



**Matthew G. Bevin**  
Governor

**COMMONWEALTH OF KENTUCKY**  
**TRANSPORTATION CABINET**  
Frankfort, Kentucky 40622  
[www.transportation.ky.gov/](http://www.transportation.ky.gov/)

**Greg Thomas**  
Secretary

August 30, 2019

CONTRACT ID NO. 19-9002  
ADDENDUM #4

Subject: Boone County

- (1) Instructions to Proposers - Replace pages 2,25,80, 82 and 83
- (2) Appendices - Replace Appendix C3, Replace entire Appendix F, Replace Special Note Summary in I-1, Add 3 Special Notes to Appendix I-3
- (3) Plan Set - Add water line relocation plan with page #'s U12-U47 to the 6-14 plan set, Replace the current 32 pages of gas line relocation plans with new 37 pages for the 6-14 plan set, Add water line relocation plans with page#'s U39-U95A to the 6-18 plan set, Add 62 pages of gas line relocation plans for the 6-18 plan set

Proposal revisions are available at

<http://transportation.ky.gov/Construction-Procurement/Pages/Design-Build-Projects.aspx>.

If you have any questions, please contact us at 502-564-3500.

Sincerely,

A handwritten signature in cursive script that reads "Rachel Mills".

Rachel Mills, P.E.  
Director  
Division of Construction Procurement

RM:mr  
Enclosures



An Equal Opportunity Employer M/F/D

## 1. **PROJECT IDENTIFICATION**

**Contract No.** 19-9002

**State Project Nos.** FD52 008 075 175-176  
FD52 008 075 177-179  
FD52 008 075 169-178

**County:** Boone

**Routes:** KY 338, KY 536, I-75

**Local Route Names:** Richwood Road, Mt. Zion Road

### 1.1 **PROJECT SCHEDULE**

The submittal process shall involve a 3-step process (Statements of Qualifications, Technical Proposal, and Price Proposal). Below is a schedule of dates for the submittal:

<b>Date</b>	<b>Submittal</b>
Early May 2019	Advertisement
May 17, 2019	Pre-Proposal Meeting (Mandatory)
May 31, 2019	Statements of Qualifications Due
June 14, 2019	Short-list
June 19, 2019 thru September 4, 2019	Alternate Technical Concept Process
September 11, 2019	Alternate Technical Concept Approvals
October 4, 2019	Technical Proposals Due
October 18, 2019	Price Proposals Due
By October 31, 2019	Project Award
November 1, 2022	Project Completion Date

### 1.2 **PROJECT-RELATED INFORMATION**

The following information is available for review and use by the Design-Build Team (DBT) in the online archive at the following location:

<https://transportation.ky.gov/Construction-Procurement/Pages/Design-Build-Projects.aspx>

- A. Project Map and KMZ's (KY 338, KY 536 and I-75)

The following information is available for review and use by the Design-Build Team (DBT) at the Pre-Proposal Meeting:

#### **6-18: KY 338 Richwood Road Interchange**

- A. Advanced Construction Plans including Roadway, Structures, MOT, Traffic, and Utilities included in contract, and utility reference plans. Final stamped plans will be available on **July 15, 2019**.
- B. Preliminary Railroad Plans
- C. Drainage Folders

(See Section 14.2 for correlation of Completion Date and Price Proposal). If the project is not completed by the completion date identified in the DBT's proposal, per Section 108.09 of the Standard Specifications, liquidated damages shall be applied for each calendar day including weekends and holidays. Contrary to current specifications, the liquidated damage rate shall be \$15,000.00 per day, and will be assessed through the winter months and during any times when a work item cannot be pursued due to seasonal limitations.

## **6.1 ALTERNATE TECHNICAL CONCEPT (ATC)**

### **6.1.1 DEFINITION**

An Alternative Technical Concept (ATC) is a change to the Project Scope that provides a solution that is equal to or better than the required scope as determined by KYTC. The ATC process allows for innovation, increased flexibility, time reductions, and cost savings to deliver the best value for the public. Where the Contract Documents reference specific patented, proprietary material; or semi-finished or finished article, product, or item for incorporation into the work, the DBT may submit an ATC for approval of an alternative material, article, product, or item that meets or exceeds the requirements and intent of the Contract work, provided that the material, article, product, or item is equal or better in quality, performance, and function, based upon documented engineering analysis. ATCs are not intended to replace pre-bid questions.

### **6.1.2 SUBMISSION REQUIREMENTS**

DBTs may submit ATC documents for consideration by the KYTC beginning June 19, 2019. KYTC will review all ATCs through **September 4, 2019**. Each ATC may include multiple issues to be considered by KYTC. The DBTs shall clearly identify each individual portion of the ATC proposal that is a proposed change to the Project Scope.

A DBT shall submit one (1) unbound version of the ATC, and one (1) CD/DVD or one (1) USB "thumb" drive containing two (2) electronic files of the ATC as follows:

- A. One (1) electronic searchable single file PDF which does not restrict printing or copying text, images, and other content.
- B. One (1) electronic password protected single file PDF which restricts copying of text, images, and other content.

Alternate Technical Concepts shall be received no later than 4:00 p.m., Eastern Time, on **September 4, 2019**. The KYTC shall reject any proposal received after aforementioned date and time and return it unopened to the DBT. In order to be considered, the original ATC shall be signed in blue ink by an authorized representative of the DBT.

The submittal shall either be mailed or hand delivered to:

Rachel Mills, PE, Director  
Division of Construction Procurement  
200 Mero Street  
Frankfort, KY 40622

Regulations listed in Section 7.1 of this document, the KYTC will advise the DBT of the short comings and direct the DBT to revise and resubmit the plan. No time extension shall be granted as a result of such action. The KYTC will schedule a review meeting or issue review comments as appropriate.

In the event the DBT believes that any review comment, or orders issued by the KYTC, require a change to the scope of the agreed work, the DBT shall first contact the KYTC for clarification and shall, within 10 days of receipt of the comments or orders, provide written notice to the District Project Manager and Project Engineer concerning the reasons why the DBT believes the scope has been changed.

**15.2 MAJOR DESIGN DECISION**

Separate submittals for concurrence with major design decisions are required. Major design decisions involve significant utility relocation, unforeseen acquisition of ROW, traffic operation or geometric decisions that involve two or more viable solutions, and any other decision that impacts the public, operation of the facility or future maintenance.

When the DBT becomes aware of additional decisions during the course of the design, they shall advise KYTC’s Project Manager in writing.

**15.3 CONSTRUCTION PLANS**

After the review comments for the final plan review submission have been complied with, and following approval of the design documentation, the DBT shall prepare plan sets for use during construction. All review comments shall be resolved in writing by the DBT to satisfaction of the KYTC before DBT submits the construction plans. Each plan sheet shall have its last revised date noted on the sheet and clearly marked “Approved For Construction”. Physical construction shall not begin until the plans marked “Approved For Construction” (by the Project Manager) are delivered to each party on the Plan Distribution Table below. KYTC will comment on these plans within 14 working days of their submission by the Project Manager. No time extensions will be approved by the Project Manager if the plan distribution is not completed and project delays occur as a result.

If the DBT chooses to utilize all, or portions, of the provided final stamped plans for either 6-14, 6-18, or proposal plans for 6-20002, then the DBT project manager shall indicate on the front layout sheet for each plan set, exactly which sheets are “Approved for Construction” according to KYTC’s design and PE of record. The DBT project manager shall also attest on the front layout sheet which plan pages contain redesigns by the DBT and have been stamped and signed by the PE of record for the DBT.

The DBT shall supply full size (22”x36”) and/or half size (11”x17”) paper prints and electronic pdf version of each plan submission simultaneously to the parties indicated below:

<b>Plans Distribution Table</b>	<b>Number of half size sets</b>
KYTC District Office	4
KYTC Central Office	2

## INDEX OF APPENDICES

### APPENDIX A - FORMS

- Appendix A1: Form A for SOQ Submittal
- Appendix A2: Acknowledgement of Receipt of Proposal Addenda (Form “AOR”)
- Appendix A3: Form “PP” – Price Proposal

### APPENDIX B - ADMINISTRATIVE

- Appendix B1: DBE Conditions
- Appendix B2: EEO / Wage Rates / Insurance / FHWA 1273 / Ethics
- Appendix B3: Documents for Bid

### APPENDIX C - DATA

- Appendix C1: Design Executive Summaries
- Appendix C2: Traffic Data and Signal Requests
- Appendix C3: CAP
- Appendix C4: Drainage

### APPENDIX D - ENVIRONMENTAL

- Appendix D1: Environmental Document (CE-3)
- Appendix D2: ACOE & DOW Permits

### APPENDIX E - RIGHT OF WAY

- Appendix E1: Right of Way Project Reports (Form TC 62-75)
- Appendix E2: Right of Way Requirements for an Approved ATC

### APPENDIX F - UTILITIES

- Appendix F1: Utility Impact Notes
- Appendix F2: Overhead Utility Plans (for information only) [Pending]
- Appendix F3: Utility Reference Plans (for information only) [Pending]
- Appendix F4: Duke Gas Specifications
- Appendix F5: Water Specifications
- Appendix F6: SD1 Sanitary Sewer Specifications
- Appendix F7: Utility Agreements [Pending]
- Appendix F8: Electric and Communications Ducts

## **APPENDIX G - RAILROAD**

Appendix G1: Railroad Construction Agreement [Pending]

Appendix G2: Railroad Right of Entry [Pending]

## **APPENDIX H – GEOTECHNICAL**

Appendix H1: KY 536 (Item No. 6-14) Geotechnical Reports (Roadway)

Appendix H2: KY 536 (Item No. 6-14) Geotechnical Reports (Structures)

Appendix H3: KY 338 (Item No. 6-18) Geotechnical Reports (Roadway)

Appendix H4: KY 338 (Item No. 6-18) Geotechnical Reports (Structures)

Appendix H5: KY 338 (Item No. 6-18) Geotechnical Reports (Railroad) [Pending]

## **APPENDIX I - CONSTRUCTION**

Appendix I1: Overall Notes (all 3 projects)

