A.L. FRANKS ENGINEERING

319 West Oak Street
El Dorado, AR 71730
PHONE 870.444.5160 • FAX 870.444.5161

ADDENDUM NO. 1

TO: ALL PLAN HOLDERS

RE: WATER IMPROVEMENTS PHASE I- MCGEHEE

ADDENDUM DATE: October 8, 2024

The Plans, Specifications and Contract Documents for the above referenced project are hereby modified as follows:

1. **Construction Plans: Remove and Replace Construction Plans with attached Revised Construction Plans.**

2. **Technical Specifications: Remove and Replace Technical Specifications with the attached Revised Technical Specifications.**
   See Sections: 3- Pipe and Fittings (Water)
   3B- Materials

3. **Bid Proposal: Remove and Replace Bid Proposal with the attached Revised Bid Proposal.**
   See Bid Items Number 6, 7, and 39

ADDENDUM NO.1 ISSUED BY:

A.L. FRANKS ENGINEERING

Cody Stringer, P.E.
Project Manager

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

ATTACHMENTS

CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I - IIJA
MCG-04-23

INDEX TO SHEETS

APPROVED BY:
CITY OF MCGEHEE, ARKANSAS

901 HOLLY ST.
MCGEHEE, ARKANSAS 71654
PH: 870-222-3160

BEFORE CONSTRUCTION BEGINS
GIVE 48 HOURS NOTICE
FOR UNDERGROUND UTILITY LOCATIONS
CALL: THE ARKANSAS ONE-CALL SYSTEM 1-800-482-8998

SUBMITTED BY:

A.L. FRANKS ENGINEERING

118 E. Broad Street
Texarkana, Arkansas 71854
Phone (870) 216-1906
Fax (870) 216-1907

101 West Main, Ste. 413
El Dorado, Arkansas 71730
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Fax (870) 444-5161

CERTIFICATE OF AUTHORIZATION
A.L. FRANKS ENGINEERING, INC.
NO. 1681
ARKANSAS ENGINEER

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

09/25/2024
CODY J. STRINGER,P.E. PROJECT ENGINEER DATE

9/25/2024
DUSTIN J. LONG,BSE PROJECT MANAGER DATE

ARKANSAS HEALTH DEPARTMENT NOTES

1. THIS PROJECT SHALL CONFORM TO THE FOLLOWING:
   A) "RECOMMENDED STANDARDS FOR WATER FACILITIES" (TEN STATES STANDARDS).
   B) ARKANSAS STATE LICENSING LAW FOR COMMERCIAL CONTRACTORS ACT 150 OF 1965 AND ACT 162 OF 1987 (AS AMENDED) REQUIRES THE INSTALLATION CONTRACTOR TO HAVE A CONTRACTORS LICENSES CLASSIFICATION OF MUNICIPAL AND UTILITY CONSTRUCTION.
   C) ARKANSAS BOARD OF HEALTH "RULES AND REGULATIONS PERTAINING TO PUBLIC WATER SYSTEMS"
   D) ALL APPLICABLE AWWA (AMERICAN WATER WORKS ASSOCIATION) SPECIFICATIONS SHALL BE INTERPRETED TO THE MOST RECENT VERSION INCLUDING:
      1) AWWA C600 STANDARDS FOR INSTALLATION OF DUCTILE WATER MAIN AND THEIR APPURTENANCES.
      2) AWWA C605 STANDARD FOR UNDERGROUND INSTALLATION OF POLYVINYL CHLORIDE (PVC) PRESSURE PIPE AND FITTINGS FOR WATER.
      3) AWWA C651 STANDARDS FOR DISINFECTING WATER MAINS.
      4) AWWA C900 & C905 STANDARD FOR PVC PRESSURE PIPE FOR WATER DISTRIBUTION.
      5) AWWA C651 STANDARDS FOR DISINFECTING WATER MAINS REQUIRE BACTI SAMPLING ON DISTRIBUTION SYSTEM EVERY 1200 FEET. HOWEVER, THE ARKANSAS DEPT. OF HEALTH, DIVISION OF ENGINEERING WILL ALLOW BACTI SAMPLING EVERY 2600 FEET ON MAINS AND BRANCH LINES AT THE END OF EVERY BRANCH LINE.
2. AWWA C651, APPENDIX C (CHLORINE NEUTRALIZATION) WILL BE COMPLIED WITH. " DRAINAGE OF MAINS AND DISPOSAL OF CHLORINATED WATER SHALL BE IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL LAWS, ORDINANCES AND REGULATIONS. MAINS SHALL BE DRAINED TO SANITARY SEWERS, WHERE AVAILABLE. DRAINAGE DIRECTLY TO SURFACE WATERS (CREEKS, RIVERS, STREAMS, LAKES, PONDS, ECT.) WILL NOT BE ALLOWED. DRAINAGE BRANCHES, BLOW-OFF'S, AIR VENTS AND APPURTENANCES SHALL BE PROVIDED WITH VALVES AND SHALL BE LOCATED AND INSTALLED AS SHOWN ON THE PLANS AND STANDARD DETAILS. DRAINAGE OF MAINS WILL BE ACCOMPLISHED IN SUCH A MANNER AS TO MINIMIZE EROSION AND SILTATION TO ADJOINING PROPERTIES. WATER VELOCITY FROM DRAINAGE AND OR BLOW-OFF WILL BE DISSIPATED AS NECESSARY TO PREVENT EROSION. DRAINAGE BRANCHES OR BLOW-OFFS SHALL BE NOT BE CONNECTED TO ANY SEWER, SUBMERGED IN ANY STREAMS, OR INSTALLED IN ANY OTHER MANNER THAT WILL PERMIT BACK SIPHONAGE INTO THE DISTRIBUTION SYSTEM.
3. THE OPERATING ROUTINE SHALL INCLUDE NECESSARY PROTECTIVE MEASURES TO DETECT AND REMOVE OR DESTROY ANY CONTAMINANT OF CONCERN OR REGULATION THAT MIGHT ENTER THE DISTRIBUTION SYSTEM. EVERY PRECAUTION MUST BE TAKEN AGAINST THE POSSIBILITY OF SEWAGE CONTAMINATION OF THE WATER IN THE DISTRIBUTION SYSTEM.WATER MAINS AND SANITARY SEWERS SHALL BE CONSTRUCTED AS FAR APART AS PRACTICABLE, AND SHALL BE SEPARATED BY UNDISTURBED AND COMPACTED EARTH. A MINIMUM HORIZONTAL DISTANCE OF TEN FEET SHOULD BE MAINTAINED BETWEEN WATER LINES AND SEWER LINES OR OTHER SOURCES OF CONTAMINATION. WATER LINES AND SEWERS SHALL NOT BE LAID IN THE SAME TRENCH EXCEPT ON THE WRITTEN APPROVAL OF THE ARKANSAS DEPARTMENT OF HEALTH. WATER MAINS NECESSARILY IN CLOSE PROXIMITY TO SEWERS MUST BE PLACED SO THAT THE BOTTOM OF THE WATER LINE WILL BE AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER LINE AT ITS HIGHEST POINT. IF THIS DISTANCE MUST BE UNAVOIDABLY BE REDUCED, THE WATER LINE OR THE SEWER LINE MUST BE ENCASED IN WATERTIGHT PIPE WITH THE SEALED ENDS EXTENDING AT LEAST TEN FEET EITHER SIDE OF THE CROSSING. ANY JOINT IN THE ENCASEMENT PIPE IS TO BE MECHANICALLY RESTRAINED. THE ENCASEMENT PIPE MAY BE VENTED TO THE SURFACE IF CARRYING WATER OR SEWER UNDER PRESSURE. WHERE A WATER LINE MUST UNAVOIDABLY PASS BENEATH THE SEWER LINE, AT LEAST 18 INCHES OF SEPARATION MUST MAINTAINED BETWEEN THE OF THE TWO PIPES IN ADDITION TO THE PRECEDING ENCASEMENT REQUIREMENT. EXCEPTIONS TO THIS MUST BE APPROVED IN WRITING BY THE ARKANSAS DEPARTMENT OF HEALTH.

   A MINIMUM HORIZONTAL DISTANCE OF THREE FEET SHALL BE MAINTAINED BETWEEN WATER LINES AND OTHER UNDERGROUND UTILITIES OF A NONSANITARY NATURE (GAS, ELECTRIC, ETC.). EXCEPTIONS TO THIS MUST BE APPROVED IN WRITING BY THE ARKANSAS DEPARTMENT OH HEALTH

GENERAL NOTES

1. A 3'-0" MIN. BURY SHALL BE MAINTAINED ON WATER MAIN.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO EXISTING STRUCTURES, PIPING, CONDUIT, ETC. RESULTING FROM CONSTRUCTION WHETHER SHOWN ON THESE DRAWINGS OR NOT.
3. CONTRACTOR SHALL PERFORM FINISH GRADING, TOP SOILING, SODDING AND ESTABLISHMENT OF GRASS COVER IN ALL DISTURBED AREAS PER PLANS AND SPECIFICATIONS, OR AS DIRECTED BY THE ENGINEER.
4. ALL WATER MAINS TO BE TESTED PER PLANS AND SPECIFICATIONS.
5. CONTRACTOR SHALL HAVE UTILITIES LOCATED AND SHALL BE RESPONSIBLE FOR DAMAGE TO ALL UTILITIES ARISING FROM CONTRACTORS WORK, REGARDLESS OF BEING SHOWN OR OMITTED FROM THESE DRAWINGS. SHOWN UTILITIES ARE INDICATED IN APPROX. LOCATIONS ONLY.
6. ALL DEBRIS SHALL BE DISPOSED OF PER SPECIFICATIONS OR AS DIRECTED BY THE ENGINEER.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE MINIMUM REQUIRED 10 FEET HORIZONTAL SEPARATION BETWEEN WATER AND SEWER MAINS.
8. CONTRACTOR SHALL ABIDE BY ADH NOTE 3 ON THIS SHEET AS IT RELATES TO SEPARATION DISTANCES AND CONTAMINATION.
9. CONTRACTOR SHALL RESTRICT ALL OPERATIONS INSIDE OF STREET/HWY R.O.W. ACCESS PERMISSION ACROSS ADJACENT PROPERTIES SHALL BE OBTAINED BY CONTRACTOR. ANY DAMAGE TO ANYTHING ON THE PROPERTY SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
10. CONTRACTOR SHALL EXPOSE EXISTING UTILITIES IN ADVANCE OF CONSTRUCTION. GRADE ADJUSTMENTS SHALL BE APPROVED BY THE ENGINEER. COSTS ASSOCIATED w/ NOT EXPOSING EXISTING UTILITIES TO ALLOW GRADE ADJUSTMENT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
11. CONTRACTOR SHALL INSTALL 12 GAUGE COATED COPPER TRACER WIRE ON ALL WATER MAINS. TRACER WIRE SHALL LOOP CONTINUOUSLY THROUGH SERVICES AND VALVE BOXES AS SHOWN ON DETAIL. GEL-PAKS SHALL BE USED FOR ALL SPLICES.
12. ALL WATER MAIN VALVES AND FITTINGS SHALL BE DUCTILE IRON w/ MECHANICAL JOINTS.
13. ALL DIRECTIONAL BORES 3" TO BE CERTA-LOK SDR-17 CLASS 250
    ALL DIRECTIONAL BORES 4" - 8" TO BE CERTA-LOK C900, D.I. OR FUSIBLE C-900.
14. CONSTRUCTION STAKING FOR CENTER LINE OF WATER MAIN ALONG U.S. HIGHWAYS AND COUNTY ROADS WILL BE CONTRACTORS RESPONSIBILITY. OWNER AND IT'S REPRESENTATIVES WILL PROVIDE GENERAL LOCATION OF EXISTING WATER MAINS. CONTRACTOR IS RESPONSIBLE FOR DAMAGE AND SUBSEQUENT REPAIRS OF EXISTING MAINS, SERVICE LINES AND APPURTENANCES.
15. ALL BENDS, FITTINGS, VALVES & FIRE HYDRANTS SHALL BE BLOCKED PER DETAILS.
16. M.J. BENDS SHALL BE UTILIZED WHERE ALLOWABLE DEFLECTION WOULD BE EXCEEDED.

GENERAL NOTES-CONT'D

17. ALL WATER MAIN VALVES TO BE INSTALLED w/ ADJ. VALVE BOXES & CONCRETE STABILIZATION PADS.
18. FIRE HYDRANTS TO BE LOCATED ON PROPERTY CORNERS PLUMB & AT HEIGHT DIRECTED BY ENGINEER.
19. ALL BENDS NECESSARY TO MEET DEFLECTION REQUIREMENTS AND ASSOCIATED BLOCKING SHALL BE INCLUDED IN BID.
20. ALL SALVAGE MATERIAL TO BE DELIVERED TO THE CITY.
21. PRIOR TO CONNECTING PROPOSED MAINS TO EXISTING MAINS THE CONTRACTOR IS TO TEMPORARILY BLOCK, PRESSURE TEST AND BAC-TI SAMPLE PER ENGINEER AND ADH SPECIFICATIONS.
22. REFER TO WATER MAIN INSTALLATION DETAILS ON SHEET 36 & 37.
23. PLUGGING AND ABANDONING EXISTING WATER MAINS SHALL BE ACCOMPLISHED UPON ACCEPTANCE TESTING COMPLETION. ABANDONING EXISTING WATER MAINS IS SUBSIDIARY TO THE PROJECT.
24. DRIVEWAYS WITH ASPHALT OR CONCRETE PAVEMENT SHALL BE CROSSED BY DIRECTIONAL BORE. GRAVEL DRIVEWAYS SHALL BE TRENCHED AND REPAIR IS SUBSIDIARY TO WATER MAIN INSTALLATION.
25. CONTRACTOR SHALL VERIFY LOCATION OF EXISTING WATER METERS PRIOR TO SERVICE INSTALLATION.
26. EXISTING HYDRANTS TO BE ABANDONED SHALL BE REMOVED AND DELIVERED TO THE CITY.
27. DISINFECTION AND TESTING OF WATER MAINS SHALL BE ACCOMPLISHED AS WORK IS COMPLETED AND WILL BE PAID SEPARATELY. FLUSHING OF WATER MAINS SHALL BE ACCOMPLISHED AT FIRE HYDRANTS OR FLUSH HYDRANTS AT THE EXTREMITY OF NEWLY INSTALLED MAINS.
28. DIRECTIONAL BORES UNDER DITCHES AND CREEKS SHALL BE CERTA-LOK C-900 PVC PIPE
29. REMOVE EXISTING FIRE HYDRANTS IS NOT A PAY ITEM AND SHALL BE INCIDENTAL TO NEW FIRE HYDRANT INSTALLATION.
30. INSTALL 1" TAP WITH SERVICE TERMINATING WITH CORP STOP IN METER BOX FOR BACTI SAMPLING AT LOCATIONS DESIGNATED BY THE ENGINEER. COST SHALL BE INCIDENTAL TO TESTING & STERILIZATION.
31. CONTRACTOR SHALL VERIFY DEPTHS OF EXISTING SEWER MAINS PRIOR TO CROSSING AND/OR DIRECTIONAL BORING PROPOSED WATER MAINS. IN THE EVENT THAT 18" VERTICAL SEPARATION CANNOT BE ACHIEVED THE WATER MAIN SHALL BE CASED WITH A 20-FT JOINT OF C900 PVC PIPE BEING CENTERED OVER THE SEWER MAIN. EACH END OF THE CASING SHALL BE SEALED.
32. SOME PROPOSED LINES ARE SHOWN OUTSIDE THE STREET R.O.W. FOR CLARITY. ALL CONSTRUCTION SHALL BE WITHIN STREET AND HIGHWAY R.O.W.
33. ABANDONED MAINS SHALL BE PLUGGED WITH A PROPERLY SIZED MJ PLUG AT THE TIME TIE-INS ARE MADE.
34. PRE-BID SITE VERIFICATION:
    FIELD VERIFY ALL EXIST CONDITIONS.
    PRIOR TO BIDDING & CONSTRUCTION REPORT ANY DISCREPANCIES TO ENGINEER IN WRITING PRIOR TO BIDDING. NO EXTRA PAYMENTS WILL BE MADE TO CONTRACTOR AFTER BIDDING TO ACCOMMODATE SITE DISCREPANCIES NOT REPORTED PRIOR TO BIDDING.
35. PRIOR TO BIDDING:
    IT IS RECOMMENDED THAT THE CONTRACTOR VISIT THE SITE, PRIOR TO BIDDING.

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

A.L. FRANKS ENGINEERING
118 East Broad Street
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PHONE: 870-222-3160

CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
GENERAL NOTES

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG-04-23
Scale: N.T.S.
Date: 9/2024
Sheet 2

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

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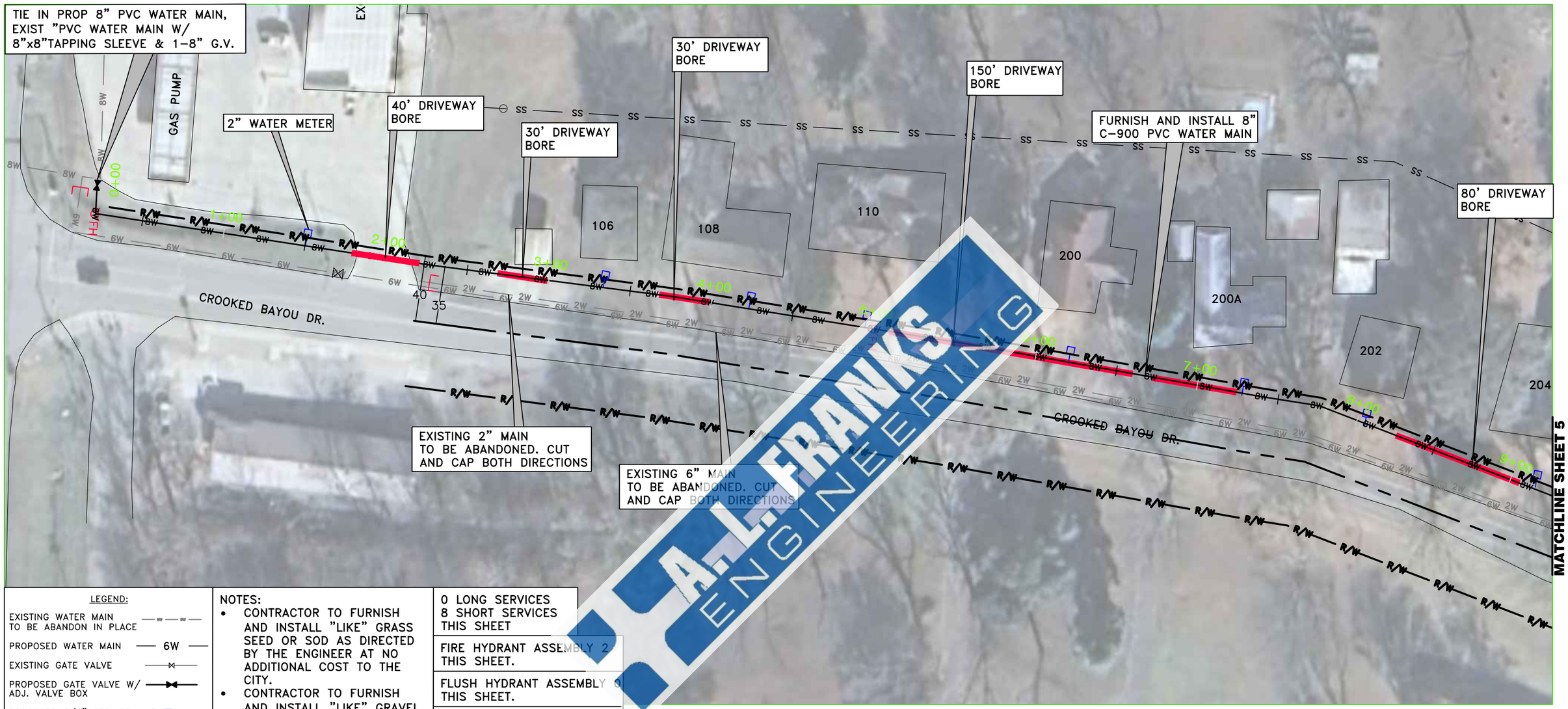
CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
EXISTING SITE LAYOUT

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG-04-23
Scale: N.T.S.
Date: 9/2024
Sheet 3



LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W —
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
- MAN HOLE
- CAP

NOTES:

- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRASS SEED OR SOD AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRAVEL ON ALL DRIVEWAY OPEN CUTS AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO VERIFY ALL METER LOCATIONS BEFORE MAKING SERVICE TAP IN NEW WATER MAIN.

0 LONG SERVICES
8 SHORT SERVICES
THIS SHEET

FIRE HYDRANT ASSEMBLY 2 THIS SHEET.

FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.

FIRE HYDRANT ASSEMBLY REMOVAL 1 THIS SHEET.

STATION 0+00-9+00

SCALE: 1"=60'-0"

WATER MAIN SHALL BE INSTALLED IN THE BACK 5' OF EXISTING HIGHWAY RIGHT OF WAY.

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

A.L. FRANKS ENGINEERING
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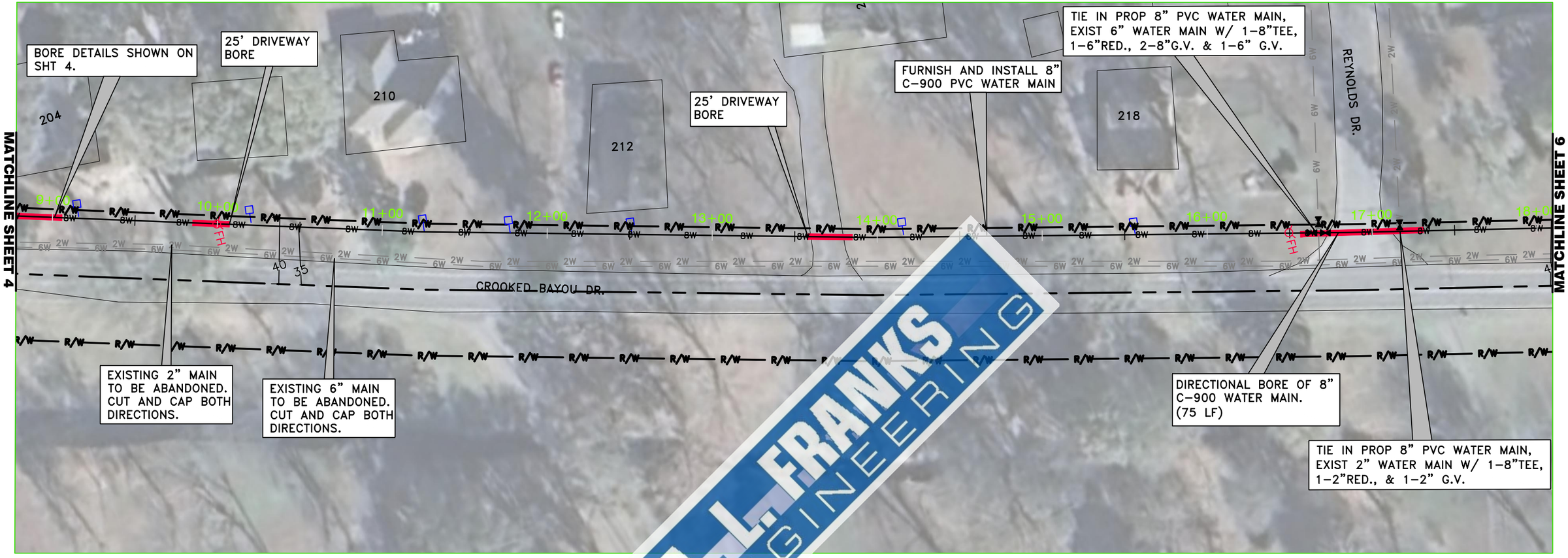
CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
CROOKED BAYOU STA. 0+00-9+00

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 4



STATION 9+00-18+00

SCALE: 1"=60'-0"

LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W —
- EXISTING GATE VALVE
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0 LONG SERVICES
7 SHORT SERVICES
THIS SHEET

FIRE HYDRANT ASSEMBLY 2 THIS SHEET.

FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.

FIRE HYDRANT ASSEMBLY REMOVAL 2 THIS SHEET.

WATER MAIN SHALL BE INSTALLED IN THE BACK 5' OF EXISTING HIGHWAY RIGHT OF WAY.

Date	Revision	By

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Approved ALF

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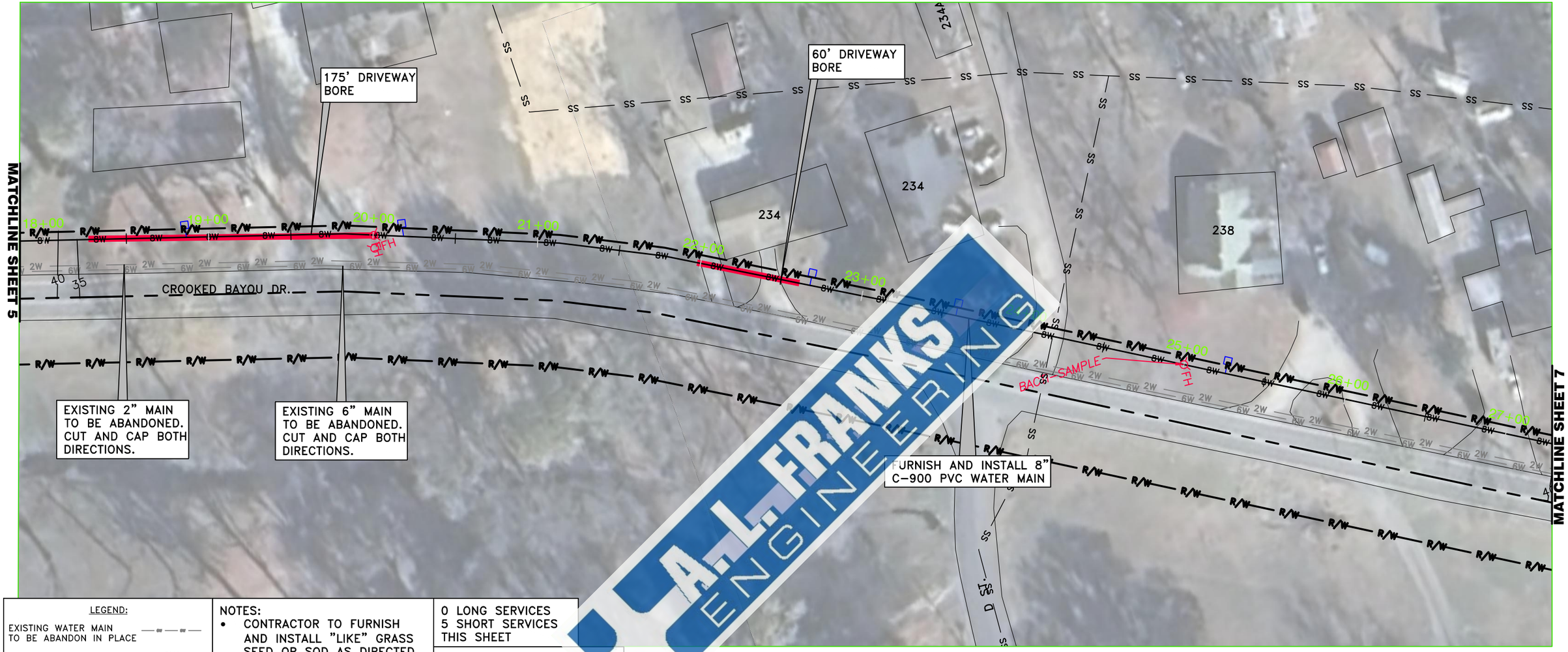
CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
CROOKED BAYOU STA. 9+00-18+00

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 5



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0 LONG SERVICES
5 SHORT SERVICES
THIS SHEET

FIRE HYDRANT ASSEMBLY 2 THIS SHEET.

FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.

FIRE HYDRANT ASSEMBLY REMOVAL 2 THIS SHEET.

STATION 18+00-27+00

SCALE: 1"=60'-0"

WATER MAIN SHALL BE INSTALLED IN THE BACK 5' OF EXISTING HIGHWAY RIGHT OF WAY.

Date	Revision	By

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CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
CROOKED BAYOU STA. 18+00-27+00

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
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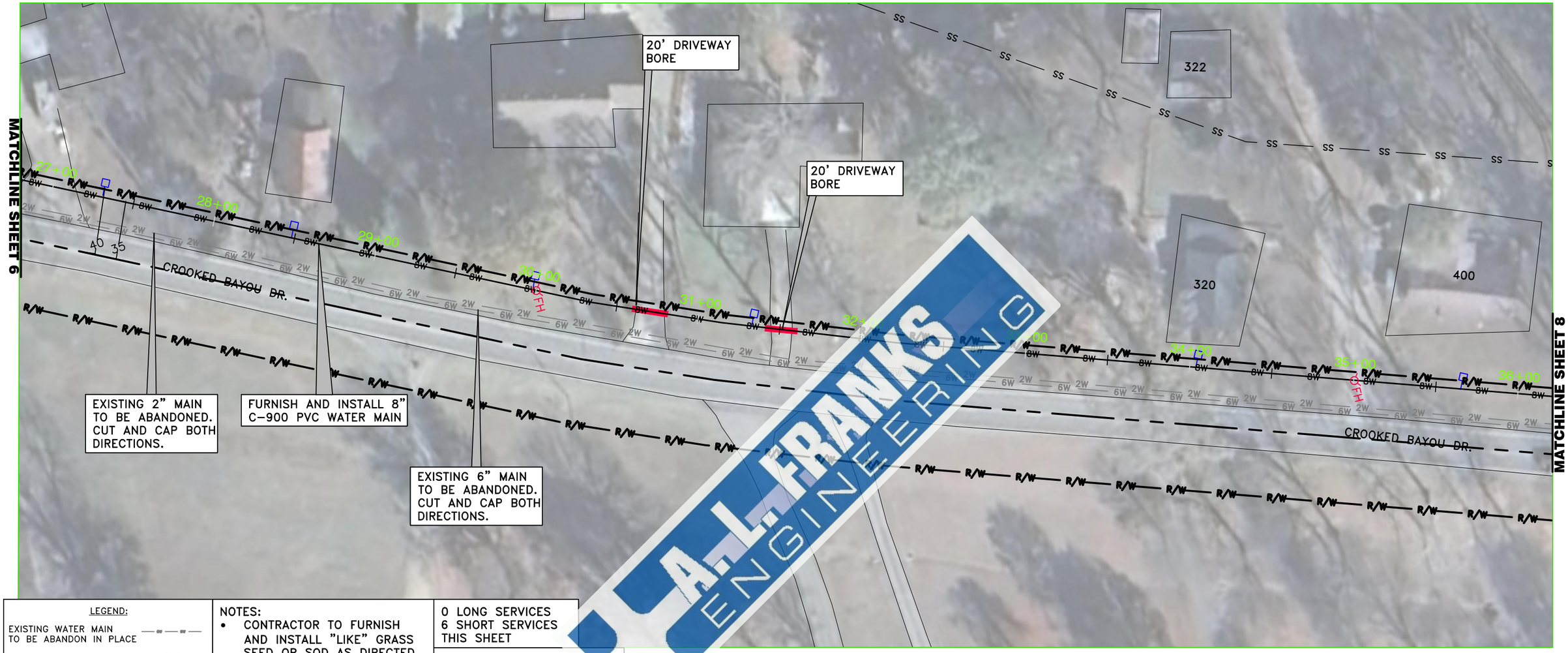
Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 6



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0	LONG SERVICES
6	SHORT SERVICES THIS SHEET
2	FIRE HYDRANT ASSEMBLY THIS SHEET.
0	FLUSH HYDRANT ASSEMBLY THIS SHEET.
2	FIRE HYDRANT ASSEMBLY REMOVAL THIS SHEET.

