public access.
 - 2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
 - 3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this Section.
- C. Dewatering:
 - 1. Remove all water, including rain water, encountered during trench and sub-structure work to an approved location by pumps, drains, and other approved methods.
 - 2. Keep trenches and site construction area free from water.
- D. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.

3.4 TRENCHING

- A. Comply with pertinent provisions of the General Conditions and the provisions of this Section.
- B. Provide sheeting and shoring necessary for protection of the Work and for the safety of personnel.
 - 1. Prior to backfilling, remove all sheeting.
 - 2. Do not permit sheeting to remain in the trenches except when, in the opinion of the Engineer, field conditions or the type of sheeting or methods of constructions such as use of concrete bedding are such as to make removal of sheeting impracticable. In such cases, the Engineer may permit portions of sheeting to be cut off and remain in the trench.
- C. Open cut:
 - 1. Excavate for utilities by open cut.
 - 2. If conditions at the site prevent such open cut, and if approved by the Engineer, trenching may be used.
 - 3. Short sections of a trench may be tunneled if, in the opinion of the Engineer, the conductor can be installed safely and backfill can be compacted properly into such tunnel.
 - 4. Where it becomes necessary to excavate beyond the limits of normal excavation lines in order to remove boulders or other interfering objects, backfill the voids remaining after removal of the objects as directed by the Engineer.
 - 5. When the void is below the subgrade for the utility bedding, use suitable earth materials and compact to the relative density directed by the Engineer, but in no case to a relative density less than 95 percent.
 - 6. When the void is in the side of the utility trench or open cut, use suitable earth or sand compacted or

- consolidated as approved by the soil engineer, but in no case to a relative density less than 90 percent.
7. Remove boulders and other interfering objects, and backfill voids left by such removals, at no additional cost to the Owner.
 8. Excavating for appurtenances:
 - a. Excavate for manholes and similar structures to a distance sufficient to leave at least 12 inches clear between outer surfaces and the embankment or shoring that may be used to hold and protect the banks.
 - b. Overdepth excavation beyond such appurtenances that has not been directed will be considered unauthorized. Fill with sand, gravel, or lean concrete as directed by the Engineer, and at no additional cost to the owner.
 9. All excavated material shall be stockpiled in a manner that will not endanger the work and that will prevent obstructions at sidewalks and driveways.
 10. The excavated material shall be placed on one side of the trench in such a manner as not to obstruct any drain or gutter or obstruct any passageway.
 11. All hydrants, valve boxes, and alarm boxes shall be kept accessible at all times.
- D. Trench to the minimum width necessary for proper installation of the utility, with sides as nearly vertical as possible. Accurately grade the bottom to provide uniform bearing for the utility.
- E. Depressions:
1. Dig bell holes and depressions for joints after the trench has been graded. Provide uniform bearing for the pipe on prepared bottom of the trench.
 2. Except where rock is encountered, do not excavate below the depth indicated or specified.
 3. Where rock is encountered, excavate rock to a minimum overdepth of 4 inches below the trench depth indicated or specified.
- F. Where utility runs traverse public property or are subject to governmental or utility company jurisdiction, provide depth, bedding, cover, and other requirements as set forth by legally constituted authority having jurisdiction, but in no case less than the depth shown in the Contract Documents.
- G. Where trenching occurs in existing lawns, remove turf in sections and keep damp. Replace turf upon completion of the backfilling.
- H. Asphalt removal and replacement
1. Removal
 - a. Removal of pavement and road surfaces shall be a part of the trench excavation and the amount removed shall depend upon the width of the trench required for installation of the pipe and the dimensions of areas required for the installation of manholes or other structures.
 - b. The dimensions of pavement removed shall not

exceed the dimensions of the opening required for installation of pipe, manholes , and other structures by more than six (6) inches in any direction unless otherwise required or approved by the Engineer.

- c. Methods such as sawing, drilling, or chipping shall be used to ensure the breakage of pavement along straight lines.

2. Replacement

a. Public Roads

- 1) All N.C. DOT roads open-cut will be repaired in accordance with typical sections included in the drawings.
- 2) The Contractor when open-cutting a road will maintain one lane of traffic at all times except when special permission is granted by the Engineer, DOT and local officials.
- 3) It will be the Contractors responsibility to notify the proper authorities to open-cutting.
- 4) The Contractor will repair the pavements cut to the satisfaction of the DOT inspectors and the Engineer.

b. Private Drives and Parking Lots

- 1) When cutting drives and parking lots the Contractor will make every effort to not inconvenience the public.
- 2) All pavements cut will be restored to equal or superior conditions.
- 3) Asphalt will be replaced with a minimum of 8 in. stone and 2 in. of asphalt.
- 4) If details on the drawings or existing conditions show pavement sections greater than this the latter shall apply.
- 5) Concrete shall be replaced with a minimum of 4 in. or the thickness of the existing concrete whichever is greater.

c. Gravel

- 1) All drives shall be repaired by placing gravel in the area disturbed by the trenching operation.
- 2) The contractor will place a minimum of 6 inches of gravel in the trench area or match greater existing stone thickness.
- 3) Gravel will be placed at all mailboxes where the trenching activity might cause difficulty to the resident or postman. One cubic yard of stone will be placed at each mail box where the shoulder is disturbed.

I. Cover:

- 1. Provide minimum cover over the top of the installed item as listed below:

- a. Sanitary sewers: 36"
- b. Water lines: 36"
- c. Natural gas lines 24"
- d. Electrical cables: 42"
- e. Electrical ducts: 36"

3.5 BEDDING

- A. Soil classifications: ASTM D 2487
 - 1. Class I: angular, 6 to 40-mm (1/4 to 1 1/2") graded stone, including materials such as coral, slag, cinders, crushed shells, and shells. Where only upgraded (one sized aggregate) crushed stone, coral, or slag, is used, limit to a 20-mm (3/4") maximum size.
 - 2. Class II: Coarse sands and gravels with maximum particles size of 40-mm (1 - 1/2") including various grades sands and gravels containing small percentages of fines, generally granular and non-adhesive, either wet or dry. Soil Types GW,SP,SW, and SP are included in this class.
 - 3. Class III: Fine sand and clayey gravels, including fine sands, sand-clay mixtures, and gravel-clay mixtures. Soil Types FM,GC,SM, and SC are include in this class.
 - 4. Class IV: Silt, silty clays and clays, including inorganic clays and silts of low liquid limits. Soil Types ML and CL are included in this class.
 - 5. Class V: This class includes the inorganic and organic soils OL, MHL CHL OHL and PT as well as soils containing frozen earth, debris, rocks larger than 40-mm (1-1/2") in diameter, and other foreign materials. These materials are not recommended for bedding or backfill, except as noted in 1100.10.
- B. Whenever soils are investigated, their identification and possible use shall be under the direction of the Engineer.
- C. Any soil whose particle size exceeds 1 1/2" and which cannot be easily worked because it is too dry and hard or too wet and plastic shall not be used in the embedment zone. Class V soils, except as permitted under backfilling , fall in this category and are not recommended.
- D. Foundation
 - 1. Native soils in the foundation shall be firm and stable to provide support for the full length of the pipe, and for the construction operations and eventual overburden loads.
 - 2. Unstable Trench Bottom: Where these unstable conditions exist, replace them with overexcavation. Stabilization in the foundation may require special construction. When using this construction place 100 to 140 - mm (4-6in.) of class I, III and III soil bedding over the special foundation. Do not use cinders in these conditions because they tend to become unstable when wet.
 - 3. Gravel or crushed stone foundation shall be laid as directed by the Engineer where unsuitable material is removed from the bottom of the trench. Gravel or crushed stone shall be North Carolina aggregate Gradation No. 57 stone.
 - 4. Overexcavation: If the trench depth is cut more than

150-mm (6in.) below the pipe bottom into the foundation zone, replace this overexcavation with Class I, II or III soils. Class III soils shall be densified in maximum lifts of 150 -mm (6 in.) Avoid densification efforts in the foundation and bedding zones with overly wet Class III soils, when they create a more unstable condition (such as in pumping of fine sands.)

E.

1. To install the pipe true to line grade, surface grade the bed to obtain a uniform and continuous support below the pipe. Pipe may either be placed upon a uniform and flat bedding surface or into a shaped area conforming to the pipe periphery. Shape or deposit bedding material in the haunch to stabilize pipe alignment during subsequent operations.
2. Special densification efforts are not necessary for Class I and II soils in the bedding. Class III soils, loose or imported, shall be densified. Where in undisturbed native Class IV soils, the bed shall be carefully shaped to conform to the bottom of the pipe periphery and to support the the pipe uniformly and continuously. Select Class IV soils which are returned for use in the bedding shall be densified using tampers, light rollers, or similar compaction equipment to obtain the same support as a shaped bed in undisturbed Class IV soil.
3. Class IV soils shall not be used as bedding material where the moisture content is not within the optimum range which permits these soils to be worked easily to obtain the uniform and continuous support.
4. The embedment soils shall densify readily. Select native soils, free of clods, debris, frozen lumps, rocks and stones larger than 1 1/2in. or other similar objects.
5. Concrete shall not be used in the embedment zone.
6. The trench shall be kept dry enough to obtain sufficient workability in the embedment soils for their use in building support for the pipe.
7. Native soils shall not be returned to the embedment zone when, after excavation, they are in the form of large lumps, clods, or are otherwise not suitable. This material may be used above the initial backfill, but only after the pipe has been covered sufficiently with acceptable soils to prevent impact damage from dumping, etc.

3.6 BACKFILLING

A. General:

1. Do not completely backfill trenches until required pressure and leakage tests have been performed, and until the utilities systems as installed conform to the requirements specified in the pertinent Sections of these Specifications.

2. Initial backfill materials shall be carefully placed in a manner sufficient to achieve uniform loading over the pipe and bedding using select native Class I, II, III, or IV soils.
 3. Where the pipe line is located within a street or road shoulder, the remainder of the trench, beyond 2 feet above the pipe, shall be backfilled with clean material free of rocks, boulders, organic matter, plastic clay lumps and muck. Backfill shall be placed in successive 8 inch layers and compacted with an approved mechanical tamp of 95 percent of Standard Proctor at optimum moisture where the pipe line is located within a street.
 4. Where the pipe line is not located in a street, the backfill shall be compacted to a density to support service vehicles.
 5. Backfill shall be compacted to a density of 95 percent of Standard Proctor at optimum moisture, except under roadways or other areas as directed by the Engineer, where backfill shall be compacted to a density of 95 percent of Standard Proctor at optimum moisture.
 6. Except as otherwise specified or directed for special conditions, backfill trenches to the ground surface with selected material approved by the Engineer.
 7. Reopen trenches which have been improperly backfilled, to a depth as required for proper compaction. Refill and compact as specified, or otherwise correct to the approval of the Engineer.
 8. Do not allow or cause any of the Work performed or installed to be covered up or enclosed by work of this Section prior to required inspections, tests, and approvals.
 9. Should any of the Work be so enclosed or covered up before it has been approved, uncover all such Work and, after approvals have been made, refill and compact as specified, all at no additional cost to the Owner.
- B. Lower portion of trench:
1. Deposit approved backfill and bedding material in layers of 6 inches maximum thickness, and compact with suitable tampers to the density of the adjacent soil, or grade as specified herein, until there is a cover of not less than 24 inches over sewers and 12 inches over other utility lines.
 2. Take special care in backfilling and bedding operations to not damage pipe and pipe coatings.
- C. Remainder of trench:
1. Except for special materials for pavements, backfill the remainder of the trench with material free from stones larger than 4 inch or 1/2 the layered thickness, whichever is smaller, in any dimension.
 2. Deposit backfill material in layers not exceeding the thickness specified, and compact each layer to the minimum density directed by the Engineer.
- D. Adjacent to buildings: Mechanically compact backfill

within ten feet of buildings.

- E. Consolidation of backfill by jetting with water may be permitted, when specifically approved by the Engineer, in areas other than building and pavement areas.

3.7 TEST FOR DISPLACEMENT OF SEWERS AND STORMDRAINS

- A. Check sewers and storm drains to determine whether displacement has occurred after the trench has been backfilled to above the pipe and has been compacted as specified.
- B. Flash a light between manholes or, if the manholes have not yet been constructed, between the locations of the manholes, by means of a flashlight or by reflecting sunlight with a mirror.
- C. If the illuminated interior of the pipe line shows poor alignment, displaced pipes, or any other defects, correct the defects to the specified conditions at no additional cost to the Owner.

3.8 PIPE JACKING

- A. The contractor may, at his option, install steel pipe casings, tongue-and-groove reinforced concrete pipes, and steel pipes under existing roads or pavements by jacking into place using procedures approved by the governmental agencies having jurisdiction and the Engineer.

3.9 TUNNELING OPERATIONS

- A. The Contractor may, at his option, tunnel pipes into position using procedures approved by the Engineer and the governmental agencies having jurisdiction.

3.10 FIELD QUALITY CONTROL

- A. The Engineer will inspect and approve open cuts and trenches before installation of utilities, and will make the following tests:
 - 1. Assure that trenches are not backfilled until all tests have been completed;
 - 2. Check backfilling for proper layer thickness and compactions;
 - 3. Verify that test results conform to the specified requirements, and that sufficient tests are performed;
 - 4. Assure that defective work is removed and properly replaced.

END OF SECTION

SECTION 02270

EROSION AND SEDIMENTATION CONTROL

PART 1 GENERAL

1.1. DESCRIPTION

- A. The CONTRACTOR shall provide all materials, labor, equipment, tools, etc., and perform all required work and services necessary for and incidental to comply with the North Carolina Sedimentation Pollution Control Act of 1973 and the Rules and Regulations promulgated pursuant to the provisions of said act.
- B. All supplementary or miscellaneous items, equipment, appurtenances, or devices necessary for or incidental to a complete and functional installation in compliance with the North Carolina Sedimentation Pollution Act, whether or not shown on the plans or addressed in the specifications, shall be provided and installed as part of the WORK.
- C. The CONTRACTOR shall be responsible for obtaining erosion and sedimentation control permits for all land disturbing activities prior to beginning the activity, that are beyond the scope of the Project Erosion and Sedimentation Control Permits as obtained by the OWNER.
- D. The CONTRACTOR shall control and prevent erosion and sedimentation during and after all land disturbing activities by providing ground cover or other protective measures, structures, or devices sufficient to restrain erosion and prevent off-site sedimentation.
- E. The CONTRACTOR shall be responsible for payment of any and all fines imposed upon the OWNER or the CONTRACTOR resulting from compliance failure.