Appendix I2: KY 536 Notes

Appendix I3: KY 338 Notes

Appendix I4: I-75 Rehab Notes

Appendix I5: CPM

VOX PN: 100870004

USER: \$\$\$\$USER\$\$\$\$

DATE: \$\$\$\$DATE\$\$\$\$

FILE NAME: \$\$\$\$design\$file\$specification\$\$\$\$

E-SHEET NAME:

PREPARED BY	_____	DATE	_____
CHECKED BY	_____	DATE	_____
APPROVED BY	_____	DATE	_____

# WATER MAIN SUMMARY

ITEM CODE	ITEM	UNIT	TOTALS	8" BEND & BLOCK	12" BEND & BLOCK	8" RESTRAINED JOINT BEND & BLOCK	12" RESTRAINED JOINT BEND & BLOCK	12" RESTRAINED JOINT BEND- NO BLOCK	8" PLUG & BLOCK	4" X 2" REDUCER	8"X8"X4" TEE AND BLOCK	12"X12"X6" TEE AND BLOCK	12"X12"X8" TEE AND BLOCK	12"X12"X8" RESTRAINED JOINT TEE- NO BLOCK	12"X12"X8" RESTRAINED JOINT TEE AND BLOCK	12"X12"X12" TEE AND BLOCK	6" 90° BEND AT FIRE HYDRANT
14009	W ENCASUREMENT STEEL BORED RANGE 4 (16")	LF	307														
14010	W ENCASUREMENT STEEL BORED RANGE 5 (24")	LF	397														
14015	W ENCASUREMENT STEEL OPEN CUT RANGE 4 (16")	LF	250														
14016	W ENCASUREMENT STEEL OPEN CUT RANGE 5 (24")	LF	215														
14019	W FIRE HYDRANT ASSEMBLY	EA	6														1
14020	W FIRE HYDRANT RELOCATE	EA	12														
14029	W METER ADJUST	EA	5														
14030	W METER RELOCATE	EA	21														
14031	W METER VALVT RANGE 2	EA	1														
14037	W PIPE DUCTILE IRON 08 INCH	LF	1158		24												
14039	W PIPE DUCTILE IRON 12 INCH	LF	3103		10												
14040	W PIPE DUCTILE IRON RESTRAINED JOINT 08 INCH	LF	1459														
14050	W PIPE DUCTILE IRON RESTRAINED JOINT 12 INCH	LF	2600			29											
14076	W REMOVE TRANSITE (AC) PIPE	LF	410				13	16									
14145	W SERVICE COPPER LONG SIDE 1 INCH	EA	4														
14147	W SERVICE COPPER LONG SIDE 2 INCH	EA	1														
14148	W SERVICE COPPER LONG SIDE 3/4 INCH	EA	1														
14149	W SERVICE COPPER SHORT SIDE 1 INCH	EA	15														
14150	W SERVICE COPPER SHORT SIDE 1-1/2 INCH	EA	1														
14151	W SERVICE COPPER SHORT SIDE 2 INCH	EA	2														
14152	W SERVICE COPPER SHORT SIDE 3/4 INCH	EA	4														
14088	W STRUCTURE REMOVAL	EA	1														
14091	W TIE-IN 02 INCH	EA	1														
14094	W TIE-IN 06 INCH	EA	3							1							
14094	W TIE-IN 08 INCH	EA	6														
14094	W TIE-IN 12 INCH	EA	4														
14105	W VALVE 06 INCH	EA	1														
14106	W VALVE 08 INCH	EA	13														
14108	W VALVE 12 INCH	EA	18														
14113	W VALVE BOX ADJUST	EA	6														
14114	W VALVE CUT-IN 02 INCH	EA	1														
14117	W VALVE CUT-IN 06 INCH	EA	1														
14118	W VALVE CUT-IN 08 INCH	EA	4														

## - BOONE COUNTY WATER DISTRICT - WATER MAIN CONSTRUCTION ONLY

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U12

*WIDENING OF KY 536  
I-75 to U.S. 25*

Addendum #4 -- 8-30-19

**\* NOTES \***

1. Contractor shall supply field notes upon completion of project in sufficient detail to prepare Record Drawings.
2. Location of utilities and structures both existing and proposed, are shown on the plans from data available at time of bidding, and are not necessarily complete or correct. Contractor shall verify the location of all utilities and structures from damage oil existing utilities and structures whether shown on the plans or not. If damage is caused, the contractor will be responsible for repair or restoration of same to the satisfaction of the Engineer and the utility company.
3. Contractor to uncover and confirm exact location of existing water mains and services at connection points prior to construction. (Incidental)
4. Prior to start of any water main construction, a "Sequence of Construction" shall be provided in writing to the Boone County Water District.
5. Contractor to coordinate and expedite the water main construction in the proper phases of the project and minimize the shut-down of the water mains.
6. Contractor to coordinate all shut-down times with the Boone County Water District. Water shutdown for tie-ins may be required to be performed at night at the discretion of Boone County Water District. PHONE: 859-586-6155
7. Contractor may be required to make temporary water main and service connections, using approved BOWD materials and methods, during phasing sequences to provide continuous water service. This is incidental to the cost of water main construction. All abandoned water meters are to be removed, removed, and services disconnected by the contractor. Contractor to confirm disconnect with BOWD prior to construction. Items and instruction labels in (parenthesis) are incidentals to the construction and cost of item.
10. Any adjustments or relocations of items to final grades and locations will be considered "incidental" to cost and construction of item.
11. ALL D.I.P. TO BE CLASS 50 WITH BLUE POLYWRAP
12. ALL P.V.C. TO BE C-900 DR 14
13. Tees, Bends, Caps, Plugs or any other fittings installed with new man are to be considered incidental and included in pipe price. These items are not paid separately and do not have separate bid items.
14. Excavation in proposed areas outside of road construction shall be backfilled above initial bedding with flowable fill to subgrade of the existing pavement. The pavement shall be saw cut to meet lines and replaced in-kind. Alternative backfill or pavement restoration methods shall be approved by the KYTC Section Engineer before use. All costs for restoration of areas outside of road construction shall be considered incidental to water main construction.
15. Blasting of rock shall not be permitted on this project.

FOR FURTHER INSTRUCTIONS AND EXPLANATIONS,  
SEE BID SPECIFICATIONS !!!

**WATER MAIN PLAN PREPARED FOR:**  
**BOONE COUNTY WATER DISTRICT**  
2475 Burlington Pike  
Burlington, Ky 41005-0018



PAGE 1 OF 36

WATER MAIN SUMMARY

VOXX PN: 100812004

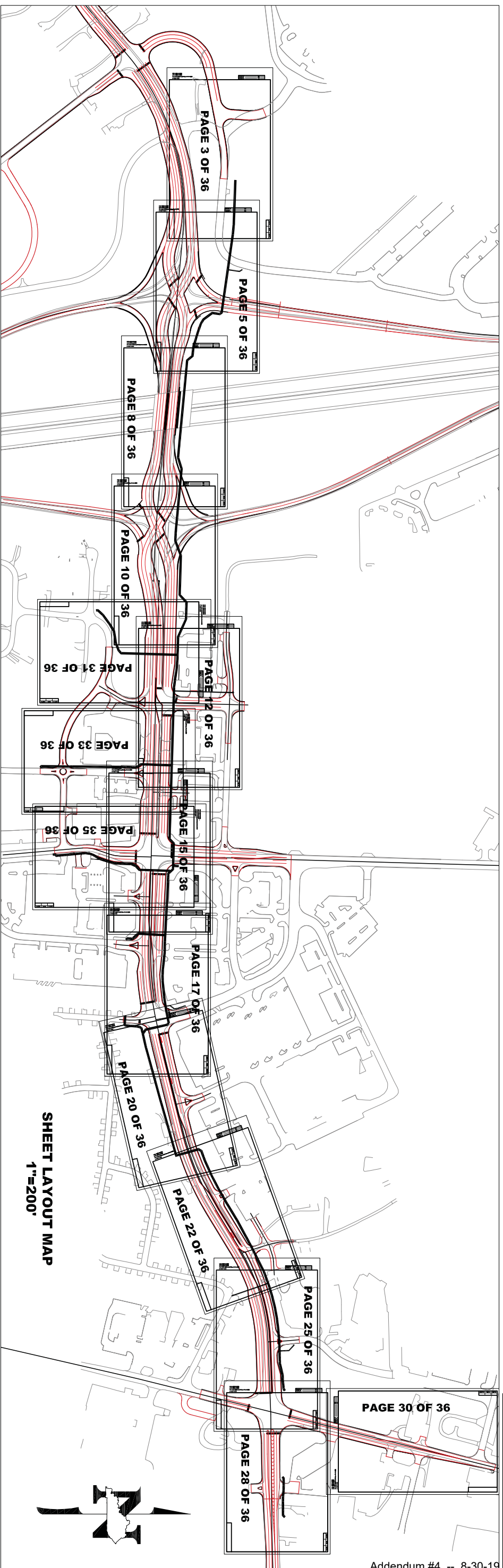
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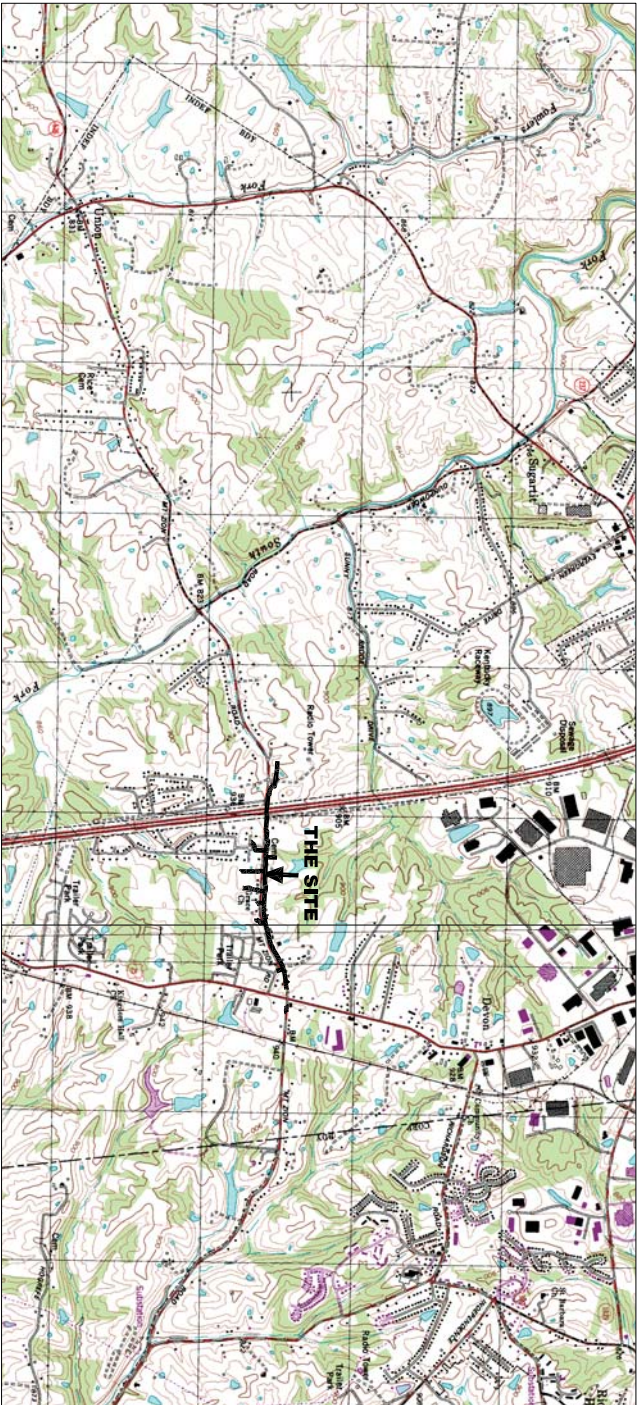
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CHECKED BY _____	DATE _____
APPROVED BY _____	DATE _____