STATION 27+00-36+00

SCALE: 1"=60'-0"

WATER MAIN SHALL BE INSTALLED IN THE BACK 5' OF EXISTING HIGHWAY RIGHT OF WAY.

Date	Revision	By

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CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
CROOKED BAYOU STA. 27+00-36+00

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
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Job No.:MCG-04-23
Scale: 1"=60'
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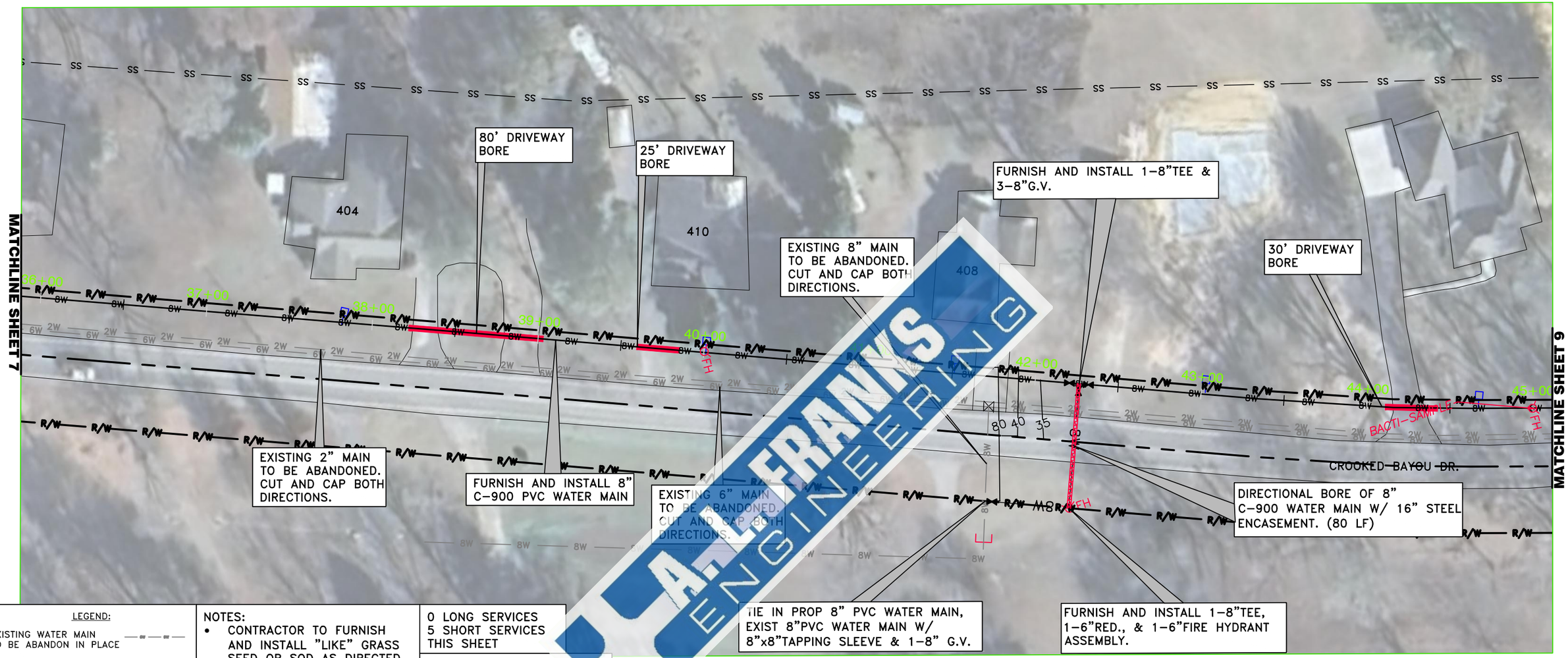
Sheet 7



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- PROPOSED WATER MAIN — 6W —
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0 LONG SERVICES
5 SHORT SERVICES
THIS SHEET

FIRE HYDRANT ASSEMBLY 3
THIS SHEET.

FLUSH HYDRANT ASSEMBLY 0
THIS SHEET.

FIRE HYDRANT ASSEMBLY
REMOVAL 2 THIS SHEET.

STATION 36+00-45+00

SCALE: 1"=60'-0"

WATER MAIN SHALL BE INSTALLED IN THE BACK 5' OF EXISTING HIGHWAY RIGHT OF WAY.

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WATER SYSTEM IMPROVEMENTS - PHASE I
CROOKED BAYOU STA. 36+00-45+00

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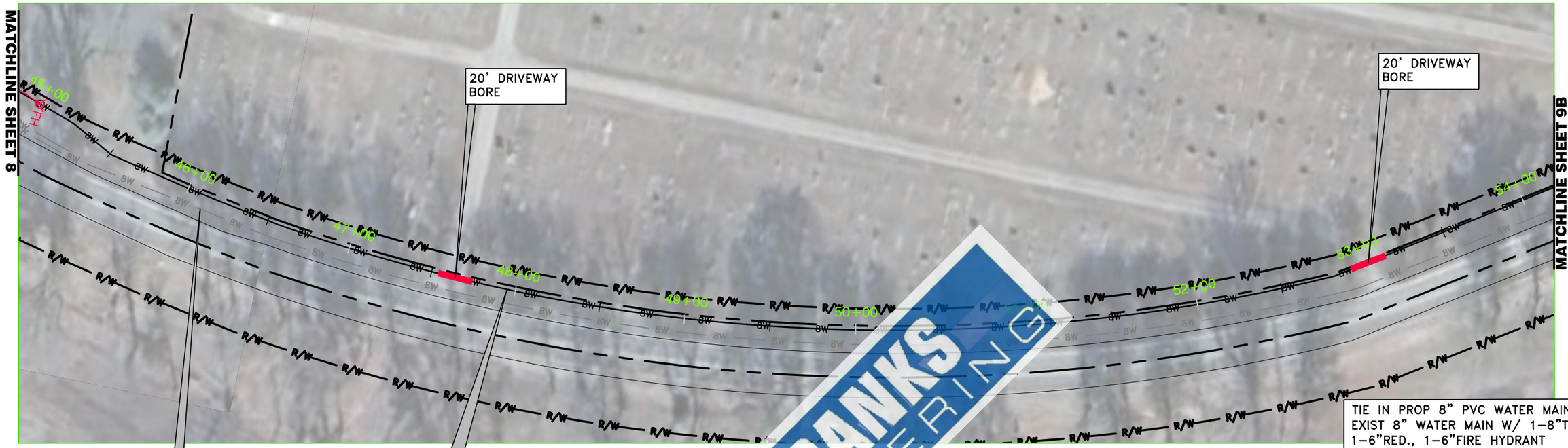
Date: 9/2024
Sheet 8



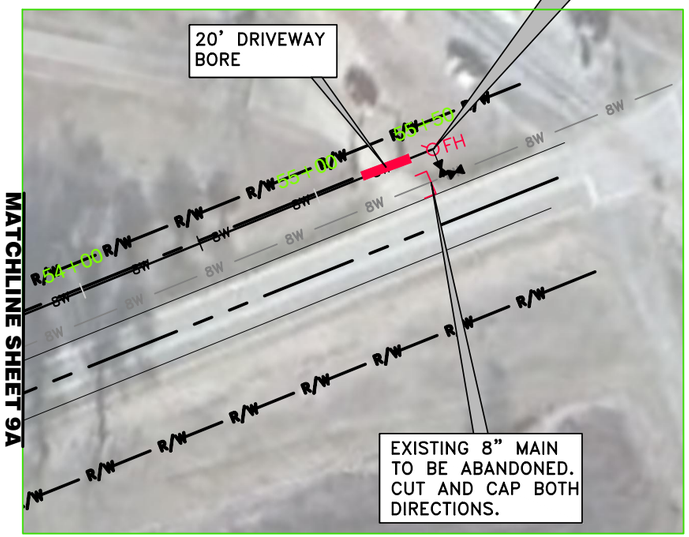
EXISTING 8" MAIN TO BE ABANDONED. CUT AND CAP BOTH DIRECTIONS.

FURNISH AND INSTALL 8" C-900 PVC WATER MAIN

TIE IN PROP 8" PVC WATER MAIN, EXIST 8" WATER MAIN W/ 1-8"TEE, 1-6"RED., 1-6"FIRE HYDRANT ASSEMBLY, & 2-8" G.V.

STATION 45+00-54+00

SCALE: 1"=60'-0"



STATION 54+00-55+50

SCALE: 1"=60'-0"

LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
- MAN HOLE
- CAP

NOTES:

- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRASS SEED OR SOD AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRAVEL ON ALL DRIVEWAY OPEN CUTS AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO VERIFY ALL METER LOCATIONS BEFORE MAKING SERVICE TAP IN NEW WATER MAIN.

0 LONG SERVICES
0 SHORT SERVICES
THIS SHEET

FIRE HYDRANT ASSEMBLY 1 THIS SHEET.

FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.

FIRE HYDRANT ASSEMBLY REMOVAL 1 THIS SHEET.

WATER MAIN SHALL BE INSTALLED IN THE BACK 5' OF EXISTING HIGHWAY RIGHT OF WAY.

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

A.L. FRANKS ENGINEERING
118 East Broad Street
Texarkana, Arkansas 71854
Phone (870) 216-1906
Fax (870) 216-1907

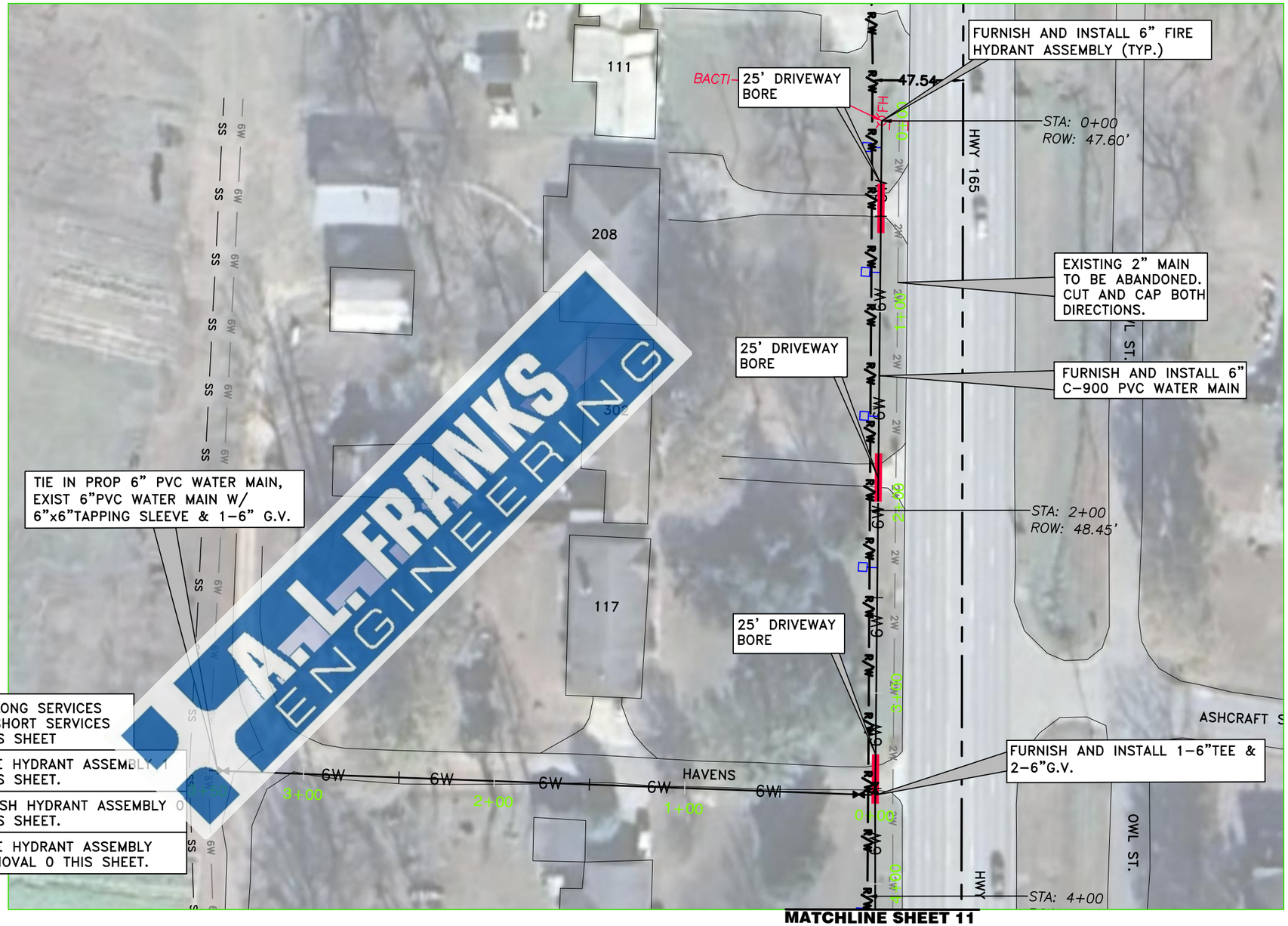
901 HOLLY STREET
MCGEHEE, ARKANSAS 71654
PHONE: 870-222-3160

CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
CROOKED BAYOU STA. 36+00-55+50

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 9

WATER MAIN SHALL BE INSTALLED IN THE BACK 5' OF EXISTING HIGHWAY RIGHT OF WAY.



MATCHLINE SHEET 11

STATION 0+00-4+00/0+00-3+50

SCALE: 1"=60'-0"

LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
- MAN HOLE
- CAP

NOTES:

- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRASS SEED OR SOD AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRAVEL ON ALL DRIVEWAY OPEN CUTS AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO VERIFY ALL METER LOCATIONS BEFORE MAKING SERVICE TAP IN NEW WATER MAIN.

0 LONG SERVICES
4 SHORT SERVICES
THIS SHEET

FIRE HYDRANT ASSEMBLY 1 THIS SHEET.

FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.

FIRE HYDRANT ASSEMBLY REMOVAL 0 THIS SHEET.

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

A.L. FRANKS ENGINEERING
118 East Broad Street
Texarkana, Arkansas 71854
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Fax (870) 216-1907

901 HOLLY STREET
MCGEHEE, ARKANSAS 71654
PHONE: 870-222-3160

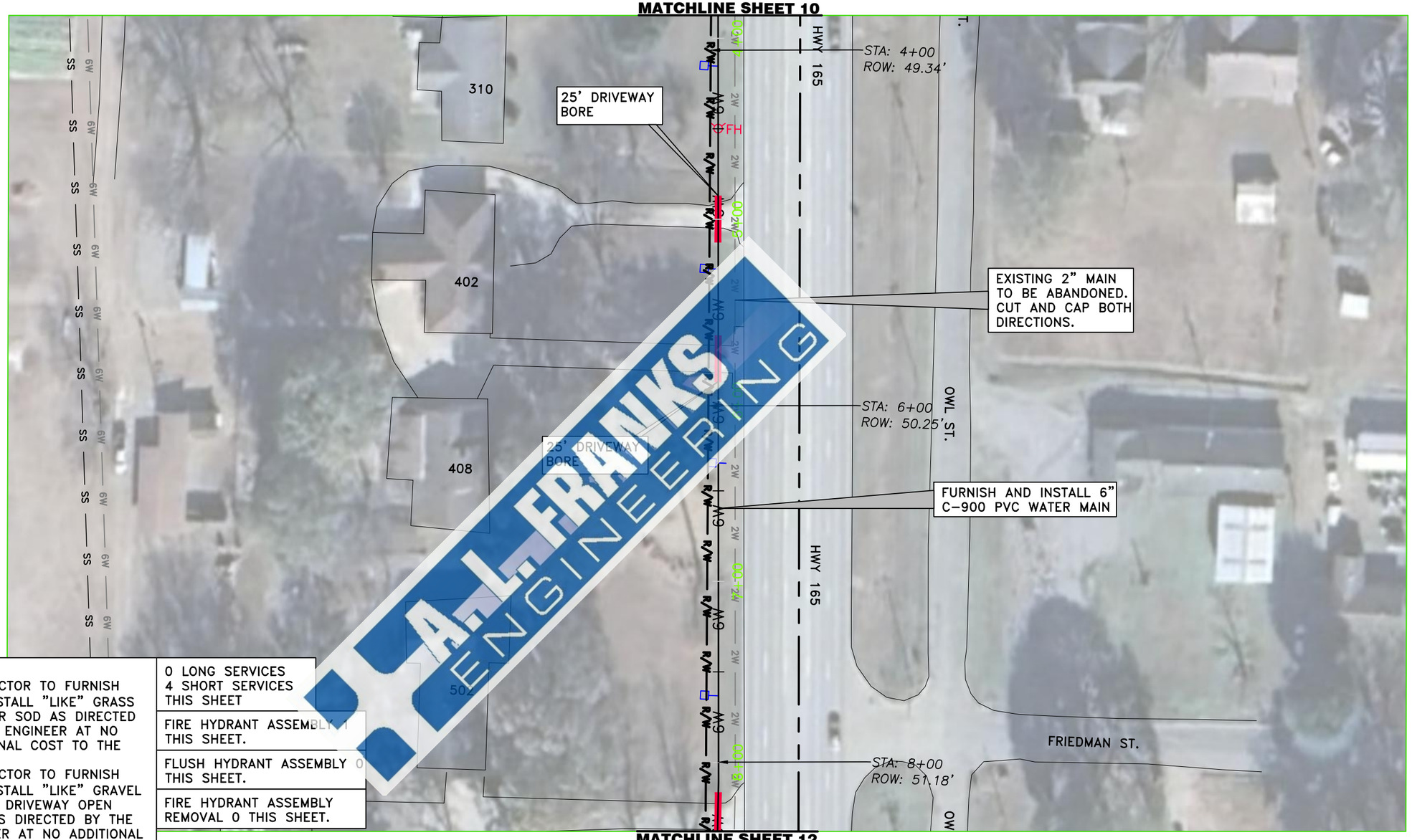
CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
HWY 65 STA. 0+00-4+00/0+00-3+50

STATE OF ARKANSAS LICENSED PROFESSIONAL ENGINEER No. 21958 CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 10

WATER MAIN SHALL BE INSTALLED IN THE BACK 5' OF EXISTING HIGHWAY RIGHT OF WAY.

MATCHLINE SHEET 10



MATCHLINE SHEET 12

LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
- MAN HOLE
- CAP

NOTES:

- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRASS SEED OR SOD AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRAVEL ON ALL DRIVEWAY OPEN CUTS AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO VERIFY ALL METER LOCATIONS BEFORE MAKING SERVICE TAP IN NEW WATER MAIN.

0 LONG SERVICES
4 SHORT SERVICES
THIS SHEET

FIRE HYDRANT ASSEMBLY 1 THIS SHEET.

FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.

FIRE HYDRANT ASSEMBLY REMOVAL 0 THIS SHEET.

STATION 4+00–8+00

SCALE: 1"=60'–0"

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

A.L. FRANKS ENGINEERING
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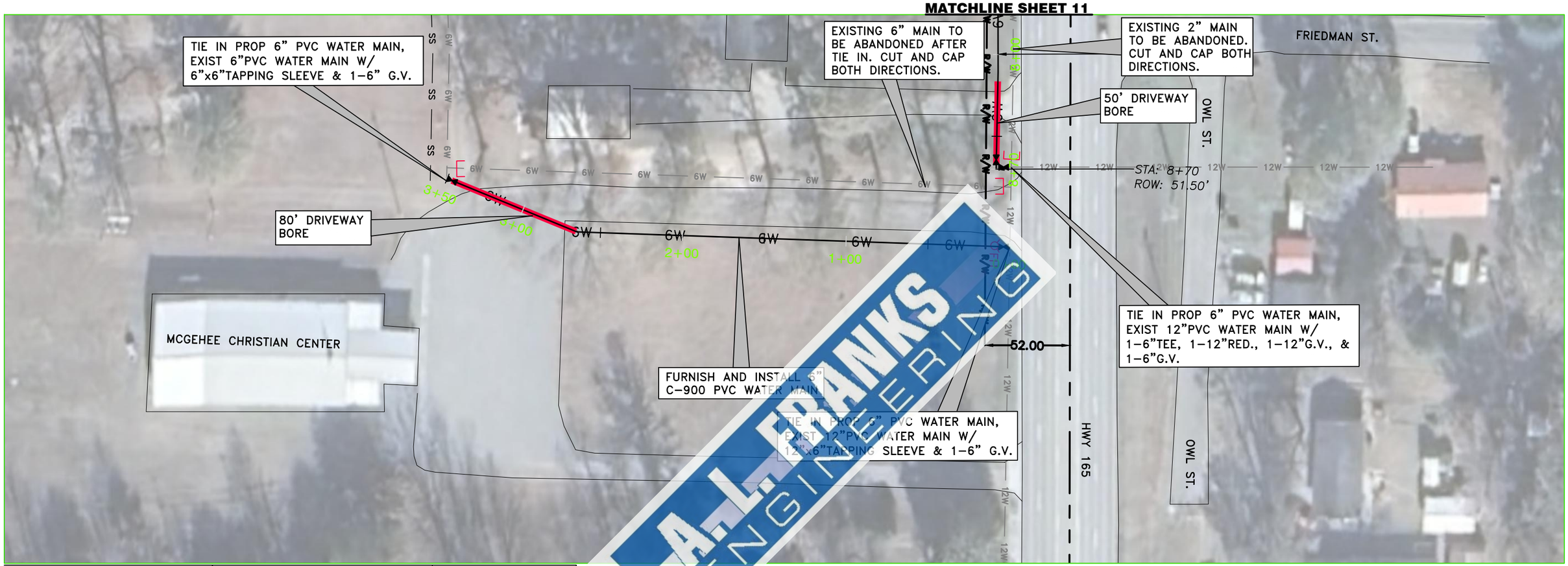
CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
HWY 65 STA. 4+00-8+00

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 11



LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
- MAN HOLE
- CAP

NOTES:

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- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRAVEL ON ALL DRIVEWAY OPEN CUTS AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO VERIFY ALL METER LOCATIONS BEFORE MAKING SERVICE TAP IN NEW WATER MAIN.

0 LONG SERVICES
0 SHORT SERVICES
THIS SHEET

FIRE HYDRANT ASSEMBLY 1 THIS SHEET.

FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.

FIRE HYDRANT ASSEMBLY REMOVAL 0 THIS SHEET.

STATION 8+00-8+70/0+00-3+50

SCALE: 1"=60'-0"

WATER MAIN SHALL BE INSTALLED IN THE BACK 5' OF EXISTING HIGHWAY RIGHT OF WAY.

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

A.L. FRANKS ENGINEERING
118 East Broad Street
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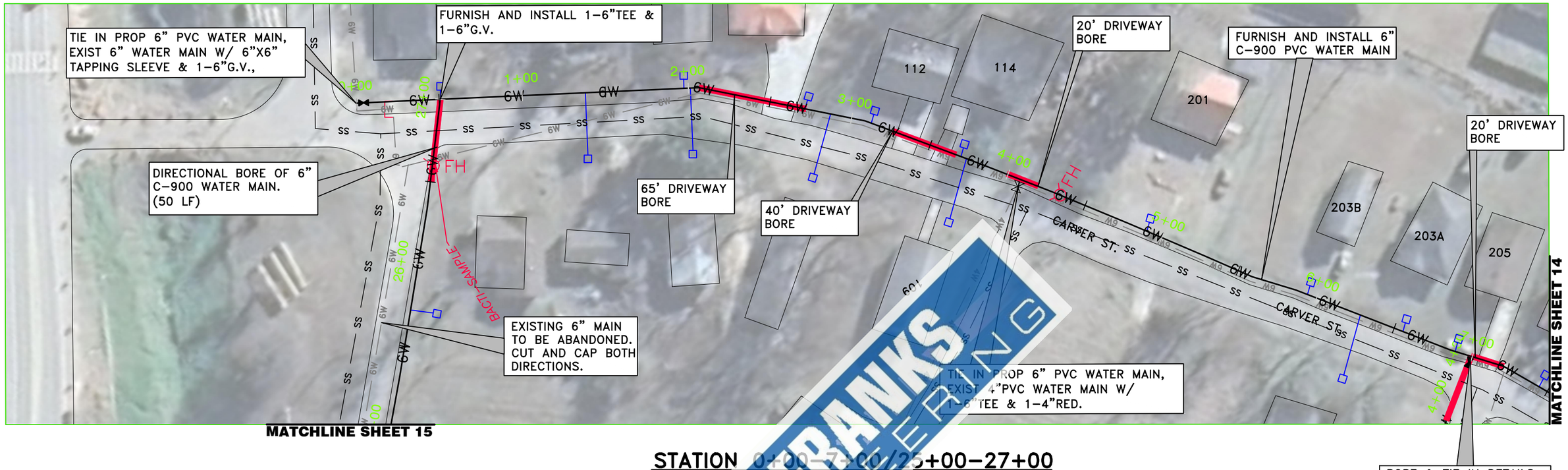
PHONE: 870-222-3160

CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
HWY 65 STA. 8+00-8+70/0+00-3+50

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 12



STATION 0+00-7+00/25+00-27+00

SCALE: 1"=60'-0"

LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W —
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
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- PHONE BOX/GAS METER
- MAN HOLE
- CAP

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- CONTRACTOR TO VERIFY ALL METER LOCATIONS BEFORE MAKING SERVICE TAP IN NEW WATER MAIN.

6 LONG SERVICES 9 SHORT SERVICES THIS SHEET
FIRE HYDRANT ASSEMBLY 2 THIS SHEET.
FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.
FIRE HYDRANT ASSEMBLY REMOVAL 2 THIS SHEET.

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

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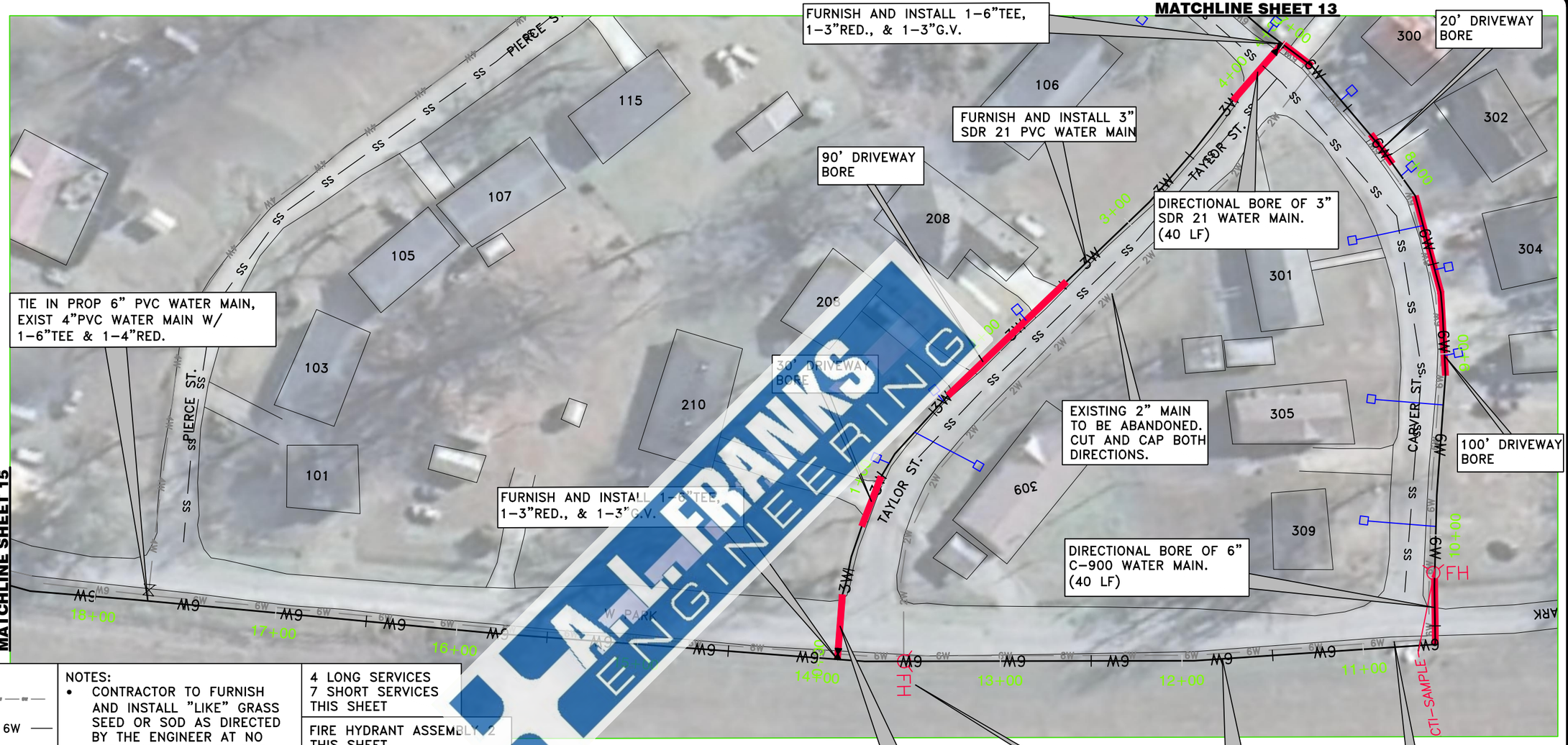
901 HOLLY STREET
MCGEHEE, ARKANSAS 71654
PHONE: 870-222-3160

CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
CARVER & PARK ST. STA. 0+00-7+00/25+00-27+00

STATE OF ARKANSAS LICENSED PROFESSIONAL ENGINEER No. 21958 CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 13



LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
- MAN HOLE
- CAP

NOTES:

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- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRAVEL ON ALL DRIVEWAY OPEN CUTS AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO VERIFY ALL METER LOCATIONS BEFORE MAKING SERVICE TAP IN NEW WATER MAIN.