1.2 REGULATORY REQUIREMENTS

- A. Requirements
 - 1. North Carolina Sedimentation Pollution Control Act.
 - a. A summary of the requirements and specifications as prepared from rules and regulations by the Department of Environment, Health and Natural Resources is attached to this section and is hereby incorporated within this section.
- B. Authority
 - 1. The North Carolina Department of Environment, Health and Natural Resources, Land Quality Section has jurisdiction and authority to insure that the requirements of the North Carolina Sedimentation Pollution Control Act are enforced.

1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements

and the methods needed for proper performance of the work of this section.

- B. Use equipment adequate in size, capacity, and numbers to accomplish the work of this section in a timely manner.
- C. In addition to complying with requirements of governmental agencies having jurisdiction, comply with the directions of the soil engineer.
- D. Reference Codes and Standards comply with applicable provisions and recommendations of the following, except as otherwise shown or specified:
 - 1. North Carolina Erosion and Sedimentation Control Planning and Design Manual.
 - 2. North Carolina Erosion and Sedimentation Control Regulations
 - 3. North Carolina Erosion and Sedimentation Control Laws.
 - 4. North Carolina Storm Water Management Regulations.

1.4 SUBMITTALS

- A. Comply with pertinent provisions of the General Conditions.
- B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
 - 1. Materials list of items proposed to be provided under this Section;
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
 - 3. Manufacturer's recommended installation procedures which when approved by the Engineer, will become the basis for accepting or rejecting actual installation procedures used on the work.

1.5 SEQUENCING AND SCHEDULING

A. Planting Time: New or affected cut or fill slopes must be at an angle that can be retained by vegetative cover or other adequate erosion-control devices or structures appropriate, and must be provided with a ground cover sufficient to restrain erosion within 21 calendar days of completion of any phase (rough or final) of grading (annual rye grass is not acceptable or approved for use in either temporary or permanent ground cover). A permanent ground cover, sufficient to restrain erosion, must be provided within the shorter of 15 working or 90 calendar days after completion of construction or development on any portion of the tract. The planting time for permanent seeding shall be 1 March through 15 October. Planting time for temporary seeding shall be in accordance with TEMPORARY SEEDING. Any changes to the planting time or to the seed mixtures must have prior approval of the Engineer. The Contractor shall be responsible for the protection of earth slopes and damage thereto shall be repaired, as required, prior to seeding.

1.6 MAINTENANCE

- A. The Contractor shall maintain the seeded and mulched areas until all work, designated portions thereof, have been

completed and accepted. Maintenance shall consist of providing protection against traffic by warning signs or barricades, repairing any areas damaged as a result of his own operations and erosion, and mowing to a height three (3) inches when weeds of other vegetation tend to shade or smother the new seedlings. Seeded areas will be considered established and satisfactory when the new growing sprouts are visible at the surface showing not less than nine (9) seedlings at least 2 inches long in each square foot.

- B. The Contractor shall be responsible for the proper care (maintenance) of the seeded and mulched areas until a satisfactory cover of growing grass is visible as specified above. During this establishment period, it will be the responsibility of the Contractor to repair soil washes and reseed and remulch unsatisfactory areas. All costs and charges in connection with work and materials necessary for maintenance and establishment of the grass, including soil for repairs, shall be borne by the Contractor and at no additional expense to the OWNER. The establishment period shall extend until conditional acceptance and/or final acceptance in conformance with the requirements of General conditions. Seeded areas not showing satisfactory growth at the surface thirty (30) days after planting shall be reseeded unless additional establishment time is approved.

1.7 NOTIFICATION REQUIREMENTS

- A. The CONTRACTOR shall notify the Johnston County Public Utilities Department at least ten (10) days prior to beginning any land disturbing activity.
- B. The contact for this PROJECT is:
1. Carlos Bagley
Johnston County Public Works Department
309 East Market Street
Smithfield, N.C. 27577
(919) 989-5075

1.8 METHOD OF PAYMENT

- A. Payment for EROSION AND SEDIMENTATION CONTROL shall be included within the respective price for the WORK as shown in the BID SCHEDULE. No additional payment shall be made for EROSION AND SEDIMENTATION.
- B. The above prices and payments shall be full compensation for work covered by this section including but not limited to the control and prevention of erosion and sedimentation resulting from land disturbing activities.

PART 2 PRODUCT

2.1 TEMPORARY SILT FENCE

- A. Silt fencing shall be furnished as specified in the

plans and the North Carolina Erosion and Sediment Control Planning and Design Manual (the Manual) Practice Standards And Specifications.

2.2. TEMPORARY GRAVEL CONSTRUCTION ENTRANCE

- A. Temporary gravel construction entrances shall be furnished in accordance with the Manual.
- B. Filter fabric underlying the temporary construction entrance shall be Trevira Spunbond 1135, Mirafi 600X, or equal.

PART 3- EXECUTION

3.1 TEMPORARY PRACTICES

- A. Silt fencing, diversion dikes, and a temporary construction entrance shall be installed as shown on the plans and as specified in the Manual.
- B. Temporary seeding shall be in accordance with the plans and the Manual.
- C. All practices shall be inspected after erodible storm event, cleaned, and repaired or replaced as necessary.

3.2 PERMANENT PRACTICES

- A. The sediment/storm water basin shall be constructed as specified herein, as shown on the plans, and as specified in the Manual. Side slopes shall be seeded and mulched.
- B. Permanent seeding shall be in accordance with the plans and the Manual.

3.3 MAINTENANCE AND REPAIR

- A. Maintain all control measures and devices.
- B. Repair all control devices and measures immediately upon failure.
 - 1. Corrections to violations of the North Carolina Sedimentation Pollution Control Act shall be made within two (2) days.

3.4 INSTALLATION AND MAINTENANCE SEQUENCING

- A. Erosion and sediment control practices and measures shall be constructed prior to any land disturbing or clearing activity. They shall be maintained in accordance with the Manual and local ordinances. They shall be removed only upon completion of all land disturbing activities.
- B. Silt fencing shall be installed downhill and diversion dikes uphill of the surcharge area and any soil stockpile areas prior to any filling activity.
- C. Surface water run-on shall be diverted away from disturbed areas by diversion dikes, rerouting ditch paths as shown in the plans, and by installing drains as specified in Section 02433

- D. The storm water basin shall be excavated and used as a sediment basin after surcharge operations have been completed and prior to composting pad construction. Drains used to keep the site dry during excavation and backfill activities shall be diverted to the basin.
- E. Upon completion of all construction activities, and upon stabilizing all areas disturbed by construction activities, temporary sediment control devices shall be removed. The basin shall be mucked out and reconstructed to design configuration.
- F. Upon removal of temporary erosion and sediment control features, the construction site shall be inspected for remaining disturbed areas. Stabilize any remaining disturbed areas.

END OF THIS SECTION

SECTION 02666

WATER DISTRIBUTION SYSTEM

**The following Water Specification is a reprint of the Johnston County Utility
Department Water Specifications**

SECTION 1 - WATER MAINS

PART 1 – DESIGN

1.1 General

All engineering plans must meet the minimum design criteria of the State (Rules Governing Public Water Supplies by N.C. Department of Health and Human Services) and the County (Johnston County Water Distribution and Wastewater Collection Design and Construction Standards), whichever is more stringent.

All submittals, construction drawings, specifications and as-built drawings shall meet the minimum criteria stated in Section 7- Certifications, Submittals and Inspections of this Document.

1.2 Location

All water mains are to be installed within the dedicated street rights-of-ways where possible. Water utility easements shall be provided for all exceptions. Mains within the street rights-of-ways shall be a minimum of 5 feet from the edge of the street pavement. No permanent structures or other utilities shall be installed over water mains or within water easements.

Dead end lines within one-half the length of the dead end segment of another connection point shall be looped/connected through a permanent 20 foot public utility easement dedicated to Johnston County. “Cross country” loops shall be ductile iron with a gate valve on each of the main and no services on the “cross country” portion of the line.

1.3 Size

Water mains designated as major transmission mains shall be sized according to the Johnston County Director of Utilities and Engineering. All other transmission mains shall be designed to meet the minimum design standards set forth by the State in accordance with NC Administrative Code T15.18C. All mains shall be a minimum of 2” in diameter.

1.4 Fire Hydrants

1.4.1 Location

All hydrants shall be installed within the right-of-way or within the dedicated

SECTION 1 - WATER MAINS

15 foot utility easement adjacent to the right-of-way. In residential areas, fire hydrants shall be installed at a maximum distance of 500 feet from the footprint of all proposed housing units. In commercial areas, hydrants shall be located within 250 feet of the footprint of each building.

1.4.2 Installation

All hydrants shall be installed on a 6-inch ductile iron branch with hydrant valves on each branch. The valve shall be within 2 feet of the main and mechanically restrained to the main. "Aqua-Grip" rings may be used in lieu of thrust rods. Thrust blocking is required with the use of thrust rods and "Aqua-Grip" rings. All thrust rods shall be stainless steel. All hydrant valves shall be installed on the water main side of roadway ditch.

1.5 Valves

1.5.1 Main Line Valves

Main line valves shall be installed at every intersection and at every point where the water main leaves the right-of-way (i.e. along cross country easements). All valves larger than 16" or installed at a depth 6' or greater shall be enclosed in a manhole and installed along a section of ductile iron water main. Main line valves shall typically be installed immediately adjacent to a fire hydrant tee and on straight runs between intersections at a maximum spacing below.

<u>Main Size</u>	<u>Maximum Spacing</u>
4"	2000'
6"	2000'
8"	2000'
12"	3000'
16"	3000'

1.5.2 Air Release Valves

Air Release Valves shall be required on mains 16" and larger which have a change in elevation of 15 feet or greater. Air release valves shall be installed at the highest point within that elevation change. Valves shall be 2" minimum with short body style. Air release valves shall be made of plastic or stainless steel. Valves shall be installed in minimum 5' diameter precast flat-top

SECTION 1 - WATER MAINS

manholes (with bolt-down rings) with one joint ductile iron pipe centered in manhole when located in a public utility easement. When located in the NCDOT right-of-way, a minimum 4' diameter manhole is required.

1.5.3 Pressure Reducing and/or Pressure Sustaining Valves

Pressure reducing and/or sustaining valves shall be installed as directed by the Johnston County Director of Utilities and Engineering to connect areas with different pressure gradients. Design parameters shall meet the Director's requirements for pressure regulation. Acceptable manufactures are Ross, Golden Anderson, and Cla-Val. If pressure reducing and/or pressure sustaining valves are located in a manhole, the rings must be bolted-down.

1.6 Water Services & Meters

1.6.1 Residential Services

Residential water services shall be a minimum of ¾" in diameter. All residential water meters shall be located within a 10 foot dedicated utility easement running parallel to the dedicated roadway right-of-way. No water services shall be installed on cross country "looped" water mains.

In the case of service installations on the opposite side of the road from the water main, a 1-inch service may be installed across the roadway that splits into two ¾" services. Water meters installed on a split service must be installed at 2 foot spacing on either side of the common property lines of the customers. "Split" services shall be used to the maximum extent possible. Split services shall be allowed for services only on the opposite side of the road from the water main. Water services shall be paired at common property lines, where possible.

1.6.2 Commercial Services

Commercial services shall be installed within a 10 foot dedicated easement parallel to the roadway right-of-way where possible. For sites with multiple water users, services may be located at the rear of the buildings or other suitable location to minimize impact on business operations during repair or maintenance. If the services are located outside the right-of-way, sufficient utility easements must be provided for the water lines from the right-of-way to the services and around the services. Meter boxes, including gang meter

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assemblies must be located in “grassed” areas or in the rear of the building. No meter boxes shall be installed in concrete or asphalt areas on the front side of the building. Prior to the County installing the water meter, a grease trap must be installed on the premises for any food service establishments, and an oil water separator installed for any automotive service establishments.

1.6.3 Master Meters

Master meters shall be permitted to serve single ownership, single lot properties in the following categories:

1. Apartments/Condominiums
2. Hotels/Motels
3. Hospitals
4. Warehouses/Industrial Buildings
5. Schools
6. Mobile Home Parks
7. Shopping Centers
8. Churches
9. Rest Homes

Plans for these properties shall meet all building and fire code requirements. All water mains, valves, and fire hydrants shall meet the County’s standards and specifications. Master meters 3” and larger shall be constructed above ground within an insulated heated enclosure. The property owner shall be responsible for providing power for keeping the meter thawed out during freezing weather conditions. For meters 1 ½” and larger, a by-pass with an air gap and a threaded or flanged spool or “jumper” piece shall be provided to the County. The by-pass may be built into the yoke or designed in the piping, depending on the size of the water service.

1.6.4 Gang Meter Assemblies

Gang meter assemblies shall be installed with a resilient seat gate valve with a 2” operating nut, valve box, and collar at the water main tap or tee. All piping material shall be threaded brass. Ductile iron nipples and poly tubing are allowed.

1.7 Water Backflow/Cross Connection

1.7.1 Required Backflow Preventers:

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A. Double Check Valve Assembly (DCVA)

A testable DCVA shall be required on the following water taps:

1. Residential water taps
2. Fire sprinkler systems without booster pump facilities or chemical additives
3. Connection to tanks, lines, and vessels that handle non-toxic substances
4. Commercial, institutional, and industrial taps with the RPZ located inside the building, a DCVA shall be installed near the main tap at right-of-way or at the point of delivery.
5. Other water taps as deemed necessary by Johnston County Utilities or Johnston County Department of Inspections

B. Reduced Pressure Zone (RPZ)

An RPZ shall be required on the following water taps:

1. All irrigation services
2. All commercial, institutional, and industrial establishments
3. Fire lines/fire systems with booster pump facilities or chemical additives
4. Other water taps as deemed necessary by Johnston County Utilities or Johnston County Department of Inspections

1.7.2 Backflow Prevention Assembly Installation:

Backflow prevention assemblies must be located in a place where it is readily accessible for regular testing, maintenance, and inspection. Any bypass lines parallel to a backflow prevention assembly shall have an approved backflow prevention assembly installed that is equal to that on the main line.

