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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE /FRANKLIN COUNTY

LOCATION: US 401 FROM NC 96 TO NORTH OF SR 1103 (FLAT ROCK CHURCH RD/CLIFTON POND RD.)

TYPE OF WORK: UTILITY RELOCATION OF WATER MAIN

T.I.P. NO.

R-2814C

SHEET NO.

UC-1

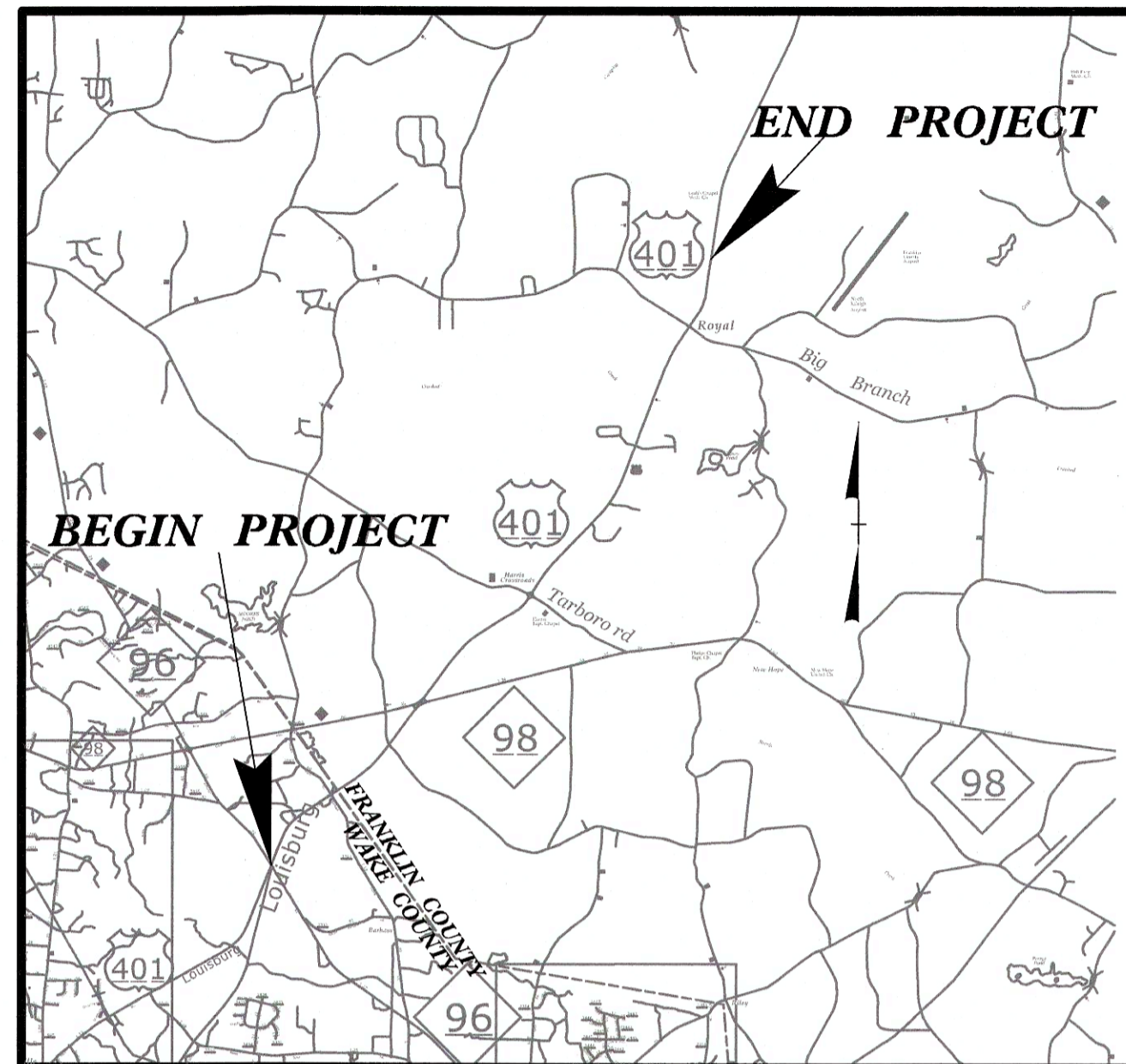
UTILITY CONSTRUCTION PLANS DESIGNED BY:



THE WOOTEN COMPANY
ENGINEERING | PLANNING | ARCHITECTURE
120 North Boylan Avenue, Raleigh, NC 27603-1423
919.828.0531 Fax 919.834.3589
License Number: F-0115

James R. Gregg

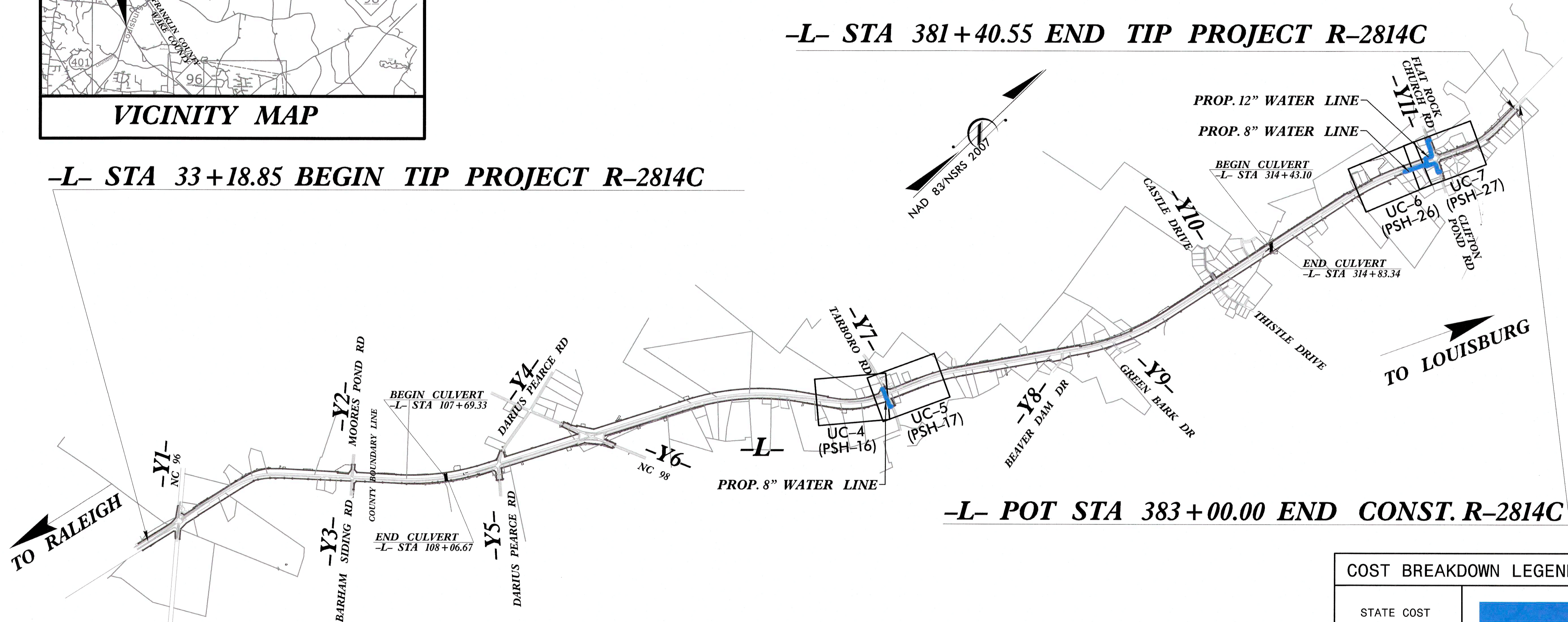
UTILITIES PROJECT MANAGER



VICINITY MAP

-L- STA 381+40.55 END TIP PROJECT R-2814C

-L- STA 33+18.85 BEGIN TIP PROJECT R-2814C



-L- POT STA 383+00.00 END CONST. R-2814C

COST BREAKDOWN LEGEND

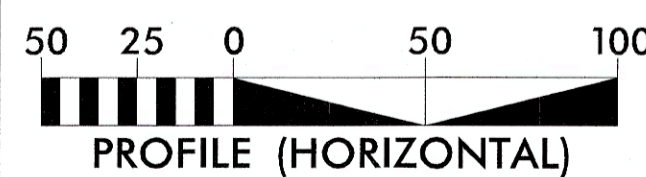
STATE COST



THIS IS A FULL AND PARTIAL CONTROL OF ACCESS PROJECT WITH ACCESS POINTS SHOWN ON THE PLANS.
THIS PROJECT IS NOT WITHIN THE LIMITS OF MUNICIPAL BOUNDARIES.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

CONTRACT: TIP PROJECT: R-2814C

GRAPHIC SCALES



INDEX OF SHEETS

| SHEET NO. | DESCRIPTION |
|----------------|-----------------------------|
| UC-1 | TITLE SHEET |
| UC-2 | UTILITY SYMBOLOGY |
| UC-3 | NOTES |
| UC-3A & UC-3B | DETAILS |
| UC-4 THRU UC-7 | UTILITY CONSTRUCTION SHEETS |
| UC-8 & UC-9 | PROFILE SHEETS |

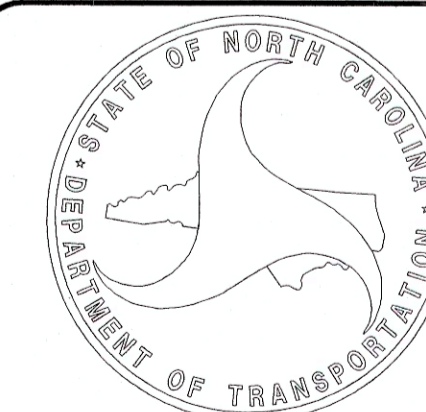
WATER OWNER ON PROJECT

(1) FRANKLIN COUNTY

SEAL



Document Not Considered Final Unless All Signatures Completed



PREPARED IN THE OFFICE OF:
DIVISION OF HIGHWAYS
UTILITIES UNIT
UTILITIES ENGINEERING

1555 MAIL SERVICE CENTER
RALEIGH NC 27699-1591
PHONE (919) 707-6690
FAX (919) 250-4151

Donna Jackson, P.E. UTILITIES REGIONAL ENGINEER