4 LONG SERVICES
7 SHORT SERVICES
THIS SHEET

FIRE HYDRANT ASSEMBLY 2 THIS SHEET.

FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.

FIRE HYDRANT ASSEMBLY REMOVAL 1 THIS SHEET.

STATION 7+00-18+00/0+00-4+30

SCALE: 1"=60'-0"

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

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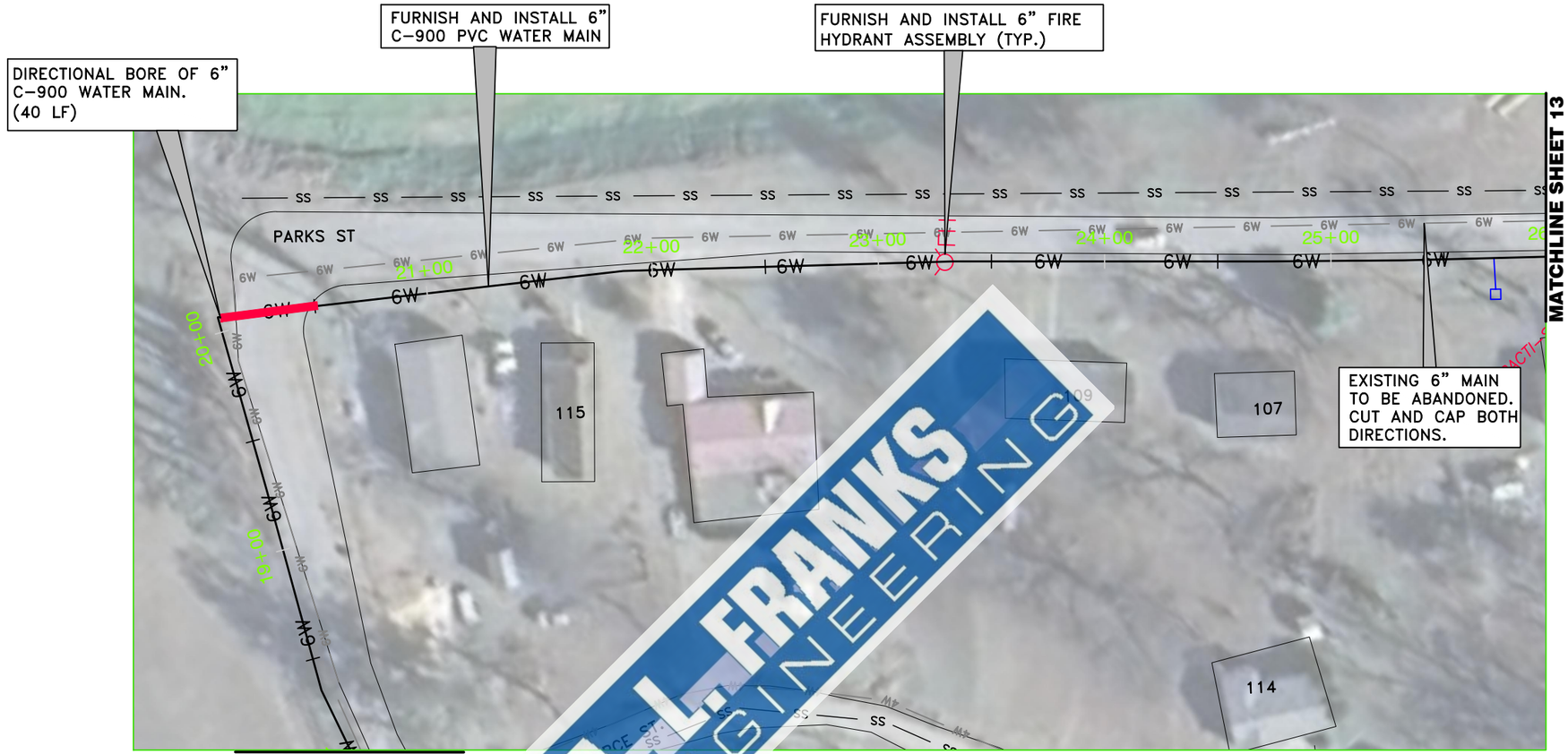
PHONE: 870-222-3160

CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
CARVER/PARK& TAYLOR STA. 7+00-18+00/0+00-4+30

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRIKER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 14



MATCHLINE SHEET 14

STATION 20+00–28+00

SCALE: 1"=60'-0"

LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W —
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
- MAN HOLE
- CAP

NOTES:

- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRASS SEED OR SOD AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRAVEL ON ALL DRIVEWAY OPEN CUTS AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO VERIFY ALL METER LOCATIONS BEFORE MAKING SERVICE TAP IN NEW WATER MAIN.

0 LONG SERVICES
1 SHORT SERVICES THIS SHEET

FIRE HYDRANT ASSEMBLY 1 THIS SHEET.

FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.

FIRE HYDRANT ASSEMBLY REMOVAL 0 THIS SHEET.

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

A.L. FRANKS ENGINEERING
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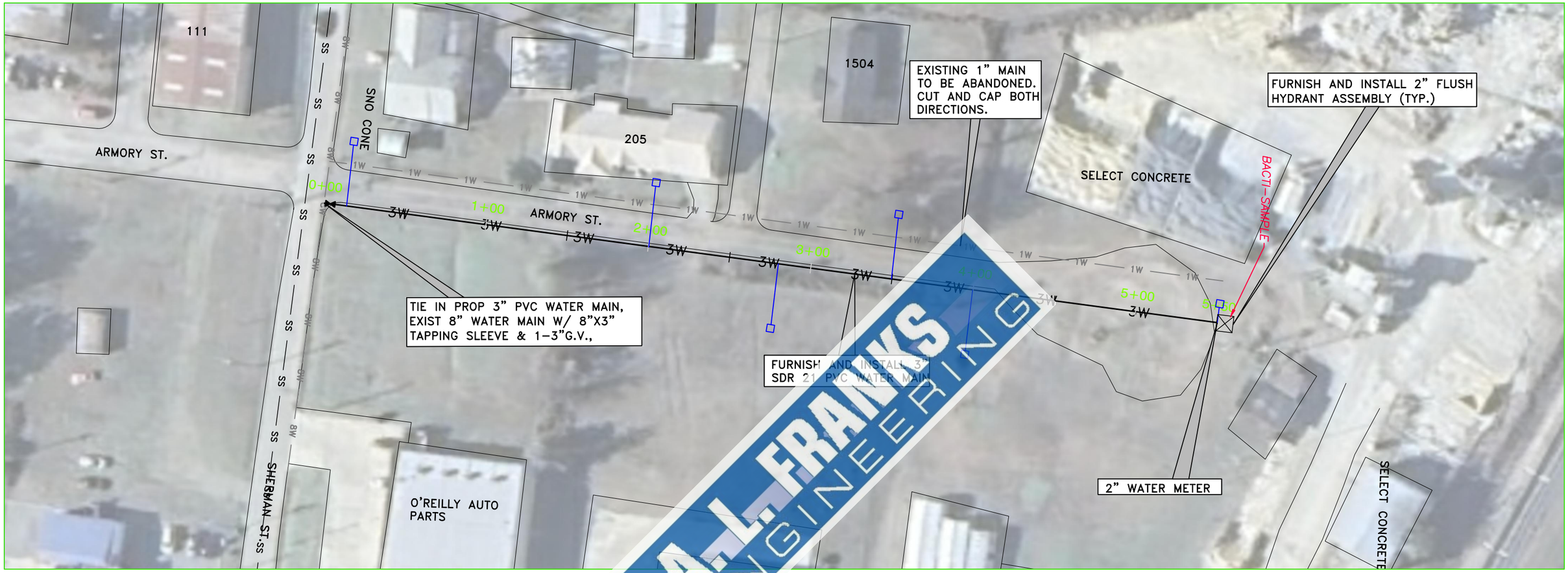
Texarkana, Arkansas 71854
Phone (870) 216-1906
Fax (870) 216-1907

901 HOLLY STREET
MCGEHEE, ARKANSAS 71654
PHONE: 870-222-3160

CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
PARK ST. STA. 20+00-28+00

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 15



LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W —
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
- MAN HOLE
- CAP

NOTES:

- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRASS SEED OR SOD AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRAVEL ON ALL DRIVEWAY OPEN CUTS AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO VERIFY ALL METER LOCATIONS BEFORE MAKING SERVICE TAP IN NEW WATER MAIN.

3 LONG SERVICES 3 SHORT SERVICES THIS SHEET	
FIRE HYDRANT ASSEMBLY 0 THIS SHEET.	
FLUSH HYDRANT ASSEMBLY 1 THIS SHEET.	
FIRE HYDRANT ASSEMBLY REMOVAL 0 THIS SHEET.	

STATION 0+00–5+50

SCALE: 1"=60'–0"

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

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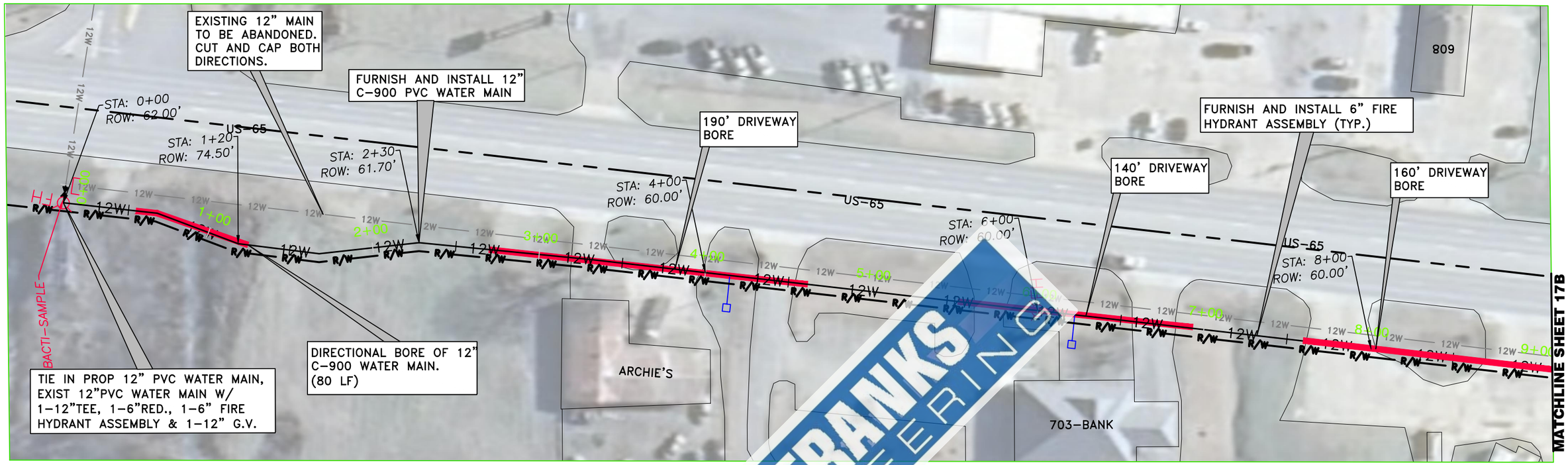
PHONE: 870-222-3160

CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
ARMORY ST. STA. 0+00 - 5+50

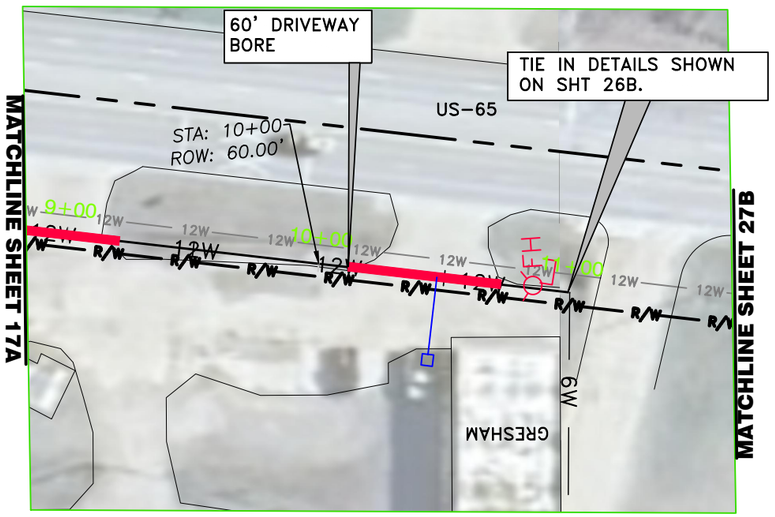
STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 16



STATION 0+00-9+00
SCALE: 1"=60'-0"

WATER MAIN SHALL BE INSTALLED IN THE BACK 5' OF EXISTING HIGHWAY RIGHT OF WAY.



STATION 9+00-11+00
SCALE: 1"=60'-0"

LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W —
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
- MAN HOLE
- CAP

NOTES:

- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRASS SEED OR SOD AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRAVEL ON ALL DRIVEWAY OPEN CUTS AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO VERIFY ALL METER LOCATIONS BEFORE MAKING SERVICE TAP IN NEW WATER MAIN.

0	LONG SERVICES
3	SHORT SERVICES THIS SHEET
	FIRE HYDRANT ASSEMBLY 3 THIS SHEET.
	FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.
	FIRE HYDRANT ASSEMBLY REMOVAL 3 THIS SHEET.

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

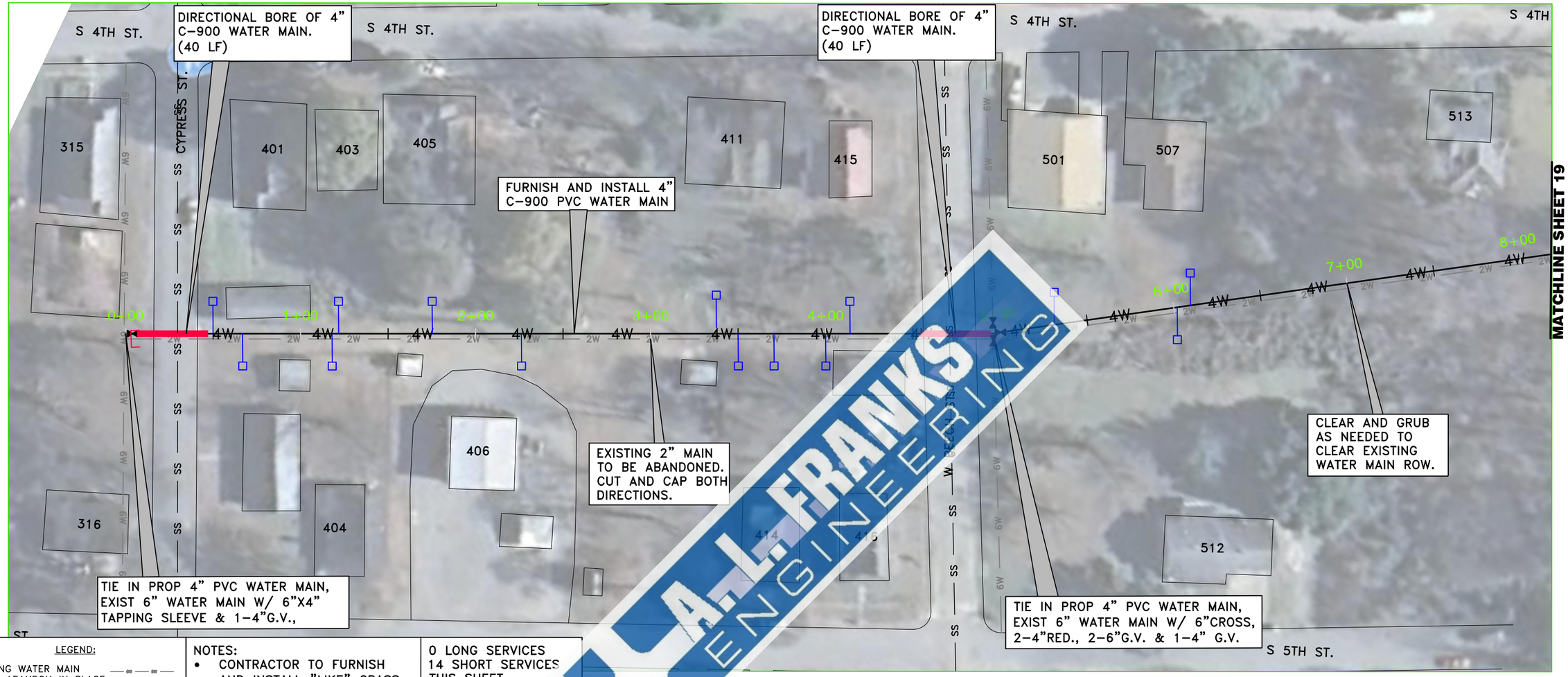
A.L. FRANKS ENGINEERING
118 East Broad Street
Texarkana, Arkansas 71854
Phone (870) 216-1906
Fax (870) 216-1907

901 HOLLY STREET
MCGEHEE, ARKANSAS 71654
PHONE: 870-222-3160

CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
HWY 65 NORTH STA. 0+00 - 11+00

STATE OF ARKANSAS LICENSED PROFESSIONAL ENGINEER No. 21958 CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 17



LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W —
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
- MAN HOLE
- CAP

NOTES:

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- CONTRACTOR TO VERIFY ALL METER LOCATIONS BEFORE MAKING SERVICE TAP IN NEW WATER MAIN.

0 LONG SERVICES
14 SHORT SERVICES
THIS SHEET

FIRE HYDRANT ASSEMBLY 0 THIS SHEET.

FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.

FIRE HYDRANT ASSEMBLY REMOVAL 0 THIS SHEET.

STATION 0+00-8+00

SCALE: 1"=60'-0"

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

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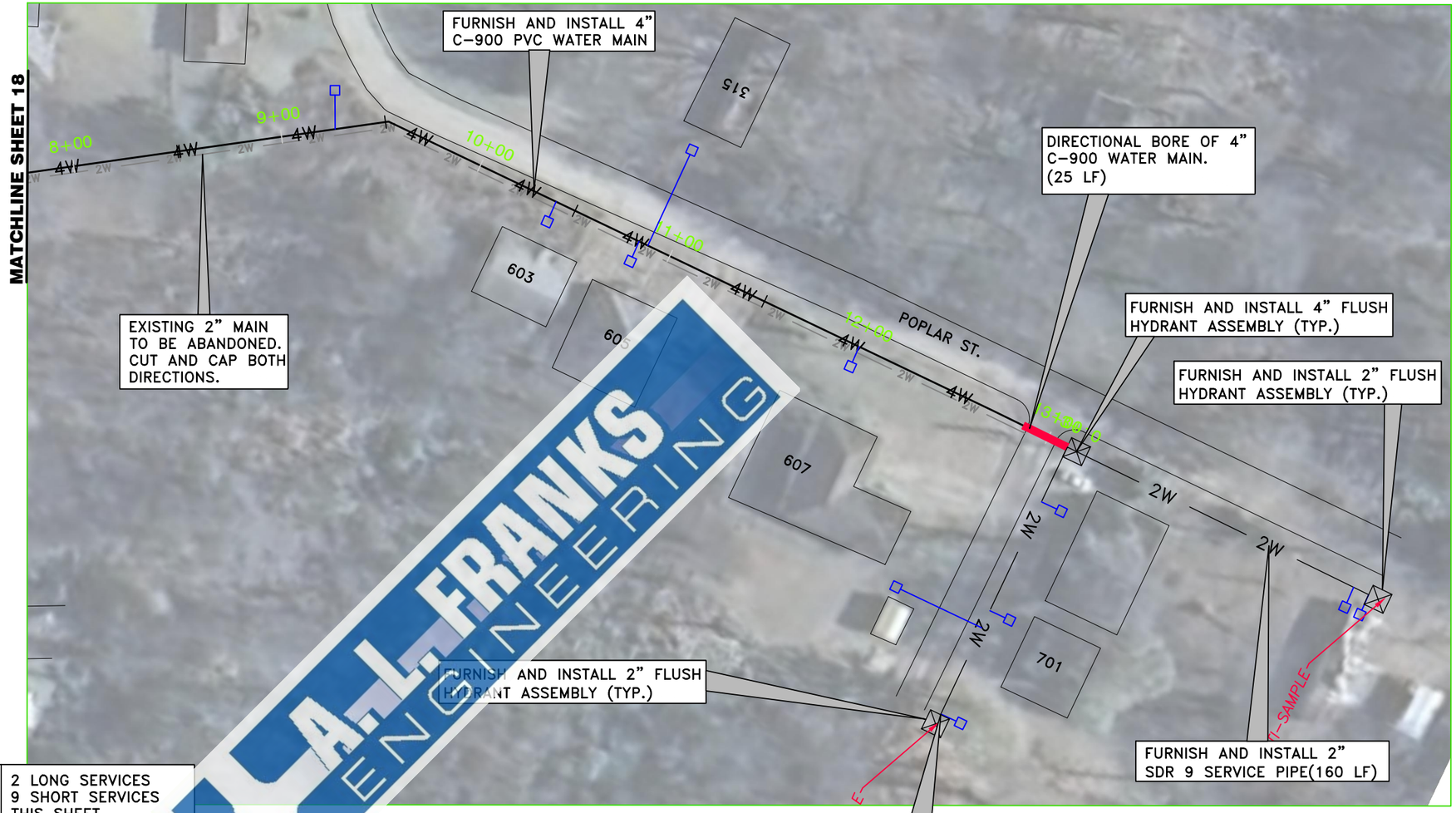
PHONE: 870-222-3160

CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
4TH & 5TH ST ALLEY STA. 0+00 - 8+00

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 18



STATION 8+00–13+10

SCALE: 1"=60'–0"

LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W —
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
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- MAN HOLE
- CAP

NOTES:

- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRASS SEED OR SOD AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRAVEL ON ALL DRIVEWAY OPEN CUTS AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO VERIFY ALL METER LOCATIONS BEFORE MAKING SERVICE TAP IN NEW WATER MAIN.

2 LONG SERVICES
9 SHORT SERVICES
THIS SHEET

FIRE HYDRANT ASSEMBLY 0 THIS SHEET.

FLUSH HYDRANT ASSEMBLY 3 THIS SHEET.

FIRE HYDRANT ASSEMBLY REMOVAL 0 THIS SHEET.

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

A.L. FRANKS ENGINEERING
118 East Broad Street
Texarkana, Arkansas 71854
Phone (870) 216-1906
Fax (870) 216-1907

901 HOLLY STREET
MCGEHEE, ARKANSAS 71654
PHONE: 870-222-3160

CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
4TH & 5TH ST ALLEY STA. 8+00 -13+10

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 19

7 LONG SERVICES
0 SHORT SERVICES
THIS SHEET

FIRE HYDRANT ASSEMBLY 3 THIS SHEET.

FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.

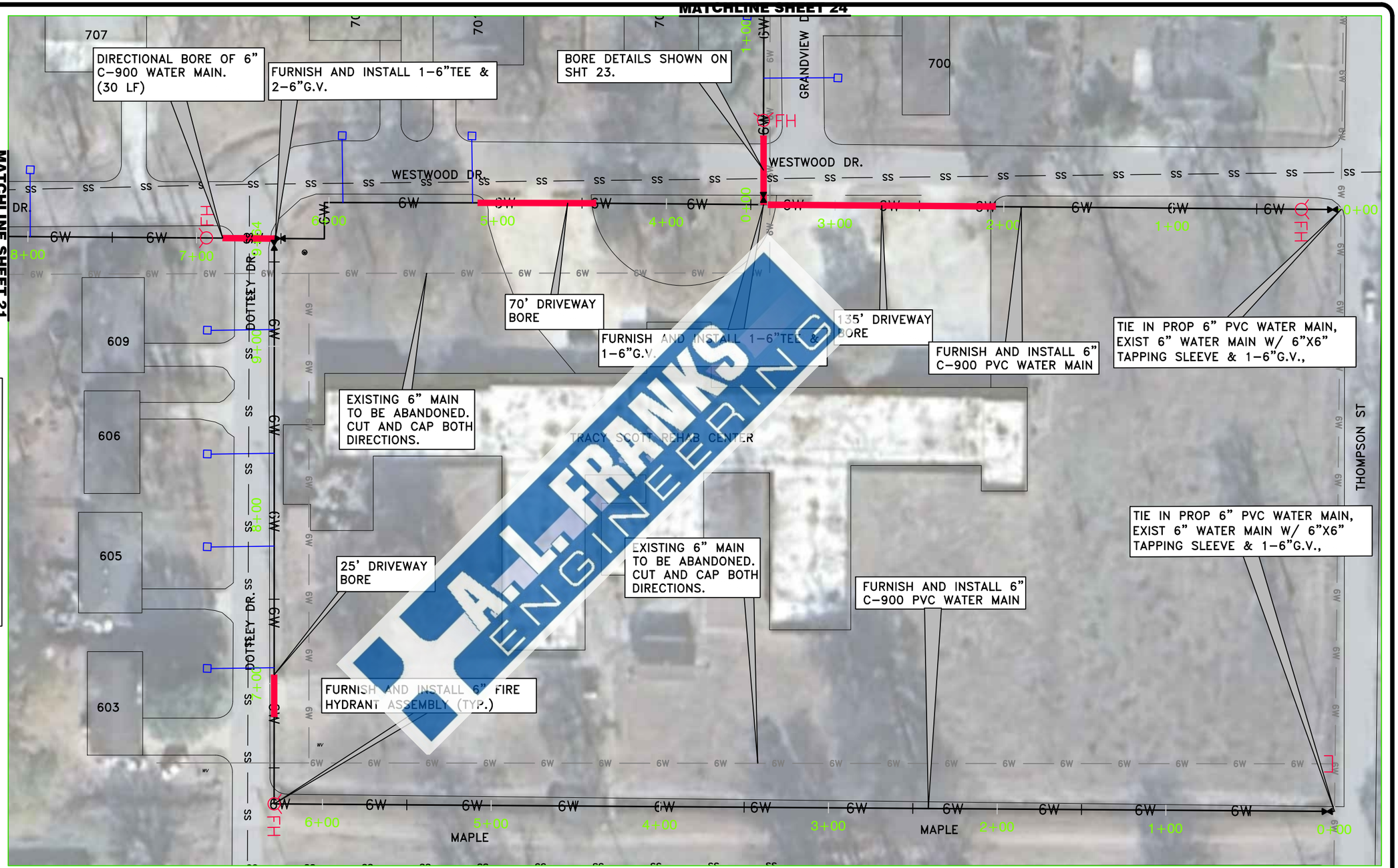
FIRE HYDRANT ASSEMBLY REMOVAL 2 THIS SHEET.

NOTES:

- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRASS SEED OR SOD AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRAVEL ON ALL DRIVEWAY OPEN CUTS AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO VERIFY ALL METER LOCATIONS BEFORE MAKING SERVICE TAP IN NEW WATER MAIN.

LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
- MAN HOLE
- CAP



STATION 0+00-8+00/0+00-9+64

SCALE: 1"=60'-0"

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

A.L. FRANKS ENGINEERING
118 East Broad Street
Texarkana, Arkansas 71854
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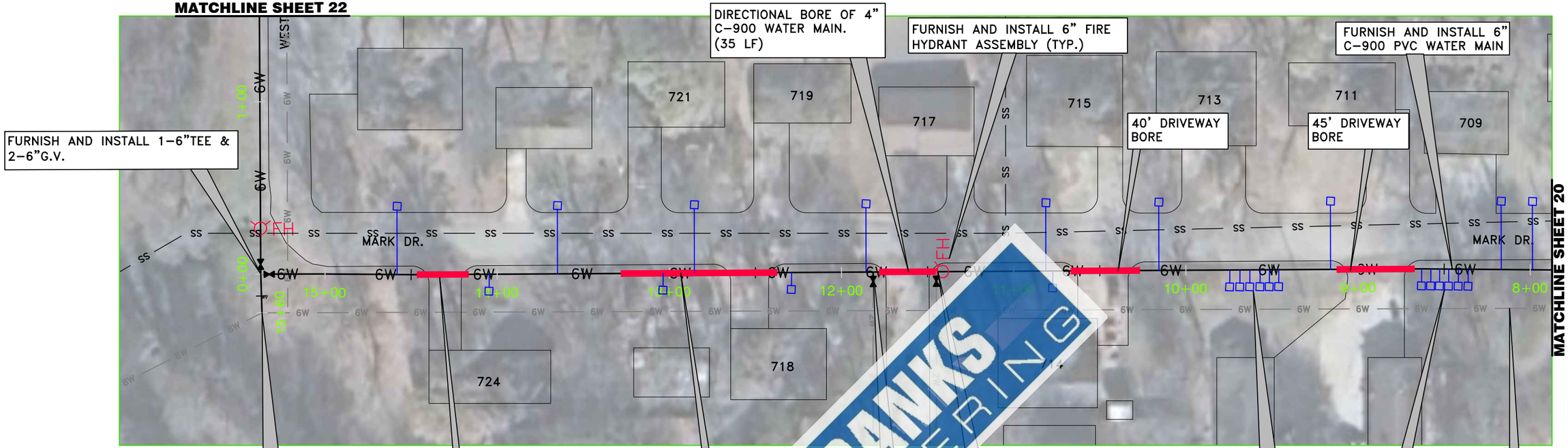
PHONE: 870-222-3160

CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
WESTWOOD DR/MAPLE ST STA. 0+00-8+00/0+00-9+64

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 20

MATCHLINE SHEET 22



LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W —
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
- MAN HOLE
- CAP

NOTES:

- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRASS SEED OR SOD AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRAVEL ON ALL DRIVEWAY OPEN CUTS AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO VERIFY ALL METER LOCATIONS BEFORE MAKING SERVICE TAP IN NEW WATER MAIN.