A. DCVA

1. Vertical or horizontal installation acceptable
2. Adequate drainage shall be provided if installed below ground

B. RPZ

1. Above ground installation preferred. Property owner must provide power to heat insulated enclosure.
2. Below ground vault shall have positive drainage, ie. adequate gravity drainage to atmosphere (daylight) or a sump pump.

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3. Twelve (12) inches minimum clearance from vault walls and floor
4. Installation in accordance with manufacturer's recommendations

1.7.3 Testing and Certifications for all RPZ Backflow Preventer Assemblies:

- A. Initial testing must be completed and certification must be submitted to Johnston County Utilities prior to water meter being set.
- B. Bi-annual testing (once every two years) with certification must be completed as the owner responsibility. The written bi-annual (every other year) certification must be submitted to Johnston County Public Utilities. A late fee of \$100 per month will be assessed for failure to submit bi-annual (every other year) certifications.

PART 2 - MATERIALS

2.1 General:

All materials and appurtenances shall meet the following minimum standard requirements therefore.

Pipe shall be of the type, size, class and diameter as hereinafter specified. General design considerations shall comply with all applicable AWWA Standards for each type and to the following:

Pipe smaller than 12" diameter shall be ductile iron or Class 200 AWWA C151.

Pipe diameter 12" and larger shall be ductile iron or polyvinyl chloride conforming to AWWA specification C-900 or C-905.

All fire hydrant legs from the main to the hydrant shall be ductile iron pipe.

Trench width for buried pipe design shall be considered as the outside diameter of the pipe plus two (2) feet, at the bottom and up to one foot above the top of the pipe.

Stone bedding to the spring line of the pipe is required for buried pipe in all wet or unsuitable soil areas. In other areas with suitable trench conditions, buried pipe shall be designed for laying conditions as shown in standard water details (flat bottom trench-tamped backfill) to withstand all internal pressures and external loads with a minimum depth to cover of three feet for pipelines eight inches and smaller in

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diameter, and three feet-six inches for lines 10 inches and larger in diameter, and greater depths of cover where required plus an H-20 live load in accordance with AASTHO Specifications.

Design pressure shall consist of a minimum of 150 psi working pressure plus 100 psi surge allowance unless designated otherwise by the County or required by actual design conditions.

Pipe diameters called for shall be the minimum net inside diameter of the pipe after any required lining is placed, with a maximum tolerance of 1/4 inch on the minus side, for sizes through 36-inch diameter.

Pipe fittings shall be of the size, and at least the same class as the pipe with which they are used. Ductile iron fittings shall be used with all ductile iron pipe and PVC pipe 4 inches or larger in diameter. Compact DI fittings may be used, and all DI fittings shall be mechanical joint type for buried installations and flanged for above ground and vault installations. All ductile iron fittings shall be cement lined and coated with the exception of sleeves.

All valves shall have standard mechanical joint ends, except where flanged or other type ends are specifically required. Flanges, where required, shall be a minimum of 125-lb. ANSI standard. Unless operating pressure requires stronger flanges, all valves shall be furnished with 2" square operating nuts, or handwheels as necessary for above ground service. All valves shall be of at least the same class as the pipe with which they are used. A valve box with lid reading "water" shall be provided for each underground valve. Precast concrete manholes, with a flat top and cast iron frame and cover, shall be provided for all air valves. A pre-cast concrete manhole shall be provided for all gate valves larger than 16" and all gate valves installed deeper than 6 feet. All valve box riser sections shall be ductile iron.

2.2 Ductile Cast Iron Pipe:

Ductile cast iron pipe shall be centrifugally cast of ductile cast iron (Class 50) having a minimum tensile strength of 60,000 psi, a minimum yield strength of 42,000 psi, and a minimum elongation of 10 percent (Grade 60-42-10). It shall be designed, manufactured, and shall conform to the requirements of ANSI A21.50 and ANSI A21.51 (AWWA C151) - 1991 Standards, for a minimum 150 psi operating pressure plus a minimum allowance of 100 psi for surge.

Nominal laying lengths shall be 18 to 20 feet nominal maximum of 20 percent of

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each size for each order being as much as 24 inches shorter than the nominal laying length and an additional 10 percent as much as 6 inches shorter than nominal laying length.

Pipe joints shall be bell and spigot, push-on, gasketed type except where other joint types are specifically required by the Plans.

Dimensions shall conform to the requirements of ANSI A21.6, ANSI A21.8, ANSI A21.11, and WW-P-42 1C, as applicable. Dimensions shall be gauged at sufficiently frequent intervals to assure dimensional control. Insides of sockets and outside of spigot ends shall be tested with circular gages.

Tolerances below the standard thickness of pipe and bell shall not exceed:

Size (inches)	Allow. Minus Tolerances (inches)
4 - 8	0.05
10 - 12	0.06
14 - 42	0.07

All pipe shall be tested at the factory in accordance with AWWA requirements for each type.

Each pipe shall be coated on the outside with standard bituminous coating of either coal tar or asphalt base approximately one mil thick. The coating shall be continuous, smooth, and strongly adherent to the pipe and shall not become brittle from cold or sticky from heat.

Interior surfaces of each pipe, for water service, shall be cement lined in accordance with ANSI 21.4, with minimum thickness of 1/16-inch for 3 to 12-inch pipe and 3/32-inch for 14 to 24-inch pipe, and 1/8-inch for 30 to 48-inch pipe.

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Each pipe shall be weighed prior to placing of inside lining. Weight, nominal thickness, sampling period, and class of pipe shall be shown on each pipe. The manufacturer's year of production and the letters DI or DUCTILE shall also be cast or stamped on the pipe. All markings shall be clear and legible and on, or near, the bell end.

2.3 Polyvinyl Chloride Pipe:

PVC pipe shall be rigid polyvinyl chloride with integrally formed, factory fabricated bell, for rubber type joint rings. It shall be suitable for all conditions imposed by Plan locations and for a maximum working pressure of 150 psi, plus 100-psi surge allowance at 73 degrees F. Pipe shall be Type 1, Grade 1, made from clear virgin material and shall conform to the requirements of Commercial Standard C5 256, ASTM D1784, ASTM D2241 and with standard dimension ratio SDR 21 Class 200. All pipe shall bear the National Sanitation Foundation Seal of Approval for potable water, the manufacture's name, and class of pipe.

(or)

PVC pipe shall be rigid polyvinyl chloride with integrally formed, factory fabricated for rubber ring type joints. It shall be suitable for all conditions imposed by Plan locations and for a minimum working pressure of 150 psi, plus 100-psi surge allowance at 73 degrees F. Pipe shall be Type 1, Grade 1, made from clear virgin material and shall conform to all requirements of AWWA Specifications C-900 or C-905, Class 150. All pipe shall bear the manufacturer's name, specification, and class pipe.

Provisions must be made for expansion and contraction at each joint, through the rubber gasket and pipe bell. Laying lengths shall be 20 feet 1 inch, or 38 feet 1 inch except that, random lengths may be furnished for special connections and other special uses.

Stored PVC pipe shall not be exposed to sunlight for more than ninety (90) days. Any excess pipe stored on-site for more than (90) days shall be covered with an opaque tarpaulin with means provided for heat dissipation and ventilation. Pipe discolored due to sunlight exposure shall not be installed in the County's distribution system. The County's representative shall determine the suitability of the exposed pipe.

The installation date for all PVC pipe shall be no later than one year from the date of manufacture as stamped on the pipe.

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2.4 HDPE Pipe:

HDPE pipe for directional drilling must be SDR11 or heavier and sized to have the inside diameter of the HDPE pipe to match the inside diameter of the connecting water main. Connection of HDPE and PVC or ductile iron pipe shall be horizontal, flange to flange level, and made to prevent binding of HDPE. Connection details must be specifically approved by the County.

2.5 Electronic Marker Balls:

Electronic location markers shall consist of 4" marker balls having a passive device capable of reflecting a specifically designated repulse frequency, unique to the utility being installed. The marker ball will contain a passive-tuned antenna, molded inside a plastic disk, which is free-floating inside a water resistant polyethylene shell. The shell shall be impervious to minerals, chemicals and temperature extremes. Marker balls shall be color coded in accordance with the American Public Works Association's utility location and coordinating council standards. Electronic marker balls shall be as manufactured by 3M Telecom Systems or equal.

Marker balls shall be installed directly over the center line of the point to be located, and a minimum of 6" from any metal objects. Burial shall not be less than 18" nor more than 2 feet. Marker balls shall be installed concurrently with water mains. Ball markers to be hand backfilled to 1 foot above ball marker as to prevent movement or damage. The maximum depth for marker ball burial shall be 2 feet. Electronic marker balls shall be installed at the following locations.

1. On ductile iron and PVC pipe

1. At a minimum of every one hundred linear feet directly over main line.
2. At bends 22 and 1/2 degrees and larger.
3. At capped or plugged ends if no blow-off assembly.
4. At tees over main line.
5. At reducers.

2.6 Encasement Pipe Installations:

Encasement pipe for installation under highways and railroads shall be spiral welded steel pipe conforming to ASTM Specification A252-61, Grade 2. Encasement pipe shall conform to DOT specifications for pipe laying for highway crossings and to AREA specifications for railroad crossings. The pipe shall be furnished with a bituminous coating on the outside.

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2.5.1 Carrier Pipe - DI with Field-Lok gaskets

2.5.2 Spacers – Stainless steel “spiders” shall be provided. At least 2 spacers per joint shall be provided for ductile iron carrier pipe.

2.7 Ductile Cast Iron Fittings:

Ductile cast iron fittings shall conform to the requirements of ANSI Specification A21.10, with mechanical joint ends conforming to ANSI Specification A21.11, except that material and manufacturer shall conform to ASTM Specification A339, Grade 80-60-3. All fittings, except sleeves, shall be bituminous coated and cement lined as required for pipe. Where flanged ends may be required, flanges shall conform to applicable requirements of ANSI B16.1 and ANSI B16b. Minimum class shall be class 350 pipe. No push-on joint ends will be allowed. Compact fittings are acceptable.

2.8 PVC Fittings:

PVC fittings and adapters shall conform to the same requirements as for pipe and shall be the same class as the pipe. Fittings shall be O-ring joint push-on type. PVC fittings shall not be used with pipe 4 inches or larger in diameter.

2.9 Tapping Sleeves and Saddles:

Tapping sleeves shall be used on all taps greater than 2". In areas with poor materials, stone backfilling shall be used. Tapping sleeves shall be the wide banded type, with two (2) 304 or 316 stainless steel bands, suitable for bolting in place on the pipe to be tapped. The body construction shall be a minimum of:

Outlet Half (load bearing half):

Outlet sizes 2"-8" 12 gauge stainless steel

Outlet sizes 10" & larger 10 gauge stainless steel

Back Half (conforming half): 14 gauge stainless steel

Outlet: schedule 10 stainless steel pipe to accept full size cutter

Flange: stainless steel

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Length:

<u>Outlet Size</u>	<u>Length</u>
2"-6"	15"
8"	21"
10"	27"
12"	30"

Sleeve shall meet all the requirements of ANSI/AWWA C110/A21.10 and C111/A21.1. Tapping sleeves shall have a full circumferential gasket. For tapping sleeves with an outlet diameter greater than 12", the sleeve shall have an outlet seal gasket. Lubricate pipe and face of gasket with water or soap-water. Do not use petroleum based products such as grease or pipe lubricant. Tapping sleeves shall be JCM 432, Mueller H-304, Ford FTSS, Romac ST III, or approved equal.

2.10 Connections to AC (Asbestos Cement) Pipe:

Details for all connections to AC pipe shall be submitted to the County and approved in writing before the commencement of work. Contractor shall use the utmost caution on any connection to AC pipe. Contractors making connections on existing AC pipe must be previously approved by the Johnston County Department of Utilities.

2.11 Gaskets:

Gaskets for pipe and fittings shall be continuous ring of rubber material compounded to resist deterioration and of a texture to assure a permanent and watertight seal. They shall have smooth surfaces, free from pitting, blisters, porosity or any other defects. Gaskets shall conform to the requirements of AWWA specification C301 and Federal Specification WW-P 4211.

Gasket lubricant shall be a potable hydrogenated vegetable oil, insoluble in cold water, non-toxic, shall not support the growth of bacteria, and shall not impart taste or odor to the water. It shall not contain detergent soaps, organic solvents or other deleterious ingredients and shall have no deteriorating effects on the gaskets. The lubricant shall be semi-paste, easily applicable, readily adherent to the inside of the bell and shall remain in a usable state throughout the range of temperature in which pipe is normally installed.

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2.11 Gate Valves:

Gate valves shall be used in sizes 12" or smaller and shall be used in buried applications. Gate valves shall be iron body, resilient wedge, non-rising stem and provided with suitable stem seals. They shall comply with AWWA C509 and be designed for an operating pressure of 200 psi. All valves shall open left (counter clockwise). Buried valves shall have a 2-inch square operating rest. Extension stems shall be furnished where depth of bury places operating nut in excess of four feet below finished grade. Extension stems must have centering ring.

Twenty inch (20") valves and larger shall be equipped with bevel gear operator. The gear mechanism shall be totally enclosed with watertight gear case, suitable for underground installation. The valves shall be designed for installation in a horizontal position and shall be equipped with track, scrappers, and rollers or trunions. Valve interior coating shall be the industry standard unless otherwise specified and outside for all potable water services. Buried valves shall be coated on the outside with bituminous or asphalt coating approximately ten mil thick.

2.12 Butterfly Valves:

Butterfly valves shall not be installed on the County's water distribution system, unless specifically approved by Johnston County Department of Utilities.