Tucker Martin, P.E. UTILITIES PROJECT ENGINEER

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

UTILITIES PLAN SHEET SYMBOLS

PROPOSED WATER SYMBOLS

| | |
|---------------------------------|--|
| Water Line (Sized as Shown) | |
| 11 1/4 Degree Bend | |
| 22 1/2 Degree Bend | |
| 45 Degree Bend | |
| 90 Degree Bend | |
| Plug | |
| Tee | |
| Cross | |
| Reducer | |
| Gate Valve | |
| Butterfly Valve | |
| Tapping Valve | |
| Line Stop | |
| Line Stop with Bypass | |
| Blow Off | |
| Fire Hydrant | |
| Relocate Fire Hydrant | |
| Remove Fire Hydrant | |
| Water Meter | |
| Relocate Water Meter | |
| Remove Water Meter | |
| Water Pump Station | |
| RPZ Backflow Preventer | |
| DCV Backflow Preventer | |
| Relocate RPZ Backflow Preventer | |
| Relocate DCV Backflow Preventer | |

PROPOSED SEWER SYMBOLS

| | |
|--|--|
| Gravity Sewer Line (Sized as Shown) | |
| Force Main Sewer Line (Sized as Shown) | |
| Manhole (Sized per Note) | |
| Sewer Pump Station | |

PROPOSED MISCELLANEOUS UTILITIES SYMBOLS

| | |
|--|--|
| Power Pole | |
| Telephone Pole | |
| Joint Use Pole | |
| Telephone Pedestal | |
| Utility Line by Others (Type as Shown) | |
| Trenchless Installation | |
| Encasement by Open Cut | |
| Encasement | |

| | |
|-------------------|--|
| Thrust Block | |
| Air Release Valve | |
| Utility Vault | |
| Concrete Pier | |
| Steel Pier | |
| Plan Note | |
| Pay Item Note | |