8 LONG SERVICES
16 SHORT SERVICES
THIS SHEET

FIRE HYDRANT ASSEMBLY 1 THIS SHEET.

FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.

FIRE HYDRANT ASSEMBLY REMOVAL 1 THIS SHEET.

STATION 8+00–15+60

SCALE: 1"=60'–0"

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

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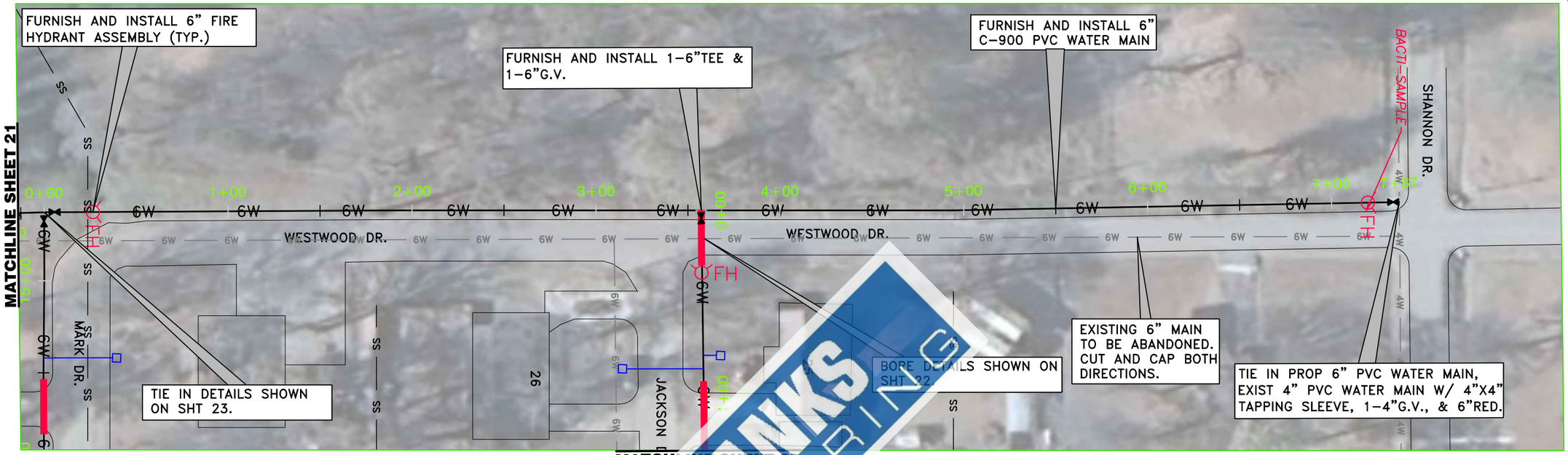
PHONE: 870-222-3160

CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
MARK DR STA. 8+00 - 15+60

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG–04–23
Scale: 1"=60'
Date: 9/2024
Sheet 21



STATION 0+00-7+37

SCALE: 1"=30'-0"

LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W —
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
- MAN HOLE
- CAP

NOTES:

- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRASS SEED OR SOD AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
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- CONTRACTOR TO VERIFY ALL METER LOCATIONS BEFORE MAKING SERVICE TAP IN NEW WATER MAIN.

0 LONG SERVICES 0 SHORT SERVICES THIS SHEET
FIRE HYDRANT ASSEMBLY 5 THIS SHEET.
FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.
FIRE HYDRANT ASSEMBLY REMOVAL 2 THIS SHEET.

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

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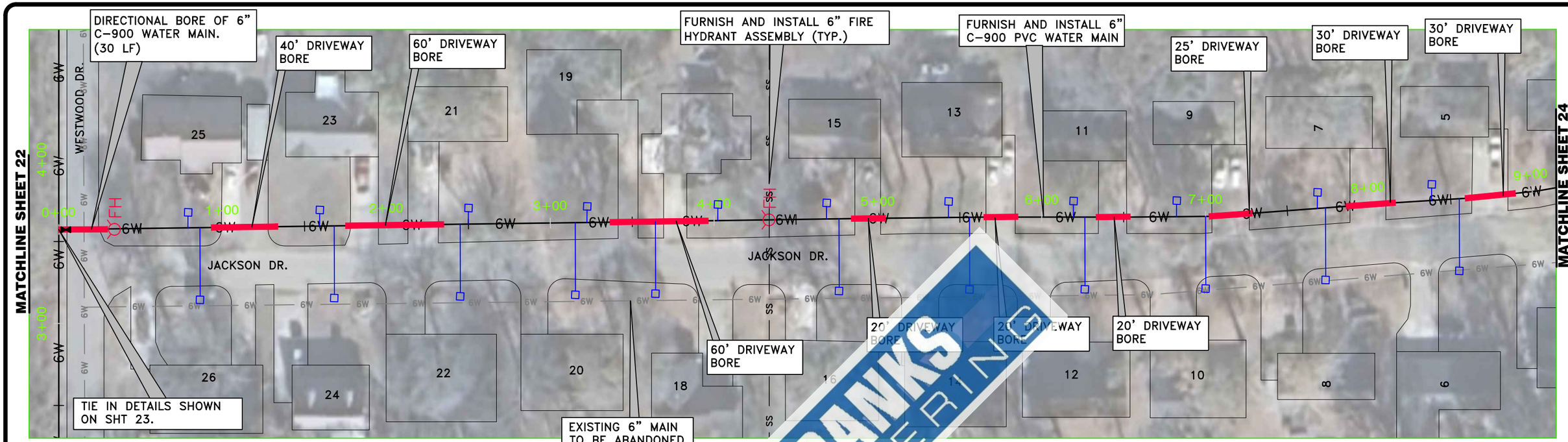
CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
WESTWOOD DR. STA. 0+00 - 7+37

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 22



STATION 0+00 - 9+00

SCALE: 1"=60'-0"

LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W —
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
- MAN HOLE
- CAP

NOTES:

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11 LONG SERVICES 11 SHORT SERVICES THIS SHEET
FIRE HYDRANT ASSEMBLY 2 THIS SHEET.
FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.
FIRE HYDRANT ASSEMBLY REMOVAL 2 THIS SHEET.

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

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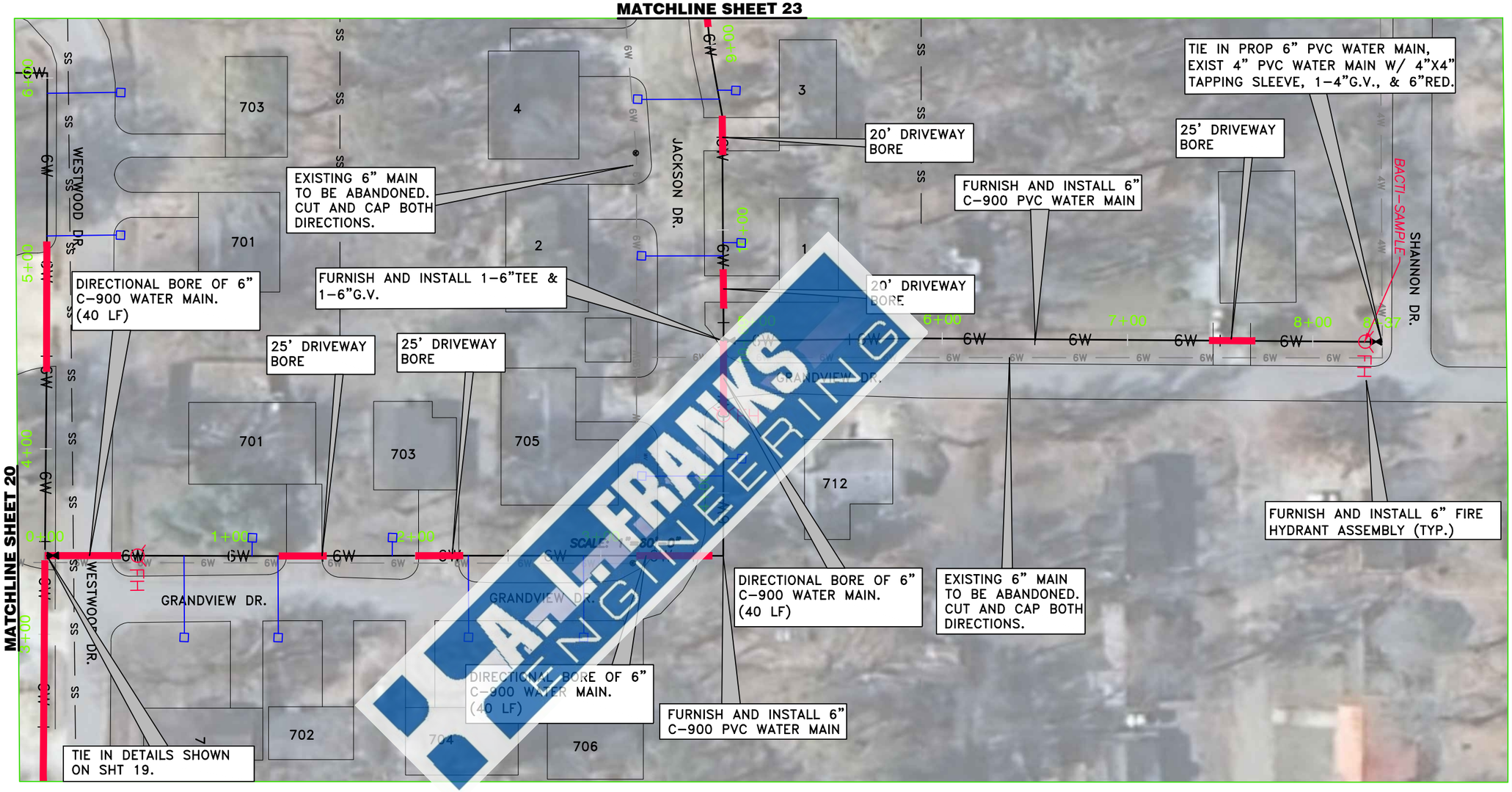
CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
JACKSON DR STA. 0+00 - 9+00

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 23

MATCHLINE SHEET 23



7 LONG SERVICES
6 SHORT SERVICES
THIS SHEET

FIRE HYDRANT ASSEMBLY 3 THIS SHEET.

FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.

FIRE HYDRANT ASSEMBLY REMOVAL 3 THIS SHEET.

NOTES:

- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRASS SEED OR SOD AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
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LEGEND:

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- PROPOSED WATER MAIN — 6W —
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
- MAN HOLE
- CAP

STATION 0+00-8+37/9+00-10+60

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

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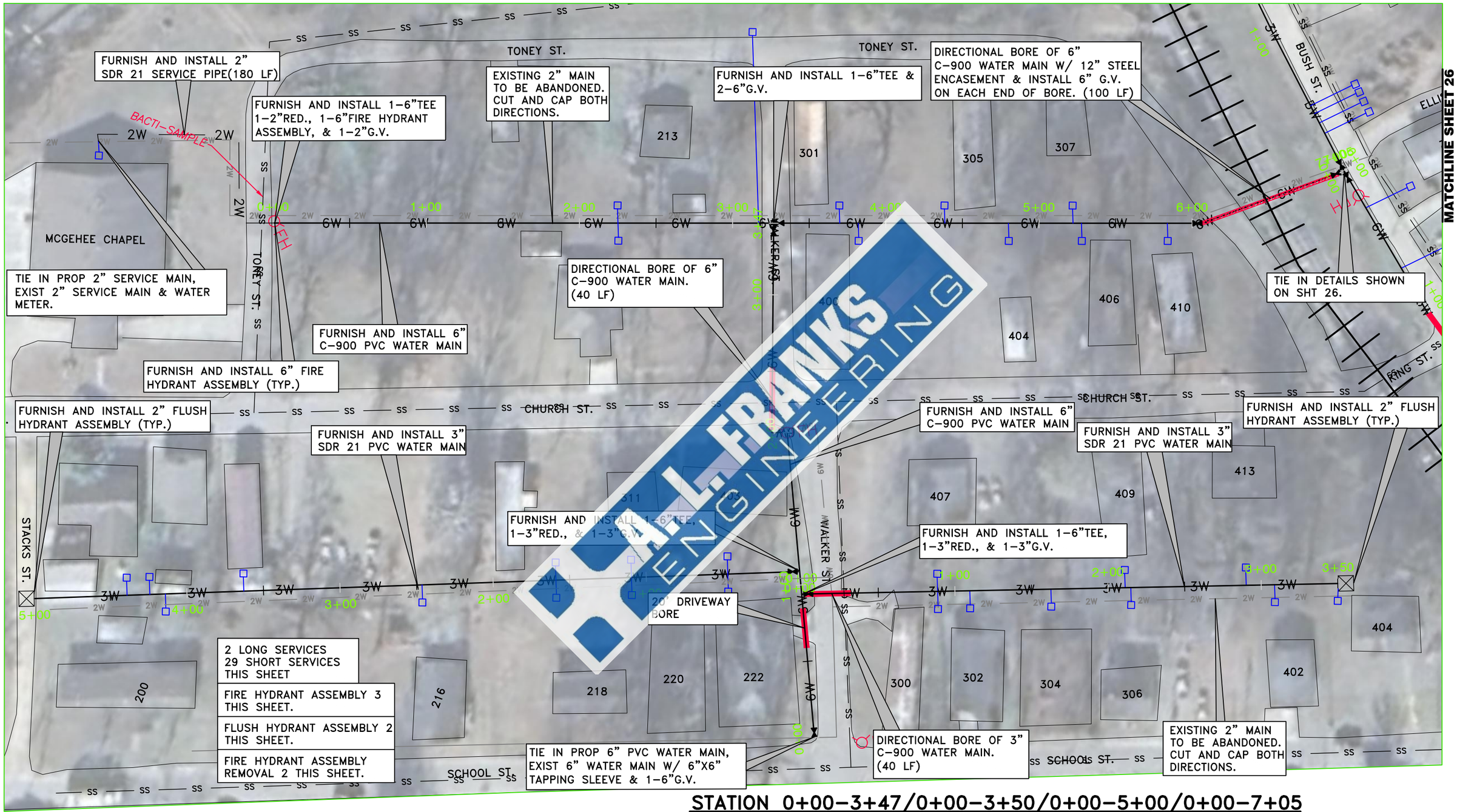
PHONE: 870-222-3160

CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
GRANDVIEW/JACKSON STA. 0+00-8+37/9+00-10+60

STATE OF ARKANSAS LICENSED PROFESSIONAL ENGINEER No. 21958 CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 24



STATION 0+00-3+47/0+00-3+50/0+00-5+00/0+00-7+05

SCALE: 1"=60'-0"

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

A.L. FRANKS ENGINEERING
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901 HOLLY STREET
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PHONE: 870-222-3160

CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
WALKER ST/SCHOOL ALLEY/CHURCH ALLEY
STA. 0+00-3+47/0+00-3+50/0+00-5+00/0+00-7+05

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 25

STATION 0+00–6+00, 0+00–3+00

SCALE: 1"=60'

LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W —
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
- MAN HOLE
- CAP

NOTES:

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- CONTRACTOR TO VERIFY ALL METER LOCATIONS BEFORE MAKING SERVICE TAP IN NEW WATER MAIN.

12 LONG SERVICES 0 SHORT SERVICES THIS SHEET	
FIRE HYDRANT ASSEMBLY	1
THIS SHEET.	
FLUSH HYDRANT ASSEMBLY	1
THIS SHEET.	
FIRE HYDRANT ASSEMBLY REMOVAL 1 THIS SHEET.	

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

A.L. FRANKS ENGINEERING
118 East Broad Street
Texarkana, Arkansas 71854
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901 HOLLY STREET
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PHONE: 870-222-3160

CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
BUSH ST STA. 0+00-6+00/0+00-3+00

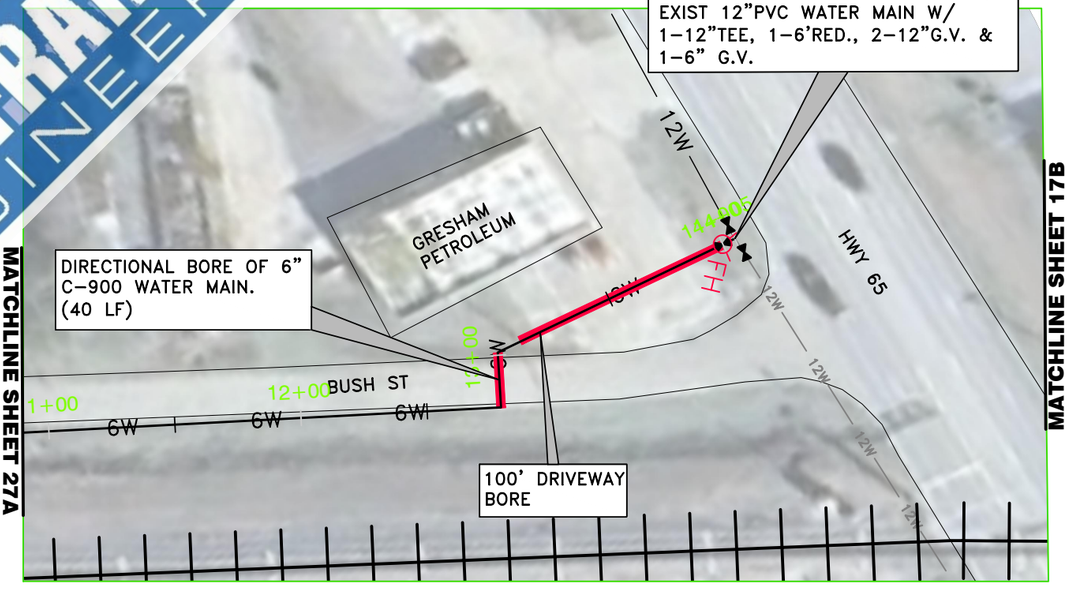
STATE OF ARKANSAS LICENSED PROFESSIONAL ENGINEER No. 21958 CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 26

EXISTING 2" MAIN TO BE ABANDONED. CUT AND CAP BOTH DIRECTIONS.

STATION 3+00-11+00

SCALE: 1"=60'-0"



STATION 11+00-14+05

SCALE: 1"=60'-0"

LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W —
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
- MAN HOLE
- CAP

NOTES:

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11 LONG SERVICES 0 SHORT SERVICES THIS SHEET	
FIRE HYDRANT ASSEMBLY 3 THIS SHEET.	
FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.	
FIRE HYDRANT ASSEMBLY REMOVAL 1 THIS SHEET.	

MATCHLINE SHEET 24

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

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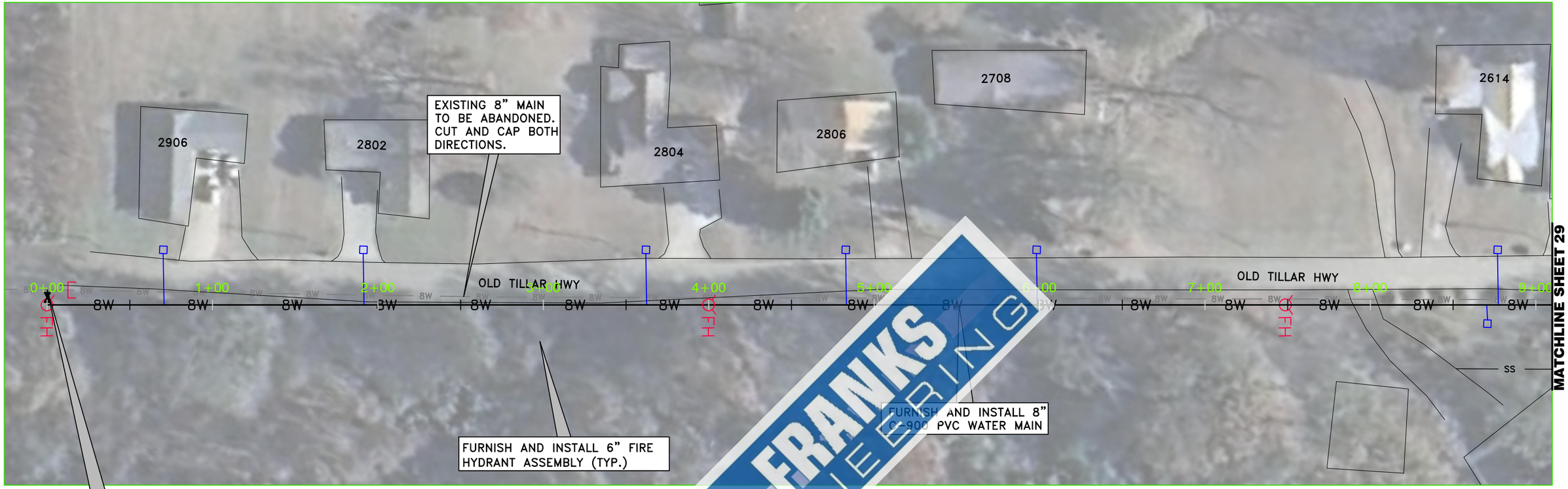
PHONE: 870-222-3160

CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
BUSH ST STA. 3+00-14+05

STATE OF ARKANSAS LICENSED PROFESSIONAL ENGINEER No. 21958 CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 27



STATION 0+00-9+00

SCALE: 1"=60'-0"

LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W —
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
- MAN HOLE
- CAP

NOTES:

- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRASS SEED OR SOD AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRAVEL ON ALL DRIVEWAY OPEN CUTS AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO VERIFY ALL METER LOCATIONS BEFORE MAKING SERVICE TAP IN NEW WATER MAIN.

6 LONG SERVICES 1 SHORT SERVICES THIS SHEET	
FIRE HYDRANT ASSEMBLY 3 THIS SHEET.	
FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.	
FIRE HYDRANT ASSEMBLY REMOVAL 2 THIS SHEET.	

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

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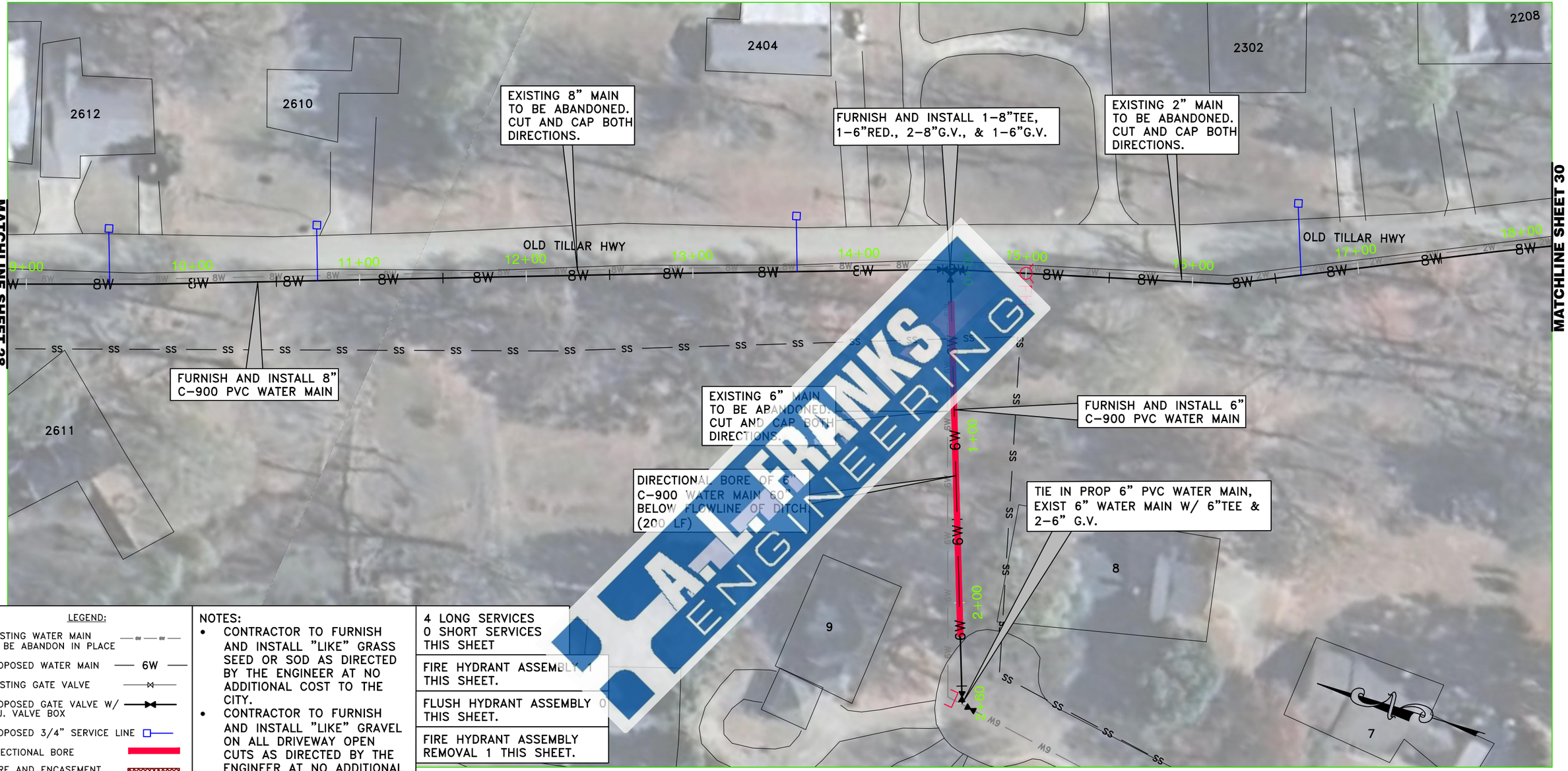
PHONE: 870-222-3160

CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
OLD TILLAR HWY STA. 0+00-9+00

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 28



LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W —
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
- MAN HOLE
- CAP

NOTES:

- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRASS SEED OR SOD AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
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- CONTRACTOR TO VERIFY ALL METER LOCATIONS BEFORE MAKING SERVICE TAP IN NEW WATER MAIN.

4 LONG SERVICES
0 SHORT SERVICES
THIS SHEET

FIRE HYDRANT ASSEMBLY 1 THIS SHEET.

FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.

FIRE HYDRANT ASSEMBLY REMOVAL 1 THIS SHEET.

STATION 9+00-18+00/0+00-2+60

SCALE: 1"=60'-0"

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

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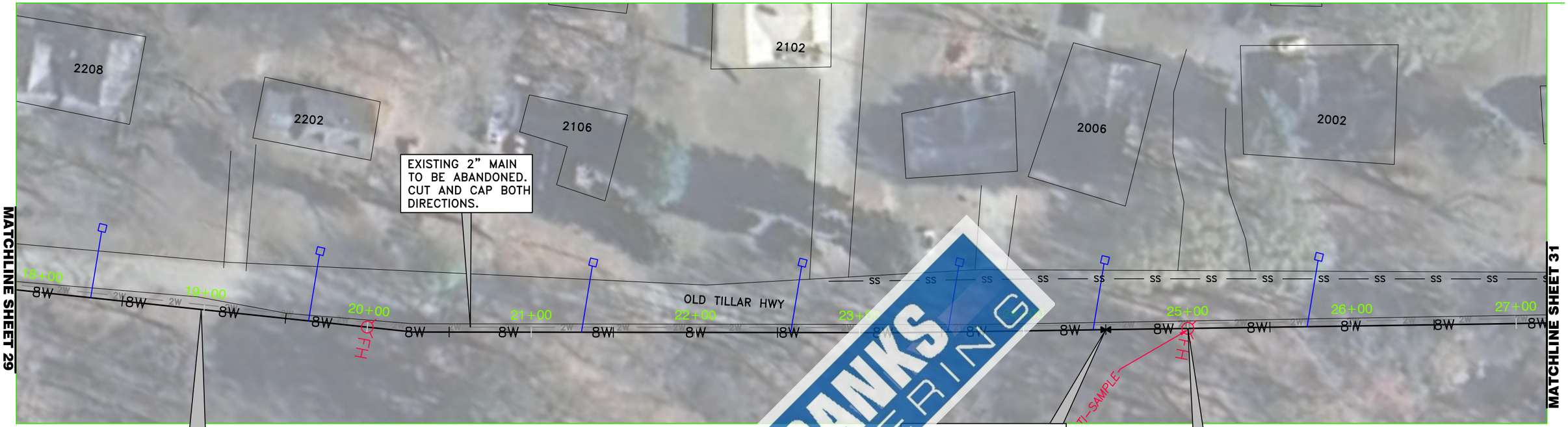
CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
OLD TILLAR HWY STA. 9+00-18+00/0+00-2+60

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 29



STATION 18+00-27+00

SCALE: 1"=60'-0"

LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W —
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
- MAN HOLE
- CAP

NOTES:

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7 LONG SERVICES
0 SHORT SERVICES
THIS SHEET

FIRE HYDRANT ASSEMBLY 2 THIS SHEET.

FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.

FIRE HYDRANT ASSEMBLY REMOVAL 2 THIS SHEET.