2.13 Valve Boxes:

Valve boxes shall be of cast iron, three-piece screw type with covers and bases. They shall be of suitable size for the valve with which they are used and fully adjustable for depth of setting, extension pieces being furnished where necessary. Drop type covers shall be provided for each box with the proper word "WATER" designating the valve service cast into its top surface. Brick bases shall be provided and shall be so designed to fully support the box without weight of the box and/or superimposed load being transmitted to any part of the valve or adjacent pipe on either side.

All valve boxes and lids shall be the same size and interchangeable with the County's existing valve box.

A circular precast concrete collar shall be installed around all valve boxes.

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2.14 Pressure Air Valves:

The valves shall be designed for at least 150-psi pressure. Air valves shall be installed in a precast, flat-top manhole with a cast iron frame and cover. A suitable ¼ turn ball cut off valve shall be provided. Isolation valve and inlet piping shall be stainless steel.

2.15 Fire Hydrants:

Fire hydrants shall be of the compression type, dry top, of cast iron and shall conform to the requirements of AWWA C502 as provided by Mueller, AVK, Clow, Kennedy, or American Darling. They shall have six-inch (6") mechanical joint connections with a minimum 4-1/4 inch main valve. Each hydrant shall have two 2-1/2 inch hose nozzles and one 4-1/2 inch pumper nozzle, with washers. Barrel lengths shall be generally for 3-1/2 foot trench, except where other lengths are necessitated by the hydrant location. Operating nuts shall be 1-7/8 inch pentagonal and open in a counterclockwise direction. Thread shall be National Standard type.

The hydrant barrel shall be made in two sections joined together a few inches above the ground line by a watertight coupling, or break ring, so designed that if a break occurs, it will occur at this point. The ring shall be of ample strength for ordinary service, and be easily and cheaply replaceable. The valve stem shall be in two sections, jointed by a special coupling at the same point as the break ring, so designed that if the hydrant is broken, the coupling will break and the valve not be disturbed. All working parts shall be removable without disconnecting the hydrant. Fire hydrant bonnets and nozzle caps shall be coated with "Alert" Model #1440 reflective fire hydrant paint or approved equal.

The fire hydrant 90-degree base elbow and gate valve shall have lock ring glands.

A repair kit shall be provided for every 10 hydrants and a minimum of one per project.

Fire hydrants shall be set plumb with break rings at final grade or no higher than 4" above final grade.

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2.16 Blow-Offs:

Blow-Offs shall conform to the details provided. The blow-off assembly shall consist of all fittings, pipe, and appurtenances as shown in standard water details. The valve shall meet the requirements for other gate valves and shall be suitable for the anticipated pressure. Blow-off assembly piping shall be brass or DI. The standpipe shall be installed so that the top of the standpipe shall be no more than 4"-6" below grade. Blow-offs shall be located in areas which will allow for positive drainage that will not cause damage or erosion and will not create a nuisance.

2.17 Valve Markers:

Valve markers shall be as shown on the detail and of concrete, reinforced as shown. Concrete shall be of a mix design to produce a 3,000 psi compressive strength at 28 days. They shall be marked with recessed letters, either MV, AV, or BO. In subdivisions or residential areas the valve markers shall be no more than 8" – 10" above grade. Valve markers in all other areas shall be no more than 18" above grade. The markers shall be installed so all letters on the markers may be read.

2.18 Water Service Meters and Appurtenances:

2.18.1 Water meters for individual residences and small commercial unit services shall be displacement disc type with magnetic drive and hermetically sealed register. The meters shall conform to the design and accuracy requirements of AWWA Specification C700-71. Registers shall be straight reading with units of gallons. Meters shall have male threaded ends and copper alloy cases and shall have a minimum warranty of one (1) year after installation to be free from defects in workmanship and materials. Meters for normal single family residential service shall be 5/8" x 3/4" with a safe operating capacity of 20 gpm. Meters for other services shall be of a size requested and approved by the County. Manufacturer of meters shall be Neptune unless otherwise approved by the County.

2.18.2 For projects that will be provided retail service by the County, **meters shall be provided and set by the Johnston County Department of Utilities.**

2.18.3 Copper meter yokes with lockable angle meter stops shall be used on all new water services. **Yokes for water services 2" and larger shall be sized for a compound meter installation.**

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- 2.18.4 Meter couplings shall be standard bronze, suitable for meters with male threaded ends.
- 2.18.5 Angle meter stops shall be heavy-duty bronze with double O-ring seals and threaded ends and shall be the same size as the meter. Angle meter stops shall be lockable in the off position.
- 2.18.6 Meter boxes shall be rectangular or oval type with minimum nominal dimensions of 20" x 10-1/2" x 12" (l.w.d.). Lids shall have a D.I. hinged door. Boxes shall be plastic except for traffic bearing installations, which shall be cast iron. All meter boxes must have a 2" hole in lid of the box. **Meter boxes for 1" and 1 1/2" water services shall be "oversized." Meter boxes for 2" water services and larger should be precast concrete with a cast iron lid containing a 2" hole in the lid.**
- 2.18.7 Corporation stops shall be heavy-duty bronze with double O-ring seals and threaded ends and shall be suitable for use with all standard water works tapping machines. **Stiffener inserts shall be plastic.** Corporation stops shall be rated for a minimum working pressure of 300 psi.
- 2.18.8 Water service pipe shall be polyethylene tubing rated for 200 psi. Where water services are "paired", a single 1" service line may be provided with a bronze wye. Where service lines cross under pavement and are installed by open cut, a 2" schedule 40 PVC sleeve shall be provided the length of the road.
- 2.18.8 Water service saddles shall be wide body style for PVC water mains (Ford S-70, JCM 403, Mueller H-134 or equal) or double strap style for ductile iron water mains (Ford S-90, JCM 403, Mueller BR2B or equal). Body shall be stainless steel, bronze or brass with o-ring seal, manufactured to meet AWWA C800. Saddles shall be used for 3/4", 1" and 1 1/2" service outlet diameter taps.
- 2.18.9 A resilient seat gate valve with 2" operating nut and valve box must be installed at the tap for all services 1 1/2" or 2" diameter.

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2.19 Mechanical Couplings:

Mechanical couplings shall be Dresser, Style 38 couplings for cast iron and steel pipe. Equal styles by Rockwell, Smith-Blair and other manufacturers may be employed.

PART 3 – INSTALLATION, INSPECTIONS AND TESTS

3.1 Installation

3.1.1. Location:

Pipework shall be installed at the locations shown on the Plans and to the position, alignment, and grade shown thereon. Prior to beginning work at any location, the Contractor shall consult with the Engineer and Owner to determine that all rights-of-way, easements, permits, or other legalities are in order. He shall familiarize himself with all conditions and/or limitations of such rights-of-way, easements and permits and shall fully comply with all such requirements. All work shall be confined to rights-of-way, easements or permit limits and any encroachment beyond such limits shall be the Contractor's liability.

3.1.2. Relation of Water Main to Sewer:

3.1.2.1. Crossing a Water Main over a Sewer: Whenever it is necessary for a water main to cross over a sewer, the water main shall be laid at such an elevation that the bottom of the water main is at least 18" above the top of the sewer, unless local conditions or barriers prevent an 18" vertical separation, in which case the water main and sewer shall be constructed of ferrous materials and with joints that are equivalent to water main standards for a distance of 10' on each side of the point of crossing.

3.1.2.2. Crossing a Water Main Under a Sewer: Whenever it is necessary for a water main to cross under a sewer, both the water main and the sewer shall be constructed of ferrous materials and with joints equivalent to water main standards for a distance of 10' on each side of the point of crossing. A section of water main pipe shall be centered at the point of crossing.

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3.1.3. Clearing & Grubbing:

Clearing and grubbing, where required, shall be done prior to beginning of pipe installation. It shall be done in accordance with applicable portions of items of General Conditions and the following:

The Contractor shall consult with the Owner and Engineer prior to starting clearing and a full understanding is to be reached as to procedure. The Contractor shall then conduct clearing and grubbing operations in strict accordance with these agreements:

- Clearing of trees and brush along the pipeline shall be carefully done so that no damage will occur outside of the limits of the right-of-way. Trees and brush must be cut by hand and trees felled within the right-of-way limits. Trees 6" or more in diameter shall be trimmed, cut into usable lengths of 3', or as DIRECTED BY THE OWNER disposed of in a manner approved by the Engineer.
- Brush, laps, roots, etc., shall be disposed off-site in a manner approved by the Engineer. Burning of trees, brush and debris will not be permitted, unless the appropriate permits have been obtained.
- Grubbing of stumps that are in the way of construction shall be done in any convenient manner which will not cause damage to remaining trees or adjacent property. Stumps shall be disposed as for brush or laps above.
- Limits of the pipe-laying operation shall be confined to the right-of-way and easements. The width of clearing shall be held to a minimum and in no case more than the width of the easement, without the written consent of the Engineer.

3.1.4 Work on Highway Right-Of-Way:

- 3.1.4.1 The Contractor shall not begin work on any property of the Department of Transportation until necessary right-of-way encroachment permits are in hand. Prior to any construction in the NCDOT right-of-way, the contractor shall videotape the proposed utility route in order to verify pre-existing conditions. He shall conform to all requirements of the Department of Transportation or its authorized representatives in the prosecution of this portion of the work. It shall be the responsibility of the

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contractor to contact the local highway representative and to determine the exact requirements for work to be done. Requirements shall include, but are not limited to the following:

- 3.1.4.2 Where a pipeline crosses under a highway, it shall be installed either by open cut, in tunnel, or in encasement under the highway. Materials and method of crossing shall be indicated on the Plans for each crossing. Where pipe is installed by open cut, at least one full lane for traffic shall be kept open and clear at all times. The contractor shall be responsible for any certifications and testing required for open-cut installations.
- The Contractor shall provide full-time flagmen, with appropriate stop signs, at all times when work is in progress.
 - Necessary warning and descriptive signs shall be provided and placed at each end of the working area while work is in progress along highways. These signs shall be well tended and shall be placed at sufficient distances from the site of the work so that ample warning is given to approaching traffic. Signs shall be removed when daily work is completed.
 - The Contractor shall keep all streets open to traffic at all times unless permitted otherwise by County Representative or Department of Transportation as applicable. The Contractor shall provide, place and maintain temporary traffic control devices as directed by the County Representative or Department of Transportation. The latest edition of the Manual on Uniform Traffic Control Devices for Streets and Highways as prepared by the National Joint Committee on Uniform Traffic Control Devices shall be used as a guide in the placement of devices and all devices shall meet the requirements of said manual.
 - Where pipe is installed in open cut across a highway, the cut shall be immediately backfilled with ABC stone and compacted per NCDOT specifications. All the work of repairing the pavement must be completed immediately. Any subsequent settlement shall be immediately corrected and repaired.
 - Where pavement is cut and replaced, the Contractor shall cut the edges to a straight and even line before repairing the pavement. No ragged edges will be allowed or accepted.
 - Where asphalt pavement or bituminous surfacing is cut, the entire area to be

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repaired shall be primed with an asphalt prime coat, acceptable to the Department of Transportation before the pavement is replaced.

- When required, the Contractor shall furnish to the Department of Transportation a 100% Performance Bond for the amount of work to be undertaken (boring or paving to be cut and replaced) along highways. Bond is required in North Carolina.
- Unless otherwise indicated, no excavated material shall be placed on the pavement side of the ditch, along State Highways. The least possible amount of trench will be left open when work is not in progress and equipment shall be removed from the pavement and shoulders during shutdown periods.
- Screenings shall be used where excavated material is placed on the pavement.
- Roadways shall be completely cleaned at the end of each workday.
- Shoulders of roadways shall be left in good, acceptable condition and all topsoil and grass that is disturbed shall be replaced. The Contractor shall pay the cost of all Department of Transportation inspectors time if required on the job.

3.1.5 Work on Railroad Right-Of-Way:

- 3.1.5.1 The Contractor shall not begin work on any property of the railroad until he has secured necessary permits. Prior to any construction in the railroad right-of-way, the contractor shall videotape the proposed utility route in order to verify pre-existing conditions. He shall conform to all requirements of the railroad, or its authorized representatives, in the prosecution of this portion of the work, including but not limited to the following:
- 3.1.5.2 Where a pipeline crosses under a railroad, the work shall be done in accordance with requirements of the Railway Company. Pipe shall be installed by boring and jacking (or open cut as designated). Excavation shall be done ahead of the pipe. The encasement must be kept on accurate line and slightly below grade. A tolerance of 1/2% will be allowed on short lines in good soil and not over 1% in any case.
- 3.1.5.3 The Contractor shall furnish the Railway Company the following:
 - Certificate of Worker's Compensation or Employer's Liability Insurance

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according to the laws of the State.

- Certificate of the Contractor's Public Liability Insurance, to protect the contractor and subcontractor for loss of life or injury to persons in an amount not less than \$1,000,000 for any one person and not less than \$1,000,000 for any accident, and for property loss or damage in an amount not less than \$1,000,000 for any one accident and not less than \$1,000,000 aggregate or larger amounts as required by the railroad encroachment agreements.
- The original policy of Railroad Protective Liability Insurance naming the Railway Company as the insured for loss of life or injury to persons in an amount not less than \$1,000,000 for one person, and not less than \$1,000,000 for any accident and for property loss or damage in an amount not less than \$1,000,000 aggregate or larger amounts as required by the railroad encroachment agreements. The Railroad Protective Liability Policy should show the location and description of work and name of Owner for whom the work is done.
- The Contractor shall also pay the cost of flagmen or other expenses of the railroad in protecting traffic. He shall notify the railroad of the time that the work will be done and shall not begin work until authorized by railroad officials.