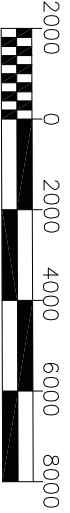


\* NOTES \*

1. Contractor shall supply field notes upon completion of project in sufficient detail to prepare "Record Drawings".
2. Location of utilities and structures, both existing and proposed, are shown on the plans from data available at time of construction. During construction the contractor shall use diligence in protecting from damage all existing utilities and structures whether shown on the plans or not. If damage is caused, the contractor will be responsible for repair or restoration of same to the satisfaction of the Engineer and the utility company.
3. Contractor to uncover and confirm exact location of existing water mains and services at connection points prior to construction. (incidental)
4. Prior to start of any water main construction, a "Sequence of Construction" shall be provided in writing to the Boone County Water District.
5. Contractor to coordinate and expedite the water main construction time to coordinate with the other work.
6. Contractor to coordinate all shut-down times with the Boone County Water District. Water shutdown for tie-ins may be required to be performed at night at the discretion of Boone County Water District. PHONE: 859-586-6155
7. Contractor may be required to make temporary water main and service connections, using approved BCWD materials and methods; during phasing sequences to provide continuous water service. This is incidental to the cost of water main construction. All connections to be completed, removed, and services disconnected by the contractor, remove, and services disconnected by Boone County Water District.
8. Contractor to confirm disconnect with BCWD prior to construction. Items and instruction labels in (parentheses) are incidentals to the construction and cost of item.
9. Any adjustments or relocations of items to final grades and locations will be considered "incidental" to cost and construction of item.
11. ALL D.I.P. TO BE CLASS 50 WITH BLUE POLYWRAP
12. ALL P.V.C. TO BE C-900 DR 14
13. Tees, Bends, Cops, Plugs or any other fittings included with new main are to be considered incidental and included in pipe price. These items are not paid separately and do not have separate bid items.
14. Excavation in paved areas outside of road construction shall be backfilled above initial bedding with flowable fill to subgrade of the existing pavement. The pavement shall be saw cut to meet lines and replaced in-kind. Alternative backfill or pavement restoration methods shall be approved by the KYTC Section Engineer before use. All costs for restoration of areas outside of road construction shall be considered incidental to water main construction.
15. Blasting of rock shall not be permitted on this project.



U.S.G.S.  
UNION AND INDEPENDENCE QUADRANGLE



GRAPHIC SCALE IN FEET

FOR FURTHER INSTRUCTIONS AND EXPLANATIONS,  
SEE BID SPECIFICATIONS !!!

SHEET LAYOUT MAP  
1"=200'

**BOONE COUNTY**  
**MT. ZION ROAD (KY 536)**  
**WATER MAIN RELOCATION PLANS**  
FD52 106 0053 006-009  
ITEM 6-14.00

WATER MAIN PLAN PREPARED FOR:  
**BOONE COUNTY WATER DISTRICT**  
2475 Burlington Pike  
Burlington, Ky 41005-0018  
ph: 859-586-6155

WATER MAIN PLAN PREPARED BY:



Civil Engineers, Surveyors and Landscape Architects  
P: (606) 772-2593 • Fax: (606) 772-2452 • www.voxxinc.com

**PG 2 OF 36**

WATER MAIN LAYOUT SHEET

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U13



VIOX PN: 100815002

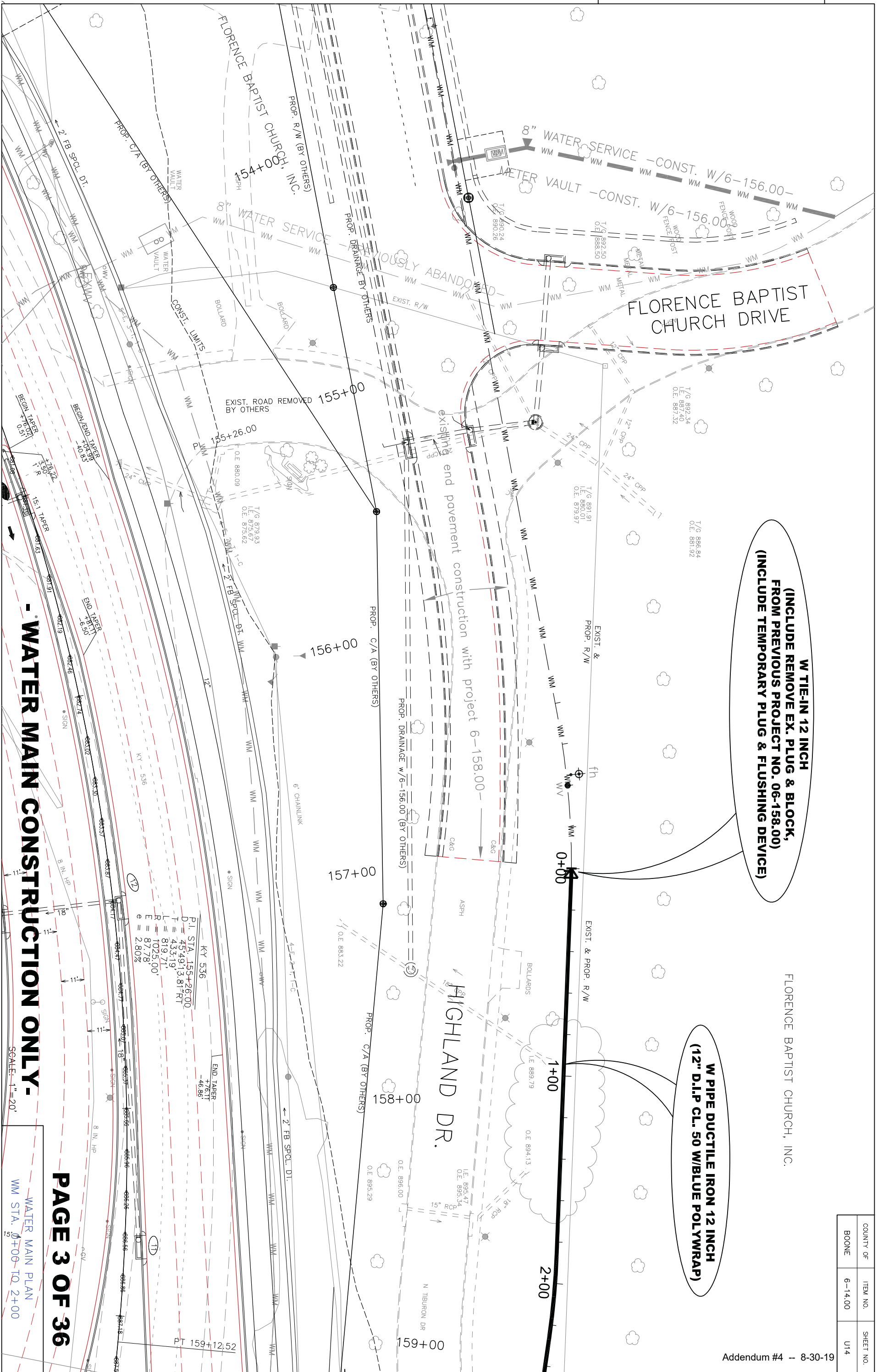
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FILE NAME: \$\$\$\$design\$file\$specification\$\$\$

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PREPARED BY	_____	DATE	_____
CHECKED BY	_____	DATE	_____
APPROVED BY	_____	DATE	_____



**W TIE-IN 12 INCH  
(INCLUDE REMOVE EX. PLUG & BLOCK,  
FROM PREVIOUS PROJECT NO. 06-158.00)  
(INCLUDE TEMPORARY PLUG & FLUSHING DEVICE)**

**W PIPE DUCTILE IRON 12 INCH  
(12" D.I.P CL. 50 W/BLUE POLYWRAP)**

**- WATER MAIN CONSTRUCTION ONLY -**

P.I. STA. 155+26.00  
 D = 45.4913.81 RT  
 T = 4.33.19  
 L = 819.71  
 R = 1025.00  
 E = 87.78  
 e = 2.80%

**PAGE 3 OF 36**

WATER MAIN PLAN  
WM STA. 0+00 TO 2+00

FLORENCE BAPTIST CHURCH, INC.