NOTE
PAY ITEM



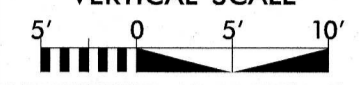
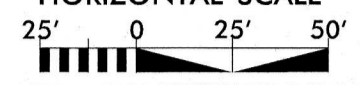
EXISTING UTILITIES SYMBOLS

| | | | |
|--|--------|---|--|
| Power Pole | | *Underground Power Line | |
| Telephone Pole | | *Underground Telephone Cable | |
| Joint Use Pole | | *Underground Telephone Conduit | |
| Utility Pole | | *Underground Fiber Optics Telephone Cable | |
| Utility Pole with Base | | *Underground TV Cable | |
| H-Frame Pole | | *Underground Fiber Optics TV Cable | |
| Power Transmission Line Tower | | *Underground Gas Pipeline | |
| Water Manhole | | Aboveground Gas Pipeline | |
| Power Manhole | | *Underground Water Line | |
| Telephone Manhole | | Aboveground Water Line | |
| Sanitary Sewer Manhole | | *Underground Gravity Sanitary Sewer Line | |
| Hand Hole for Cable | | Aboveground Gravity Sanitary Sewer Line | |
| Power Transformer | | *Underground SS Forced Main Line | |
| Telephone Pedestal | | Underground Unknown Utility Line | |
| CATV Pedestal | | SUE Test Hole | |
| Gas Valve | | Water Meter | |
| Gas Meter | | Water Valve | |
| Located Miscellaneous Utility Object | | Fire Hydrant | |
| Abandoned According to Utility Records | AATUR | Sanitary Sewer Cleanout | |
| End of Information | E.O.I. | | |

*For Existing Utilities
 Utility Line Drawn from Record (Type as Shown)
 Designated Utility Line (Type as Shown)

5/14/99
REV: 2/1/2012

UTILITY CONSTRUCTION

| | | | |
|--|--|---|-----------|
| PREPARED IN THE OFFICE OF: | | PROJECT REFERENCE NO. | SHEET NO. |
|  THE WOOTEN COMPANY <small>ENGINEERING PLANNING ARCHITECTURE</small> <small>120 North Boker Avenue Raleigh, NC 27603-1423</small> <small>919.878.6511 Fax 919.878.3589</small> <small>License Number: F-0105</small> | | R-2814C | UC-3 |
| | | DESIGNED BY: JRG | |
| DRAWN BY: TK | |  | |
| CHECKED BY: JRG | | | |
| APPROVED BY: JRG | | | |
| REVISED: | | NORTH CAROLINA DEPARTMENT OF TRANSPORTATION | |
| VERTICAL SCALE  | | HORIZONTAL SCALE  | |
| UTILITIES ENGINEERING SEC. | | PHONE: (919) 707-6690 FAX: (919) 250-4151 | |

UTILITY CONSTRUCTION

NCDOT GENERAL NOTES:

1. THE EXISTING UTILITIES BELONG TO FRANKLIN COUNTY
2. THE PROPOSED UTILITY CONSTRUCTION IN FRANKLIN COUNTY SHALL MEET THE APPLICABLE REQUIREMENTS OF THE NC DEPARTMENT OF TRANSPORTATION'S "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" DATED JANUARY 2018.
3. ALL WATER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL AND NATURAL RESOURCES, DIVISION OF WATER RESOURCES, PUBLIC WATER SUPPLY SECTION. PERFORM ALL WORK IN ACCORDANCE WITH THE APPLICABLE PLUMBING CODES.
4. THE UTILITY OWNER OWNS THE EXISTING UTILITY FACILITIES AND WILL OWN THE NEW UTILITY FACILITIES AFTER ACCEPTANCE BY THE DEPARTMENT AND THE UTILITY OWNER. THE DEPARTMENT OWNS THE CONSTRUCTION CONTRACT AND HAS ADMINISTRATIVE AUTHORITY. COMMUNICATIONS AND DECISIONS BETWEEN THE CONTRACTOR AND UTILITY OWNER ARE NOT BINDING UPON THE DEPARTMENT OR THIS CONTRACT UNLESS AUTHORIZED BY THE ENGINEER. AGREEMENTS BETWEEN THE UTILITY OWNER AND CONTRACTOR FOR THE WORK THAT IS NOT PART OF THIS CONTRACT OR IS SECONDARY TO THIS CONTRACT ARE ALLOWED, BUT ARE NOT BINDING UPON THE DEPARTMENT.
5. PROVIDE ACCESS FOR THE DEPARTMENT PERSONNEL AND THE OWNER'S REPRESENTATIVES TO ALL PHASES OF CONSTRUCTION. NOTIFY DEPARTMENT PERSONNEL AND THE UTILITY OWNER TWO WEEKS PRIOR TO COMMENCEMENT OF ANY WORK AND A MINIMUM OF ONE WEEK PRIOR TO SERVICE INTERRUPTIONS AND TESTING. KEEP UTILITY OWNERS' REPRESENTATIVES INFORMED OF WORK PROGRESS AND PROVIDE OPPORTUNITY FOR INSPECTION OF CONSTRUCTION AND TESTING.
6. THE PLANS DEPICT THE BEST AVAILABLE INFORMATION FOR THE LOCATION, SIZE, AND TYPE OF MATERIAL FOR ALL EXISTING UTILITIES. MAKE INVESTIGATIONS FOR DETERMINING THE EXACT LOCATION, SIZE, AND TYPE MATERIAL OF THE EXISTING FACILITIES AS NECESSARY FOR THE CONSTRUCTION OF THE PROPOSED UTILITIES AND FOR AVOIDING DAMAGE TO EXISTING FACILITIES. REPAIR ANY DAMAGE INCURRED TO EXISTING FACILITIES TO THE ORIGINAL OR BETTER CONDITION AT NO ADDITIONAL COST TO THE DEPARTMENT.
7. MAKE FINAL CONNECTIONS OF THE NEW WORK TO THE EXISTING SYSTEM WHERE INDICATED ON THE PLANS, AS REQUIRED TO FIT THE ACTUAL CONDITIONS, OR AS DIRECTED.
8. MAKE CONNECTIONS BETWEEN EXISTING AND PROPOSED UTILITIES AT TIMES MOST CONVENIENT TO THE PUBLIC, WITHOUT ENDANGERING THE UTILITY SERVICE, AND IN ACCORDANCE WITH THE UTILITY OWNER'S REQUIREMENTS. MAKE CONNECTIONS ON WEEKENDS, AT NIGHT, AND ON HOLIDAYS IF NECESSARY.
9. ALL UTILITY MATERIALS SHALL BE APPROVED PRIOR TO DELIVERY TO THE PROJECT. SEE 1500-7, " SUBMITTALS AND RECORDS" IN SECTION 1500 OF THE STANDARD SPECIFICATIONS.

NCDOT PROJECT SPECIFIC NOTES:

1. PROPOSED WATER LINE SHALL BE PVC C900 DR-18, RJDI CLASS 350 (RESTRAINED JOINT DUCTILE IRON), AND HDPE DR-9, AND RJDI WITH STEEL ENCASEMENT FOR BORE AND JACK AS INDICATED ON THE CONSTRUCTION DRAWINGS.
2. CONTRACTOR'S ATTENTION IS DIRECTED TO SECTIONS 102, 107, AND 1550 OF THE STANDARD SPECIFICATIONS AND APPLICABLE FRANKLIN COUNTY STANDARDS CONCERNING TRENCHLESS INSTALLATION. IT IS CONTRACTOR'S RESPONSIBILITY TO HAVE BORE DESIGNED AND SEALED BY A LICENSED NORTH CAROLINA PROFESSIONAL ENGINEER. NO DAMAGE IS ALLOWED TO RIVER, WETLANDS, OR BUFFER ZONES.
3. TRACER WIRE AND WARNING TAPE SHALL BE INSTALLED WITH ALL PLASTIC PIPE UTILITIES. WIRE, TAPE, AND PIPE SHALL BE COLOR CODED ACCORDING TO UTILITY (BLUE FOR WATER) AND SHALL BE IN ACCORDANCE WITH NCDOT SPECIFICATIONS.
4. EXISTING CONDITIONS SURVEY AND PROPOSED ROADWAY PLANS PROVIDED TO THE WOOTEN COMPANY BY NCDOT, MAY 19, 2016.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER DISPOSAL OF ALL WATER IN EXISTING UTILITY LINES WHEN MAKING CONNECTIONS.
6. IF HDPE PIPE IS INSTALLED BY DIRECTIONAL DRILL, IT SHALL BE FILLED WITH WATER AND NOT BE CONNECTED TO ANY OTHER PIPE FOR ONE WEEK FROM TIME OF INSTALLATION.
10. CONTRACTOR MUST UTILIZE MULTIPLE WORK CREWS IN ORDER TO MAKE CONNECTIONS TO EXISTING WATER SYSTEM TO MINIMIZE SERVICE INTERRUPTION TIME.
11. CONTRACTOR SHALL COORDINATE WITH UTILITY OWNERS PRIOR TO MAKING CONNECTIONS, GIVING AT LEAST 24 HOURS NOTICE.
12. ALL TIE-RODS AND OTHER ACCESSORIES SHALL BE STAINLESS STEEL MATERIAL.

PROJECT TYPICAL WATER DETAILS

NCDOT STANDARD DETAILS:
1. 300.01 (SHEETS 1,2, AND 3)

PREPARED IN THE OFFICE OF:

THE WOOTEN COMPANY
ENGINEERING PLANNING ARCHITECTURE
120 North Boylan Avenue, Raleigh, NC 27603-1423
919.878.0531 Fax 919.878.2989
License Number: F-3032

PROJECT REFERENCE NO. **R-2814C** SHEET NO. **UC-3A**

DESIGNED BY: JRG
DRAWN BY: TK
CHECKED BY: JRG
APPROVED BY: JRG

REVISED:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

UTILITIES ENGINEERING SEC.
PHONE: (919) 707-6690
FAX: (919) 250-4151

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UTILITY CONSTRUCTION PLANS ONLY

SEAL
37878
JAMES H. GREGG
REGISTERED PROFESSIONAL ENGINEER

VERTICAL SCALE
5' 0 5' 10'

HORIZONTAL SCALE
25' 0 25' 50'

WATER LINE CONSTRUCTION SHOWN ON THIS SHEET

UTILITY CONSTRUCTION

REVISIONS

| SYM. | DESCRIPTION | DATE | BY |
|------|-------------|------|----|
|------|-------------|------|----|

**WATER MAIN TRENCH DETAILS
TYPE 3 LAYING CONDITIONS**
N.T.S.

NOTES:
1. LAYING CONDITIONS AS PER AWWA C900 AND C900 STANDARDS.
2. BEDDING MATERIAL SHALL BE 4" MINIMUM THICKNESS, LOOSE SOIL (DEFINED AS NATIVE SOIL EXCAVATED FROM THE TRENCH), FREE FROM ROCKS AND SHALL PROVIDE UNIFORM SUPPORT FOR THE FULL LENGTH OF PIPE. COMPACT TO 98% MAXIMUM DENSITY.
3. INITIAL BACKFILL SHALL BE LOOSELY CONSOLIDATED, IN MAXIMUM 6" LOOSE LIFTS, COMPACTED TO 90% OF MAXIMUM DENSITY.
4. UNDER AREAS TO BE SEEDS OR SOILED, COMPACT SUCCEEDING LAYERS OF FINAL BACKFILL IN 12" LOOSE LIFTS TO 98% MAXIMUM DENSITY.
5. UNDER STRUCTURES, PAVEMENTS AND ROAD SHOULDER, COMPACT SUCCEEDING LAYERS OF FINAL BACKFILL IN 6" LOOSE LIFTS TO 98% MAXIMUM DENSITY EXCEPT COMPACT TOP 12" OF SUBGRADE TO 98% MAXIMUM DENSITY.
6. PROVIDE #10 SOLID COPPER WIRE IN SUFFICIENT LENGTH TO BE SPIRAL WRAPPED AROUND EACH VALVE BODY, BRING WIRE TO WITHIN 6 IN. OF TOP OF BOX AND INSERT INTO BOX THROUGH DRILLED HOLE. NOT REQUIRED FOR DUCTILE IRON PIPE.
7. INSTALL 3" WIDE DETECTOR TAPE AT 18" DEPTH. TAPE SHALL HAVE MOBILE FOIL LAYER.