3.1.6 Bored Encasement Installation

- 3.1.6.1 No bore pits or equipment shall be placed outside the right-of-way or easement without expressed consent of landowner.
- 3.1.6.2 Encasement pipe which is dry bored under highways and railroads for installation of water lines shall be installed at the locations, to the gradients, and within the tolerances (if any), as shown on the plans. In event the encasement is installed off grade or seriously out of line, then another encasement pipe will be dry bored as close as practical to the original pipe with no additional compensation allowed therefore. The original encasement must be sealed with a watertight concrete plug (min. 3' deep) at each end. When boring equipment is removed, compacted material (95%) should be brought up to the invert of the pipe.
- 3.1.6.3 Pipelines installed through steel encasement shall meet specifications herein described and all Department of Transportation or Railroad specifications and guidelines for installing pipelines through steel encasement pipe. Upon insertion of the pipeline through the encasement pipe, the ends of the encasement pipe shall be

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sealed with brick and mortar. Brick and mortar shall be as herein specified, and the seal shall be such to withstand hydrostatic pressure from ground water and all backfill loads. Contractor shall provide means to prevent water line from floating within the encasement pipe. Grouting procedure will not be allowed.

- 3.1.6.4 Casing pipe and joints shall be of leak proof construction, capable of withstanding railway or traffic loading. The diameter of the casing pipe shall be at least 4" greater than the largest outside diameter of the carrier pipe, joints, or couplings for carrier pipe less than 6" in diameter and at least 4" greater for carrier pipe, 6" in diameter and greater, unless indicated differently on drawings. Further, the casing pipe shall be of great enough diameter to allow carrier pipe to be removed subsequently without disturbing the case pipe and immediate areas.

- 3.1.6.5 Steel encasement pipe shall be as specified in item 2.6 of this section.

3.1.7 Trench Excavation:

- 3.1.7.1 Trenches for pipe shall be dug true to line and grade and to the following requirements: Depth of cover shall not be less than 3'-0" for pipe up to 8" in diameter and 3'-6" for pipe 10" and larger in diameter, measured to the top of pipe, unless shown differently on the profile or authorized by the Engineer. The depth of cover shall be measured from edge of pavement or finished grade, whichever is deeper. If the water main is installed in the bottom of the ditch, the depth of cover shall be measured from the bottom of the ditch.
- 3.1.7.2 Sides of trenches shall be kept as nearly vertical as possible. They shall be at least 12" and not more than 18" wider at the top of the pipe than the outside diameter of the pipe, plus sheathing where it is necessary. Where paving is to be cut, it shall be cut in advance of trenching 1' wider than the specified width of the trench.
- 3.1.7.3 Where soil conditions prohibit vertical walls, the trench width at the bottom and at 1' above the top of the pipe shall be as specified above with the remainder being held to the least possible width greater than that specified. Where soil conditions prevent ditch excavation without excessive widths, or where directed by the Engineer, wood sheeting, as hereinafter specified, shall be driven to support the trench walls or a suitably reinforced steel trench box shall be employed.
- 3.1.7.4 Trench bottoms shall be hand graded to provide uniform and continuous bearing for the pipe along its entire length, with bell holes being dug for pipe bells. No ridges,

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sags, or undercutting will be allowed. Excess excavating below grade shall be backfilled with suitable material, which shall be thoroughly tamped.

- 3.1.7.5 If approved by the Engineer and subject to suitable soil conditions, the trench may be excavated a few inches below the established subgrade and backfilled with select material (from the excavation, if available) well compacted and so shaped as to give the pipes uniform bearing throughout their lengths at the established grade. Bell holes shall be dug to relieve the bells of load and to provide for completing the joints.
- 3.1.7.6 Where the material at grade is unstable, soft, and incapable of supporting the pipe, the trench shall be excavated below grade, as directed by the Engineer, and refilled to grade with crusher-run stone or gravel to form a firm foundation for the pipe. Stone shall be compacted and graded to provide a stable foundation and a uniform bearing for pipe. Bell holes shall be provided as in other types of foundations.
- 3.1.7.7 When authorized by the Engineer, the Contractor shall dispose of material excavated from the trench that is unsuitable for backfill material. The Contractor shall provide select borrow material to replace unsuitable material for backfilling the trench as directed.
- 3.1.7.8 Should ground water be encountered in the bottom of the trench, causing the trench bottom to be unstable, the material, as directed by the Engineer, shall be excavated below grade sufficiently to allow a bed of crushed rock or gravel to be placed in which to bed the pipe. The crushed rock or gravel shall be placed up to the spring line of the pipe. The work shall be done as for unstable foundations. The depth of cut below grade shall be only the minimum amount to accomplish the purpose, and shall be as directed by the Engineer.
- 3.1.7.9 The Contractor shall furnish all machinery for pumping, bailing, and/or well pointing and shall pump, bail, or otherwise remove any water which may be found or shall accumulate in the trenches, and shall perform all work necessary to keep them clear of water while the pipe is being laid. The disposal of water after removal shall be satisfactory to the Engineer.
- 3.1.7.10 Whenever necessary, the side of the trench shall be braced and rendered secure and either open or closed sheeting used to the satisfaction of the Engineer; such sheeting and bracing to be left in place until the trench is refilled to a safe limit, not less than 2' above the top of the pipe. The top portion may then be cut off, but the lower portion shall remain undisturbed. In lieu of sheeting, suitable trench boxes may be

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employed. All sheeting, bracing, trench boxes, and trench construction methods shall conform to the latest Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970.

- 3.1.7.11 All existing water, sewer, and gas lines, buried electrical and telephone cable, and other known utilities intersecting the lines of construction, if requested by the Engineer or County's representative, shall be uncovered by the Contractor at his expense and exposed to the Engineer at least 100' ahead of pipe laying operations to insure the correctness of grades.
- 3.1.7.12 The Contractor shall at all times take necessary precautions in preventing gutters, catch basins, ditches and other drainage facilities from being clogged that might cause flooding conditions and damage to public or private properties.
- 3.1.7.13 Rock Removal, Blasting
 - 3.1.7.13.1 In rock or other unyielding material, the excavation shall be made at least 6" below subgrade elevation. The trench shall be refilled with select material compacted in place as specified for ordinary excavation. Suitable material from excavation may be used, if available. If not, it shall be hauled in.
 - 3.1.7.13.2 All blasting, where required, shall be done under the personal supervision of someone thoroughly skilled in this class of work. All necessary measures to protect life and property shall be taken. When in close proximity to buildings, transmission lines, telephone lines or other facilities, timber mats or other means of preventing damage from flying debris shall be used. Ample and suitable signals shall be given in proximity to the work before each blast, and flagmen shall be placed on all roads, beyond the danger zone, in every direction to warn traffic. All responsibility for damage rests on the Contractor.
 - 3.1.7.13.3 Rock Excavation for trenches and pits includes removal and disposal of materials and obstructions encountered that cannot be excavated with a track-mounted power excavator, equivalent to Caterpillar Model No. 320 CL, and rated at not less than 138 HP flywheel and 44,000 pound drawbar pull and equipped with a short stick and a 30 inch wide, tight tip radius rock bucket with rock teeth rated at 0.75 cubic yard (heaped) capacity.

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- i. Typical of materials classified as rock are boulders one-half (1/2) cubic yard or more in volume, solid rock, rock in ledges, and rock-hard cementitious aggregate deposits.
- ii. Intermittent drilling, blasting, or ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.
- iii. Do not perform rock excavation work until material to be excavated has been cross-sectioned and classified by the Owner's representative, and such information provided to the Engineer for approval.
- iv. Rock payment lines are limited to the following:
In pipe trenches, six (6) inches below invert elevation of pipe and two (2) feet wider than outside diameter of pipe, but not less than three (3) feet minimum trench width.

3.1.7.13.4 Rock shall be defined as that solid material that cannot be excavated under the conditions stated above. All blasting shall be done after coordination with the County representative and subject to all applicable regulations. The County reserves the right to require the removal of rock by means other than blasting where any pipe or conduit is either too close to or so situated with respect to the blasting as to make blasting hazardous. Rock taken from the ditch shall immediately be hauled away and disposed of by the contractor at his expense.

3.1.7.13.5 If rock is encountered, it shall be paid for at the unit price set forth in the Bid. Only solid rock requiring blasting or drilling for its removal will be classified as rock excavation. Rock excavated in excess of the stated limits will not be paid for.

3.1.8 Pipe Installation:

- 3.1.8.1 The Contractor shall haul the pipe and appurtenances to the site of the work and distribute them neatly along the trench prior to laying. The pipe shall be carefully handled to prevent damage. Mechanical hoists or other approved methods shall be

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used in the handling. Depth of cover shall not be less than 3'-6" for pipes 8" in diameter or 3'-6" for pipes 10" and larger in diameter, measured to the top of pipe, except where shown differently on a profile or specifically authorized by the Engineer.

- 3.1.8.2 Pipe and appurtenances shall be kept clean and open ends securely plugged when pipe and bell and spigots shall be thoroughly inspected and cleaned prior to lowering into the ditch and care shall be exercised after the pipe is in place to prevent dirt or other extraneous material from getting into the pipe or bells and into the spigot.
- 3.1.8.3 Spigots shall be fully seated in the bells and the pipe shall be uniformly bedded on the bottom of the trench for its entire length with bells lying in previously dug bell holes sufficiently large to allow proper bedding and jointing. Fittings, valves, and other appurtenances shall be located where shown on the Plans or directed by the Engineer, with the pipe being cut where necessary. After joining, a reasonable amount of deflection may be made in the joint. Such deflection shall not exceed the allowable amount specified by the manufacturer for each size of pipe.
- 3.1.8.4 Where 4" and larger water main is installed around cul-de-sacs, fittings shall be used for bends. 4" and larger piping will not be allowed to bend via deflection around cul-de-sacs. In lieu of bends around cul-de-sacs, Fluid-Tite PVC Stop and Repair Couplings may be used.
- 3.1.8.5 Cast iron pipe shall be laid in accordance with the manufacturer's instructions, applicable portions of AWWA Specification C600, and the following:
 - 3.1.8.5.1 For mechanical joint pipe, Type II, the rubber rings shall be properly lubricated and spigots and bells cleaned before assembling the joint. Units of bolted joints shall be tightened with special torque limiting wrenches set to provide the proper strain on the bolt, and all nuts tightened to that limit.
 - 3.1.8.5.2 Rubber ring joints, Type III, shall be assembled in accordance with the manufacturer's instructions. The bell and spigot shall be absolutely clean prior to the seating of the gasket. The gasket shall be wiped clean, flexed and properly inserted into the socket and seated evenly and properly. Care shall be taken to eliminate any bulges which might interfere with the proper entry of the spigot. A thin film of lubricant shall be applied to the inside surface of the gasket. The joint shall then be completed by forcing the spigot into the bell until it makes contact with the bottom of the gasket. This shall be done

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by use of a pipe jack and assembly, or other methods as approved by the Engineer. This process shall not be completed using a backhoe to force the spigot into the bell for 12" and smaller piping. **PVC pipe 12" in diameter and smaller shall be "hand-belled."**

- 3.1.8.6 PVC pipe shall be installed to all applicable portions of requirements for other pipe material and to the exact instructions of the manufacturer. Adapters shall be furnished and installed as necessary when connections are made to other types of pipe.
- 3.1.8.7 Fittings shall be installed where shown on the Plans or directed by the Engineer. They shall be handled and installed in the same manner as the pipe and all shall be well blocked as hereinafter specified.
- 3.1.8.8 Valves shall be installed at the locations shown on the Plans. They shall be carefully handled, cleaned, and checked for operation prior to backfilling. Care shall be taken to insure that no dirt, rock, or other obstacles that would interfere with the valve operation are left in the valve.
- 3.1.8.9** A valve box shall be installed with each underground valve. They shall be carefully set, centered exactly over the operating nut and truly plumbed. The base shall be set on brick, so arranged that the weight of the valve box and superimposed loads will bear on the base and not on the valve or pipe. **Extension stems shall be furnished where depth of bury places operating nut in excess of 4' beneath finished grade.** Extension stems shall have centering ring.
- 3.1.8.10 Fire hydrants shall be installed in the locations shown on the Plans, or as directed by the Engineer. They shall, in general, be set well back of the curb or ditch line, with the break ring approximately 2" above the finished ground or pavement elevation. A minimum of four cubic feet of stone shall be placed under and around the bottom of each hydrant to facilitate its drainage. Hydrants shall be well blocked with concrete and connected back to the main with tie rods or gripper rings as hereafter specified. Each hydrant shall be painted, after installation, with an acceptable paint and of color(s) selected by the Owner. Reflective paint shall be required on tops and caps of hydrants.

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- 3.1.8.11 Valve markers shall be installed for each main line valve and shall be set where directed by the Engineer. They shall be carefully set with the letters facing the valves and shall be plumb. Distance to valve or blow-off shall be stamped on brass or bronze embed on marker.

3.1.9 Thrust Blocking:

- 3.1.9.1 Concrete for blocking and protection shall be poured in accordance with the following requirements: All fittings, bends, dead ends, fire hydrants, etc., shall be acceptably blocked with concrete having bearing on undisturbed earth in the side and/or bottom of the trench. Bearing area shall be equal to that shown on the Plans and greater if deemed necessary by the Engineer. No concrete shall be poured or splattered on fitting bells, glands, or bolts.
- 3.1.9.2 Reaction blocking for water mains 12" and larger shall be transit-mixed concrete. Bags of unmixed sacrete or other bagged concrete for blocking and bracing shall not be acceptable. This concrete shall have a 28 day compressive strength of 3000 p.s.i.
- 3.1.9.3 Material for reaction blocking for water mains less than 12" may be composed of 3,000 psi bagged concrete that has been mixed with the correct proportion of water. Bagged concrete must be mixed according to the manufacturer's directions.

3.1.10 Backfilling:

- 3.1.10.1 All trash, forms, debris, and other foreign material shall be cleared from around all pipes and structures before backfilling.
- 3.1.10.2 Backfilling of trenches shall be completed after the installation of each section of pipe. Backfilling shall be kept up with the pipe laying to the satisfaction of the Engineer.
- 3.1.10.3 Backfilling around the pipe and to a depth of at least 1' above the top of pipe shall be placed by hand in layers of not over 6". Only select material containing no rocks or other objectionable material shall be used for this portion of the backfill. As fast as the material is placed, it shall be cut under the haunches of the pipe with a shovel and thoroughly compacted with mechanical tamps for the full width of the trench to provide support for the bottom and sides of the pipe. Filling shall be carried up evenly on both sides.