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U14

Addendum #4 - 8-30-19

VIOX PN: 100815002

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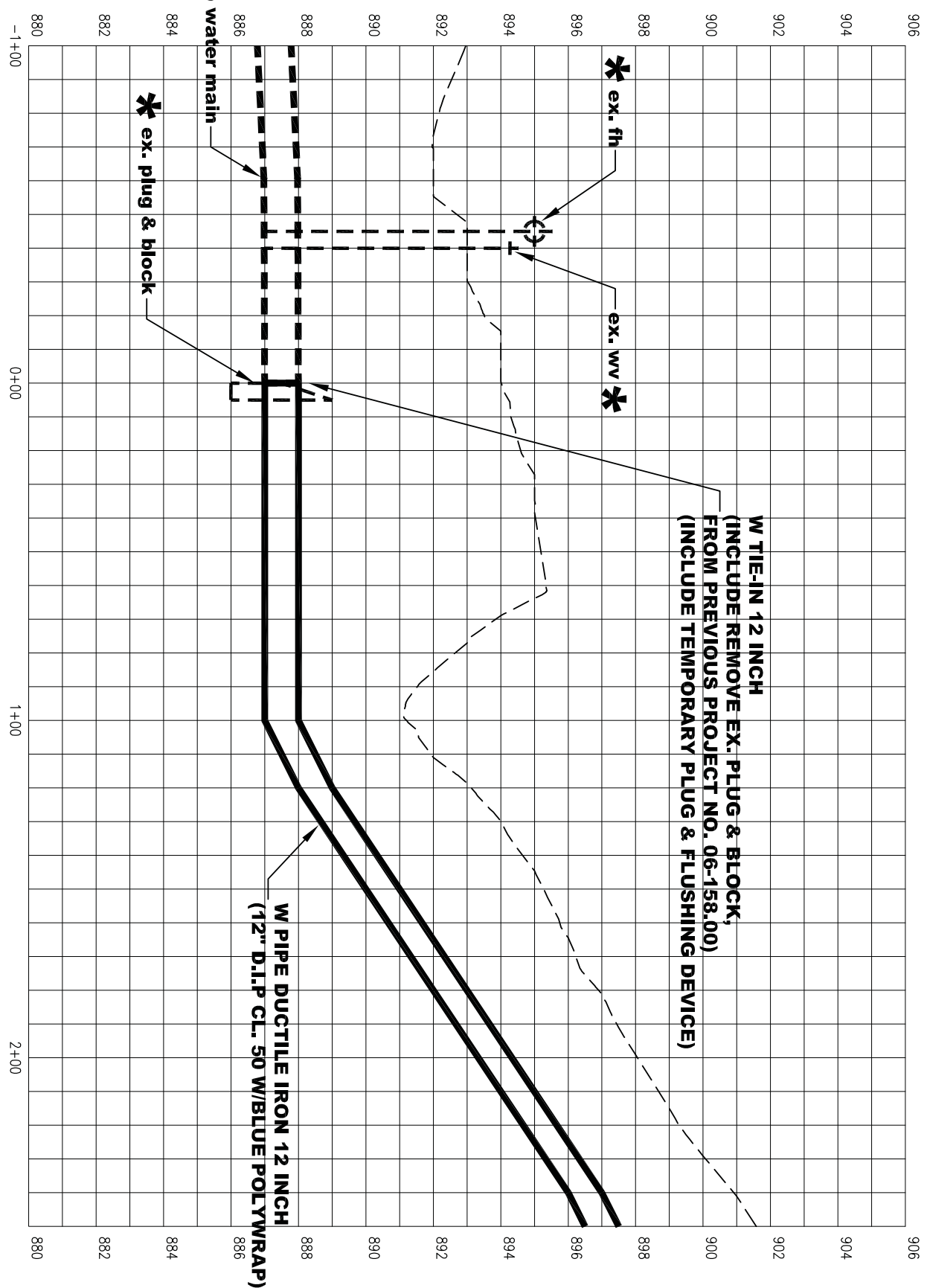
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PREPARED BY _____	DATE _____
CHECKED BY _____	DATE _____
APPROVED BY _____	DATE _____

**NOTE:**  
 ROTATE BENDS VERTICAL WHERE REQUIRED.  
 DEFLECT PIPE WHERE POSSIBLE: MAX. DEFLECTION - 6"-8"-12" = 5"

**\* Items previously installed  
 with project 6-158.00**

**\* ex. 12" d.i.p water main**



HORIZONTAL ~ 1"=20'  
 VERTICAL ~ 1"=2'

**- WATER MAIN CONSTRUCTION ONLY -**

COUNTRY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U15

Addendum #4 -- 8-30-19

VIOX PN: 100815002  
USER: \$\$\$USER\$\$\$  
DATE: \$\$\$DATE\$\$\$  
FILE NAME: \$\$\$design\$file\$specification\$\$\$  
E-SHEET NAME:

PREPARED BY \_\_\_\_\_ DATE \_\_\_\_\_  
CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
APPROVED BY \_\_\_\_\_ DATE \_\_\_\_\_

**(SEE NOTE NO. 14 ON SHEET 1 OF 36)**

W TIE-IN 08 INCH  
(2- 45° BEND & BLOCKS)  
(INCLUDE TEMP. PLUG & FLUSHING DEVICE)

W FIRE HYDRANT RELOCATE

W PIPE DUCTILE IRON 12 INCH  
(CL. 50 W/BLUE POLYWRAP)

W STRUCTURE REMOVAL  
(OLD VAULT)

W PIPE DUCTILE IRON 08 INCH  
(CL. 50 W/BLUE POLYWRAP)

W METER VAULT RANGE 2  
(8")

(12", 22 1/2° RJ VERTICAL BEND & BLOCK)

(12", 22 1/2° RJ VERTICAL BEND- NO BLOCK)

W ENCASEMENT STEEL BORED  
RANGE 5 (40 LF 24")  
W ENCASEMENT STEEL OPEN CUT  
RANGE 5 (35'+19'=54 LF 24")

NOTE: RJ = RESTRAINED JOINT

RAMP F-2  
P.I. STA. 21622+04.93  
D = 89+34.40/28" LT  
T = 99+27'  
L = 156.34'  
R = 100.00'  
E = 40.90'  
e = 2.00%

W PIPE DUCTILE IRON  
RESTRAINED JOINT 12 INCH  
(CL. 50 W/BLUE POLYWRAP)

W FIRE HYDRANT ASSEMBLY

(12", 11 1/4° RJ BEND- NO BLOCK)

(12", 11 1/4° RJ BEND- NO BLOCK)

(12", 45° RJ BEND & BLOCK)

(12", 45° RJ BEND: NO BLOCK)

**- WATER MAIN CONSTRUCTION ONLY -**

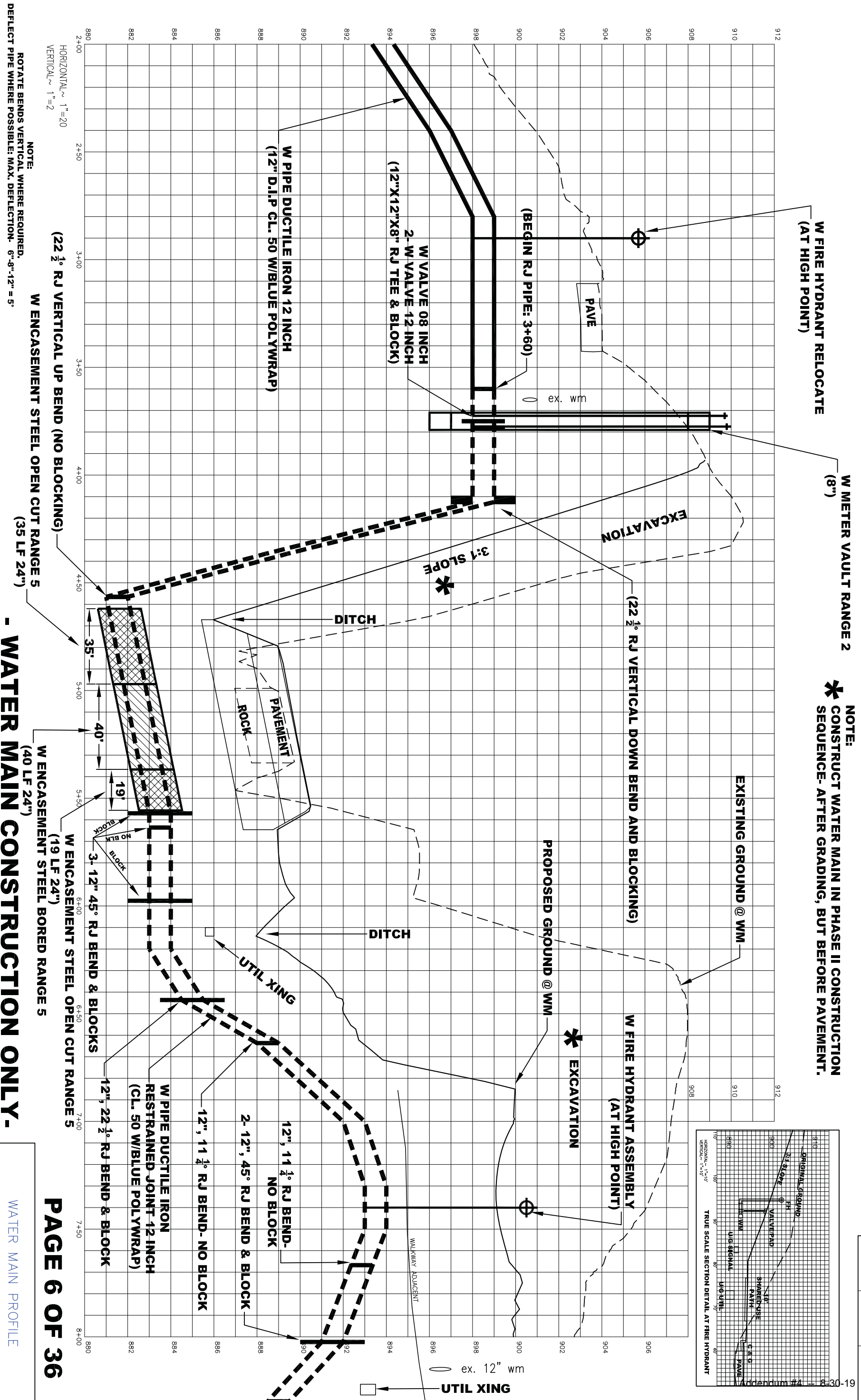
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**PAGE 5 OF 36**