FRANKLIN COUNTY PUBLIC UTILITIES
DRAWING # **W-1**
STANDARD WATER MAIN TRENCH DETAIL

REVISIONS

| SYM. | DESCRIPTION | DATE | BY |
|------|-------------|------|----|
|------|-------------|------|----|

GATE VALVE ASSEMBLY
N.T.S.

NOTES:
1. INSTALL MARKER POSTS ON EDGE OF THE DOT 9" W LINE.
2. PROVIDE MARKER POSTS AT ALL LINE VALVES.
3. ABBREVIATIONS STAMPED ON POST AS FOLLOWS:
M = MAIN VALVE
B = BELOW OFF VALVE

NOTE: ALL GATE VALVES SHALL BE PLACED ON A 4" HIGH CONCRETE BLOCK.

NOTE: 1. PLACE GATE VALVES ON 4" CONCRETE BLOCK.
2. WHERE PVC PIPE IS BEING INSTALLED, 6 IN. OF COMPACTED #57 STONE MAY BE USED IN LIEU OF THE 4" CONCRETE BLOCK.

NOTE: 1. BRING #10 SOLID COPPER WIRE TO WITHIN 6" OF TOP OF BOX AND INSERT INTO BOX THROUGH DRILLED HOLE.

FRANKLIN COUNTY PUBLIC UTILITIES
DRAWING # **W-2**
GATE VALVE ASSEMBLY

REVISIONS

| SYM. | DESCRIPTION | DATE | BY |
|------|-------------|------|----|
|------|-------------|------|----|

TAPPING SLEEVE AND VALVE ASSEMBLY
N.T.S.

NOTES:
1. TAPPING SLEEVE SHALL BE STAINLESS STEEL WRAP-AROUND TYPE AS MANUFACTURED BY FORD, HUEBLER, OR BOWEN.
2. PLACE TAPPING VALVE ON 4" CONCRETE BLOCK. PLACE BLOCK ON 4" COMPACTED #57 STONE. BACKFILL AROUND SLEEVE AND VALVE WITH STONE TO TOP OF PIPE.
FULL CIRCLE SS BODY AS MANUFACTURED BY SAMPY/BLAIR OR BOWEN.

NOTE: 1. BRING #10 SOLID COPPER WIRE TO WITHIN 6" OF TOP OF BOX AND INSERT INTO BOX THROUGH DRILLED HOLE.

FRANKLIN COUNTY PUBLIC UTILITIES
DRAWING # **W-3**
TAPPING SLEEVE AND VALVE ASSEMBLY

REVISIONS

| SYM. | DESCRIPTION | DATE | BY |
|------|-------------|------|----|
|------|-------------|------|----|

FIRE HYDRANT AND VALVE DETAIL
N.T.S.

NOTES:
1. ALL PIPE JOINTS SHALL BE MECHANICAL, MEGA-LOG RESTRAINTS MAY BE USED IN PLACE OF ROADS.
2. PLACE HYDRANTS AT PROPERTY CORNERS AS DIRECTED BY FRANKLIN COUNTY.
3. ALL HYDRANTS SHALL RECEIVE 2 SHOP COATS AND 1 FIELD COAT OF ZINC-SAFETY COLOR PAINT AS DESCRIBED IN AWWA C502. ALL NOZZLE CAPS AND BONNETS SHALL BE PAINTED WHITE. PAINT SHALL BE HIGH-GLOSS ENAMEL.
4. FIRE HYDRANTS SHALL BE CLOW "MEDALLION".
5. APPLY 2 - COATS OF BITUMASTIC MATERIAL TO ROADS OR PROVIDE GALVANIZED ROADS.