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- 3.1.10.4 The balance of the backfill shall be placed and tamped to prevent excessive settlement in a manner satisfactory to the Engineer. If the trench backfill is located under miscellaneous paved areas, areas to be paved, unpaved streets, or driveways, the trench shall be backfilled with suitable material free from large stones or clods in 8" layers (loose measurement) and thoroughly tamped and compacted to 95% of maximum as established by AASHTO Specification T99, Method A, with mechanical tampers, so as to avoid future settlement. Where applicable, the compaction shall be acceptable to the Department of Transportation or County. For trenches located in streets and highways, trench backfilling shall be in accordance with the requirements of item 3.1.14 of this section, Cutting and Replacing Pavement.
- 3.1.10.5 For pipe outside street limits, compaction shall be at least 90% of maximum as established by AASHTO Specification T99, Method A.
- 3.1.10.6 Excess material shall be promptly removed from the site, and the pavement or road surface cleaned of objectionable material. Contractor shall provide screenings if trench material is placed on pavement. The pavement and/or road surface shall be cleaned daily with a mechanical broom and/or washed if requested by the County or Department of Transportation officials.
- 3.1.10.7 In unpaved streets and shoulders of roads, the top 6" of trench shall be filled with well compacted topsoil. In paved areas, the top of the trench shall be filled with the specified base for pavement, well mixed and compacted. Any settlement of backfill below finish grade shall be promptly corrected.
- 3.1.10.8 The Contractor will be responsible for all final subsidence of all trenches and shall leave the same flush with the original ground after all settlement has taken place. Trenches must be protected against scour due to surface drainage. The Contractor shall correct any future settlement within the guarantee period at his own expense.

3.1.11 Stream Crossings:

No open cut installation of HDPE pipe shall be allowed. Cut & cover installations for major stream crossings shall be ball & socket ductile iron pipe and extend two pipe joints beyond the top of bank on each side with ball and socket ductile iron pipe or reinforced joint pipe. A main line valve and a fire hydrant shall be installed on both sides of all major stream crossing for bypassing purposes in case of pipe failure under stream.

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3.1.12 Meter Yoke Installation:

All meters yokes shall have the following clearances from the centerline of the yoke to the lid:

<u>Meter Size</u>	<u>Clearance (minimum)</u>
3/4"	10"
1"	10"
1 1/2"	12"
2"	12"

All meter yokes shall be centered in the meter box. **All water meters 2" and larger shall be compound type affecting meter yoke width dimensions.**

3.1.13 Dust Control:

The Contractor shall control dust throughout the life of the project within the project area and at all other areas affected by the construction of the project. Dust control shall not be considered effective where the amount of dust creates a potential or actual unsafe condition, public nuisance, or condition endangering the value, utility, or appearance of any property. The Contractor will provide dust control measures as directed by the County.

3.1.14 Cutting and Replacement of Pavement:

- 3.1.14.1 Where pavement is to be cut, the Contractor shall notify the property owners affected and have permission forms signed by the affected property owners.
- 3.1.14.2 Where pavement is to be cut for installation of pipe or other utilities, the Contractor shall cut it neatly in advance of trenching and shall replace the pavement with base and new pavement.
- 3.1.14.3 All pavement shall be neatly cut to a straight edge in advance of trenching with the method of cutting being subject to approval of the Engineer. Pavement shall be cut 12" wider than the excavated area on each side. Ragged or irregular edges will not be allowed and work completed with barred edges shall be redone. Concrete pavement shall be sawed with suitable concrete saw cutting equipment.
- 3.1.14.4 Trench backfilling shall be done in layers not over 6" thick and thoroughly compacted. Compaction shall be such as to prevent future settlement and shall be done by acceptable means, approved by the County. Rolling with rubber tired vehicles or track-type equipment will not be allowed. Compaction shall be at least 95% of

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maximum as established by AASHTO Specification T99, Method A. The entire trench shall be backfilled with crushed run stone for open cut NCDOT roads.

- 3.1.14.5 Base for pavement shall be crusher run stone for all non-NCDOT maintained streets, HB binder for all secondary highways, and reinforced concrete for all primary highways. All base shall be placed in accordance with plan and/or encroachment permit details. Base width shall be shown on the plans and/or encroachment permits for various types of pavement cuts.
- 3.1.14.6 Crusher run stone shall be well mixed and compacted by tamping and rolling. Compaction shall be to such degree as to preclude settlement. Crusher run base material shall be placed at the same time that the trench is backfilled. Backfilling to top of ditch, to be cut out and replaced with base material at a later date, will not be allowed.
- 3.1.14.7 Crusher run base for highway pavement and adjacent drives shall be 8" of stone, stabilized with 5% Portland cement. It shall be thoroughly mixed prior to compacting.
- 3.1.14.8 Crusher run base for non-highway pavement and drives shall be 8" of stone without the addition of cement.
- 3.1.14.9 Binder base for secondary roads shall be a minimum of 6" HB binder conforming to specifications of the Department of Transportation.
- 3.1.14.10 Concrete base shall consist of 8" of concrete, reinforced with #4 reinforcing steel bars placed at 8" on center in the transverse direction and #4 tie bars in the longitudinal direction. Concrete shall be designed to produce a compressive strength of 3000 psi at 28 days. The design of the mix and source of supply shall be subject to approval of the Engineer.
- 3.1.14.11 Pavement shall be replaced with the same type of pavement that exists prior to cutting and shall consist of either bituminous surface course (double treatment), 2" of hot plant mix asphaltic concrete, or 8" of Portland cement concrete; all conforming to specifications of the Department of Transportation for each type.

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- 3.1.14.11.1 All pavement shall be repaired within the same week that it is cut. Should inclement weather delay pavement replacement, the Contractor shall not cut additional pavement until he has notified the Engineer and received specific permission and instructions.
- 3.1.14.11.2 For asphalt pavement or bituminous surfacing, the entire area to be resurfaced (including edges of existing pavement) shall be primed with an acceptable asphalt prime coat just prior to placing new pavement.

3.1.15 Removal and Replacement of Sidewalk, Other Items:

- 3.1.15.1 Where pipe is to be placed under existing concrete sidewalk, the concrete shall be removed in construction units unless their length is more than 10', in which case the concrete shall be cut as specified in paragraph 3.1.14 of this section. The backfill shall be thoroughly compacted for the entire depth of the trench.
- 3.1.15.2 The sidewalk shall be replaced with 3000 psi concrete, 4" thick, except for driveways where it shall be 6" thick. The concrete shall be placed monolithic and dressed off with a wooden float, brush and edging tool. Where pipe is to be placed under concrete walk, the Contractor may, with the permission of the Engineer, install the pipe by tunneling instead of removing and replacing the walk. If pipe is to be placed under curb and gutter, it shall be done by tunneling.
- 3.1.15.3 The Contractor shall be responsible for removing and replacing items such as mail boxes, fences, shrubbery, walls, steps, and any other private ornamental items that are in direct conflict with the water line work.

3.1.16 Connections to Existing Mains:

- 3.1.16.1 Connections to existing facilities shall be made where shown on the plans or directed by the County representative. All connections to County lines shall be witnessed by a representative of the County. Wet taps, using tapping sleeves and valves, shall generally be made; except as otherwise directed or planned by the County in which case the main shall be cut and the connections made with fittings and valves. Wet taps shall not be allowed when the water main to be tapped is the same diameter as connecting line. In no case shall the Contractor shut off the water or operate the fire hydrants or gate valves in the existing systems without the expressed permission of the Owner. In event such instructions or permissions given by the County delays the

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cutoff, such instructions shall be followed without recourse. All connections shall be made in the presence of a County representative. At least 48 hours notice must be given to a representative of the County for a wet tap and a minimum of 72 hours notice must be given for instances where the water main must be removed from service and cut. **Any Contractor making a connection to an AC water main must be pre-approved by the Johnston County Department of Utilities.**

- 3.1.16.2 In making connections to the existing distribution system, valves shall be set as shown on the Plans, or at such designated places as the Engineer may direct. If due to unforeseen conditions, these locations have to be change or additional valves or fittings added, the Contractor shall install the valves or fittings at the new locations.

3.1.17 Cross-Connections:

- 3.1.17.1 No potable water supply shall be connected by any means whatever to another source of water supply or to a storage facility unless such connection has been previously approved by the Public Utilities Department. No connection shall be made to any plumbing system that does not comply with the North Carolina State Building Code, volume II, or any applicable local plumbing code.
- 3.1.17.2 No person shall introduce any water into the distribution system of a public water supply through any means other than from a source of supply duly approved by the Department or its representatives, or make a physical connection between an approved supply and unapproved supply unless authorized in an emergency by the Department or its representative.
- 3.1.17.3 In cases where storage capacity is used only for non-potable purposes and there is installed either an elevated tank or a ground reservoir, the following precautions shall be taken:
- (A) When the reservoir or elevated tank is filled from a supply other than a public water supply and the public water supply is used as a supplemental supply, the pipeline from the public water supply shall be installed in such a manner that the water will be discharged over the top or rim of the reservoir or elevated tank. There shall be a complete physical break between the outlet end of the fill pipe and the top or overflow rim of the tank or reservoir of at least twice the inside diameter of the inlet pipe.
 - (B) When the elevated tank or ground storage reservoir is filled entirely by water from a public water supply:

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- (i) If a covered ground reservoir or covered elevated storage tank is used, an approved reduced pressure back-flow preventor or an approved double check valve assembly may be used. The back-flow prevention device shall be installed in such a manner as to afford adequate protection and shall be easily accessible and shall include all necessary pressure gauges and drains for testing. Gate valves shall be installed in the line at both ends of the back-flow prevention device.
- (ii) If an uncovered ground reservoir or uncovered elevated storage tank is used, a complete physical break shall be provided between the reservoir or elevated tank and the public supply. The physical break between the inlet pipe and the top or overflow rim of the reservoir shall be at least twice the diameter of the inlet pipe.

3.1.17.4 All cross-connections between potable water supplies and non-potable or unprotected supplies which are not specifically covered in the categories in this Paragraph will be considered as special problems and the protective devices required will be determined by the Department on the basis of the degree of health hazard involved.

3.1.17.5 Persons desiring to install non-potable water supplies in conjunction with a public water supply shall submit to the public water supply section, Division of Environmental Health, detailed plans and specifications in triplicate showing the non-potable water supply and its relation to the potable water supply. *DENR – Public Water Supply Section 15A: 18C .0400* (6) Any such interconnection to a potable water system is subject to the approval of the water supplier and shall not be made until authorized by the water supplier in addition to the Department.

3.1.17.6 No person shall fill special use tanks or tankers containing pesticides, fertilizers, other toxic chemicals or their residues from a public water system except at a location equipped with an over-the-rim free discharge of water or an approved reduced pressure backflow preventer properly installed on the public water supply. No supplier of water shall permit the filling of such special use containers except at locations so equipped.

3.1.18 Repairs to Damaged Services and Utilities:

3.1.18.1 Repairs to damaged services and utilities shall be promptly made at the Contractor's expense. The Contractor shall use every effort to avoid damaging or breaking water,

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sewer, gas, power, telephone, or other utility service. Utility lines shall be properly supported across the pipe trench until backfilling is completed. Should damage occur, immediate action shall be initiated to affect satisfactory repairs. All repair work shall be satisfactory to the Owner of the damaged utility.

3.1.19 Cleanup:

- 3.1.19.1 All pipeline rights-of-way and pipework areas shall be cleaned up, restored and left in satisfactory condition.
- 3.1.19.2 Cleanup of work along highways or roads shall be made immediately upon completion of the backfill operation. Ditching and pipe laying shall be stopped at any time that cleanup work lags and shall not be resumed until cleanup progress is satisfactory to the Engineer. Final cleanup and condition of the work area shall be subject to the approval of the State Highway Representative, the Owner, and the Engineer.
- 3.1.19.3 Cleanup of work for cross-county locations shall follow immediately upon the completion of any major part of the work or upon instructions by the Engineer. Topsoil shall be replaced on all areas disturbed by the pipeline work throughout the length of the water main, and to the full satisfaction of the property owner. Topsoil may be removed from the line of work and stockpiled for future use. It shall be carefully removed, stockpiled, protected, respread, dressed off, and the entire right-of-way left in condition acceptable to the Engineer and property owner. If topsoil is not stockpiled and protected, suitable, approved material from other sources shall be provided. Where the line is located on pasture land, grassed areas, or roadway shoulders, grass shall be replaced.
- 3.1.19.4 All disturbed pipeline areas shall be seeded in accordance with NC DOT standards.
- 3.1.19.5 All lines 16" and larger in diameter shall be pigged prior to testing.
- 3.1.19.6 Flushing of water lines shall be coordinated with Johnston County with a minimum of two hours notice before the commencement of flushing.

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3.2 Testing:

3.2.1 Pressure Testing:

3.2.1.1 All pressure and leakage tests must be witnessed by the County for approval. All services shall be installed prior to pressure testing. Testing shall be performed at a minimum of one point for every 10,000 l.f. of water line with a minimum of one point per subdivision.

3.2.1.2 Each section of the pipeline shall be subjected to and successfully meet a pressure test of not less than 175 psi. The line shall be slowly filled with water and all air expelled through the air valves or other means. A suitable test pump shall be connected to the line by means of a tap in the line, or other suitable methods, and the proper test pressure slowly applied to the line. The pressure test shall be maintained for at least two hours, at full pressure. Leaks, if found, shall be immediately repaired.

3.2.1.2.1 After the pressure test is completed, a leakage test shall be conducted. Leakage test shall be conducted by measuring, by suitable and accurate methods, the amount of water that enters the test section under maximum operating pressures for a period of at least two hours.

3.2.1.2.2 No pressure pipe installation will be accepted until leakage is less than the number of gallons per hour for each section tested, as determined by the following formula:

$$L = \frac{SD(P)^{1/2}}{148000}$$

L = Allowable leakage, in gallons per hour.