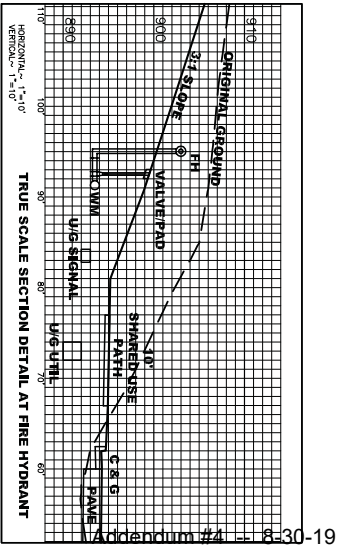
WATER MAIN PLAN  
WM STA. 2+00 TO STA. 8+00

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U16

Addendum #4 - 8-30-19



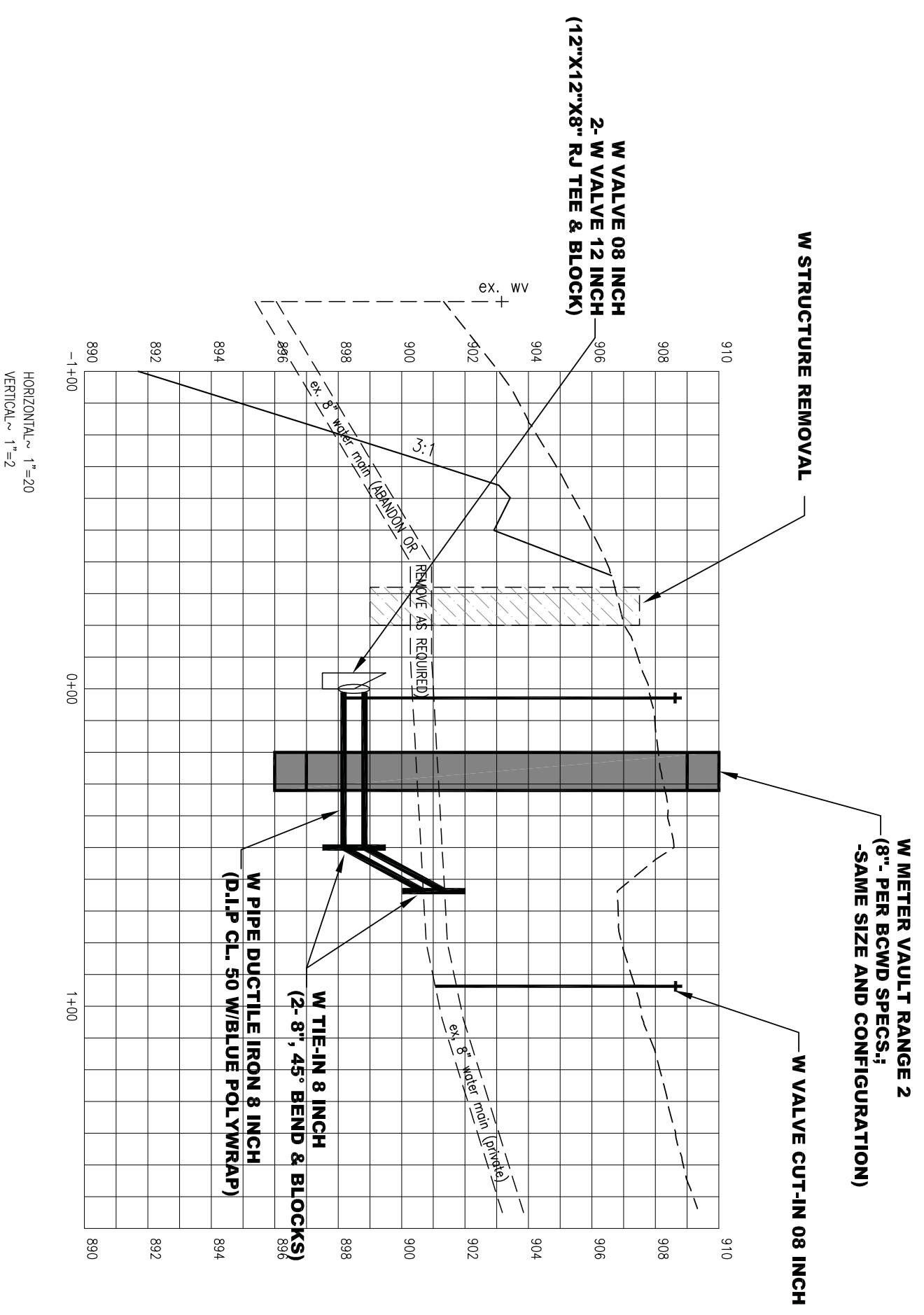
**NOTE:**  
 \* CONSTRUCT WATER MAIN IN PHASE II CONSTRUCTION SEQUENCE AFTER GRADING, BUT BEFORE PAVEMENT.



COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U17

COUNTRY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U18

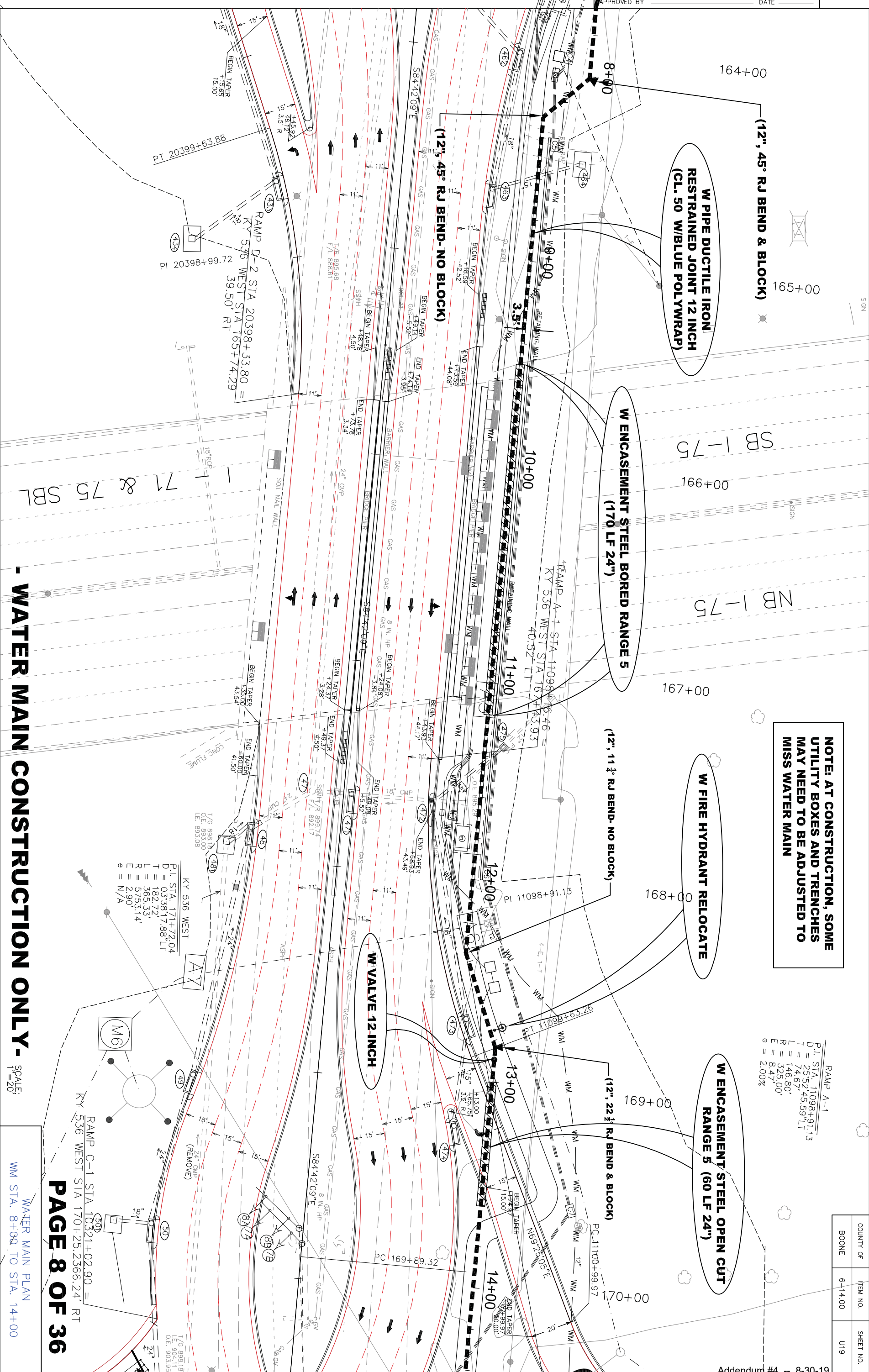
Addendum #4 -- 8-30-19



**NOTE:**  
 ROTATE BENDS VERTICAL WHERE REQUIRED.  
 DEFLECT PIPE WHERE POSSIBLE: MAX. DEFLECTION- 6"-8"-12" = 5°

**- WATER MAIN CONSTRUCTION ONLY -**

PREPARED BY	_____	DATE	_____
CHECKED BY	_____	DATE	_____
APPROVED BY	_____	DATE	_____



**NOTE: AT CONSTRUCTION, SOME UTILITY BOXES AND TRENCHES MAY NEED TO BE ADJUSTED TO MISS WATER MAIN**

RAMP A-1  
 P.I. STA. 11098+91.13  
 D = 25.52, 45.59' LT  
 T = 74.67'  
 L = 146.80'  
 R = 325.00'  
 E = 847.00'  
 e = 2.00%