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

A.L. FRANKS ENGINEERING
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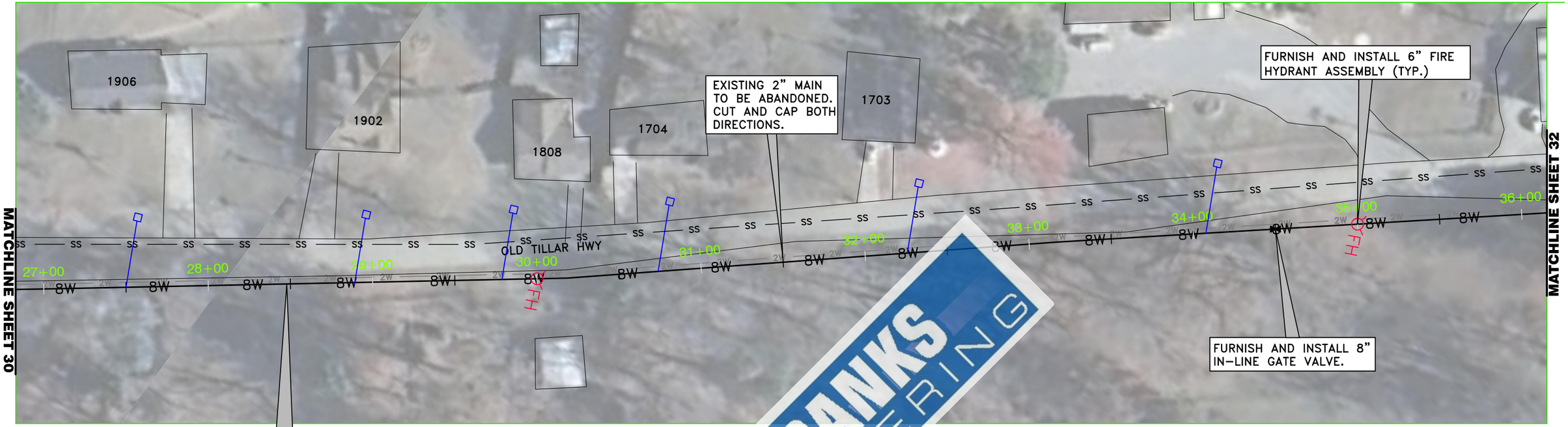
CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
OLD TILLAR HWY STA. 18+00-27+00

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 30



STATION 27+00-36+00

SCALE: 1"=60'-0"

LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W —
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
- MAN HOLE
- CAP

NOTES:

- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRASS SEED OR SOD AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO FURNISH AND INSTALL "LIKE" GRAVEL ON ALL DRIVEWAY OPEN CUTS AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE CITY.
- CONTRACTOR TO VERIFY ALL METER LOCATIONS BEFORE MAKING SERVICE TAP IN NEW WATER MAIN.

6 LONG SERVICES 0 SHORT SERVICES THIS SHEET	
FIRE HYDRANT ASSEMBLY 2 THIS SHEET.	
FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.	
FIRE HYDRANT ASSEMBLY REMOVAL 2 THIS SHEET.	

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

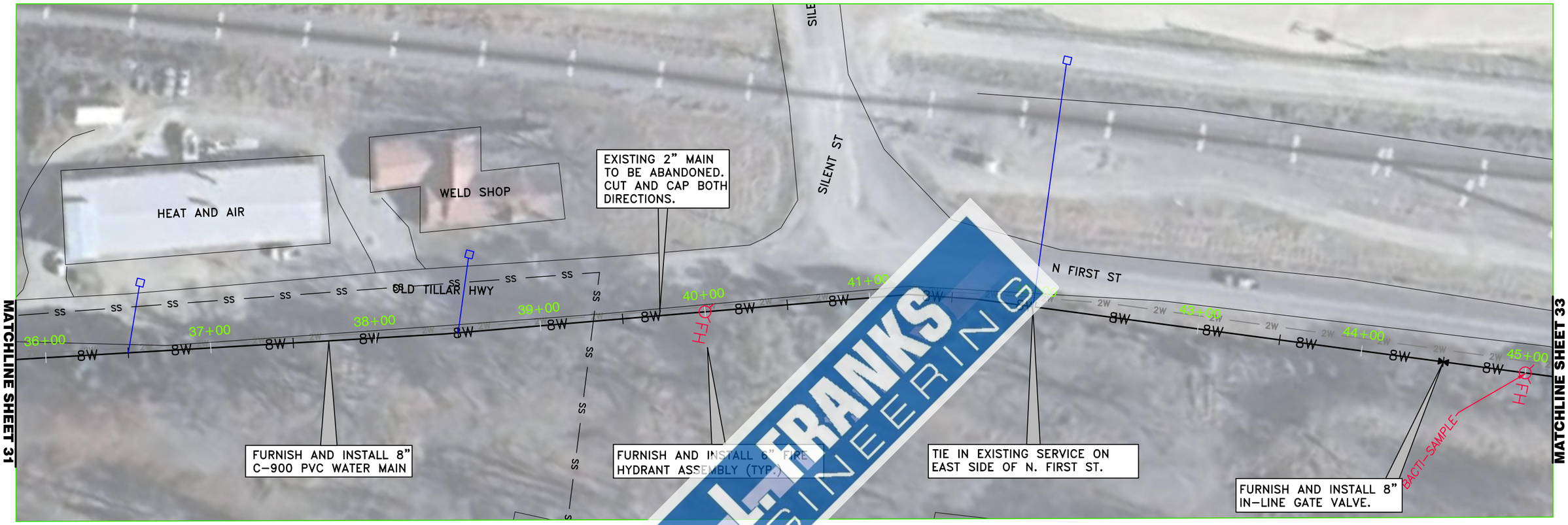
A.L. FRANKS ENGINEERING
118 East Broad Street
Texarkana, Arkansas 71854
Phone (870) 216-1906
Fax (870) 216-1907

901 HOLLY STREET
MCGEHEE, ARKANSAS 71654
PHONE: 870-222-3160

CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
OLD TILLAR HWY STA. 27+00-36+00

STATE OF ARKANSAS LICENSED PROFESSIONAL ENGINEER No. 21958 CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 31



STATION 36+00- 45+00

SCALE: 1"=60'-0"

LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W —
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
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- CAP

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3 LONG SERVICES 0 SHORT SERVICES THIS SHEET	
FIRE HYDRANT ASSEMBLY 2 THIS SHEET.	
FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.	
FIRE HYDRANT ASSEMBLY REMOVAL 2 THIS SHEET.	

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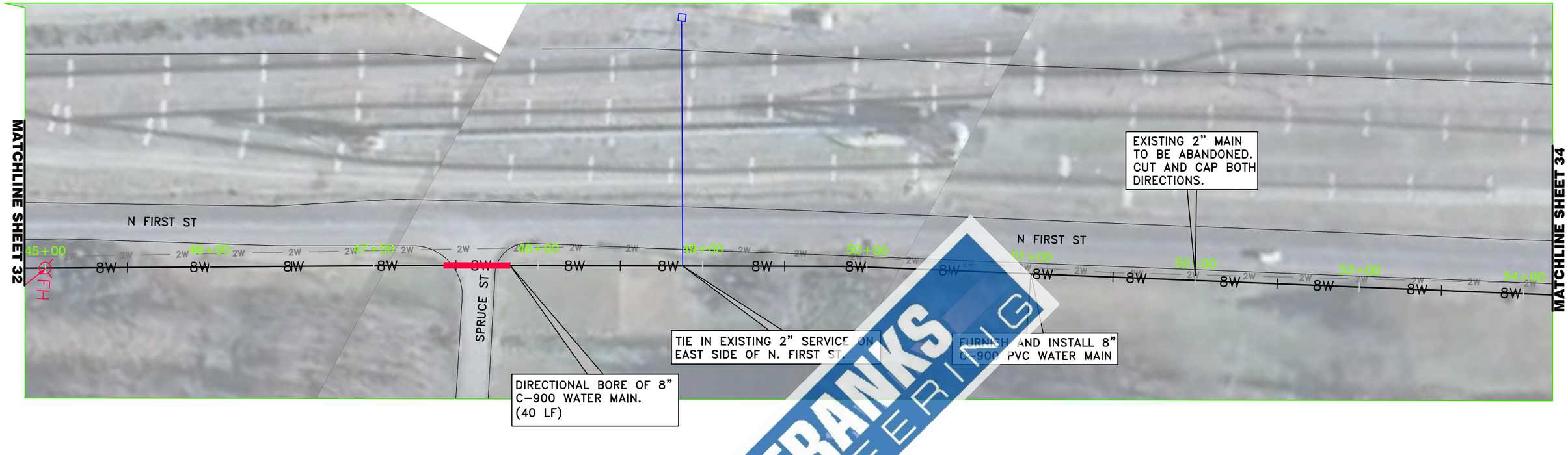
CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
OLD TILLAR HWY STA. 36+00-45+00

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 32



STATION 45+00-54+00

SCALE: 1"=60'-0"

LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
- MAN HOLE
- CAP

NOTES:

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1 LONG SERVICES 0 SHORT SERVICES THIS SHEET
FIRE HYDRANT ASSEMBLY 0 THIS SHEET.
FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.
FIRE HYDRANT ASSEMBLY REMOVAL 0 THIS SHEET.

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

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CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
OLD TILLAR HWY STA. 45+00-54+00

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 33

STATION 54+00-63+00

SCALE: 1"=60'-0"

LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W —
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
- BORE AND ENCASEMENT
- PROPOSED FIRE HYDRANT ASSEMBLY — FH
- POWER POLE/FIBER OPTIC
- PHONE BOX/GAS METER
- MAN HOLE
- CAP

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- CONTRACTOR TO VERIFY ALL METER LOCATIONS BEFORE MAKING SERVICE TAP IN NEW WATER MAIN.

0 LONG SERVICES
0 SHORT SERVICES
THIS SHEET

FIRE HYDRANT ASSEMBLY 1 THIS SHEET.

FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.

FIRE HYDRANT ASSEMBLY REMOVAL 0 THIS SHEET.

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

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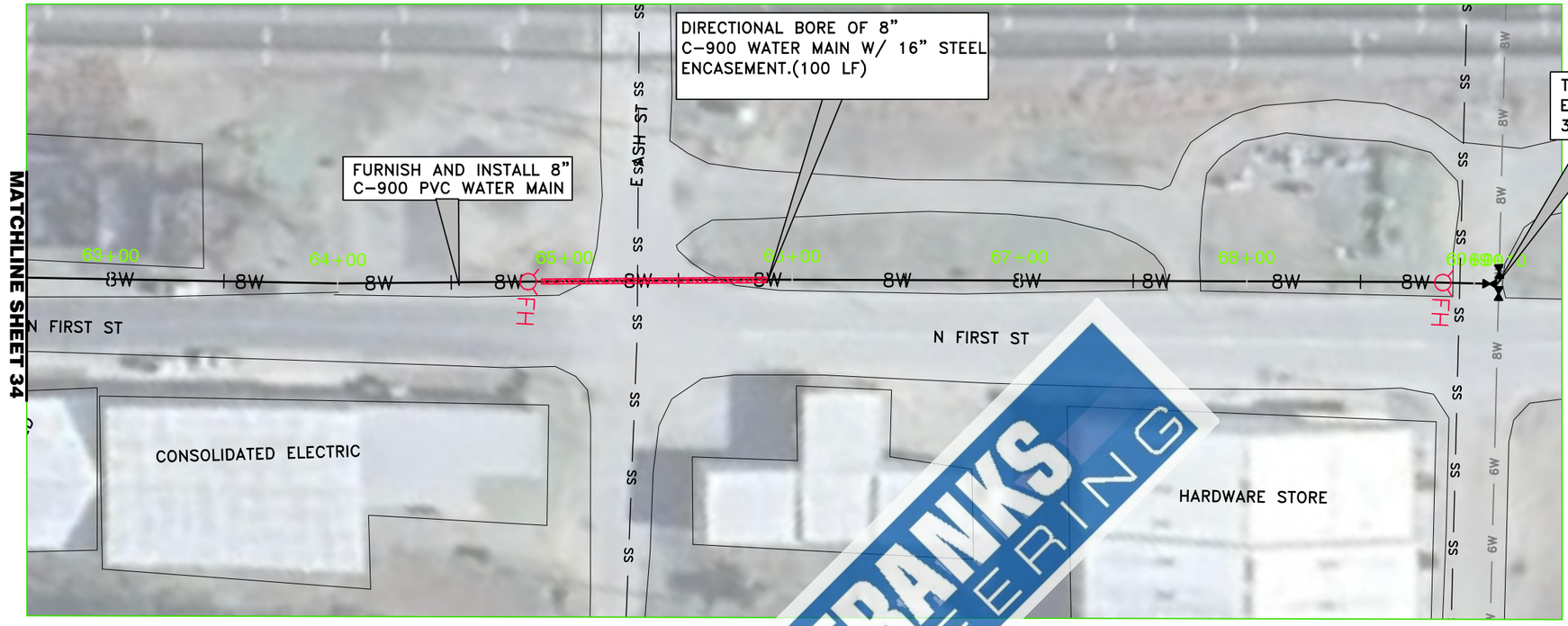
CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
OLD TILLAR HWY STA. 54+00-63+00

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 34



STATION 63+00-69+10

SCALE: 1"=60'-0"

LEGEND:

- EXISTING WATER MAIN TO BE ABANDON IN PLACE
- PROPOSED WATER MAIN — 6W —
- EXISTING GATE VALVE
- PROPOSED GATE VALVE W/ ADJ. VALVE BOX
- PROPOSED 3/4" SERVICE LINE
- DIRECTIONAL BORE
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0 LONG SERVICES 0 SHORT SERVICES THIS SHEET
FIRE HYDRANT ASSEMBLY 2 THIS SHEET.
FLUSH HYDRANT ASSEMBLY 0 THIS SHEET.
FIRE HYDRANT ASSEMBLY REMOVAL 2 THIS SHEET.

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

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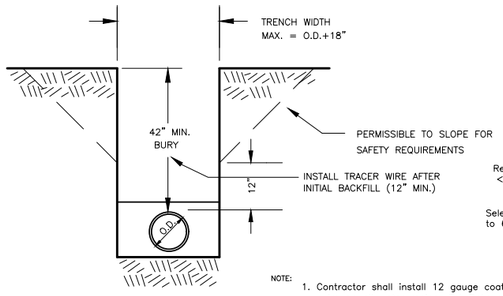
CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
OLD TILLAR HWY STA. 63+00-69+10

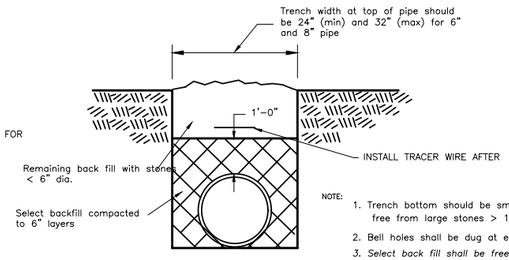
STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG-04-23
Scale: 1"=60'
Date: 9/2024
Sheet 35



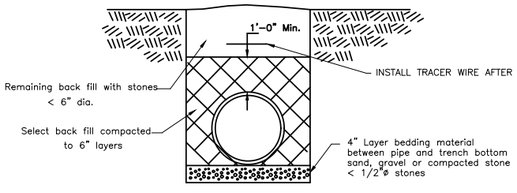
NOTE:
1. Contractor shall install 12 gauge coated copper tracer wire on all water mains. Gel-Paks shall be used for all splices.

TYPICAL TRENCH SECTION
N.T.S.



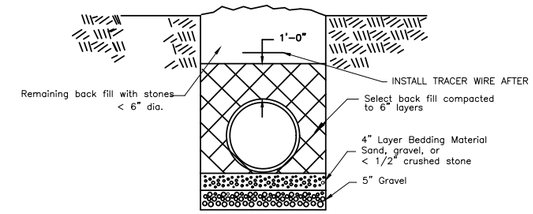
NOTE:
1. Trench bottom should be smooth and free from large stones > 1/2"or clods
2. Bell holes shall be dug at each joint.
3. *Select back fill shall be free of rocks >3/4"ø, clods or frozen material compacted to 90% standard proctor.*
4. *Trench excavation is unclassified; contractors bid shall include excavation of all materials and shall include bedding or back fill as shown in type 1,2,or 3 laying conditions.*
5. *Pipe bedding must meet AWWA C605 standard.*

TYPE 1 LAYING CONDITION
(USE UNDER NORMAL CONDITIONS)



NOTE:
IF SPOIL BANK MATERIAL DOES NOT CONFORM TO SELECT BACKFILL REQUIREMENTS, A IMPORTED MATERIAL SHALL BE PLACED AROUND PIPE.

TYPE 2 LAYING CONDITION
(USE FOR ROCKY OR HARD TRENCH BOTTOM)

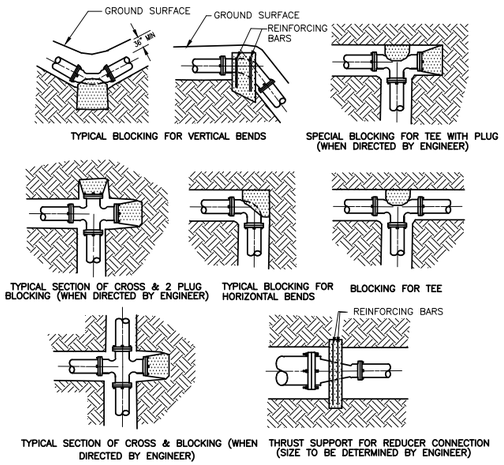


TYPE 3 LAYING CONDITION
(USE FOR SOFT OR WET TRENCH BOTTOM)

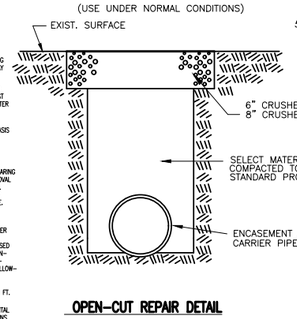
GENERAL DATA FOR BLOCKING STANDARD FITTING						
PIPE SIZE	THRUST IN TONS EXERTED AT PLUGS, TEES AND BENDS FOR EACH 100 LBS. PER SQ. IN. OF TEST PRESSURE					
	PLUG	TEE	90° BEND	45° BEND	22-1/2° BEND	11-1/4° BEND
4"	0.63	0.63	0.89	0.48	0.25	0.12
6"	1.40	1.40	2.00	1.08	0.55	0.28
8"	2.50	2.50	3.55	1.92	0.98	0.49
10"	3.93	3.93	5.55	3.00	1.53	0.77
12"	5.65	5.65	8.00	4.33	2.21	1.11
14"	7.70	7.70	10.88	5.89	3.00	1.51
16"	10.05	10.05	14.21	7.69	3.85	1.97
18"	12.70	12.70	17.99	9.74	4.96	2.49
20"	15.71	15.71	22.22	12.02	6.13	3.08
24"	22.67	22.67	32.00	17.31	8.83	4.43
27"	28.63	28.63	40.48	21.91	11.17	5.61
30"	35.35	35.35	50.00	27.06	13.79	6.93
36"	50.90	50.90	72.98	38.95	19.89	9.98
42"	69.27	69.27	97.97	53.02	27.03	13.58
48"	90.48	90.48	127.96	69.25	35.30	17.74
54"	114.51	114.51	161.94	87.64	44.68	22.45

NOTES ON THRUST BLOCKING

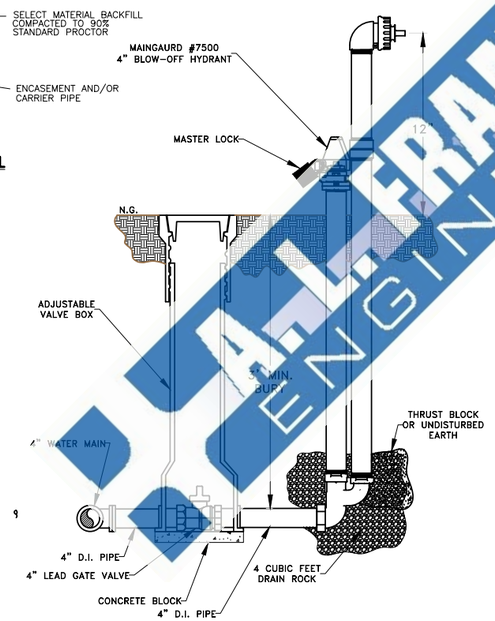
1) ALL BLOCKING SHALL BE AGAINST UNDISTURBED HAND DUG SOIL AND SHALL BE CONCRETE HAVING A MINIMUM 28 DAY STRENGTH OF 2500 LBS PER SQUARE INCH.
2) THRUST CALCULATIONS TO BE BASED ON THRUST DUE TO WATER PRESSURE AT 100% OF TEST PRESSURE . THRUST = 2 AP SIN 1/2 ϕ WHERE A = AREA OF PIPE, P = WATER PRESSURE, ϕ = DEFLECTION ANGLE.
3) VERTICAL UPLIFT BLOCKS SHALL BE DESIGNED ON THE BASIS OF 150 LBS. PER CU. FT. FOR CONCRETE AND SOIL AT 120 LBS. PER CU. FT. OVER THE AREA OF BLOCK.
4) VERTICAL DOWN THRUST BLOCKS SHALL BE DESIGNED ON THE BASIS OF 2000LBS PER SQ. FT. ALLOWABLE SOIL BEARING PRESSURE. DIMENSIONS MAY BE DECREASED WITH APPROVAL OF THE ENGINEER IF MEASURED SOIL CONDITIONS PERMIT. IN POOR SOIL CONDITIONS, BLOCK DIMENSIONS SHALL BE INCREASED IN PROPORTION TO ALLOWABLE BEARING VALUE.
5) THRUST BLOCKS ON HORIZONTAL BENDS, TEES, CROSSES, AND REDUCERS SHALL BE SIZED BASED ON 2000 LBS. PER SQ. FT. OF BLOCKING SURFACE AREA IN CONTACT WITH UNDISTURBED SOIL. BLOCK DIMENSIONS MAY BE DECREASED WITH APPROVAL OF THE ENGINEER IF MEASURED SOIL CONDITIONS PERMIT. IN POOR SOIL CONDITIONS, BLOCK DIMENSIONS SHALL BE INCREASED IN PROPORTION TO THE ALLOWABLE BEARING VALUE.
6) ALL BLOCKING SHALL HAVE A MINIMUM SOIL COVER OF 1 FT.
7) ADDITIONAL REINFORCING MAY BE REQUIRED FOR HORIZONTAL BLOCKING TO HANDLE UNUSUAL SHEAR LOADING CONDITIONS.



THRUST BLOCKING DETAILS
N.T.S.

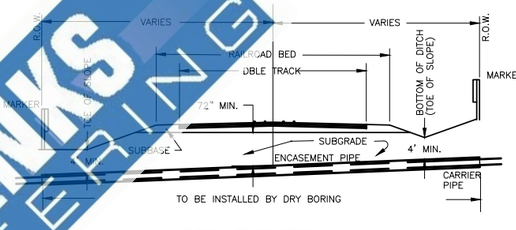


OPEN-CUT REPAIR DETAIL
GRAVEL SURFACE
(NOT A PAY ITEM)

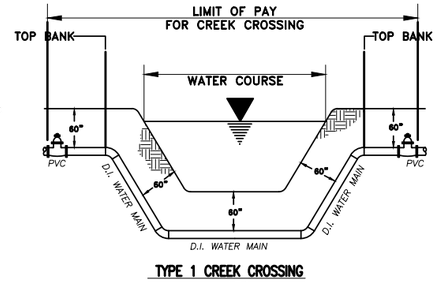


BLOW-OFF SHALL BE NON-FREEZING, SELF DRAINING TYPE WITH A 3' MIN. BURY. BLOW-OFFS WILL BE FURNISHED WITH A 4" LEAD VALVE AND 4" INLET, A NON-TURNING OPERATING ROD AND SHALL OPEN TO THE LEFT. tHE OPERATING DRIVE MECHANISM SHALL BE OF BRONZE-BRONSE DESIGN WITH AN ALUMINUM PLUNGER AND BE SERVICEABLE FROM ABOVE GRADE WITH NO DIGGING. THE OUTLET SHALL BE 4" FIP WITH PLUG AND EXTEND A MIN. 12" ABOVE GROUND, MODEL# MAINGUARD #7500, AS MANUFACTURED BY KUPFERLE FOUNDRY, CO. OR APPROVED EQUAL

4" BLOW-OFF ASSEMBLY
N.T.S



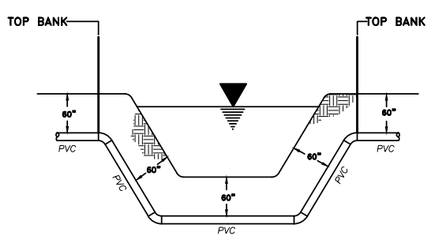
TYPICAL RR CROSSING
N.T.S.



TYPE 1 CREEK CROSSING
N.T.S

NOTE:
INSTALL DUCTILE IRON MAIN FROM TOP BANK TO TOP BANK WITH MECHANICAL JOINT FITTINGS. DUCTILE IRON TO BE CONCRETE ENCASED PER CONCRETE ENCASEMENT DETAIL

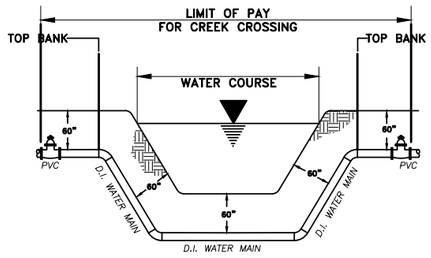
WHEN CROSSING A WATER COURSE THAT IS GREATER THAN 15 FEET CONTRACTOR TO INSTALL ISOLATION VALVES ON EACH SIDE OF THE WATER COURSE.



TYPE 3 CREEK CROSSING
N.T.S

NOTE:
INSTALL MAIN FROM TOP BANK TO TOP BANK WITH MECHANICAL JOINT FITTINGS AS NEEDED

TYPE 3 CREEK CROSSING IS NOT A PAY ITEM



TYPE 2 CREEK CROSSING
N.T.S

NOTE:
INSTALL DUCTILE IRON MAIN FROM TOP BANK TO TOP BANK WITH MECHANICAL JOINT FITTINGS

WHEN CROSSING A WATER COURSE THAT IS GREATER THAN 15 FEET CONTRACTOR TO INSTALL ISOLATION VALVES ON EACH SIDE OF THE WATER COURSE.

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

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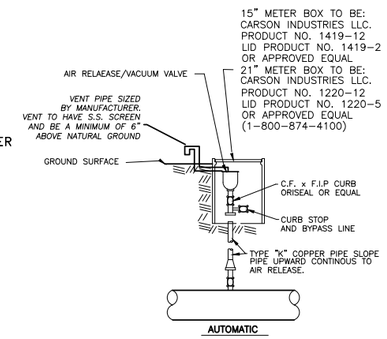
CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
CONSTRUCTION DETAILS

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER

Job No.:MCG-04-23
Scale: N.T.S.
Date: 9/2024
Sheet 36

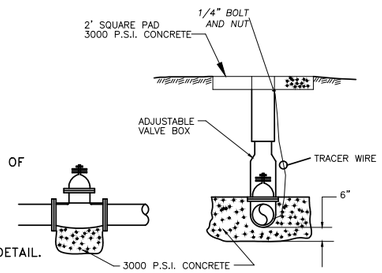
GENERAL NOTES

1. A 3'-0" MIN. BURY SHALL BE MAINTAINED ON WATER MAIN.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO EXISTING STRUCTURES, PIPING, CONDUIT, ETC. RESULTING FROM CONSTRUCTION WHETHER SHOWN ON THESE DRAWINGS OR NOT.
3. CONTRACTOR SHALL PERFORM FINISH GRADING, TOP SOILING AND ESTABLISHMENT OF GRASS COVER IN ALL DISTURBED AREAS PER PLANS AND SPECIFICATIONS, OR AS DIRECTED BY THE ENGINEER.
4. ALL WATER MAINS TO BE TESTED PER PLANS AND SPECIFICATIONS.
5. CONTRACTOR SHALL HAVE UTILITIES LOCATED AND SHALL BE RESPONSIBLE FOR DAMAGE TO ALL UTILITIES ARISING FROM CONTRACTORS WORK, REGARDLESS OF BEING SHOWN OR OMITTED FROM THESE DRAWINGS. SHOWN UTILITIES ARE INDICATED IN APPROX. LOCATIONS ONLY.
6. ALL DEBRIS SHALL BE DISPOSED OF PER SPECIFICATIONS OR AS DIRECTED BY THE ENGINEER.
7. THE MINIMUM SEPARATION DISTANCES SHALL BE ADHERED TO AS NOTED IN NOTE 3 OF SHEET 2 REGARDING WATER AND AND SEWER MAINS.
8. CONTRACTOR SHALL ABIDE BY ADH NOTE 3 ON SHEET 2 AS IT RELATES TO SEPARATION DISTANCES AND CONTAMINATION.
9. CONTRACTOR SHALL RESTRICT ALL OPERATIONS INSIDE OF CONSTRUCTION EASEMENT. ACCESS PERMISSION ACROSS ADJACENT PROPERTIES SHALL BE OBTAINED BY CONTRACTOR. ANY DAMAGE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
10. CONTRACTOR SHALL EXPOSE EXISTING UTILITIES IN ADVANCE OF CONSTRUCTION. GRADE ADJUSTMENTS SHALL BE APPROVED BY THE ENGINEER. COSTS ASSOCIATED w/ NOT EXPOSING EXISTING UTILITIES TO ALLOW GRADE ADJUSTMENT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
11. CONTRACTOR SHALL INSTALL 12 GAUGE COATED COPPER TRACER WIRE ON ALL WATER MAINS. TRACER WIRE SHALL LOOP CONTINUOUSLY THROUGH SERVICES AND VALVE BOXES AS SHOWN ON DETAIL. GEL-PAKS SHALL BE USED FOR ALL SPLICES.
12. ALL WATER MAIN VALVES AND FITTINGS SHALL BE DUCTILE IRON w/ MECHANICAL JOINTS.
13. ALL JACK AND BORES TO BE DUCTILE IRON.
14. CONSTRUCTION STAKING FOR CENTER LINE OF WATER MAIN ALONG U.S. HIGHWAYS WILL BE CONTRACTORS RESPONSIBILITY.
15. ALL BENDS, FITTINGS, VALVES & FIRE HYDRANTS SHALL BE BLOCKED PER DETAILS.
16. M.J. BENDS SHALL BE UTILIZED WHERE ALLOWABLE DEFLECTION WOULD BE EXCEEDED.
17. ALL WATER MAIN VALVES TO BE INSTALLED w/ ADJ. VALVE BOXES & CONCRETE STABILIZATION PADS.
18. FIRE HYDRANTS TO BE LOCATED ON PROPERTY CORNERS PLUMB & AT HEIGHT DIRECTED BY ENGINEER.
19. ALL BENDS NECESSARY TO MEET DEFLECTION REQUIREMENTS AND ASSOCIATED BLOCKING SHALL BE INCLUDED IN BID.