S = Length of pipeline tested, ft

D = Nominal diameter of the pipe, in inches.

P = Average test pressure during the leakage test, in pounds per square inch gauge

3.2.1.2.3 Should any test disclose leakage greater than that allowed above, the defect shall be located and repaired until the leakage is within the specified allowance.

3.2.1.2.4 All pressure and leakage tests must be witnessed by the County for approval.

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3.2.2 Sterilization and Bacteriological Testing:

- 3.2.2.1 Before any potable water main is placed in service, it shall be flushed out and sterilized with chlorine or calcium hypochlorite. The sterilizing solution shall be introduced at one end of the main as water is being withdrawn for the other end, in such proportion as to give 50 PPM of free chlorine throughout the main. The solution shall remain in the pipe for 24 hours, at which time it shall have residual chlorine of 10 PPM throughout the main, or the process shall be repeated. The line shall be flushed out and bacterial analyses show negative results, the process being repeated if necessary.
- 3.2.2.2 Upon completion of sterilization, the water line shall be refilled with water and samples collected for bacteriological examination. Generally, a sample will be taken every 2,000 feet for distribution lines and every 4,000 feet on transmission lines. Samples may be taken at new service connections, at air valve stations, or through any other connection to the line one (1") or smaller in diameter. Samples shall not be taken at fire hydrants without the expressed consent of the County. The samples shall be taken in standard sterilized bacteria sample bottles marked with the sample location provided by contractor. Samples shall be taken in the presence of a County representative. The contractor shall take samples to a State certified laboratory for analysis. Results of the analyses shall be furnished to the County.
- 3.2.2.3 Bacteriological test results over 30 days old for lines not yet put in service will not be accepted.

3.2.3 Fire Flow Tests:

- 3.2.3.1 A fire flow and residual pressure tests shall be performed with the most remote hydrant flowed. The static pressures at the flowed hydrant and residual hydrant shall be measured, the stabilized flow measured, and the residual pressure measured. Minimum acceptable test conditions shall be 500 gpm at 20 psi residual. **Test results certified by the engineer of record shall be furnished to the County.**

3.2.4 Inspection and Acceptance:

- 3.2.4.1 All work shall be subject to inspection and approval by the County prior to final acceptance. Final acceptance shall be contingent upon all pressure, leakage and fire flow tests yielding satisfactory results, and submittal of accurate as-built plans.

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Utilities will not be accepted until after underground electrical utilities have been installed.

- 3.2.4.2 All connections to the County's water system must be witnessed by the County representative for acceptance.

END OF SECTION

SECTION 02930

SEEDING AND MULCHING

PART 1 GENERAL

1.1. DESCRIPTION

- A. Work included: The work covered by this section of the specifications consists of furnishing all labor, equipment, and supplies, and performing all operations in connection with seeding and mulching in strict accordance with this section of the specifications and the applicable drawings, and subject to the terms and conditions of the contract.
- B. Related Work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

A.2 SUBMITTALS

- A. Seed: The Engineer shall be furnished with four (4) signed copies of a statement from the vendor certifying that each container of seed delivered is fully leveled in accordance with the Federal Seed Act and is at least equal to the requirements for seed as herein specified. This certification shall appear on or with all copies of invoices for the seed. Each lot of seed shall be subject to sampling and testing at the discretion of the Engineer. Sampling and testing will be in accordance with the latest rules and regulations under the Federal Seed Act.
- B. Fertilizer and Lime: The Engineer shall be furnished with four (4) copies of invoices for all fertilizer and lime used on the project. Invoices for fertilizer shall show the grade furnished. Invoices for lime shall show total minimum carbonates and minimum percentages of the material furnished that pass the 100, 20, and 10 mesh sieves. Each lot of fertilizer and lime shall be subject to sampling and testing at the discretion of the Engineer. Sampling and testing will be in accordance with the official methods project, a final check of the total quantities of fertilizer and lime used will be made against the total area treated, and if the minimum rates of application have not been met, the Engineer may require the distribution of additional quantities of fertilizer and limes to make up the minimum rates of application specified.

1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work

of this Section.

- B. Use equipment adequate in size, capacity, and numbers to accomplish the work of this Section in a timely manner.
- C. In addition to complying with requirements of governmental agencies having jurisdiction, comply with the directions of the soil engineer.

1.4 SEQUENCING AND SCHEDULING

- A. **Planting Time:** A ground cover sufficient to restrain erosion must be provided within 15 working days or 60 calendar days, whichever is the shorter period, of completion of any grading or ground disturbance. The planting time for permanent seeding shall be 1 March through 15 October. Planting time for temporary seeding shall be in accordance with TEMPORARY SEEDING. Any changes to the planting time or to the seed mixtures must have prior approval of the Engineer. The Contractor shall be responsible for the protection of earth slopes and damage thereto shall be repaired, as required, prior to seeding.

1.5 MAINTENANCE

- A. The Contractor shall maintain the seeded and mulched areas until all work, designated portions thereof, have been completed and accepted. Maintenance shall consist of providing protection against traffic by warning signs or barricades, repairing any areas damaged as a result of his own operations and erosion, and mowing to a height three (3) inches when weeds or other vegetation tend to shade or smother the new seedlings. Seeded areas will be considered established and satisfactory when the new growing sprouts are visible at the surface showing not less than nine (9) seedlings at least 2 inches long in each square foot.
- B. The Contractor shall be responsible for the proper care (maintenance) of the seeded and mulched areas until a satisfactory cover of growing grass is visible as specified above. During this establishment period, it will be the responsibility of the Contractor to repair soil washes and reseed and remulch unsatisfactory areas. All costs and charges in connection with work and materials necessary for maintenance and establishment of the grass, including soil for repairs, shall be borne by the Contractor and at no additional expense to the OWNER. The establishment period shall extend until conditional acceptance and/or final acceptance in conformance with the requirements of General conditions. Seeded areas not showing satisfactory growth at the surface thirty (30) days after planting shall be reseeded unless additional establishment time is approved.

PART 2 PRODUCTS

2.1 MATERIALS - SEED

- A. Seed shall be labeled in accordance with U.S. Department of Agriculture rules and regulations under the Federal Seed Act in effect on the date of the invitation for Bids. Seed which has become wet, moldy, or otherwise damaged in transit or in storage will not be acceptable. Seed for all areas shall meet the minimum percentage purity in each lot of seed as shown below.

Kind of Seed	Minimum Percentage Purity
Sudan Grass	98
Tall Fescue	97
Bermuda, common-unhulled seed	97
Bahia, Pensacola	72
Lespedeza, Common (unscarified seed)	97
Lespedeza, Sericea (unscarified seed)	98
Kentucky Bluegrass	85
Rye Grain	97

Note: Weed seed not to exceed 1 percent.

- B. Fertilizer shall be 8-8-8 commercial mixed grade, uniform in composition, free flowing, and suitable for application with approved equipment, delivered to the site in bags or other convenient containers, each fully labeled, conforming to the applicable State fertilizer laws, and bearing the name or trademark and warranty of the producer.
- C. Lime shall be ground limestone containing not less than 85 percent of total carbonates and shall be ground to such fineness that 100 percent will pass through a No. 10 mesh sieve and at least 90 percent will pass through a 20 mesh sieve, and 50 percent will pass the No. 100 sieve. Coarser materials will be acceptable provided the specified rates of application are increased proportionately, on the basis of quantities passing the 100 mesh sieve, but no additional payment will be made for the increased quantity.

2.2. MATERIALS - MULCH

- A. Mulch material which contains an excessive quantity of matured seed of noxious weeds or other species which would grow and be detrimental to the development of grasses will not be acceptable. Straw or other mulch material which is fresh and excessively brittle or which is in such advanced stage of decomposition as to smother or retard the growth of grass will not be acceptable. Mulch shall be any of the following materials:
1. Straw: Straw shall be threshed straw of oats, wheat, rye, beans or peanuts.
 2. Hay: Hay shall be such types as native hay or broom sedge hay.
 3. Wood cellulose fiber mulch: For use with the hydraulic application of grass seed and fertilizer,

shall consist of specially prepared wood cellulose dyed an appropriate color to facilitate visual metering of application of the materials. The mulch material shall be supplied in packages having a gross weight not in excess of 100 pounds. The wood cellulose fiber shall contain not in excess of 10 percent moisture, air dry weight basis. The wood cellulose fiber shall be manufactured so that after addition and agitation in slurry tanks with fertilizers, grass seeds, water, and any other approved additives, the fibers in the material will become uniformly suspended to form a homogeneous slurry; and that when hydraulically sprayed on the ground, the material will form a blotter-like ground cover impregnated uniformly with grass seed; and which, after application, will allow the absorption of moisture and allow rainfall or mechanical watering to percolate to the underlying soil suppliers shall be prepared to certify that laboratory and field testing of their product has been accomplished, and that their product meets all the foregoing requirements based upon such testing.

- B. Bituminous adhesive material: for anchoring of mulch shall conform to one of the following types and shall be non-toxic.
1. Asphalt emulsion - Fed Spec SS-A-674, Type 12 s-1.
 2. Cutback Asphalt - Fed Spec SS-A-671, designation Rc-70, MC-30, and MC-70.

2.3 Mixes - Seed - (permanent Seeding)

- A. All areas except around buildings.
1. Seed mixture; planting period: Year around

Kind of Seed	Min. lbs. per acre
Tall Fescue (Ky. 31 var.)	50
Bermuda, common-unhulled seed	20
Bahia, Pensacola var.	50
Centipede	5
Total	125

2. On slopes 4:1 and steeper, Lespedeza Sericea will be added to above mixtures at rates of 35 lbs. per acre.

- B. Around buildings

Kind of Seed	Min. lbs. per acre
Tall Fescue (Ky. 31 var.)	100

2.4 EQUIPMENT - HYDRAULIC - PERMANENT SEEDING - (Optional)

- A. General: In lieu of distributing fertilizer, seed and mulch in separate operations as provided hereinbefore, the

Contractor has the option of combination of fertilizer, seed and mulch.

- B. Seeder: Equipment to be used for applying a seed-fertilizer mix over prepared slopes shall be a hydraulic seeder designed to pump and discharge a waterborne homogeneous slurry of seed, fertilizer, and wood cellulose fiber at the desired specified rate. The seeder shall be equipped with a power-driven agitator, and shall be capable of discharging up to 200 gallons per minute at 100 pounds pressure from a nozzle with clearance for 1/2 inch solids.
- C. Wood cellulose fiber mulch spreader: Hydraulic equipment used for the application of fertilizer, seed, and slurry of prepared wood pulp shall have a built-in agitation system with an operating capacity sufficient to agitate, suspend, and homogeneously mix a slurry containing up to 40 pounds of fiber plus a combined total of 70 pounds of fertilizer solids for each 100 gallons of water. The slurry distribution lines shall be large enough to prevent stoppage. This discharge line shall be equipped with a set of hydraulic spray nozzles that will provide even distribution of the slurry on the various slopes to be mulched. The slurry tank shall have minimum capacity of 1000 gallons and shall be mounted on a traveling unit which may be either self propelled or drawn by a separate unit that will place the slurry tank and spray nozzles near the areas to be mulched so as to provide uniform distribution without waste. The Engineer may authorize equipment with smaller tank capacity provided that the equipment has the necessary agitation system and sufficient pump capacity to spray the slurry in a uniform coat over the surface of the area to be mulched.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION OF SEEDBED - PERMANENT SEEDING

- A. General: The areas to be treated and their respective requirements for seed, fertilizer, lime, and other treatment shall be as indicated on the drawings and/or as specified herein. Equipment necessary for the proper preparation of the ground surface and for handling and placing all required materials shall be on hand, in good condition, and shall be approved before the work is started. The contractor shall demonstrate to the Engineer before starting work that the application of the materials required will be made at the specified rates.
- B. Clearing and cleanup of seedbed area: Prior to tillage

operations in graded areas, the surface shall be regraded as may be required to restore any eroded or unsuitable surface; vegetation on the site, if any, that might interfere with tillage or seeding operations shall be mowed, raked, and burned or removed from the site. Also, prior to or during tillage operations, ground surfaces to be seeded shall be cleared of stumps, roots, cable, wire, grade stakes, and other materials that might hinder proper tillage, seeding or subsequent maintenance operations.

- C. Tillage: In the graded areas, tillage shall consist of disking, scarifying or otherwise loosening the soil to a minimum depth of 4 inches. Clods shall be broken and the soil worked into a satisfactory seedbed by disking, harrowing, or other suitable methods. Slope surfaces upon which power tillage equipment cannot operate shall be grooved or punctured by hand or other suitable means so as to provide small pockets, ridges, or trenches in which seeding materials can lodge. Tillage or the preparation of the seedbed shall not be done when the soil is frozen, extremely wet, or otherwise in an unfavorable working condition.

3.3 APPLICATION - FERTILIZER AND LIME - PERMANENT SEEDING.

- A. Application of Fertilizer: Fertilizer shall be distributed uniformly at a rate of 1,200 pounds per acre over the areas to be seeded and shall be incorporated into the soil to a depth of at least 4 inches by disking, harrowing, or other acceptable methods in grades areas. The incorporation of fertilizer may be a part of the tillage operation specified above. Distribution by means of an approved seed drill equipped to sow seed and distribute fertilizer at the same time will be acceptable.
- B. Application of lime: Immediately following or simultaneously with the incorporation of fertilizer, lime shall be distributed uniformly at a rate of 2000 pounds per acre over the areas to be seeded and shall be incorporated into the soil to a depth of at least 4 inches by disking, harrowing, or other acceptable methods in the graded areas. The incorporation of the lime along with the fertilizer may form a part of the tillage operation specified above.
- C. Leveling: Depressions or irregularities in the surface resulting from tillage, fertilizing, liming, or other operations shall be leveled before seeding operations are begun except in ungraded areas where the condition of the surface and soil would make this operation impracticable.