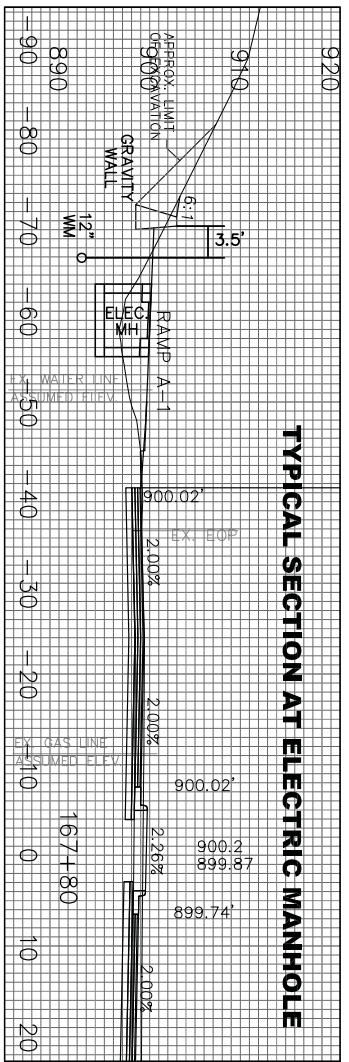
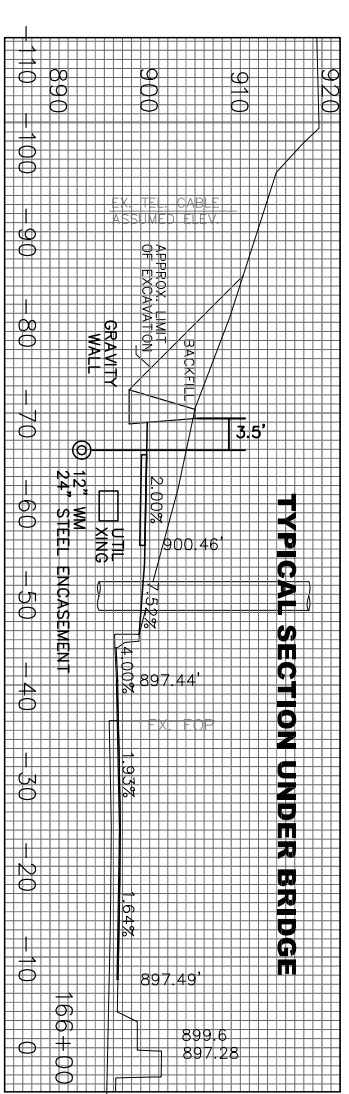
KY 536 WEST  
 P.I. STA. 171+72.04  
 D = 03.38, 17.88' LT  
 T = 182.72'  
 L = 365.33'  
 R = 575.314'  
 E = 2.90'  
 e = N/A

**- WATER MAIN CONSTRUCTION ONLY -**

SCALE: 1"=20'

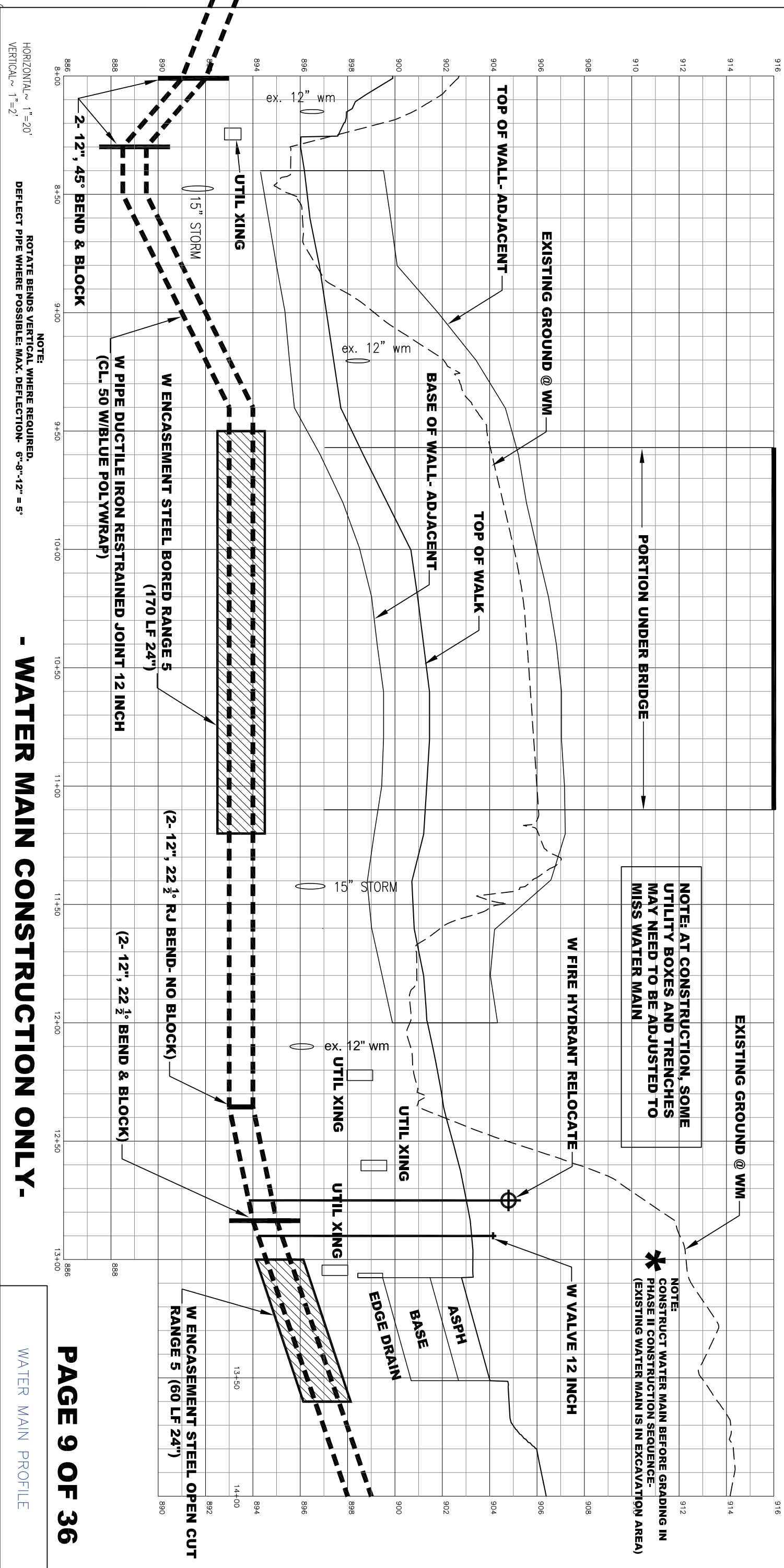
WATER MAIN PLAN  
 WM STA. 8+00 TO STA. 14+00

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U19



Addendum #4 -- 8-30-19

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U20



HORIZONTAL ~ 1"=20'  
VERTICAL ~ 1"=2'

NOTE:  
ROTATE BENDS VERTICAL WHERE REQUIRED.  
DEFLECT PIPE WHERE POSSIBLE; MAX. DEFLECTION- 6"-8"-12" = 5°

**- WATER MAIN CONSTRUCTION ONLY -**

PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

RAMP C-1  
 P.I. STA. 10320+52.93  
 D = 652723.75' LT  
 T = 64.27'  
 R = 114.24'  
 E = 18.87'  
 e = 2.00%  
 PC: 11100+99.97