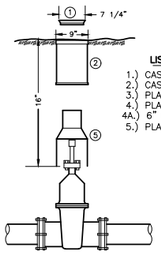


NOTE: 1. ALL THREADED CONNECTIONS SHALL HAVE A DOUBLE WRAP OF 3-MIL TEFLON TAPE ON THE THREAD.
2. VALVES WILL BE PIPED TO POINT BEYOND PAVEMENT AND SHOULDER. PIPING SHALL BE SLOPED CONSTANTLY UPWARD TO AIR RELEASE VALVE.

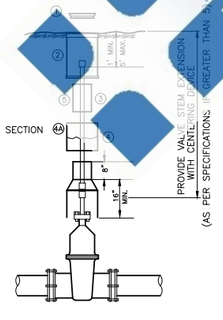
AIR\VACUUM RELEASE VALVE DETAILS
N.T.S.



BLOCKING DETAILS FOR VALVES
N.T.S.

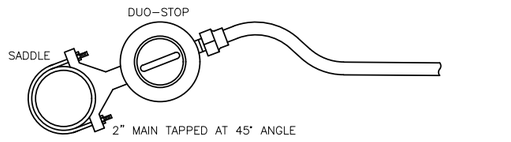


LIST OF MATERIALS
1.) CAST IRON COVER
2.) CAST IRON TOP SECTION
3.) PLASTIC EXTENSION PIECE
4.) PLASTIC EXTENSION COUPLING
4A.) 6" PRESSURE PIPE
5.) PLASTIC OR CAST IRON BOTTOM SECTION

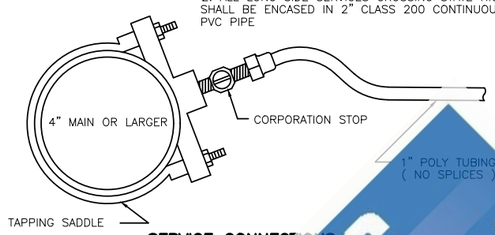


NOTES:
1.) IF PLASTIC EXTENSION PIECE (3) AND COUPLING (4) ARE NOT USED, 6" PRESSURE PIPE (4A) AND ANOTHER VALVE BOX (5) MAY BE USED INSTEAD.
2.) EXTENSION PIECE CAN BE CUT TO LENGTH REQUIRED

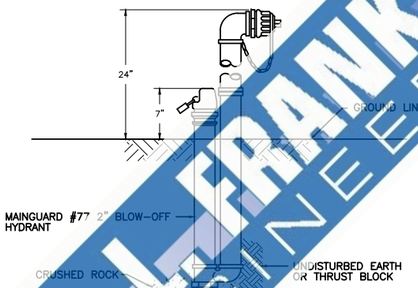
VALVE BOX INSTALLATION
N.T.S.



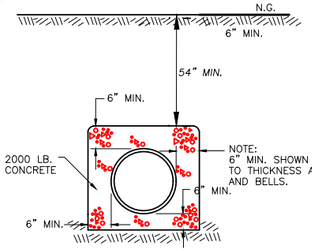
NOTES: 1. USE CORPORATION STOPS ON 6" MAIN & LARGER. USE C.F. DUO-STOPS ON SMALLER MAINS
2. ALL LONG SIDE SERVICES CROSSING STATE HIGHWAYS SHALL BE ENCASED IN 2" CLASS 200 CONTINUOUS PVC PIPE



SERVICE CONNECTIONS
N.T.S.

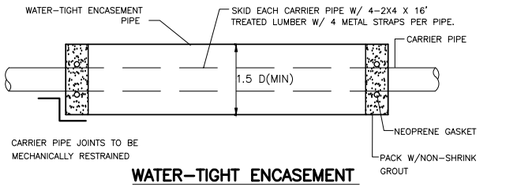


2" BLOW-OFF ASSEMBLY
N.T.S

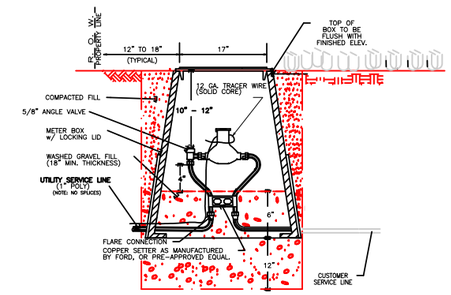


CONCRETE ENCASEMENT
N.T.S.

NOTES CONCERNING FIRE HYDRANTS:
1. DRAINAGE BED SHALL CONSIST OF CRUSHED STONE OR COURSE GRAVEL w/ COURSE SAND, MIN. VOLUME 7 CU. FT. DRAIN BED SHALL EXTEND A MIN. 6" ABOVE DRAIN OUTLET.
2. USE 6" C.I. NIPPLE w/M.J. RETAINER GLANDS IF DISTANCE BETWEEN VALVE AND FIRE HYDRANT MUST BE GREATER THAN 17".
3. FIRE HYDRANT TO BE BLOCKED AGAINST FIRM SOIL AS SHOWN.
4. ALL HYDRANTS SHALL BE INSTALLED PLUMB.
5. LARGE NOZZLE FACES ROAD, UNLESS OTHERWISE NOTED. ROTATE BARREL AS REQUIRED.
6. HYDRANT SHOULD NOT BE SET CLOSER THAN 4' TO OBSTRUCTIONS THAT ARE IN LINE WITH NOZZLE.
7. USE M.J. ANCHOR TEE FOR 16" AND SMALLER MAINS. WHEN USING REGULAR M.J. TEE USE 13" ADAPTER NIPPLE BETWEEN TEE AND VALVE.
7A. TAPPING SADDLE MAY BE USED ON DUCTILE IRON MAINS LARGER THAN 16" DIAMETER.
8. SADDLES SHALL BE EQUAL TO MANUFACTURERS BY AMERICAN CAST IRON PIPE CO. THEY SHALL BE FIELD COATED WITH COAL TAR ENAMEL.

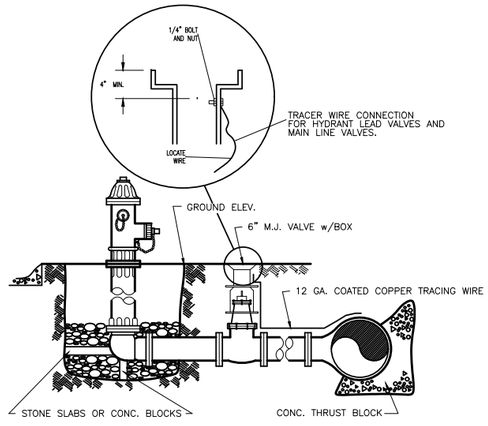


WATER-TIGHT ENCASEMENT
N.T.S.



NOTE: 1. CONTRACTOR TO FURNISH AND INSTALL NEW 1" SERVICE AND CONNECT TO EXISTING METER UNLESS OTHERWISE NOTED.
2. SERVICE TUBING SHALL INCLUDE STAINLESS STEEL INSERTS AT ALL FITTING CONNECTIONS.
3. PROVIDE YOKE BAR (FORD Y501) FOR 5/8" METERS WITH FLAT RUBBER GASKETS (EC-1).
4. ANGLE YOLK BALL VALVE SHALL BE FORD BA94313WR (5/8").
5. ON PRIVATE SIDE OF METER INSTALL 5/8" STRAIGHT BALL VALVE STR. B91-313WR.
6. SERVICE SADDLE SHALL BE SINGLE STRAP, EPOXY COATED WITH STAINLESS STEEL BAND FOR WATER MAINS 6" & LARGER. FOR 4" MAINS & SMALLER USE BRASS SADDLE. INCLUDE THREADED CORP STOP WITH PJ NUT FOR CTS TUBING CONNECTION.

PROPOSED WATER METER CONNECTION DETAIL
N.T.S.



FIRE HYDRANT ASSEMBLY
N.T.S.

Date	Revision	By

Designed CJS
Checked KSB
Drawn CJS
Approved ALF

A.L. FRANKS ENGINEERING
118 East Broad Street
Texarkana, Arkansas 71854
Phone (870) 216-1906
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901 HOLLY STREET
MCGEHEE, ARKANSAS 71654
PHONE: 870-222-3160

CITY OF MCGEHEE, ARKANSAS
WATER SYSTEM IMPROVEMENTS - PHASE I
CONSTRUCTION DETAILS

STATE OF ARKANSAS LICENSED PROFESSIONAL ENGINEER No. 21958 CODY J. STRINGER

Job No.:MCG-04-23
Scale: N.T.S.
Date: 9/2024
Sheet 37

TECHNICAL SPECIFICATIONS

101 W. Main St., Ste. 413
El Dorado, AR 71730
(870) 444-5160

TABLE OF CONTENTS

SECTION 1 - SITE PREPARATION, EXCAVATION, BACKFILL

1A - Sitework

1. DESCRIPTION: The work to be performed under this section shall consist of furnishing all labor, equipment and materials, and in performing all operations necessary in connection with site clearing and restoration as shown in the plans and specifications herein.

   It shall be the responsibility of each bidder to examine the site carefully and make his own calculations as to costs to be incurred by reason of the requirements of this section.

   Site clearing and restoration shall include all of the following:

   A. The cutting and removal of all trees, shrubs, underbrush, and the removal of any debris existing above natural ground surface and within the limits of right-of-way necessary to permit the construction of the improvements. Trees, shrubs, underbrush, and debris removed from the site shall be disposed of by the Contractor.

   B. The removal, storage and reconstruction of fences where necessary to permit the construction of the improvements. As quickly as feasible after the work has been performed, fences shall be reconstructed to conditions at least as good as the original. The Contractor shall furnish new materials as necessary to permit proper restoration.

   C. The replacement of yards, lawns, shrubbery, or plants in the right-of-way that are disturbed by the Contractor while constructing the improvement. Disturbed lawns shall be replaced by solid sodding, using the same kind of grass as existing in the undisturbed portion of the lawn. Yards shall be replaced by seeding, fertilizing and the control of erosion. Shrubbery or plants shall be replaced with the same kind in good condition. Topsoil shall be preserved or shall be hauled in prior to establishment of yard or lawn. All yards and lawns shall have 4 inches of topsoil on all disturbed areas.

   D. The reconstruction of dirt and gravel roads or drives. The alignment and grade shall be restored, as close as possible, to that existing prior to construction. Gravel shall be preserved and hauled in as necessary and utilized for resurfacing per plans.

E. The removal and subsequent replacement of sidewalks, curbs, curb and gutter, culverts, storm drains and other related items which are displaced by the Contractor's operations. The Contractor shall furnish new materials necessary to permit replacement to a condition better than or equal to that existing prior to construction.

F. Where trees, plants, shrubbery, etc. are adjacent to the line of the work and are not to be removed or removed and replaced, the Contractor shall protect such trees, plants, shrubbery, etc. by substantial wooden boxes and guards and shall not permit machinery or employees to scrape, tear the limbs from, or damage, or attach guy cables to them, and if in the opinion of the Engineer such trees, plants, shrubbery, etc. would be damaged by machinery, etc., hand excavation may be required. The Contractor shall be responsible for all damages to adjacent trees, plants, shrubbery, etc.

G. Where construction will occur within state owned right-of-ways, sitework shall conform to Arkansas Highway and Transportation Department requirements. The Contractor shall be responsible for notification of the AHTD at least 48 hours prior to construction.

H. Damage to paved surfaces, not shown on the plans for scheduled repair, shall be repaired at the expense of the Contractor.

I. Contractor shall maintain sufficient steel plates of adequate length and width to maintain access for property owners. The number shall be at the discretion of the Engineer. Costs of emergency repairs to driveways and streets required by and in the opinion of the Owner shall be deducted from the contract price.

J. The Contractor's operations are restricted to street right-of-ways or secured easements. The Contractor shall, when paralleling streets or roads, determine the right-of-way limit and restrict operations to the right-of-way.

K. The Contractor shall provide for traffic control including but not limited to flagging, signage, etc. Through traffic shall be maintained on all streets during construction.

L. The Contractor shall provide barricades on all open ditches and trenches left unattended.

M. All yards shall be raked smoothly to grade and be absent from rocks and all debris as defined by the Engineer.

N. Contractor is responsible for restoring all surfaces to a condition better than or equal to that existing prior to construction within 30 consecutive calendar days after the surface has been damaged due to construction, unless stricter timelines are required by additional state, local, or federal permits.

Should the contractor fail to restore surfaces within the allotted timeframe, the Engineer and/or owner reserves the right to direct the Contractor to discontinue installing any new water mains until all previously disturbed areas have been restored to an acceptable condition.

O. Payment: No separate payment shall be made for any of the items listed in this section, but shall be considered subsidiary to the price for pipeline installation. Twenty percent (20%) of the cost for pipeline installation is considered equitable for site work. Twenty percent (20%) of the unit price bid for pipeline installation may be retained if site work is not being performed in an acceptable manner.

SECTION 1 - SITE PREPARATION, EXCAVATION, BACKFILL

1B - Trench Excavation and Backfilling

1. GENERAL: Excavation shall include the removal of all earth, rock, or other materials to the extent necessary to install the pipe and appurtenances in conformance with the lines and grades shown in the plans, or as specified.

2. MAXIMUM AND MINIMUM WIDTH OF TRENCHES: The sides of all trenches shall be cut as nearly vertical as possible. Unless otherwise specified on the plans, the minimum width of trench in which the pipe may be installed shall be 12 inches plus the outside diameter of the pipe, and the maximum width shall be 24 inches plus the outside diameter of the pipe, measured at an elevation in the trench which is twelve inches above the top of the pipe when it is laid to grade.

   Whenever the prescribed maximum trench width is exceeded, except as such excess may be necessary for compliance with the plans or specifications, the pipe may be cradled with Class 2500 Concrete as directed by the Engineer, and at the expense of the Contractor.

3. SHEETING, SHORING, AND BRACING: The sides of all excavation shall be sufficiently sheeted, shored and braced so as to prevent slides, cave-ins, settlement or movement of the banks, and to maintain the excavation clear of obstructions that will in any way hinder or delay the progress of the work. In wet, saturated or flowing materials, where it is necessary to install tight sheeting or cofferdams, wood or steel sheet piling of a design and type approved by the Engineer shall be used. All sheeting, shoring and bracing shall have sufficient strength and rigidity to withstand the pressure exerted and maintain the sides of the excavation properly in place and protect all persons or property from injury or damage. When excavations are made adjacent to existing buildings or other structures, or in paved streets, particular care shall be taken to adequately sheet, shore and brace the sides of the excavation to prevent undermining of, or settlement beneath the structures or pavement. Underpinning of adjacent structures or pavement shall be done by the Contractor at his own cost and expense, and in a manner satisfactory to the Engineer, or, when required by the Engineer, the pavement shall be removed, the void satisfactorily refilled, compacted, and the pavement replaced by the Contractor; the entire expense of such removal and subsequent replacement thereof shall be borne by the Contractor. Sheeting, shoring and bracing shall not be left in place unless otherwise provided for in the contract authorized by the Engineer. The removal of sheeting, shoring and bracing shall be done in such manner as not to endanger or damage either new or existing structures, private or public properties, and so as to avoid cave-ins, or sliding of the banks. All holes or voids left by the removal of the

sheeting, shoring or bracing shall be immediately and completely filled and compacted with suitable materials. If for any reason, the Contractor, with the approval of the Engineer, elects to leave in place the sheeting, shoring or bracing, no payment shall be allowed for such materials left in place.

4. DEWATERING EXCAVATIONS: The Contractor shall immediately remove all surface or seepage water from sewers, drains, ditches, and other sources which may accumulate during the excavation and construction work, by providing the necessary underdrains or otherwise, and by doing the necessary pumping, bailing, and draining. The Contractor shall have available at all times sufficient equipment in proper working order for doing the work herein required. All water removed from excavations shall be disposed of in an approved manner, so as not to create unsanitary conditions, nor to cause injury or damage to persons or property, or damage to the work in progress, nor to interfere unduly with the use of streets, private driveways, or entrances. Pumping, bailing and draining, underdrains, ditches, etc., shall be considered as incidental work and will not be paid for as separate items, but their cost shall be included in such contract price as is provided in the contract.

5. SUBGRADE IN EARTH (TYPE I LAYING CONDITION): Where a firm and stable foundation for the pipe can be obtained in the natural soil and where special embedment is not shown on the plans or specified herein, the trench bottom shall be smooth and free from stones greater than ½", large dirt clods, or frozen material. The bell holes shall be accurately located and shall be of sufficient width and depth to allow ample room for making the joint and to relieve the pipe bell of all load.

   Should the excavation be carried below grade, except as herein specifically provided, the Contractor shall, at his own expense, refill it to the proper elevation with sand or gravel, as directed by the Engineer, which shall be compacted by tamping until it is firm and unyielding.

6. SUBGRADE IN ROCK (TYPE II LAYING CONDITION): If the bottom of the excavation for the pipe line is found to be in rock or other hard material that cannot be excavated to a true subgrade and shaped to provide uniform bearing for the pipe barrel, the rock or other material shall be removed to a depth not less than six inches below subgrade and the bottom of the trench brought to true subgrade elevated by filling with sand to a depth shown on the Detail Sheet and compacting by means of tamping until a firm and uniformly unyielding foundation is obtained, as specified by the Engineer.

7. SOFT SUBGRADE (TYPE III LAYING CONDITION): Where soft or spongy material is encountered in the excavation at subgrade level, it shall be removed, only upon the direction of the Engineer, to such a depth that by replacing the unsuitable material with tamped gravel a firm and stable foundation can be secured.

8. DISPOSAL OF EXCAVATED MATERIAL: Suitable excavated materials shall be piled adjacent to the work to be used for backfilling. Excavated materials unsuitable for the backfilling, or in excess of that required for backfilling shall be disposed of by the Contractor at locations designated on the plans or approved by the Engineer. Desirable top soil, sod, etc. shall be carefully piled separately in its original position when required. Excavated materials shall be handled at all times in such a manner as to cause a minimum inconvenience to public travel and to permit safe and convenient access to private and public property adjacent to or along the line of the work. In parkways and easements where it is necessary to deposit excavated materials on lawns during the work, burlap or similar materials shall be placed on the lawn to prevent contact between excavated materials and the lawn.

9. USE OF EXPLOSIVES: The use of explosives will not be allowed.

10. TRENCH BACKFILLING: Backfilling shall include the refilling and consolidating of the fill in trenches and excavations up to the surrounding ground surface.

Backfilling shall be done with good earth, sand or gravel and shall be free of large rocks or hard lumpy material. All select fill material shall conform to AWWA-C605 Standards. No material of a perishable, spongy or otherwise unsuitable nature shall be used in backfilling.

After the pipe and embedment have been placed, the method of backfilling pipe trenches shall be as follows: Selected material shall first be taken from the spoil bank and placed on both sides of the pipe simultaneously in layers of not more than six inches in loose thickness, and these layers shall be firmly compacted by hand or mechanical tamping. The layers of backfill shall be sprinkled lightly with water if additional moisture is required for proper compaction. This process of filling and tamping in layers shall be continued until the backfill is brought up to one foot above the top of the pipe. Rolling compaction devices shall not be used until at least 18 inches of backfill is over the pipe. Remaining backfill shall be in accordance with Section 1B 11.

11. COMPACTION: All trench backfill in areas under paved surfaces, parking areas, sidewalks and other structures, as determined by the Engineer shall be compacted to a density of at least 90% of the maximum dry density as determined by the AASHO Method T99 to a point 6 inches below the top of the backfill. The top 6 inches shall be compacted to a density of 95% of the maximum dry density as determined by AASHO Method T99. In all other locations, compaction of backfill from the bottom of the trench to a distance of one foot above the top of the pipe shall be in accordance with Section 1B 10. From a point one foot above the top of the pipe to the top of the trench, the backfill need not be mechanically tamped. Before reaching the top of the trench, the trench shall be flooded with water or rolled by passing the wheel or track of a piece of equipment along the trench line to achieve some degree of consolidation.

In place moisture-density test may be ordered by Engineer to insure that all trench backfill complies with the requirements of the specification. Tests will be performed by a recognized testing laboratory, and all costs will be paid for by Owner. Failed tests shall be paid for by the Contractor. Copies of all test results will be furnished to the Contractor.

12. PROTECTION OF EXISTING UTILITIES: It shall be the responsibility of the Contractor to verify the existence and location of all underground utilities along the route of the work. The omission from or the inclusion of utility locations on the plans is not to be considered as the non-existence of, or a definite location of existing underground utilities.

    The Contractor will take the necessary precautions to protect existing utilities from damage due to his operations. Any damage to the utilities will be repaired at the Contractor's expense.

    A sufficient distance back from the edge of the excavation shall be maintained to avoid overloading and to prevent slides or caving. The excavation material shall be kept trimmed in such a manner as to be of as little inconvenience as possible to the public and adjoining property owners.

13. PAYMENT: No separate payment shall be made for any of the various items of "Trench Excavation and Backfill", but shall be considered subsidiary to the price for pipeline installation.

SECTION 1C - TRENCH SAFETY SYSTEMS

1. DESCRIPTION: This section covers excavation and supporting systems for trenches to protect the safety of workers, provide suitable means for constructing utility lines, and to protect public or private property, including existing utilities.

   The Contractor's attention is directed to Bid Item “Trench Safety Systems” under which full compensation will be made for the design, materials, equipment, fabrication and labor required to furnish, install, and remove trench excavation, shoring, bracing and protective systems.

2. EXISTING STRUCTURES: Where existing buildings, other utilities, streets, highways, or other structures are in close proximity to the trench, adequate protection shall be provided by the use of sheeting and shoring to protect the structure, street, or highway from possible damage. In the case of utilities, the Contractor may elect to remove the utility provided that the removal and subsequent replacement meets with the approval of the Engineer, the utility owner, or whoever has jurisdiction of the structure. In all cases, it shall be the responsiblity of the Contractor to protect public and private property and any person or persons who might, as a result of the Contractor's work, be injured.

3. EXCAVATIONS, TRENCHING, AND SHORING: The Contractor shall include in his bid price and be solely responsible for trench safety provisions meeting the requirements of the United States Department of Labor Occupational Safety and Health Administration. The following regulations, as contained in Subpart P, Part 1926 of the Code of Federal Regulations (29), shall be complied with along with all other applicable Subparts and Regulations not herein contained. All excavations left open shall be secured with safety fencing.

SECTION 2A - CAST-IN-PLACE CONCRETE

1. GENERAL:

A. Standards: Concrete work shall conform to all requirements of ACI-30l "Specifications for Structural Concrete for Buildings" and ACI-318 "Building Code Requirements for Reinforced Concrete" except as modified herein.

B. Scope: Work consists of furnishing all plant, labor, materials, equipment, and appliances, and performing all operations in connection with installation of the concrete work, complete, in strict accordance with the Specifications and Drawings.

C. Inspection: Embedded items must be inspected and tests for concrete and other materials shall have been completed and approved by the Engineer before concrete is placed.

D. Slab on Earth: Before proceeding to construct concrete slabs on earth, all pipes under concrete floor on earth shall have received the required tests. All backfill and fill material under slabs on grade shall be compacted in 6" layers to 98% maximum density as measured by ASTM D-698 Standard Compaction Procedure. Unsuitable material encountered in subgrade shall be removed and replaced with material approved by the Engineer. Subgrade shall be brought to true, even plane, and compacted to solid bearing. Gravel drainage fill shall be placed and compacted where shown on Drawings.

2. QUALITY AND CONTROL

A. Design: Concrete shall be composed of Portland cement, fine aggregate, coarse aggregate and water. All concrete shall be designed by an approved testing laboratory in accordance with the ACI Standard Recommended Practice for Selecting Proportions for Concrete (ACI-211) to produce the strength for each class of concrete specified, and with the requirements outlined below. The concrete shall be so designed that the concrete materials will not segregate and excessive bleeding will not occur. Any costs for the testing laboratory for designing concrete mixes shall be borne by the Contractor.

Concrete strengths shall be as follows:

Class A Concrete - 4000 psi @ 28 days

Class B Concrete - 2000 psi @ 28 days

MAXIMUM SLUMPS FOR VARIOUS TYPES OF CONSTRUCTION

Types of Construction	Hand Placed Maximum	High Frequency Vibrator Used Maximum
Reinforced Foundation Walls and Footings	5"	2"
Slabs, Beams, and Reinforced Walls	6"	3"
Building Columns	5"	3"
Pavements	3"	2"

The slump shall not exceed the maximum specified above for the type of construction for which it is to be used. No water will be added after the amount specified by the mix design.

B. Location of Different Concrete Classes: Concrete fill to be Class B. All remaining concrete including structural concrete to be Class A.

C. Production of Concrete: All ready-mixed concrete shall be batched, mixed and transported in accordance with "Specifications for Ready-Mixed Concrete (ASTM C-94)". Plant equipment and facilities shall conform to the "Check List for Certification of Ready-Mixed Concrete Production Facilities" of the National Ready-Mixed Concrete Association. Site mixed concrete shall conform to the requirements of "Specifications for Structural Concrete" (ACI-301). The Contractor may elect to use either ready-mixed or site mixed concrete for this project provided he informs the Engineer of his choice at the time of the pre-construction conference.

D. Laboratory Testing: The Owner shall engage an independent testing laboratory to conduct concrete tests. Contractor will be responsible for sampling concrete for test cylinders, recording, and delivering them to the laboratory, providing all materials required, and for making all slump tests in the field directed by the Engineer. All costs in connection with work performed by the laboratory will be paid by the Owner. The Contractor shall be responsible for the costs of work performed by the laboratory required for redesign of concrete proportions and re-testing of in place concrete when cylinders indicate low strength concrete has occurred.

At least one test shall be made on fresh concrete for each sixty (60) cu. yds. of each class of concrete (or fraction thereof) placed on any one day and in any event, not less than one test for each class of concrete each day it is used. Testing shall be done in accordance with the following ASTM Specifications, latest edition:

C172,	Standard Method of Sampling Fresh Concrete
C31,	Standard Method of Making and Curing Concrete Compression and Flexure Test Specimens in the Field
C39,	Standard Method of Test of Compressive Strength of Molded Concrete Cylinders
C143,	Standard Method of Slump Test for Consistency of Portland Cement Concrete

Before any concrete is poured, the Contractor shall construct a storage box in accordance with ASTM Specification C31. Each set of tests shall consist of one (1) slump test and three (3) compression test cylinders. All cylinders shall be kept in the storage box for the first 24 hours. The three (3) cylinders shall be laboratory cured and tested for adequacy of the design for strength of the concrete in accordance with ASTM Specification C31. One cylinder shall be tested at 7 days and two at 28 days.

E. Failure of Concrete to Meet Strength Requirements: The concrete shall be considered acceptable if, for any one class of concrete, the average of all tests or any five (5) consecutive tests is equal to or greater than the specified strength, provided that no more than one (1) test of the five (5) falls between 90% and 100% of the specified strength. The only cylinders to be used to determine concrete acceptability will be those laboratory cured and tested at 28 days. When it appears the tests of laboratory-cured cylinders will fail to meet these requirements, the Engineer may require changes in the proportions of concrete for the remainder of the work in order to meet the strength requirements. In addition, the Engineer may also require additional curing not to exceed a total of 21 days on portions of the concrete already poured.

The Engineer may also require tests in accordance with Methods of Securing, Preparing and Testing Specimen from Hardened Concrete for Compressive and Flexural Strengths (ASTM Specifications C42) when the concrete cylinder tests fail to meet strength requirements. In the event there still is questions as to the quality of the concrete in the structure, the Engineer may require load tests for that portion where the questionable concrete has been placed. Such load tests will be made as outlined in the American Concrete Institute Building Code, (ACI 318), and shall be at the expense of the Contractor.

F. Removal of Under Strength Concrete: If the above tests indicate that a particular batch of previously placed concrete is under strength, the

Engineer may direct that the under strength batch be removed and replaced. The removal of the under strength concrete shall also include the removal of concrete that has obtained the required strength if the Engineer deems this necessary to obtain structural or visible continuity when the concrete is replaced.

The removal, and replacement of any under strength concrete, shall be made at no additional cost to the Owner. This shall include any new formwork required or any reinforcing steel that may be required. The Owner shall not be charged any additional costs for any extra work that is required because of the failure of any concrete to meet the minimum test requirements.

3. FORMWORK:

Forms shall be built true to line and grade, and be mortar tight and sufficiently rigid to prevent displacement or sagging between supports. All formwork and shoring shall be designed for the construction loads to be placed on them and the design and construction of said forms shall be in accordance with ACI Standard "Recommended Practice for Concrete Formwork" (ACI 347). The structural adequacy of the formwork shall rest with the Contractor. All forms shall be so constructed that they can be removed without hammering or prying against the concrete. Forms shall not be removed without approval of the Engineer. Forms shall not be removed before the minimum times given below, or longer if job control tests indicate the concrete has not attained strength specified below, except when specifically authorized by the Engineer.

Beams and Slabs	7 days
Walls up to 12" thick and Vertical Surfaces	3 days
Columns	5 days
Walls greater than 12" thick	7 days

In general, forms or shores for supported slabs and beams shall not be removed until the concrete, so supported, has acquired seventy (70) percent of its design strength; except where loads other than the dead weight of the concrete are added, the shores shall not be removed until twenty-four (24) hours after the concrete has obtained ninety (90) percent of its design strength. Forms shall be removed immediately after expiration of the lapsed time specified above or sooner, if required by the Engineer, where concrete is to receive a rubbed finish.

A. Preparation Before Placing: Water shall be removed from excavations before concrete is deposited. Hardened concrete, wood chips, shavings, and other debris shall be removed from interior of forms and inner surfaces of mixing and conveying equipment. Wood forms shall be oiled or, except in freezing weather, wetted with water in advance of pouring. Reinforcement shall be secured in position, inspected and approved by the Engineer before starting pouring of concrete.