3.4 APPLICATION - SEED - PERMANENT SEEDING

- A. General: All seeding work shall be accomplished using the proper seed mixture, during the planting periods listed below, except as otherwise directed, in writing, by the Engineer. A satisfactory method of sowing shall be employed, making use of approved mechanical powerdrawn

drills or seeders, mechanical handseeders, or other approved methods. When drills are used, provision shall be made by markers or other means to assure that the successive seeded strips will overlap or be separated by a space no greater than the space left between the rows planted by the equipment being used. When delays in operations carry the work beyond the most favorable planting period for the species designated, or when conditions are such, by reason of drought, high winds, excessive moisture, or other factors, that satisfactory results are not likely to be obtained, the work will be stopped by the Engineer and shall be resumed only when directed. If inspection, during seeding operations or after there is a show of green, indicates that strips wider than the space between the rows planted have been left unplanted, or that other areas have been skipped, the Engineer may require the sowing of additional seed on these areas.

- B. Drill seeding shall be done with approved equipment with drills not more than 10 inches apart. The seed shall be sown uniformly over the designated areas. The seed shall be sown to an average depth of 1/4 inch and at the rate specified. Sloped surfaces shall be sown with the drill moving perpendicular to the slope. Broadcast seeding by use of distributors such as a "Cyclone" seeder will be permitted only as specifically authorized by the Engineer.

3.5 APPLICATION - MULCHING

- A. All areas shall be uniformly mulched in a continuous blanket immediately following seeding operations. Mulch shall be spread at a rate of 1 1/2 tons to the acre. 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 thickness of the covering shall be adequate to hold the soil but sufficiently loose and open to favor the development of grass.
- B. Immediately following the spreading of the mulch, the material shall be anchored to the soil by means of a seed drill, cultipacker, disc harrow set to cut only slightly, or other suitable equipment which will secure the mulch firmly and prevent loss or bunching by wind or rain, or may be anchored with string lines placed at sufficient intervals. On slopes where machinery cannot be used, mulch may be retained in place by hand spading, string lines, or other approved means which will not be detrimental to subsequent maintenance. Upon completion, the surface of the mulched areas shall be reasonably smooth and free from clods of earth, bumps or waterholding pockets.
- C. On slopes 4:1 or steeper, the mulch shall be further anchored in place by the application of emulsified asphalt or cut-back asphalt of the types SS-1 or Rc-70, MC-30 and MC-70, respectively, and shall be non-toxic to the growth of grass. The bituminous material shall be applied at the

rate of 0.2 to 0.4 gallons per square yard by an approved method of pressure distribution. The application of the bituminous adhesive may be part of the mulching operations if an approved mulching machine is used which is equipped to coat and distribute the mulch simultaneously.

3.6 APPLICATION - HYDRAULIC EQUIPMENT

- A. Fertilizer shall be distributed at the rate of 6000 pounds per acre and incorporated to a depth of at least three (3) inches as specified herein. Additional fertilizer at the rate of 600 pounds per acre shall be distributed simultaneously with the seed using an approved seeder.
- B. The distribution and rate of application of lime shall conform to the requirements as specified herein.
- C. Seeds and mulch. the combination of seeds and rates of application shall conform to the requirements as specified herein.
The wood cellulose fiber mulch shall be applied at the rate between 1000 and 1200 pounds per acre in the mixture of seed and fertilizer.
- D. Maintenance and establishment shall conform to requirements hereinbefore specified.

3.7 TEMPORARY SEEDING

- A. General: The work covered by this paragraph consists of the seeding of selected areas in advance of the permanent seeding and mulching operations so as to minimize erosion of grade areas during construction operation. Temporary seeding shall be considered as a supplement to and not as a substitute for the requirements for the control of erosion and siltation provided in other sections of the specifications. The work shall include preparing seedbeds; furnishing, placing, and covering fertilizer and seed; and any other operations necessary for the seeding of the required areas; all in accordance with these specifications.
- B. Temporary seed location and planting time: The work of temporary seeding shall be done promptly at the locations and times directed by the engineer. Temporary seeding shall be done under any or all of the following conditions as directed by the Engineer.
 - 1. When it is impossible or impractical to bring an area to final line, grade, and finish so that permanent seeding and mulching operations can be performed without subsequent serious disturbance by additional grading;
 - 2. When erosion occurs or is considered to be potentially substantial on areas of graded roadbed where construction operations are temporarily suspended;
 - 3. During seasons of the year when permanent seeding and mulching is prohibited by these specifications.
 - 4. When an immediate cover would be desirable to minimize erosion, siltation, or pollution on any area.
- C. Fertilizer shall be applied at the rate of 800 pounds and

seed at the rate of 125 per acre.

- D. Seed: Sudan grass shall be used in summer months and Rye Grain during the remainder of the year. The Engineer will determine the exact dates for using each kind of seed.
- E. Lime: the Contractor may add the lime required for permanent seeding during this operation, provided the area on which temporary seeding is being done is to final line and grade. Compensation for the lime will be made when the permanent seeding is done on this area.
- F. Seedbed preparation: Areas to be seeded shall be loosened to the depth directed by the Engineer but in no case greater than 4 inches. The required depth will depend on the soil conditions and topography of the seedbed. The entire surface to be seeded will have adequate furrows, ridges, with reasonable assurance that the materials will not be easily displaced by wind, rain, or surface runoff.
- G. Applying and covering fertilizer and seed: The rates of application of fertilizer and seed shall be as herein specified. No fertilizer or seed shall be applied when the the Engineer determines that conditions are unfavorable for such operations. The fertilizer or seed shall be distributed uniformly over the seedbed at the required rates of applications. Fertilizer and seed shall be covered or left uncovered, as directed by the Engineer. If covering is required, it shall be to the degree acceptable to the Engineer for the prevention of displacement by wind, rain, or surface runoff.

3.8 FIELD QUALITY CONTROL

- A. The Contractor shall establish and maintain quality control for seeding operations to assure compliance with contract requirements and maintain records of his quality control for all operations including but not limited to the following:
 - 1. Clearing and Cleanup of Seedbed Area
 - 2. Tillage
 - 3. Application of Fertilizer and Lime
 - 4. Leveling Seedbed.
 - 5. Seeding
 - 6. Mulch Properly Placed and Anchored
 - 7. Satisfactory stand of grass. Coverage of the planted species at the end of the maintenance period and maintenance procedures shall be in accordance with the specifications.
- B. A copy of the quality control records and test reports, if required, as well as corrective action taken, will be furnished the Owner as directed by the Engineer.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART A - GENERAL

1A. DESCRIPTION

1. Work included: Provide cast-in-place concrete, including formwork and reinforcement, where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
2. Related work:
 - a. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and other Sections in of these Specifications.

2A. QUALITY ASSURANCE

1. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
2. Comply with "Specifications for Structural Concrete for Buildings," ACI 301, except as may be modified herein.
3. Provide access for, and cooperate with, the inspector and testing laboratory described in General Conditions of these Specifications.
4. Do not commence placement of concrete until mix design has been reviewed and approved by the Engineer and all governmental agencies having jurisdiction.

3A. PRODUCT HANDLING

1. Comply with pertinent provisions of The General and Special Conditions.

PART B - PRODUCTS

1B. FORMS

1. Design, erect, support, brace, and maintain formwork so it will safely support vertical and lateral loads which might be applied until such loads can be supported safely by the concrete structure.
2. Construct forms to the exact sizes, shapes, lines, and dimensions shown, and as required to obtain accurate alignment, locations, grades, and level and plumb work in the finished structure.

2B. MOISTURE BARRIER

1. Where so indicated on the Drawings, provide a moisture barrier consisting of:
 - a. Four inches of clean dry sand, evenly spread as a cushion;
 - b. "Visqueen" or equal 6 mil thick plastic sheeting, with all joints taped and sealed;
 - c. Two inches of clean dry sand, evenly spread on top of the installed plastic sheeting.

3B REINFORCEMENT

1. Comply with the following as minimums:
 - a. Bars: ASTM A 615, grade 60 unless otherwise shown on the Drawings, using deformed bars for number 3 and larger;
 - b. Welded wire fabric: ASTM A 185;
 - c. Bending: ACI 318
2. Fabricate reinforcement to the required shapes and dimensions, within fabrication tolerances stated in the CRSI "Manual of Standard Practices."
3. Do not use reinforcement having any of the following defects:
 - a. Bar lengths, depths, or bends exceeding the specified fabricating tolerances;
 - b. Bends or kinks not indicated on the Drawings or required for this Work;
 - c. Bars with cross-section reduced due to excessive rust or other causes.

4B. CONCRETE

1. Comply with the following as minimums:
 - a. Portland cement: ASTM C150, type I or II, low alkali
 - b. Aggregate, general:
 - i. ASTM C30, uniformly graded and clean;
 - ii. Do not use aggregate known to cause excessive shrinkage.
 - c. Aggregate, coarse: Crushed rock or washed gravel with minimum size between 3/4" and 1-1/2", and with a maximum size number 4.
 - d. Aggregate, fine: Natural washed sand of hard and durable particles varying from fine to particles passing 3/8" screen, of which at least 12 percent shall pass a 50-mesh screen.
 - e. Water: Clean and potable.
2. Provide concrete with the compressive strengths shown on the Drawings. When such strengths are not shown on the Drawings, provide the following as minimums:
 - a. Concrete footings - 3000 psi
 - b. Concrete walls - 3000 psi
 - c. Concrete walks and slabs on grade - 3000 psi
3. Surface treatment:
 - a. Where "sealer" or "hardener" is called for on the Drawings, provide "Ashford Formula" manufactured by Curecrete Chemical

Company of Orem, Utah and distributed by Martech Associates, 19836 Vintage Street, Chatsworth, California 91311 (213) 993-1163, and provide the manufacturer's standard written 20 year/10 year warranty.

b. Except as otherwise directed by the Engineer or shown on the Drawings, on all other concrete slab, driveway, and walkway surfaces provide "Hunt TLF" curing agent manufactured by Hunt Process Co., Inc.

5B. OTHER MATERIALS

1. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

PART C - EXECUTIONS

1C SURFACE CONDITIONS

1. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

2C. REINFORCING

1. Comply with the following, as well as the specified standards, for details and methods of reinforcing placement and supports.

- a. Clean reinforcement and remove loose dust and mill scale, earth, and other material which reduce bond or destroy bond with concrete.
- b. Position, support, and secure reinforcement against displacement by forms, constructions, and the concrete placement operations.
- c. Place reinforcement to obtain the required coverages for concrete protection.
- d. Install welded wire fabric in as long lengths as practicable, lapping adjoining pieces one full mesh minimum.
- e. Unless otherwise shown on the Drawings, or required by governmental agencies having jurisdiction, lap bars 40 diameters minimum.

3C. EMBEDDED ITEMS

1. Do not embed piping, other than electrical conduit, in structural concrete.

- a. Locate conduit to maintain maximum strength of the structure.
- b. Increase the thickness of the concrete if the outside diameter of the conduit exceeds 30 percent of the thickness of the concrete.

2. Set bolts, inserts, and other required items in the concrete, accurately secured so they will not be displaced, and in the precise locations needed.

4C. MIXING AND TRANSPORT

1. Transit mix the concrete in accordance with provision of ASTM C 94.
2. For ready-mixed concrete, no more than one hour shall elapse from the time the concrete truck is loaded at the plant to the time the concrete is placed.

5C PLACING CONCRETE

1. Preparation:
 - a. Remove foreign matter accumulated in the forms.
 - b. Rigidly close openings left in the formwork.
 - c. Wet wood forms sufficiently to tighten up the cracks. Wet other material sufficiently to maintain workability of the concrete.
 - d. Use only clean tools.
2. Conveying:
 - a. Perform concrete placing at such a rate that concrete which is being integrated with fresh concrete is still plastic.
 - b. Deposit concrete as nearly as practicable in its final locations so as to avoid separation due to rehandling and flowing.
 - c. Do not use concrete which becomes non-plastic and unworkable, or does not meet required quality control limits, or has been contaminated by foreign materials.
 - d. Remove rejected concrete from the job site.
3. Placing concrete in forms:
 - a. Deposit concrete in horizontal layers not deeper than 24", and avoid inclined construction joints.
 - b. Remove temporary spreaders in forms when concrete has reached the elevation of the spreaders.
4. Placing concrete slabs:
 - a. Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
 - b. Bring slab surfaces to the correct level with a straightedge, and then strike off.
 - c. Use bull floats or darbies to smooth the surface, leaving the surface free from bumps and hollows.
 - d. Do not sprinkle water on the plastic surface. Do not disturb the slab surface prior to start of finishing operations.

6C. CONSOLIDATION

1. General:
 - a. Consolidate each layer of concrete immediately after placing, by use of internal concrete vibrators supplemented by hand spading, rodding, or tamping.
 - b. Do not vibrate forms or reinforcement.

c. Do not use vibrators to transport concrete inside the forms.

7C. JOINTS

1. Construction joints:

a. Do not use horizontal construction joints except as may be shown on the Drawings.

b. If additional construction joints are found to be required, secure the Engineer's approval of joint design and location prior to start of concrete placement.

2. Expansion joints:

a. Do not permit reinforcement or other embedded metal items that are being bonded with concrete (except dowels in floors bonded on only one side of the joints) to extend continuously through any expansion joint.

b. Fill expansion joints full depth with expansion joint material approved by the Engineer.

8C. CONCRETE FINISHING

1. Except as may be shown otherwise on the Drawings, provide the following finish at the indicated locations.

a. Scratch finish:

i. Apply to monolithic slab surfaces that are to receive concrete floor topping or mortar setting bed.

b. Float finish:

i. Apply to monolithic slab surfaces that are to receive trowel finish and other finishes specified hereinafter, and to slab surfaces which are to be covered with insulation.

c. Trowel finish:

i. Apply to monolithic slab surfaces that are to be exposed to view, unless otherwise shown, and to slab surfaces that are to be covered with resilient flooring, carpeting, paint, or other thin-film finish coating system.

d. Non-slip broom finish:

i. Apply to walks, stairs, drives, ramps, and similar pedestrian and vehicular areas.

9C. REMEDIAL WORK

1. Repair or replace deficient work as directed by the Engineer and at no additional cost to the Owner.

END OF SECTION