FRANKLIN COUNTY PUBLIC UTILITIES
DRAWING # **W-4**
STANDARD FIRE HYDRANT INSTALLATION DETAIL

REVISIONS

| SYM. | DESCRIPTION | DATE | BY |
|------|-------------|------|----|
|------|-------------|------|----|

COMPLETE BOX
DIMENSIONS IN INCHES LENGTH

| TOP | BOTTOM |
|-----|--------|
| 10 | 15 |
| 10 | 24 |
| 16 | 24 |
| 16 | 36 |
| 26 | 48 |
| 26 | 60 |

FRANKLIN COUNTY PUBLIC UTILITIES
DRAWING # **W-5**
SCREW-TYPE VALVE BOX

REVISIONS

| SYM. | DESCRIPTION | DATE | BY |
|------|-------------|------|----|
|------|-------------|------|----|

CONCRETE THRUST BLOCK DETAIL FOR PRESSURE MAIN HORIZONTAL BENDS AND TEES
N.T.S.

NOTES:
1. THRUST BLOCKS SHALL BE CONSTRUCTED OF 2500 P.S.I. CONCRETE.
2. INSTALL TAPE AROUND BEND OR FITTING TO PREVENT BONDING OF CONCRETE.
3. PRESSURE TEST AT 200 P.S.I.

| BEND / FITTING | PIPE SIZE (NOM. DIA. IN INCHES) | | | | | | | |
|---------------------|---------------------------------|-----|-----|-----|-----|-----|-----|-----|
| | 4 | 6 | 8 | 10 | 12 | 16 | 18 | 24 |
| 90° BEND | 1.4 | 2.0 | 2.7 | 3.4 | 4.0 | 5.4 | 6.0 | 6.7 |
| 45° BEND | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 4.0 | 4.5 | 5.0 |
| 22 1/2° BEND | 0.8 | 1.1 | 1.5 | 1.8 | 2.2 | 2.9 | 3.2 | 3.6 |
| 11 1/4° BEND | 0.5 | 0.8 | 1.0 | 1.3 | 1.5 | 2.0 | 2.3 | 2.6 |
| TEE BRANCH/DEAD END | 1.2 | 1.7 | 2.3 | 2.9 | 3.4 | 4.5 | 5.1 | 5.7 |

FRANKLIN COUNTY PUBLIC UTILITIES
DRAWING # **W-6**
CONCRETE THRUST BLOCKING

REVISIONS

| SYM. | DESCRIPTION | DATE | BY |
|------|-------------|------|----|
|------|-------------|------|----|

THRUST COLLAR DETAIL
N.T.S.

FRANKLIN COUNTY PUBLIC UTILITIES
DRAWING # **W-7**
THRUST COLLAR DETAIL

REVISIONS

| SYM. | DESCRIPTION | DATE | BY |
|------|-------------|------|----|
|------|-------------|------|----|

VERTICAL BENDS

| STATIC THRUST SIZE OF 90° BEND | NUMBER OF POUNDINGS | NUMBER OF RODS REQUIRED |
|--------------------------------|---------------------|-------------------------|
| 6" | 4,528 | 2 |
| 8" | 7,084 | 2 |
| 12" | 17,312 | 3 |
| 16" | 30,779 | 4 |
| 20" | 48,091 | 6 |
| 24" | 69,252 | 8 |

FRANKLIN COUNTY PUBLIC UTILITIES
DRAWING # **W-8**
VERTICAL BENDS

REVISIONS

| SYM. | DESCRIPTION | DATE | BY |
|------|-------------|------|----|
|------|-------------|------|----|

BORE AND JACK DETAILS

FRANKLIN COUNTY PUBLIC UTILITIES
DRAWING # **W-25**
BORE AND JACK DETAILS

REVISIONS

| SYM. | DESCRIPTION | DATE | BY |
|------|-------------|------|----|
|------|-------------|------|----|

DIRECTIONAL BORE DETAILS

FRANKLIN COUNTY PUBLIC UTILITIES
DRAWING # **W-26**
DIRECTIONAL BORE DETAILS