B. Conveying: Concrete shall be conveyed from mixer to forms as rapidly as practicable and by methods which will prevent segregation or loss of ingredients. It shall be deposited as nearly as practicable in its final position. Chutes used shall be such that concrete slides in them and does not flow. Chutes, if permitted, shall have a slope of less than 1 on 2. Where a vertical drop greater than five (5) feet is necessary, placement shall be through elephant trunks or similar devices to prevent segregation.

C. Placing: Concrete shall be placed before initial set has occurred and in no event after it has contained its water content for more than 30 minutes. Unless otherwise specified, all concrete shall be placed upon clean, damp surfaces free from running water, or upon properly consolidated fills, but never upon soft mud or dry, porous earth. The concrete shall be compacted and worked in an approved manner into all corners and angles of the forms and around reinforcement and embedded fixtures as to prevent segregation of the coarse aggregate. Construction of forms for the lifts of vertical walls shall be such as to make all parts of the walls easily accessible for the placement, spading, and consolidation of the concrete as specified herein.

D. Vibration: All concrete shall be placed with the aid of mechanical vibration equipment as approved by the Engineer. Vibration shall be transmitted directly to the concrete; in no case shall it be transmitted through forms. The duration of vibration at any location in forms shall be held to the minimum necessary to produce thorough compaction. Vibrations shall be supplemented by forking or spading by hand, and adjacent to the forms on exposed faces in order to secure smooth, dense and even surfaces, with particular care being taken to prevent coarse aggregate from becoming set too near any surfaces that are to receive rubbed finish.

E. Construction Joints: Construction joints shall be formed as indicated on the Drawings or as approved or directed by the Engineer. Where indicated or required, dowel rods shall be used. All concrete at the joints shall have been in place not less than 12 hours, and longer if so directed by the Engineer, before concrete resting thereon is placed. Before placing is resumed, or commenced, excess water and laitance shall be removed, and concrete shall be cut away, where necessary, to insure a strong dense concrete at the joint. In order to secure adequate bond, the surface of concrete already in place shall be cleaned, roughened, and then spread

with a one-half (½) inch layer or mortar of the same cement-sand ratio as is used in the concrete, immediately before the new concrete is deposited. The unit of operation is not to exceed 60 feet in any horizontal direction, unless otherwise required by the Drawings. Constructions joints, if required, shall be located near the mid-point spans for slabs, beams, or girders. Joints in columns or piers shall be made at the underside of the deepest beam or girder at least five (5) hours before any overhead work is placed thereon. Joints not shown or specified shall be so located as to least impair strength and appearance of work. Vertical joints in wall footings shall be reduced to a minimum. Placement of concrete shall be at such a rate that surfaces of concrete not carried to joint levels will not have attained initial set before additional concrete is placed in one operation. To insure a level straight joint in exposed vertical surfaces, a strip of dressed lumber may be tacked to the inside of the forms at the construction joint. The concrete shall be poured to a point one (1) inch above the underside of the strip. The strip shall be removed one (1) hour after concrete has been placed and any irregularities in the joint line leveled off with a wood float and all laitance removed. Waterstops shall be installed in all construction joints below grade or in liquid containing structures as noted on the Plans.

F. Patching: Any concrete which is not formed as shown on the Plans, or for any reason is out of alignment or level or shows a defective surface shall be considered as not conforming with the intent of these Specifications and shall be removed from job by Contractor at his expense, unless the Engineer grants permission to patch defective area, which shall be done in accordance with the following procedure. Permission to patch any such area shall not be considered a waiver of the Engineer's right to require complete removal of defective work if patching does not, in his opinion, satisfactorily restore quality and appearance of surface. Suitable non-shrink, latex or epoxy mortar shall be used for patching and repairing defective surface if directed by the Engineer.

After removing forms, all concrete surfaces shall be inspected and any poor joints, voids, stone pockets, all tie holes, or other defective areas shall be patched, if permitted by the Engineer. Where necessary, defective areas shall be chipped away to a depth of not less than one (1) inch with edges perpendicular to the surface. Area to be patched and a space at least six (6) inches wide entirely surrounding it shall be wetted to prevent absorption of water from the patching mortar. A grout of equal parts of Portland Cement and sand, with sufficient water to produce a brushing consistency, shall then be well brushed into the surface followed immediately by the patching mortar. The patch shall be made of the same material and of approximately the same proportions and shall not be richer than 1 part cement to 3 parts sand. White Portland Cement shall be substituted for a part of the gray Portland Cement to match color of the surrounding concrete. The proportion of white and gray cements shall be

determined by making a trial patch. The amount of mixing water shall be as little as consistent with the requirements of handling and placing. The mortar shall be re-tempered without the addition of water by allowing it to stand for a period of one (1) hour during which time it shall be mixed occasionally with a trowel to prevent settings.

The mortar shall be thoroughly compacted into place and screened off so as to leave patch slightly higher than surrounding surface. It shall then be left undisturbed for a period of 1 to 2 hours to permit initial shrinkage before being finally finished. The patch shall be finished in such a manner as to match the adjoining surface. On exposed surfaces where unlined forms have been used, the final finish shall be obtained by striking off the surface with a straight edge spanning of patch and held parallel to the direction of the form marks.

Tie holes left by withdrawal of rods or the holes left by removal of ends of ties shall be filled solid with mortar after first being thoroughly wetted.

4. FINISHES:

A. Top and bottom slabs of all structures and water carrying conduits except as noted otherwise on the Plans shall be finished as follows: The top of the slab shall be screeded to grade and cross section; lightly tamped as required to bring up a good bed of mortar for finishing and re-screeded as necessary. The surface shall then be finished with a wood float and leveling darby. No further finish will be required on top slabs of structures or conduits which are to be buried. In the case of all exposed top slabs of structures and conduits, they shall be given a final steel trowel and a light broomed, slip resistant finish to a uniform surface which conforms with accuracy to required shape, slope and grade. Slabs shall be edged as appropriate.

B. Rubbed Finish: Unless otherwise indicated, all faces (except top surfaces of slabs) exposed to view, such as walls, grade beams, columns, beams, canopy soffits, and fascias, etc. shall be finished as follows:

Forms shall be removed as specified in paragraph 3 - Formwork, and all fins removed, off-sets leveled, damaged places and depressions resulting from the removal of metal ties or other causes shall be carefully pointed with a mortar of sand and cement in the proportion which has been employed for the concrete. The surface film of all such pointed places shall be carefully removed before setting occurs. After the point has set sufficiently to permit it, all exposed surfaces shall be dampened and rubbed with a No. 16 carborundum stone, to a smooth even plane. Final rubbing shall be done with a No. 30 carborundum stone, or an abrasive of equal quality, to obtain an entire surface of a smooth texture and uniformity in color. Mortar of grout worked up during rubbing shall be

promptly removed by sacking with burlap or other suitable means so that no visible grout film or paste will remain. A cement wash or plaster coat shall not be used. All surfaces shall be finished uniformly smooth and washed clean. The rubbed finish for any area shall be completed in the same day and the limits of a finished area shall be made at natural breaks in the finished surface. If the Contractor does not provide suitable surface finish using carborundum stones specified above, the Engineer, without additional cost to the Owner, may require the use of a power operated grinding machine to produce the desired finish.

5. CURING:

A. General: Immediately following placing, concrete shall be protected from premature drying, hot and cold temperatures, rain, flowing water and mechanical injury. Maintain above 50 deg. F. and in moist condition for at least seven (7) days after placing for normal concrete and three (3) days for high early strength concrete. Comply with "Recommended Practice for Curing Concrete", ACI 308, unless otherwise indicated. Curing compound satisfactory composition and characteristics may be used except on surfaces to which new concrete is to be bonded and provided such compound does not stain or discolor any surface which will be exposed. Curing compound shall be applied in strict accordance with manufacturer's direction.

B. Cold weather procedures shall conform with "Recommended Practice for Winter Concreting", ACI 306. Adequate equipment shall be provided for heating the concrete materials and protecting the concrete during the freezing or near freezing weather. All concrete materials, reinforcement, forms, fillers and ground or other surfaces which concrete will contact shall be free from frost or ice. Salt or other chemicals shall not be used to prevent freezing.

C. Hot weather procedures shall conform with "Recommended Practice for Hot Weather Concreting", ACI 302 & ACI 305. During hot weather adequate provisions shall be made to reduce concrete temperature and water evaporation by proper attention to ingredients, production methods, handling, placing, protection and curing.

D. Protection from the Sun: All concrete shall be adequately protected from injurious action of sun in a manner satisfactory to the Engineer.

E. Temperature Variation: During and at the conclusion of the specified curing period, means shall be provided to insure that the temperature of the air immediately adjacent to the concrete does not fall more than 5 deg. F. in any one hour.

6. EMBEDDED ITEMS:

Before placing concrete, care shall be taken to determine that any embedded metal or wood parts are firmly and securely fastened in place as indicated. They shall be thoroughly clear and free from coating, rust, scale, oil or any foreign matter. Embedding of wood in concrete shall be avoided whenever possible, metal being used instead. If wood is allowed, it shall be thoroughly wetted before concrete is placed.

7. MEASUREMENT AND PAYMENT:

Cast-in-place concrete shall not be measured for separate payment but shall be considered subsidiary to the item of the contract to which the work applies.

SECTION 2B - CONCRETE THRUST BLOCKS AND COLLARS

1. GENERAL: Concrete thrust blocks and anchors shall be provided along the pipe line in accordance with the construction details, plan sheets, or as directed by the Engineer. The concrete mix shall be Class 3000 for thrust collars and Class 2500 for thrust blocks.

Concrete for thrust blocks shall be placed against undisturbed soil. The excavation shall be hand shaped and free of loose material. Forms shall be used to confine the concrete in areas other than that part that is in contact with undisturbed soil in the direction of the thrust.

No concrete shall be placed around any part of a joint or placed so that it interferes with the removal of any joint accessories such as bolts, followers, threads, collars, couplings, etc. Fire hydrant drains shall not be restricted.

The top of the concrete thrust block or collar shall be struck off with a wood straight edge or float.

Concrete shall not be placed when the temperature is below 45 deg. F, or below 40 deg. F if the temperature is rising unless approved by the Engineer. Placement shall be in accordance with Section 2A of these Specifications.

Admixtures are not to be used without the approval of the Engineer.

All placement of concrete must be in the presence of the Engineer or his representative. The Contractor is cautioned that he may be required to remove any concrete placed in the absence of the Engineer or his representative without compensation.

Backfill over concrete thrust blocks or collars shall not be placed before the concrete has attained initial set.

No thrust blocks shall be less than six (6) inches thick between the pipe line or appurtenances and undisturbed soil in the direction of the thrust.

The excavation shall be free of water before concrete is placed. Steel reinforcement, as specified on the Plans, shall be placed as specified.

The pipe or appurtenances shall be cleaned before placing concrete when the concrete is to be in direct contact with the pipe or appurtenances.
The area of contact of the thrust blocks and collars shall be sufficient to resist the thrust. This area will vary depending on the safe bearing value of the soil.

Suggested safe bearing values are as follows:

Type of Soil	Suggested Safe Bearing Values (tons/sq. ft.)
Solid Rock	25
Hard Slate	6
Medium Shale	4
Soft Shale	2
Dry Clay Gravel	4
Soft Clay	1.5
Dry Sand or Loam	2.5
Wet Clay	0.75

The above values are approximate and will vary considerably and are intended to be used only as a guide. The Contractor is responsible for determining the soil bearing value or taking other action to assure that the bearing area is adequate to restrain the pipe or appurtenances.

Where the soil is unstable or in the case of recent fill areas, the following procedures shall apply either singly or in a combination:

A. Thrust blocks shall be of adequate size to restrain pipe or appurtenances by mass alone without depending on horizontal bearing of the soil.

B. The excavation shall extend deep enough to contact firm soil and the block brought up to the pipe or appurtenances and constructed so that the block acts as a beam and will provide restraint required. Such blocks shall be reinforced with steel reinforcing bars.

C. Anchor blocks shall be constructed in a firm soil and tie rods extended to the pipe or appurtenances.

Thrust blocks for vertical bends shall be adequate to resist the thrust by mass alone when the thrust is upward.

Thrust blocks and collars shall be adequate to restrain the pipe line and appurtenances at the specified test pressure. The following table lists the resultant thrust at certain fittings at pressure of 100 psi. In order to determine the thrust at the test pressure these values are to be multiplied by a factor equal to the test pressure divided by 100.

Thrust Per 100 psi Pressure

Fitting	Thrust (Tons)									
	2"	2 ½"	3"	4"	6"	8"	12"	16"	10"	24"
11¼ deg. Bend	0.03	0.05	0.07	0.12	0.3	0.5	1.1	2.0	3.1	4.4
l5 deg.	0.04	0.06	0.09	0.16	0.4	0.7	1.5	2.6	4.1	5.9
22½ deg.	0.06	0.10	0.14	0.24	0.6	1.0	2.2	3.9	6.1	8.8
30 deg.	0.08	0.13	0.18	0.32	0.7	1.3	2.9	5.2	8.1	11.7
45 deg.	0.12	0.19	0.27	0.48	1.1	1.9	4.3	7.7	12.0	17.3
90 deg.	0.22	0.35	0.50	0.88	2.0	3.6	8.0	14.2	22.2	32.0
Plug	0.15	0.24	0.35	0.62	0.4	2.5	5.7	10.1	15.7	22.6

Concrete thrust blocks or collars that fail to restrain the pipe or appurtenances shall be replaced by the Contractor at his expense.

2. MEASUREMENT AND PAYMENT: No separate payment shall be made for concrete thrust blocks, but shall be considered subsidiary to the price for pipeline installation.

SECTION 3 - PIPE & FITTINGS (WATER)

3A - General

1. GENERAL: This section covers the furnishing and laying, or installing of all water pipe and fittings.

   All pipe furnished shall be designed and used for the distribution of potable water only and have a depth of cover equal to or greater than 36 inches. Lubricant furnished for lubricating joints shall be non-toxic, shall not support the growth of bacteria, shall have no deteriorating effects on the gasket or pipe material and shall not impart taste or odor to water. The lubricant containers shall be labeled with the manufacturer's name.

2. PROTECTION OF PIPELINE: Well fitted stoppers or bulkheads shall be securely placed in all openings and in the end of the line when construction is stopped temporarily and at the end of each day's work. It shall be the responsibility of the Contractor to deliver to the Owner a pipeline which is clean throughout its entire length.

3. MEASUREMENT AND BASIS OF PAYMENT: The pipeline, complete in place, will be measured for payment in linear feet along the ground surface above the pipe as installed. Measurement shall be through fittings, valves and specials and no deduction in length shall be made for such appurtenances. Installation of the pipeline will be paid for at the unit contract price per linear foot as provided in the Proposal and Bid Schedules.

   Payment of the unit contract price will be the total compensation for furnishing all labor, pipe, fittings, tools and incidentals and performing all work that is necessary for the installation in accordance with the plans and the provisions of the specifications.

   The installation of appurtenances which are shown on the plans or described elsewhere in these specifications and for which there is no specific item included in the Bid Schedule shall be considered a part of the work to be performed and paid for at the contract price per linear foot of the pipeline.

   Payment will be made for completed sections or blocks of line installed as defined by the Engineer. Completion shall include clean-up, testing, sterilization and reconnects made and the line placed in service.

SECTION 3 - PIPE & FITTINGS (WATER)

3B - Materials

1. WATER MAINS:

A. AWWA C-900 PVC Pipe: (4" - 12") The pipe shall be DR 18 (minimum) Class 150 psi (minimum), cast iron pipe o.d. base that meets all the requirements of AWWA C-900, ASTM D1784, ASTM D2241, and ANSI/NSF standard 61. All pipe shall be suitable for use as a pressure conduit at a maximum hydrostatic working pressure of 235 psi at 73 deg. F. Provisions must be made for expansion and contraction at each joint with an elastomeric ring and integral thickened bell as part of each joint. The dimensions of the gasket joint shall meet the requirements provided in ASTM D 3139 when measured in accordance with ASTM D2122.

All pipe shall bear the National Sanitation Foundation seal for potable water pipe.

The manufacturer shall furnish an affidavit that all delivered materials comply with requirements of the above specifications.

4" - 12" - DR 18, Class 235 PSI

B. AWWA C-900 Certa-Lok RJ PVC Pipe: (4" - 12") The pipe shall be DR 18 (minimum) Class 150 psi (minimum), cast iron pipe o.d. base that meets all the requirements of AWWA C-900, ASTM D1784, ASTM D2241, and ANSI/NSF standard 61. All pipe shall be suitable for use as a pressure conduit at a maximum hydrostatic working pressure of 235 psi at 73 deg. F. Provisions must be made for expansion and contraction at each joint with an elastomeric ring and integral thickened bell as part of each joint. The dimensions of the gasket joint shall meet the requirements provided in ASTM D 3139 when measured in accordance with ASTM D2122. This pipe shall be restrained joint PVC pipe.

All pipe shall bear the National Sanitation Foundation seal for potable water pipe.

The manufacturer shall furnish an affidavit that all delivered materials comply with requirements of the above specifications.

4" - 12" - DR 18, Class 235 PSI

C. AWWA D2241/RJ Certa-Lok Yelomine PVC Pipe: (3") The pipe shall be SDR 17 (minimum) Class 150 psi (minimum), cast iron pipe o.d. base that meets all the requirements of AWWA C-900, ASTM D1784, ASTM D2241, and ANSI/NSF standard 61. All pipe shall be suitable for use as a pressure conduit at a maximum hydrostatic working pressure of 250 psi at 73 deg. F. Provisions must be made for expansion and contraction at each joint with an elastomeric ring and integral thickened bell as part of each joint. The dimensions of the gasket joint shall meet the requirements provided in ASTM D 3139 when measured in accordance with ASTM D2122. This pipe shall be restrained joint PVC pipe.

All pipe shall bear the National Sanitation Foundation seal for potable water pipe.

The manufacturer shall furnish an affidavit that all delivered materials comply with requirements of the above specifications.

3" - SDR 17, Class 250 PSI

D. AWWA Class 200 PVC Pipe: (1" – 4") The pipe shall be SDR 21 (minimum) Class 200 psi, cast iron pipe o.d. base that meets all the requirements of AWWA Class 200, ASTM D1784, and ASTM D2241. All pipe shall be suitable for use as a pressure conduit at a maximum hydrostatic working pressure of 200 psi at 73 deg. F. Provisions must be made for expansion and contraction at each joint with an elastrometric ring and integral thickened bell as part of each joint. The dimensions of the gasket joint shall meet the requirements provided in ASTM D3139 when measured in accordance with ASTM D2122.

All pipe shall bear the National Sanitation Foundation seal for potable water pipe.

The manufacturer shall furnish an affidavit that all delivered materials comply with requirements of the above specifications:

1" – 4" – SDR 21, Class 200 psi

E. Ductile Iron Pipe: (4" - 12") The pipe shall conform to ANSI A21.51 (AWWA C 151) and ANSI A21.50 (AWWA C150). The minimum tensile strength shall be 42,000 psi, and the modulus of rupture 60,000 psi. The pipe shall have a cement mortar lining and seal coat conforming to ANSI A21.4 (AWWA C 104). Joints shall conform to ANSI A21.11 (AWWA C 111) and may be mechanical joint or push-on joint unless otherwise specified.

The minimum thickness class shall be as follows or as specified:

4" - 12" - Metal Thickness Class 50.

The pipe shall be wrapped in polyethylene and taped in accordance with AWWA C105. Polyethylene material shall conform to ANSI/ASTM D1248. Min. Nominal Thickness = 9 mils.

F. Gray and Ductile Iron Fittings: Fittings shall be designed for working pressures of 350 psi in accordance with ANSI A21.10 (AWWA C153). Joints may be mechanical joint, push-on joint, or standard bell and spigot joint as specified. Mechanical joint fittings shall conform to ANSI A32.22 (AWWA C111) and shall be furnished with cast iron or ductile iron glands, bolts and nuts, and plain rubber gaskets. Fittings shall contain no more than 8.0% lead. The body thickness and radii of curvature of push-on joint fittings shall conform to ANSI A32.22 (AWWA C111). Standard bell and spigot fittings shall be Class D or equal. All fittings except sleeves and plugs shall have a cement mortar lining in accordance with ANSI A 32.4 (AWWA C104). Joint shall conform to ANSI A32.22 (AWWA C111) and may be mechanical joint or push-on joint unless otherwise specified. The minimum thickness class shall be Class 50 unless otherwise specified.

G. Mechanical Joint Restrainer Glands: Mechanical joint restrainer glands shall be made from cast iron or ductile iron and shall be designed for a working pressure of at least 200 psi, Megalug Series 1100 for Ductile Iron Pipe and Megalug Series 2000PV for PVC Pipe or approved equal. The set screws shall be extended through the outer most part of the gland. Glands shall be designed to fit standard mechanical joint fittings (AWWA C111). The minimum number and minimum size set screws shall be as follows:

Size Gland	Size Set Screws	No. Set Screws
4"	½"	4
6"	⅝"	6
8"	⅝"	9
10"	⅝"	16
12"	⅝"	16
16"	⅝"	24
20"	⅝"	28
24"	⅝"	32

H. AWWA C-901 HDPE Pipe: (3/4 " - 3") The pipe shall be SDR 9 (minimum) Class 250 psi (minimum), small diameter pressure-rated hdpe pipe that meets all the requirements of AWWA C-901, ASTM D3035, ASTM F714, ASTM D2737, and ASTM D2239. All pipes shall be suitable for use as a pressure conduit at a maximum hydrostatic working pressure of 250 psi at 73 deg. F.

All pipes shall bear the National Sanitation Foundation seal for potable water pipe.

The manufacturer shall furnish an affidavit that all delivered materials comply with requirements of the above specifications.

3/4" - 3" - SDR 9, Class 250 PSI

I. AWWA C-906 HDPE Pipe: (4 " - 12") The pipe shall be DR 9 (minimum) Class 250 psi (minimum), pressure-rated hdpe pipe that meets all the requirements of AWWA C-906, ASTM D3035, ASTM F714, ASTM D3350 Cell Class 445574C/E, PPI (TR-4) PE 4710, and ANSI/NSF 61/14. All pipes shall be suitable for use as a pressure conduit at a maximum hydrostatic working pressure of 250 psi at 73 deg. F.

All pipes shall bear the National Sanitation Foundation seal for potable water pipe.

The manufacturer shall furnish an affidavit that all delivered materials comply with requirements of the above specifications.

4" - 12" - DR 9, Class 250 PSI

2. JOINTS:

A. Plain End: Plain ends for use with mechanical couplings shall be square cut and the inside and outside edge burrs shall be removed. The pipe shall be sufficiently free from indentations, projections, or roll marks at each end to make a tight joint.

B. Rubber "O" Ring: Rubber "O" ring joints shall conform to AWWA C208 for bell and spigot ends with rubber gasket. The rubber "O" ring gasket materials shall comply with the requirements of AWWA C300.

SECTION 3 - PIPE & FITTINGS (WATER)

3C - Installation

1. GENERAL: Before installation of pipe and appurtenances, the trench bottom shall be graded so uniform support of the pipe and appurtenances is provided. Shallow depressions shall be made in the trench bottom to accommodate bell ends.

Proper implements, tools, and facilities shall be provided and used by the Contractor for the safe and convenient prosecution of the work. Under no circumstances shall pipe or accessories be dropped or dumped into the trench.

All foreign matter or dirt shall be removed from the inside of the pipe and appurtenances before lowering into the trench and the pipe interior shall be kept clean during and after laying. A swab shall be kept in the pipeline as the pipe is being laid. Care shall be taken to prevent dirt from entering the joint space and at times when pipe laying is not in progress, the open ends of the pipe shall be closed by installing a plug or cap of sufficient design to prevent trench water, foreign matter, and dirt from entering the pipeline.

Cutting of the pipe for inserting valves, fittings, or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe or pipe lining. Torch cutting is not permitted. All pipe shall be cut at an angle of 90 deg. to the pipe centerline. Cutting at other angles to provide greater deflections at the joints shall not be permitted.

Field welding or welding except by pipe manufacturer shall not be permitted.

Unless otherwise approved or directed by the Engineer, pipe shall be laid with bell ends facing the direction of laying; and for lines on an appreciable slope, bells shall, at the direction of the Engineer, face upgrade.

No pipe shall be laid in water, or when the trench condition or the weather is unsuitable for such work, except by permission of the Engineer.

A continuous 12-gauge coated solid copper wire shall be installed with all mainline pipe. Coating shall be color blue for water. The wire shall be attached and laid along the pipe. The wire shall be looped around valves, saddles, curb stops and other appurtenances in such manner that there is not interference with the operation of the appurtenances.

All services shall have a tracer wire from the main to the water meter. The tracer

wire shall be spliced into the tracer wire located at the main and run along the service line and up into the meter box. Tracer wire shall be solid copper wire with USE rated insulation and a minimum size of AWG #12. Insulation shall be color blue for water. Splices shall be connected by means of a split bolt or compression type connection with NEC approved underground splice kits. Wire nuts shall not be used. A waterproof or corrosion proof connection for direct bury application shall be used. Tracer wire shall be installed 8”-12” directly above the pipe and shall not be less than 2’ below grade. Tracer wire is not to be taped directly to the pipe unless prior written approval is received from the Engineer and the Owner. After installation, the tracer wire shall be tested in the presence of the Engineer to verify continuity of the tracer wire system.

During the pipe laying operation, deflections at joints or in the pipe itself shall not exceed the amounts recommended by the pipe manufacturer.

2. JOINTING MECHANICAL JOINT PIPE & FITTINGS: Prior to jointing the pipe and/or fittings, the plain ends of the pipe and the bells of the pipe and fittings shall be thoroughly cleaned using a soapy water and cloth, removing all foreign materials from the bells, especially the gasket seats.

The cast or malleable iron follower rings shall be placed on the plain end of the pipe or fittings, followed by the rubber gasket which has been thoroughly cleansed and lubricated with the soapy water.

The plain end of the pipe shall be placed in the bell, to which connection is to be made, and shouldered in back of the bell. The rubber gasket shall be advanced into the bell and seated in the gasket seat; the follower ring shall next be brought into contact with the rubber ring, and all bolts entered and nuts started. The pipe may then be given a maximum deflection as prescribed in the preceding table.

Joints shall be made tight by advancing the nuts with a wrench 180 deg. apart until a tight joint is made.

The Contractor shall provide a "torque wrench" suitable for measuring tension on bolts for at least such a time as the workmen making the joints have gotten the "feel" of the required tension. At no time should handles longer than those supplied by the wrench manufacturer be permitted. The torque range shall be as follows:

⅝" Bolts	45-60 ft. lbs.
¾" Bolts	75-90 ft. lbs.
1" Bolts	80-100 ft. lbs.
1¼” Bolts	105-120 ft. lbs.

After the workmen have become accustomed to this torque, a socket wrench with a 10-inch handle may be used.

The rubber gasket and joint bolts of mechanical joint retainer glands shall be installed in accordance with above. Set screws shall be tightened evenly to approximately 65-foot pounds for larger diameter. Do not attempt to deflect joint after tightening set screws.

3. JOINTING PUSH-ON JOINT PIPE & FITTINGS: Prior to jointing the pipe and/or fittings, the plain ends of the pipe and the bells of the pipe and fittings shall be thoroughly cleaned using a soapy water and cloth, removing all foreign material from the bells, especially the gasket seats. Any burrs or imperfections in that part of the plain end or bell which will be in contact with the gasket shall be removed.

The clean rubber gasket shall be inserted in the bell and a thin film of lubricant shall be applied to the inside surface of the gasket.

The cleaned plain end shall initially be entered in the bell straight.

The plain end shall be forced inside the gasket and bell until it strikes the end of the interior of the bell, after which the end of the pipe shall be moved sideways or up eight (8) inches to move it slightly away from home to allow for expansion and to provide flexibility to the completed line. The pipe may then be deflected as prescribed in the preceding table.

Lubricants are normally supplied by the pipe manufacturer in sufficient quantities. No substitutes shall be made.

The Contractor shall furnish such jacks, or other devices as are necessary for forcing the pipe into the bell and gasket. Care shall be exercised to avoid damage to the pipe where the pushing device or machine part contacts the pipe. A wood block or suitable pad shall be placed between the pipe and that part of the pushing device which contacts the pipe.

All plain ends that enter a push-on bell shall be beveled at 30 deg. for at least ⅛ inch. All cut pieces or ends of pipe of other classifications shall be so beveled.

4. INSTALLATION OF PVC JOINTS: Both bell and plain end of pipe shall be thoroughly cleaned before attempting to joint the pipe.

Place rubber gasket in bell if not delivered from supplier in place. The colored side of gasket shall be to the outside.

Lubricate the plain end (do not lubricate the bell end) with approved lubricant and insert plain end into the bell until stop mark on plain end is flush with the end of the bell. In the case of pipe which has two marks on the plain end, insert plain end into bell so that only one mark is visible.

When the pipe is cut, the plain ends must be beveled similar to the bevel on full

lengths. After beveling, stop marks must be applied to the ends. Use the plain end of another piece of pipe or fitting to determine the location of the stop mark and mark the piece of pipe that has been cut.

Pipe shall not be exposed to sunlight for more than one (1) day, therefore it must be backfilled or protected the same day it is delivered to the job.

The joints shall be inserted as far as possible on each side of valves that are inserted in the line.

5. INSTALLATION OF WATER MAINS BY DIRECTIONAL BORE:

A. General.

1. Determine drilling length and equipment pull strength for type of soil encountered.

2. Provide method to control line and grade.

   a. Provide and maintain instrumentation that accurately locates pilot hole.

   b. Drill pilot hole along path following Drawings to these tolerances:

      1) Vertical alignment plus or minus 0.5 foot. Vertical path of pilot hole must not establish new high points not shown on Drawings.

      2) Horizontal alignment plus or minus 1.0 foot.

   c. Include electronic monitoring of horizontal and vertical drilling head location. Obtain accuracy range within 1 inch of actual position of pipeline. Record position readings at maximum of 10 foot intervals.

   d. At completion of pilot hole drilling, furnish tabulations of horizontal and vertical alignment to Engineer.

3. When water is encountered.

   a. Provide and maintain dewatering system of sufficient capacity to remove water.

   b. Keep excavation free of water until backfill operation is in progress.

   c. Perform dewatering in manner that removal of soils particles are held to minimum.

4. Maintain close observation to detect settlement or displacement of surface and adjacent facilities.

   a. Notify Engineer immediately if settlement or displacement is detected.

b. Maintain safe conditions and prevent damage.

B. Drilling Operation.

1. Drilling Fluids.
   a. Maintain drilling fluid in bore hole to increase stability of surrounding soil and reduce drag on pulled pipe.

   b. Dispose of drilling fluid and other spoils at location following laws, ordinances, rules, and regulations of local jurisdiction.

   c. Transport excess fluids and other spoils to disposal site, at no additional cost to the Owner.

   d. Minimize drilling fluid at locations other than entry and exit points. Immediately clean up any drilling fluids that inadvertently surface.

   e. Provide clean water for drilling, at no cost to the Owner, at Engineer's requirement.

2. Pilot Hole Drilling.
   a. Angle entry hole so that curvature of pilot hole does not exceed allowable bending radius of specified pipe.

   b. Be able to make a turn of up to 90 degrees and maintain curvature not to exceed allowable bending radius of specified pipe.

   c. Alignment Adjustment and Restarts.
      1) Follow pipeline alignment on Drawings within tolerances specified herein. Before adjustments, notify Engineer for approval.

      2) Notify Engineer when forward motion of operation is stopped by an obstruction.

      Abandon in place with drilling fluid, unless Engineer directs otherwise.

      Upon Engineer's approval, attempt second installation at approved location or excavate at point of difficulty and install specified pipe by trench method.

      3) Withdrawals, abandonments, and restarts are at no additional cost to the Owner.

      4) Exercise caution including, but not limited to, locating, drilling downholes (test pits) to observe drill stems or reamer assembly to clear other existing utilities at locations following Drawings.

      5) Minimum depth shall be (3) feet to the top of the carrier pipe. Extra

vertical depths needed to avoid existing utilities and or obstructions will be at no additional cost to the Owner.

C. INSTALLATION

Installing Specified Pipe.

1. Provide a swivel to reaming assembly and pull section of pipe to minimize torsional stress on pull section after drilling pilot hole.

2. Hold reaming diameter to 1.5 times outside diameter of specified pipe being installed.

3. Protect pull section as it proceeds during pull back so it moves freely and is not damaged.

4. Pull detection wire along with specified pipe and establish continuity with approved connectors.

5. If connecting to adjacent pulled or non-pulled section of HDPE pipe, allow pull section of pipe to extend past termination point. Make tie-ins the next day after pullback of HDPE pipe.

6. Test pit pipe installation to verify horizontal and vertical alignment at Engineer's direction.

   a. One test pit for every 500 feet along length of pipeline.

   b. Engineer may order additional test pit for each test pit that reveals pipeline installation is not in compliance with Contract Documents at no additional cost to the Commission.

7. Replace portions of pipeline not in compliance with Contract Documents at Engineer's direction and at no additional cost to the Owner.

D. MEASUREMENT AND BASIS OF PAYMENT

The directional bored pipeline, complete in place, will be measured for payment in linear feet as shown on the plans or according to the linear feet of the surface material where the bore was approved. Installation of the pipeline will be paid for at the unit contract price per linear foot as provided in the Proposal and Bid Schedule.

Payment of the unit contract price will be the total compensation for furnishing all labor, pipe, fittings, tools and incidentals and performing all work that is necessary for the installation in accordance with the plans and the provisions of the specifications.

SECTION 3 - PIPE & FITTINGS (WATER)

3D - Appurtenances

1. GATE VALVES:

A. General: Gate valves, two (2) inches through twenty-four (24) inches shall be designed for a working pressure of 200 psi. Valves shall conform to AWWA C500 with iron bonnet (bronze mounted), nonrising stem double-disc (parallel seat type), o-ring stem seals and 2" x 2" square operating nut. Valves shall open when the operating nut is turned to the left (counterclockwise). Valve ends shall be mechanical joint complete with accessories or as specified. Tapping valves shall conform to above specifications except that the connections shall be ANSI B16.1, Class 125 flange on one side (inlet) and mechanical joint on the other (outlet) or as specified. Tapping Sleeves are to be Grade 304 Stainless Steel.

All gate valves shall be model A-2360-20 as manufactured by the Mueller Company or approved equal.

B. Valve Boxes: Valve boxes shall be the H-10346, 562-A, two-piece, screw type, 5½" shaft, 24-36" extension, with drop cover marked water as manufactured by the Mueller Co. or equal. Valve boxes shall be set vertical and concentric with the valve stem. Any valve box which is so moved from its original position as to prevent the application of the valve key shall be satisfactorily reset by the contractor at his own expense. A concrete pad of the dimensions shown on the details of the plans shall be poured around all valve boxes.

C. Installation of Valves: Valves shall be jointed in accordance with the methods of jointing pipe as specified elsewhere herein. Valve stems shall be plumb and there shall not be any obstructions which will prohibit the installation of valve boxes directly over the stem.

Concrete anchor collars shall be provided around an adjoining length of pipe for all valves 16-inches in diameter or larger and for smaller valves when specified on the Plans. Mechanical joint retainer glands shall be installed on all valves with mechanical joint ends 12-inches in diameter or larger when cast iron or ductile iron pipe is specified and for smaller valves when specified on the Plans. All valves shall be cradled in concrete with an adequate bearing area to prevent differential settlement between the valve and pipe.

When the distance between the valve operating nut and the finished surface exceeds five (5) feet, a valve stem extension shall be provided. The stem shall be round steel bar stock at least 7/8 inch in diameter with a 2-inch square operating nut attached to the upper end and of length adequate to reach from the valve operating nut to a point within 18-inches to 12-inches of the finished surface. A box wrench made from steel ¼ inch shall be welded to the lower end of the stem extension which will fit over the valve operating nut. the stem extension shall be attached to the valve operating nut by a ¼ inch bolt which shall pass through the stem extension box and the valve operating nut. The hole for the ¼ inch nut shall be ⅜ inch in diameter. A round center guide made from 3/16 inch or ¼ inch steel plate shall be welded to the valve stem extension approximately 6 inches from the upper end. the diameter of the guide shall be slightly smaller in diameter than the inside diameter of the valve box. shop drawings shall be submitted to the Engineer for approval prior to installing stem extension pieces.

2. AIR RELEASE VALVE:

A. General: The air release valve shall have a combination of large and small orifice units for allowing air to enter or exit the transmission main. The valve shall have a cast iron body and the only moving part shall be a stainless steel ball. The valve shall be capable of fully automatic operation within the full range of pipeline operating conditions and shall not blow shut or collapse the ball during operation. The large orifice seat shall be replaceable.

Normal operating pressure shall be less than 150 psi. All valves shall have flanged inlets and outlets. The valve flange shall be 125 pound and conform to ANSI 16.1 for 150 psi working pressure.

The valve shall be in every way similar to a APCO Model 50C manufactured by APCO Valve Corp., Schaumburg, IL, or approved equal.

B. Connection: Each valve installation shall include a flanged butterfly valve installed below the air release valve between the release valve and the pipeline. The butterfly valve shall be a Pratt Model 2FII, or approved equal.

The butterfly valve shall have a handle operator, mechanical stops and position indicator.

All piping shall be ductile iron, Class 50.

C. Location: The valves shall be installed at locations shown on the plans or as directed by the Engineer.

3. BLOW-OFF VALVE INSTALLATION: Blow-off valves shall be installed at the locations shown on the plans. The unit price shall consist of furnishing and installing all required materials including gate valves, cast iron piping and fittings, and concrete required for blocking and performing all operations necessary for the installation of a blow-off valve in accordance with the details shown on the plans.

4. FIRE HYDRANTS:

A. General: Hydrants shall conform to AWWA C502, the following specifications, and shall be F.M. approved and U.L. listed and be the Standard Fire Hydrant, Catalog Number A-401, manufactured by the Mueller Company, Chattanooga, Tennessee, or equal.

Working pressure	Minimum 150 psi
Size of Valve Opening	Minimum 5"
Diameter of Inlet Connection	6"
Type of Inlet Connection	Mechanical Joint
Number & Size of Hose Connection	2 – 2½", 1-5"
Nozzle Arrangement	All in same plane
Nozzle Thread	ASA Standard
Nozzle Cap Chains	None
Nozzle Cap Washers	Rubber
Direction to Turn to Open	Right (counter clockwise)
Shape & Size of Operating & Nozzle Cap Nut	5-sided, 1¼" from flat to point
Color above ground-barrel & dome	Safety Yellow
Color, Nozzle Caps & Top Nut, including shield	Color selected by Owner

B. Setting Hydrants: Hydrants shall be thoroughly cleaned before setting, removing all dirt and foreign matter from the barrel and the bottom section up to the main valve.

The main valve shall be in the "closed" position and the waste outlet shall be free of any obstructions.

Hydrants shall be located a safe distance from driveways, roadways and narrow type sidewalks and in a manner to provide complete accessibility and they shall stand plumb with nozzles at proper elevation.

The Contractor shall, if necessary, rotate the hydrant barrel or nozzle

section at the flanged joint to obtain the desired nozzle position as specified by the Engineer.

The bowl or bottom of the hydrant shall be supported firmly on the bottom and shall be well braced against unexcavated earth on the back side. Stone slabs, concrete blocks, or other suitable material may be used to block the hydrant. If considered necessary by the Engineer, the hydrant shall be tied to the branch pipe with suitable rods or clamps. These rods or clamps to be furnished by the Contractor without additional compensation.

A drainage bed shall be provided under and around the base of the hydrant of at least six (6) cubic feet in volume and extending at least six (6) inches above the drain outlet and shall consist of gravel or broken stone mixed with coarse sand thoroughly compacted. Under no circumstances shall the waste outlet on the hydrant or the drainage bed be connected to a sewer.

Backfilling and tamping around hydrant barrels shall be continuous in operation.

After installation and before being tested and placed in service, fire hydrants shall be covered with a cloth or water-resistant sack.

5. MEASUREMENT AND PAYMENT: Completed installations of appurtenances in accordance with the plans and specifications including bolts, gaskets, flanges, blocking, piping, and other incidentals shall be paid for at the unit price as provided in the Proposal and Bid Schedule.

SECTION 4 - RESTORATION OF SPECIAL SURFACES

1. DESCRIPTION: This section covers replacement of special surfaces including private drives and parking areas.

   Restoration of other surfaces is covered under Section 1A - SITE WORK.

2. BACKFILL UNDER SPECIAL SURFACES: Backfill under special surfaces shall be specified in Section 1B - TRENCH EXCAVATION AND BACK-FILLING of these specifications as modified herein.

   Backfill from 6-inches above the pipe shall be made of suitable materials from the spoil bank brought up in compacted layers not exceeding 6-inches in depth of loose material. Compaction of backfill shall be carefully and thoroughly done so as not to displace utility lines from their original positions. All the backfill materials shall be at optimum moisture and shall be thoroughly compacted to 90% of the maximum density as determined by the Modified Proctor Compaction Test. However, the top 6-inch of the backfill shall be compacted to 95% maximum density as determined by the Modified Proctor Compaction Test.

3. ASPHALT PAVING REPLACEMENT: After the backfill material has been brought within 10" of the finish surface, the material on either side of the trench shall be removed for a horizontal distance of 6" from the widest point of the trench to a depth of 10". This will provide a shoulder of undisturbed bearing along each side of the trench 6" wide. The cut shall have a uniform width as nearly as is practicable, and shall be made perpendicular to the surface of the pavement in order that the repair shall result in a uniform, neat appearance. If the surface is asphalt, 8" of gravel base (SB-2) will be placed to within 2" of the surface. The surface will be tack coated and surfaced with 2" of hot mix asphaltic concrete meeting the Arkansas Department of Transportation specifications. The above requirements shall apply for all pavement thickness up to and including the thickness outlined above, but in no case shall the total thickness of repairs be less than the total thickness of the pavement in each individual case.

4. CONCRETE PAVING REPLACEMENT: See Plans.

5. MEASUREMENT AND PAYMENT: Restoration of special surfaces will be based on a linear foot basis and be paid for at the unit price specified in the bid proposal. Special surface restoration will not be measured for payment unless the edges have been evenly saw-cut.

SECTION 5 – TESTING AND STERILIZATION

SECTION 5A- WATER

1. DESCRIPTION OF WORK: The work to be performed under this section of the specifications shall consist of furnishing all labor, materials, and equipment necessary to test and sterilize the water main as specified herein.

2. HYDROSTATIC TEST: After the pipe has been laid for at least seven (7) days the line shall be tested in such sections approved by the Engineer. The Contractor shall furnish all labor, materials, tools, and equipment required to bulkhead and seal off the line for testing, fill it with water, raise the filled line to test pressure and measure both pressure and leakage over the test period.

   The entire length of the installed line shall be field tested in accordance with all AWWA formulas and for water tightness in the following manner: The section of the line to be tested shall be filled with water and allowed to stand for such time as is required for the cement lining of the pipe to absorb such water as it will and for the escape of all air from the line. During the filling of the line, care shall be exercised to see that all air vents are open and all bulkheads, valves, manholes, connections, etc. in the section undergoing test shall be carefully examined for leakage. All known leaks shall be stopped, regardless of these test requirements. If permanent air vents are not located at all high points, the contractor shall install corporation cocks at such points so that the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed and the test pressure applied. At the conclusion of the pressure test the corporation cocks shall be removed and plugged or left in place at the discretion of the owner.

   The test shall consist of raising and holding the hydrostatic pressure in the test section to 150 psi. Such pressure shall be maintained for a period of not less than two (2) hours, during which time the water pumped into the line to maintain the test pressure shall be accurately measured in a satisfactory manner.

   Water Mains shall be Hydrostatic Tested per AWWA C605 (latest revision) leak test for PVC. No pipe installation will be accepted if the leakage is greater than that determined by the following formula:

$$Q = \frac{LD\sqrt{P}}{148000}$$

   in which Q is allowable leakage, in gallons per hour; L is the length of pipe tested in feet; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the hydraulic test, in pounds per square inch gage.

In the event any section of the line tested fails to meet the above specified requirements for water tightness, the cause of the excessive leakage shall be determined and remedied to the satisfaction of the Engineer, at the expense of the Contractor, including retesting. The section of line that fails to meet the requirements for water tightness shall be completely removed and replaced with new pipe and fittings. Unless previously approved, in writing, by the Engineer, full circle clamps and couplings shall not be used to remedy leaks. Knock-ons's and other slip style repair couplings will NOT be accepted.

It shall be the responsibility of the Contractor to provide the necessary outlets for testing the pipeline.

Water mains shall be pressure tested within 45 days of installation, unless written approval, extending said timeframe, is received from the Engineer. Request for extension shall be in writing from the contractor and shall include the following information: location of main, including beginning and ending station numbers, reasoning for time extension request, as well as, a new scheduled date of completion for the pressure testing requirements. Engineer reserves the right to grant or deny each request on a case by case basis. Should contractor fail to provide a passing pressure test within the allotted time period, the Engineer and/or Owner reserves the right to direct the Contractor to discontinue installing any new water mains until the section of main in question passes all pressure testing requirements.

3. STERILIZATION: Prior to sterilizing, each valved section of the new pipeline shall be pressure tested and flushed with clean water from the existing system to remove all apparent evidence of dust, soil and fine debris which may have entered the line during construction and testing.

All disinfection to be in accordance with AWWA standard C651(latest revision). Chlorine shall be used to sterilize the pipeline by the following method: The amount of chlorine applied shall be such as to provide a dosage of not less than fifty (50) parts per million. The chlorinating material shall be introduced to the water lines and distribution system in a manner approved by the Engineer. After a contact time of not less than twenty-four (24) hours, the system shall be flushed with clean water until the residual chlorine content is not greater than 0.2 parts per million. All valves in the lines being sterilized shall be opened and closed several times during the contact period.

A minimum of three (3) samples shall be collected and submitted for analysis to the State Board of Health for each segment of water line installed. No water main shall be placed into service until satisfactory test reports have been received.

Water mains that have previously passed the hydrostatic pressure testing requirements shall be sterilized and have satisfactory test results back from the

Arkansas Department of Health within 10 working days of passing said pressure test. If samples are not satisfactory, contractor shall immediately re-sterilize the main, and re-sample per guidelines previously stated in this section. Should the contractor fail to receive satisfactory test results within the above allotted time period, the Engineer and/or owner reserves the right to direct the Contractor to discontinue installing any new water mains until the section of main in question passes all testing requirements from the Arkansas Department of Health and is then placed into service.

Unless otherwise provided for in the Bid Schedule and Proposal, the cost of furnishing the chlorine, labor, tools, equipment, and test of chlorine content and bacteriological tests shall be at the expense of the Contractor.

4. MEASUREMENT AND PAYMENT: Testing and sterilization will be paid for at the price shown in the Proposal. All temporary connections between the existing water mains and the proposed water mains for the purpose of flushing and testing is the sole responsibility of the contractor and is not a pay item. Proposed connection locations must be approved by the Engineer or his representative prior to installation and said connections must be completely removed prior to substantial completion.

   Water mains that have passed the testing and sterilization requirements set forth in this section, shall be placed into active service within 5 days of passing said testing requirements.

SECTION 6 - HIGHWAY & RAILROAD CROSSINGS

1. DESCRIPTION OF WORK: This section of the specifications shall comprise the furnishing and installing of pipe under existing railroads, streets, and highways, as designated on the plans and described herein. The work shall include all excavation and backfill incidental to the installation.

2. MATERIALS: When encasement pipe is required, the pipe for bored crossings shall be of the length and size shown on the plans and be constructed of smooth-wall welded steel pipe as follows: Steel encasement pipe shall be smooth-weld steel pipe of the size and thickness shown on the Plans and shall conform to the requirements of ASTM A139-68, Grade B.

3. CONSTRUCTION METHODS: Bores may be made by "wet" or "dry" boring methods unless a dry bore is specifically called for on the Plans. Wet bores may be used at all locations where alternate boring methods are not called for on the Plans providing (1) soil conditions encountered are suitable and there is no danger of damage to above structures and (2) the specific permit from the Highway Department or railroad company does not prohibit "wet" bores.

   The minimum length of carrier and/or encasement pipe shall be determined as

indicated on the plans. Individual encasement pipe sections shall be welded together to prevent leakage. The ends of the encasement pipe shall be plugged with a rubber boot, or brick and mortar, at the Engineer's direction, to prevent entrance of excessive ground water.

No trench excavation shall be carried closer than 10 feet of highway pavement edges and 5 feet of all other pavement edges. No dirt from trench excavation shall be piled on roadway shoulders. All trench backfill shall be mechanically tamped to same density as surrounding ground. Before completion of this proposed work, all roadway shoulders, slopes, ditches and berms shall be restored to their original position. If the tunnel is greater in size than 5% of the encasement pipe diameter the void area between the outside of the encasement pipe and the tunnel wall shall be filled with HOLEPLUG as manufactured by Baroid Industrial Drilling Products or approved equal.

The entire operation of tunneling and setting pipe shall be carried out subject to the inspection and approval of the Engineer and by the Agency having jurisdiction. Adequate means shall be provided to keep the work free from water.

The Contractor shall notify the Railroad Company or Highway Department of his construction schedule not less than 5 days prior to commencing work on the right-of-way of the Railroad Company or Highway Department as to the details of construction methods at the time of construction.

Where PVC carrier pipe is installed within encasement pipe, the carrier pipe shall be banded with treated wood blocks at intervals of approximately 10 feet to carry the weight of the pipe and prevent it from resting on the pipe bells.

4. MEASUREMENT AND PAYMENT: Highway and railroad crossings will be based on a linear foot price from the face of each bore pit where the bore begins and ends. The pay item shall consist of furnishing all tools, equipment, materials, and labor including encasement pipe where indicated, carrier pipe, and appurtenances necessary to install water main under roadways and/or railroads at locations shown on the plans.

EXHIBIT "A"

STORM WATER POLLUTION

PREVENTION PLAN

CITY OF MCGEHEE, ARKANSAS

WATER SYSTEM IMPROVEMENTS - PHASE I

BID PROPOSAL

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
1	480	L.F.	Furnish and Install labor and equipment for 12" C-900 PVC Water Main and Fittings including Trench Excavation, Laying, Bedding, Blocking and Backfilling per plans and specifications for the unit price of _____ Dollars and _____ Cents/L.F	$ _____	$ _____
2	11,240	L.F.	Furnish and Install labor and equipment for 8" C-900 PVC Water Main and Fittings including Trench Excavation, Laying, Bedding, Blocking and Backfilling per plans and specifications for the unit price of _____ Dollars and _____ Cents/L.F	$ _____	$ _____

BID PROPOSAL CONTINUED

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
3	9,980	L.F.	Furnish and Install labor and equipment for 6” C-900 PVC Water Main and Fittings including Trench Excavation, Laying, Bedding, Blocking and Backfilling per plans and specifications for the unit price of _____ Dollars and _____ Cents/LF	$ _____	$ _____
4	1,220	L.F.	Furnish and Install labor and equipment for 4” C-900 PVC Water Main and Fittings including Trench Excavation, Laying, Bedding, Blocking and Backfilling per plans and specifications for the unit price of _____ Dollars and _____ Cents/LF	$ _____	$ _____

BID PROPOSAL CONTINUED

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
5	2,200	L.F.	Furnish and Install labor and equipment for 3" SDR 21 PVC Water Main and Fittings including Trench Excavation, Laying, Bedding, Blocking and Backfilling per plans and specifications for the unit price of _____ Dollars and _____ Cents/LF	$_____	$_____
6	500	L.F.	Furnish and Install material, labor and equipment for 2" poly water pipe SDR-9 treated water main and Fittings including Trench Excavation, Laying, Bedding, Blocking and Backfilling per plans and specifications for the unit price of _____ Dollars and _____ Cents/LF	$_____	$_____

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
7	100	L.F.	Furnish and Install material, labor and equipment for 1” poly water pipe SDR-9 treated water main and Fittings including Trench Excavation, Laying, Bedding, Blocking and Backfilling per plans and specifications for the unit price of _____ Dollars and _____ Cents/LF	$_____	$_____
8	640	L.F.	Directional Bore 12” Certa-Loc Pipe DR-18 Water main per plans and specifications for the unit price of (Directional Bore includes the pipe) _____ Dollars and _____ Cents/LF	$_____	$_____

BID PROPOSAL CONTINUED

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
9	1200	L.F.	Directional Bore 8” Certa-Loc Pipe DR-18 Water main per plans and specifications for the unit price of (Directional Bore includes the pipe)	$ _____	$ _____
			_____ Dollars and _____ Cents/LF		
10	2,200	L.F.	Directional Bore 6” Certa-Loc Pipe DR-18 Water main per plans and specifications for the unit price of (Directional Bore includes the pipe)	$ _____	$ _____
			_____ Dollars and _____ Cents/LF		

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
11	120	L.F.	Directional Bore 4” Certa-Loc Pipe DR-18 Water main per plans and specifications for the unit price of (Directional Bore includes the pipe) _____ Dollars and _____ Cents/LF	$_____	$_____
12	300	L.F.	Directional Bore 3” Certa-Loc Pipe SDR-17 Water main per plans and specifications for the unit price of (Directional Bore includes the pipe) _____ Dollars and _____ Cents/L.F	$_____	$_____
13	180	L.F.	Bore and Encase 8” Water Main in 0.375” x 16” Steel Encasement per plans and specifications for the unit price of (Bore and Encase does include the pipe and steel encasement) _____ Dollars and _____ Cents/L.F	$_____	$_____

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
14	100	L.F.	Bore and Encase 6” Water Main in 0.375” x 12” Steel Encasement per plans and specifications for the unit price of (Bore and Encase does include the pipe and steel encasement) _____ Dollars and _____ Cents/L.F	$_____	$_____
15	3	EA.	Tie in Existing 12” Water Line per plans and specifications for the unit price of (Does not include valve) (Not a Pay Item if Tapping Sleeve or Saddle is used) _____ Dollars and _____ Cents/EA	$_____	$_____
16	3	EA.	Tie in Existing 8” Water Line per plans and specifications for the unit price of (Does not include valve) (Not a Pay Item if Tapping Sleeve or Saddle is used) _____ Dollars and _____ Cents/EA	$_____	$_____

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
17	3	EA.	Tie in Existing 6” Water Line per plans and specifications for the unit price of (Does not include valve) (Not a Pay Item if Tapping Sleeve or Saddle is used) _____ Dollars and _____ Cents/EA	$ _____	$ _____
18	3	EA.	Tie in Existing 4” Water Line per plans and specifications for the unit price of (Does not include valve) (Not a Pay Item if Tapping Sleeve or Saddle is used) _____ Dollars and _____ Cents/EA	$ _____	$ _____
19	4	EA.	Tie in Existing 2” Water Line per plans and specifications for the unit price of (Does not include valve) (Not a Pay Item if Tapping Sleeve or Saddle is used) _____ Dollars and _____ Cents/EA	$ _____	$ _____

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
20	1	EA.	Furnish and Install 12"X6" M.J. Tapping Sleeve and Valve including valve box and blocking per plans and specifications for the unit price of _____ Dollars and _____ Cents/EA	$ _____	$ _____
21	3	EA.	Furnish and Install 8"X8" M.J. Tapping Sleeve and Valve including valve box and blocking per plans and specifications for the unit price of _____ Dollars and _____ Cents/EA	$ _____	$ _____

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
22	1	EA.	Furnish and Install 8"X6" M.J. Tapping Sleeve and Valve including valve box and blocking per plans and specifications for the unit price of _____ Dollars and _____ Cents/EA	$_____	$_____
23	1	EA.	Furnish and Install 8"X3" M.J. Tapping Sleeve and Valve including valve box and blocking per plans and specifications for the unit price of _____ Dollars and _____ Cents/EA	$_____	$_____
24	6	EA.	Furnish and Install 6"X6" M.J. Tapping Sleeve and Valve including valve box and blocking per plans and specifications for the unit price of _____ Dollars and _____ Cents/EA	$_____	$_____

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
25	1	EA.	Furnish and Install 6"X4" M.J. Tapping Sleeve and Valve including valve box and blocking per plans and specifications for the unit price of _____ Dollars and _____ Cents/EA	$ _____	$ _____
26	2	EA.	Furnish and Install 4"X4" M.J. Tapping Sleeve and Valve including valve box and blocking per plans and specifications for the unit price of _____ Dollars and _____ Cents/EA	$ _____	$ _____
27	4	EA.	Furnish and Install 12" Gate Valve including valve box, valve marker and blocking per plans and specifications for the unit price of _____ Dollars and _____ Cents/EA	$ _____	$ _____

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
28	20	EA.	Furnish and Install 8” Gate Valve including valve box, valve marker and blocking per plans and specifications for the unit price of _____ Dollars and _____ Cents/EA	$_____	$_____
29	31	EA.	Furnish and Install 6” Gate Valve including valve box, valve marker and blocking per plans and specifications for the unit price of _____ Dollars and _____ Cents/EA	$_____	$_____
30	5	EA.	Furnish and Install 4” Gate Valve including valve box, valve marker and blocking per plans and specifications for the unit price of _____ Dollars and _____ Cents/EA	$_____	$_____

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
31	6	EA.	Furnish and Install 3” Gate Valve including valve box, valve marker and blocking per plans and specifications for the unit price of _____ Dollars and _____ Cents/EA	$_____	$_____
32	4	EA.	Furnish and Install 2” Gate Valve including valve box, valve marker and blocking per plans and specifications for the unit price of _____ Dollars and _____ Cents/EA	$_____	$_____
33	55	EA.	Furnish and Install 6” Fire Hydrant Assembly including 6” Gate Valve, Blocking and Drain Rock per plans and specifications for the unit price of _____ Dollars and _____ Cents/EA	$_____	$_____

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
34	1	EA.	Furnish and Install 4” Flush Hydrant Assembly including 4” Gate Valve, Blocking and Drain Rock per plans and specifications for the unit price of _____ Dollars and _____ Cents/EA	$ _____	$ _____
35	6	EA.	Furnish and Install 2” Flush Hydrant Assembly including 2” Gate Valve, Blocking and Drain Rock per plans and specifications for the unit price of _____ Dollars and _____ Cents/EA	$ _____	$ _____
36	41	EA.	Remove existing Fire Hydrants and deliver to the City per plans and specifications for the unit price of _____ Dollars and _____ Cents/EA	$ _____	$ _____

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
37	146	EA.	Furnish and Install and 3/4“ Short Side Service Connections Including up to 60 feet of service line to existing meters per plans and specifications for the unit price of _____ Dollars and _____ Cents/EA	$ _____	$ _____
38	95	EA.	Furnish and Install and 3/4“ Long Side Service Connections Including up to 120 feet of service line to existing meters per plans and specifications for the unit price of _____ Dollars and _____ Cents/EA	$ _____	$ _____
39	1	EA.	Furnish and Install and 2“ Long Side Service Connections Including up to 120 feet of service line to existing meters per plans and specifications for the unit price of _____ Dollars and _____ Cents/EA	$ _____	$ _____

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
40	2	EA.	Furnish and Install and 2“ Short Side Service Connections Including up to 60 feet of service line to existing meters per plans and specifications for the unit price of _____ Dollars and _____ Cents/EA	$_____	$_____
41	500	L.F.	Open Cut and Repair Asphalt Surface per plans and specifications for the unit price of _____ Dollars and _____ Cents/LF	$_____	$_____
42	500	L.F.	Open Cut and Repair Concrete Surface per plans and specifications for the unit price of _____ Dollars and _____ Cents/LF	$_____	$_____

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
43	1	LS	Trench Safety per plans and specifications for the lump sum price of _____ _____ Dollars and Cents/LS	$_____	$_____
44	1	LS	Furnish all labor and install all equipment for testing and sterilization of treated mains and appurtenances per plans and specifications for the lump sum price of _____ _____ Dollars and Cents/LS	$_____	$_____
			TOTAL OF ALL ITEMS (1-44)		**$_____**

NOTES

1) Miscellaneous items, directed work, connections, etc., not specifically listed but required to complete the proposed improvements to a complete and operational system shall be included in the Bid under the most appropriate Bid Item.

2) Time required to complete base bid work shall be 365 calendar days.

3) Contractor is solely responsible for the complete abandonment of all existing mains unless otherwise noted.