**W PIPE DUCTILE IRON  
 27" RESTRAINED JOINT 12 INCH  
 (CL. 50 W/BLUE POLYWRAP)**

**W ENCASUREMENT STEEL BORED RANGE 5  
 (40 LF 24")**

**W ENCASUREMENT STEEL BORED RANGE 5  
 (34 LF 24")  
 W ENCASUREMENT STEEL OPEN CUT RANGE 5  
 (26 LF 24")**

**W FIRE HYDRANT ASSEMBLY**

**(12", 45° RJ BEND-  
 NO BLOCK)**

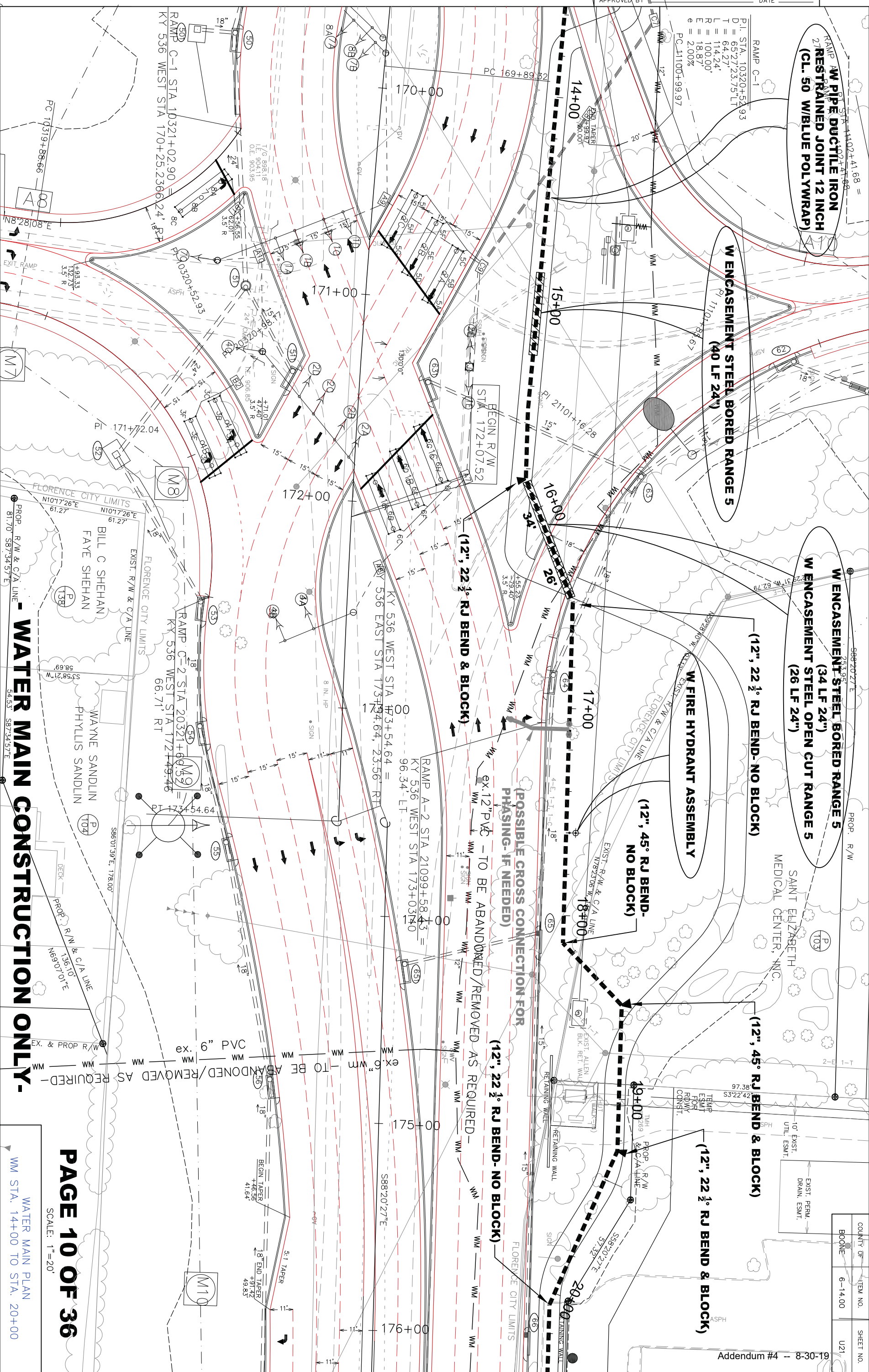
**(12", 45° RJ BEND & BLOCK)**

**(12", 22 1/2° RJ BEND & BLOCK)**

**(12", 22 1/2° RJ BEND & BLOCK)**

**(12", 22 1/2° RJ BEND- NO BLOCK)**

**(12", 22 1/2° RJ BEND- NO BLOCK)**



**WATER MAIN CONSTRUCTION ONLY**

**PAGE 10 OF 36**

SCALE: 1"=20'

WATER MAIN PLAN  
 WM STA. 14+00 TO STA. 20+00

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U21

Addendum #4 -- 8-30-19



VIOX: 100015002

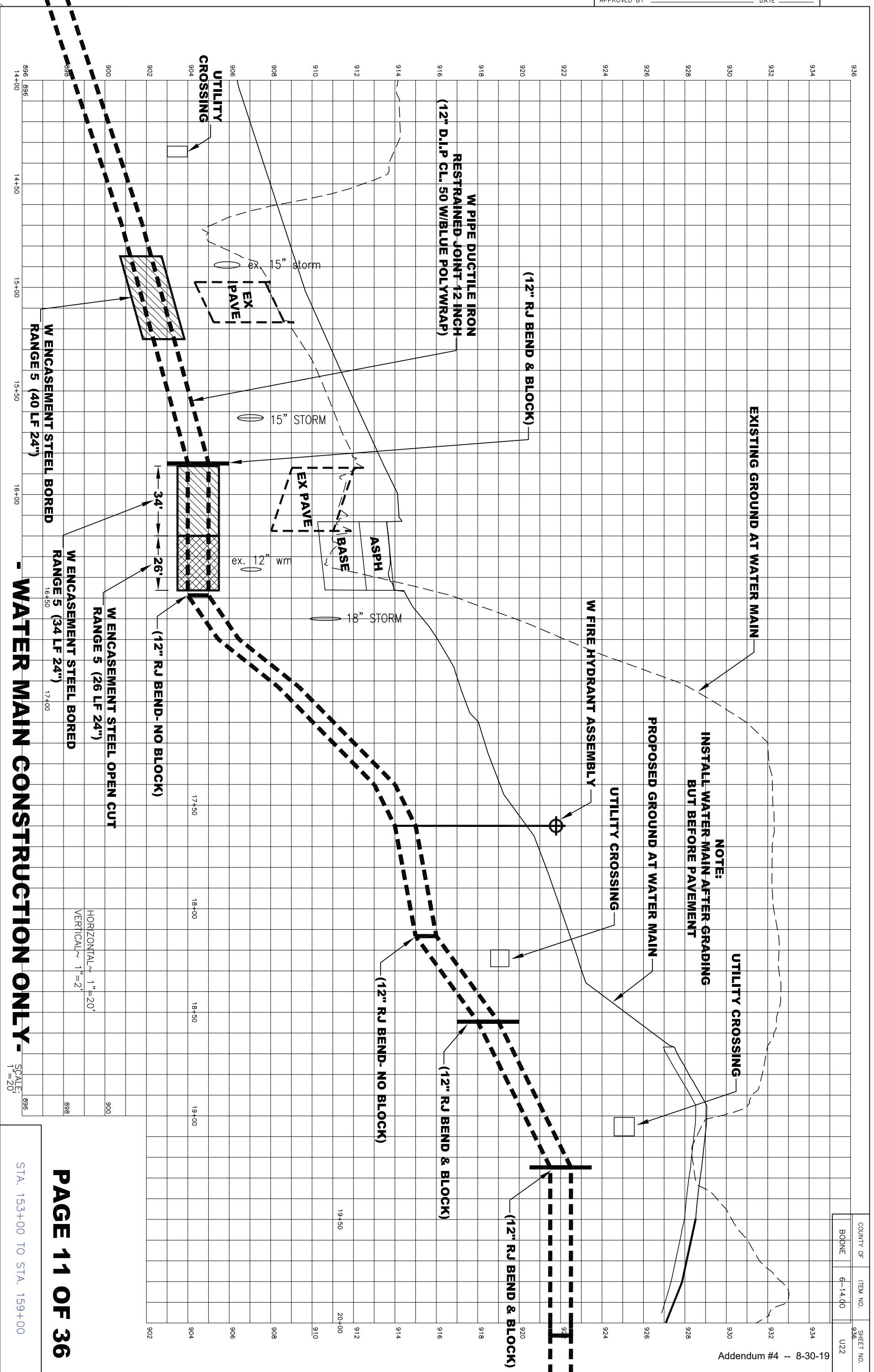
USER: \$\$\$USER\$\$\$

DATE: \$\$\$DATE\$\$\$

FILE NAME: \$\$\$design\$file\$specification\$\$\$

E-SHEET NAME:

PREPARED BY _____	DATE _____
CHECKED BY _____	DATE _____
APPROVED BY _____	DATE _____

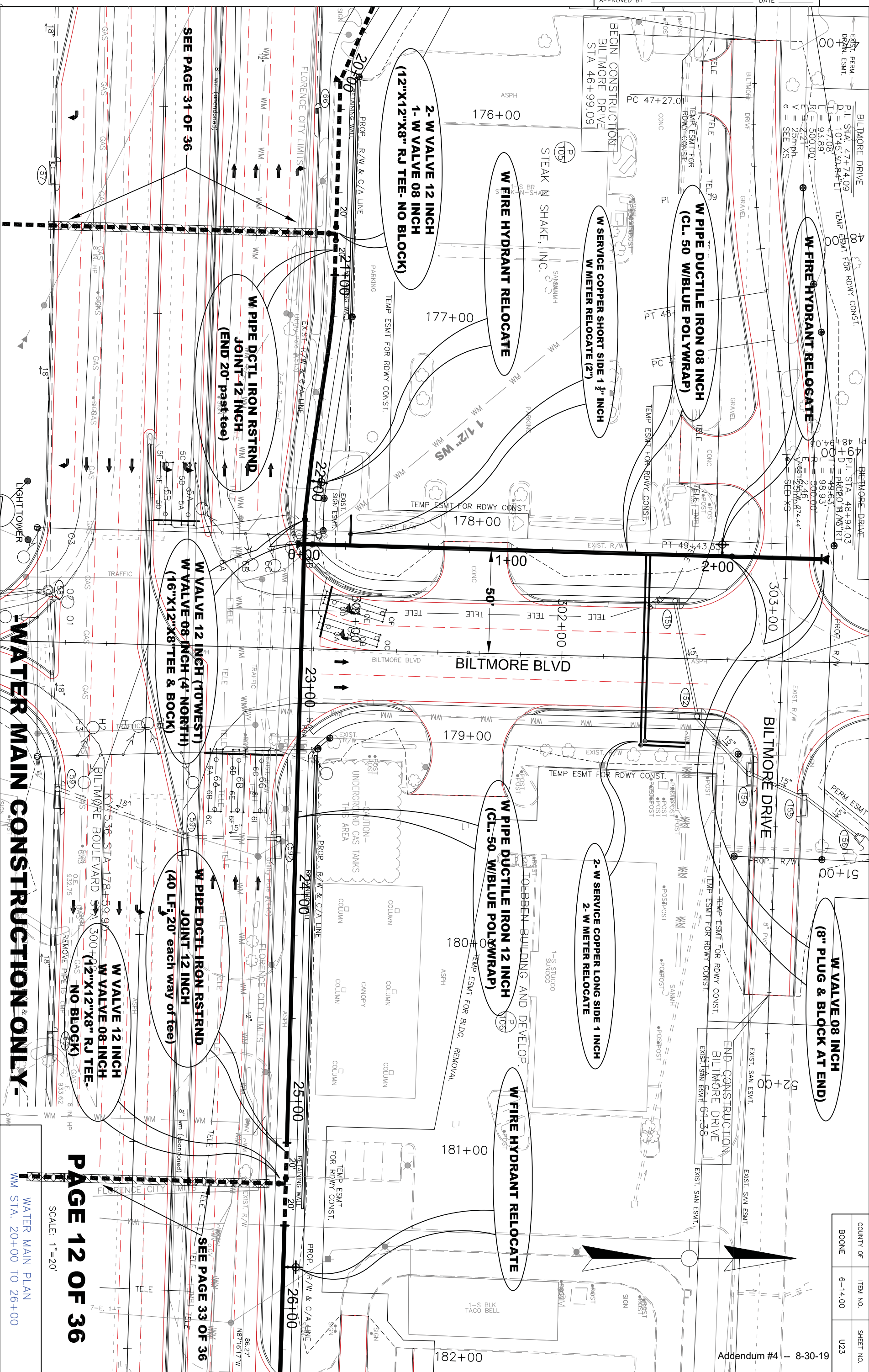


**- WATER MAIN CONSTRUCTION ONLY -**

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U22
		936

Addendum #4 -- 8-30-19

PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE



**WATER MAIN CONSTRUCTION ONLY**

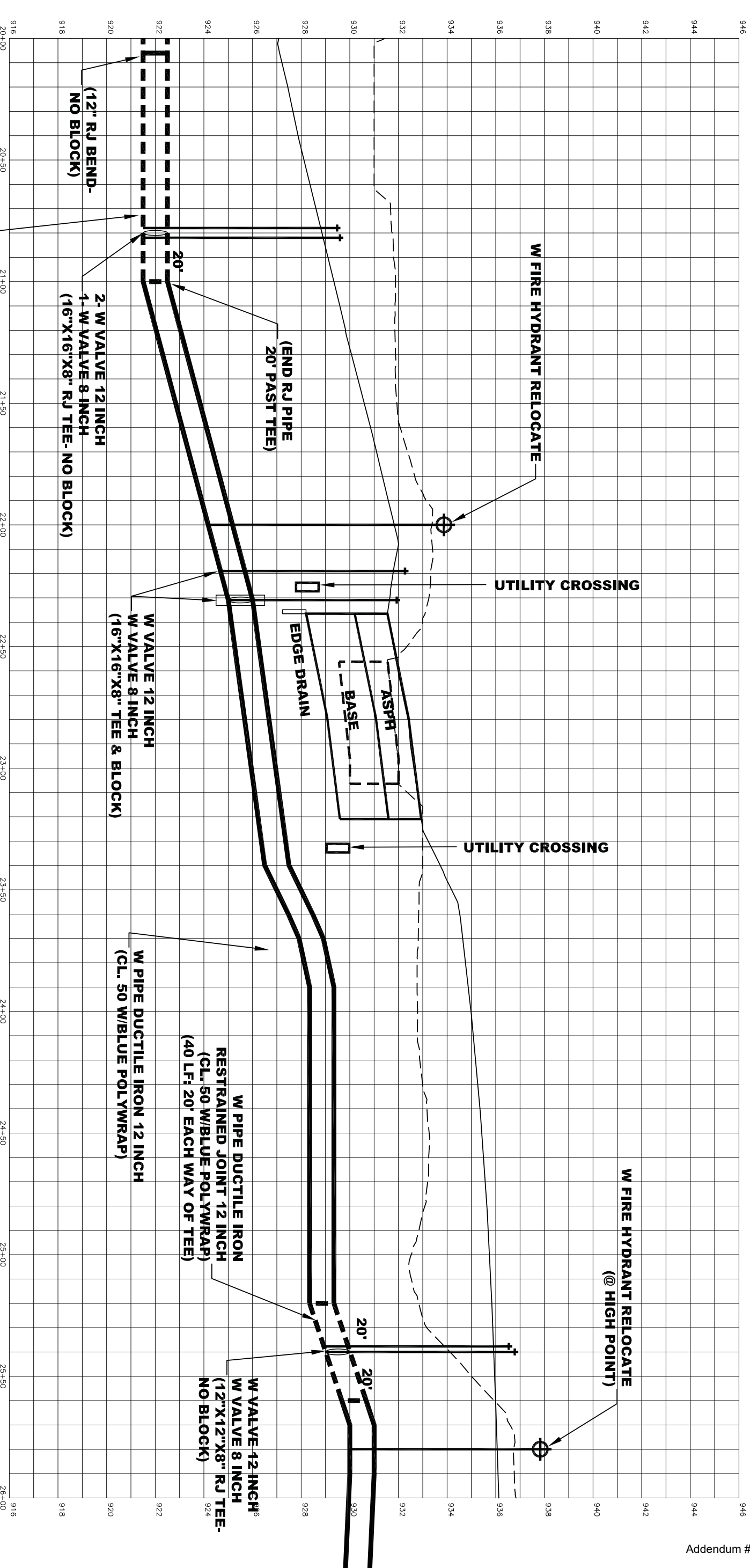
**PAGE 12 OF 36**

SCALE: 1"=20'  
 WATER MAIN PLAN  
 WM STA. 20+00 TO 26+00

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U23

Addendum #4 - 8-30-19

PREPARED BY _____	DATE _____
CHECKED BY _____	DATE _____
APPROVED BY _____	DATE _____



W PIPE DUCTILE IRON  
RESTRAINED JOINT 12 INCH  
(CL. 50 W/BLUE POLYWRAP)

(12" RJ BEND-  
NO BLOCK)

2. W VALVE 12 INCH  
1. W VALVE 8 INCH  
(16"X16"X8" RJ TEE- NO BLOCK)

(END RJ PIPE  
20' PAST TEE)

W FIRE HYDRANT RELOCATE

UTILITY CROSSING

EDGE DRAIN

ASPH  
BASE

UTILITY CROSSING

W VALVE 12 INCH  
W VALVE 8 INCH  
(16"X16"X8" TEE & BLOCK)

W PIPE DUCTILE IRON 12 INCH  
(CL. 50 W/BLUE POLYWRAP)

W PIPE DUCTILE IRON  
RESTRAINED JOINT 12 INCH  
(CL. 50 W/BLUE POLYWRAP)  
(40 LF: 20' EACH WAY OF TEE)

W FIRE HYDRANT RELOCATE  
(@ HIGH POINT)

W VALVE 12 INCH  
W VALVE 8 INCH  
(12"X12"X8" RJ TEE-  
NO BLOCK)

NOTE:

HORIZONTAL ~ 1" = 20'  
VERTICAL ~ 1" = 2'

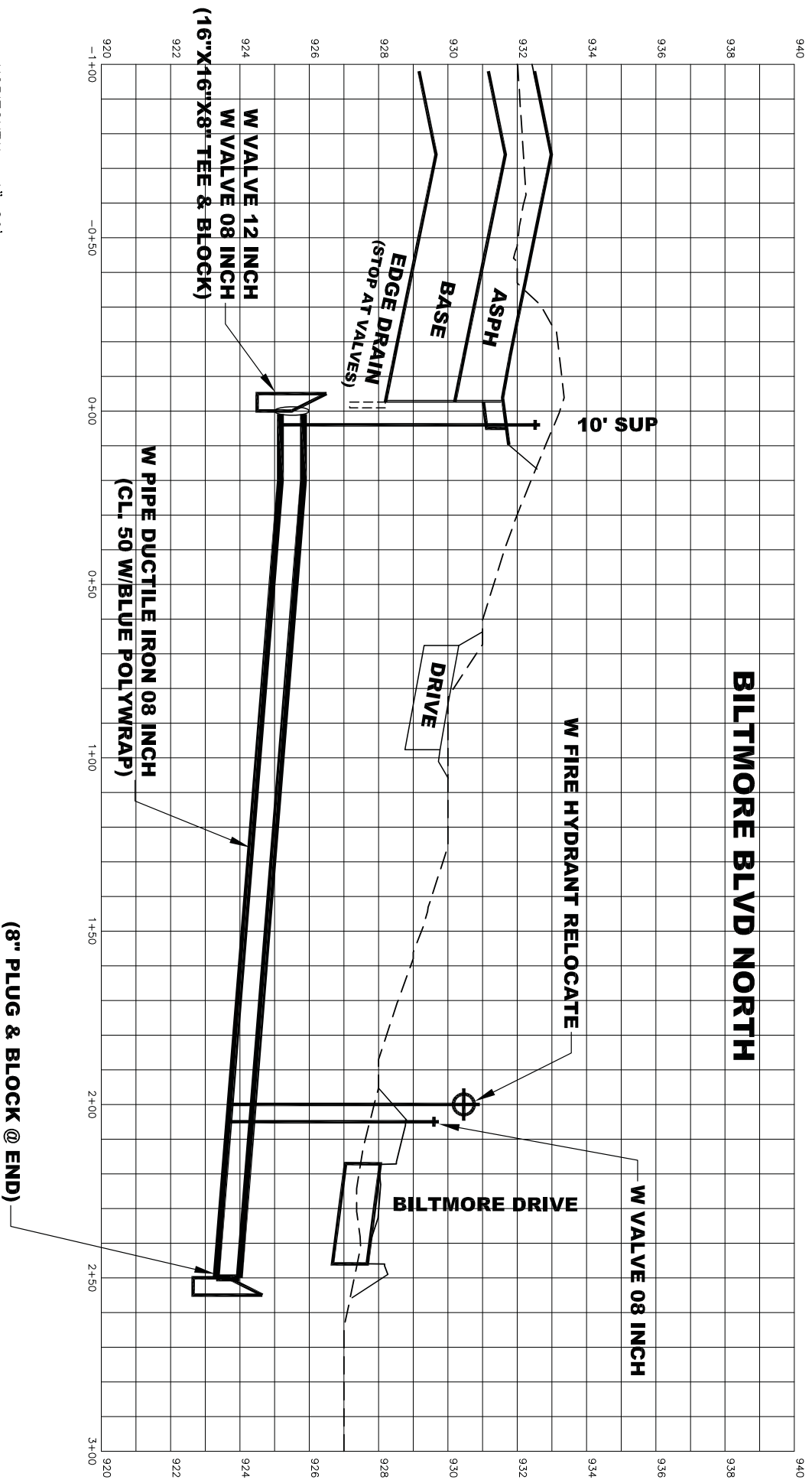
ROTATE BENDS VERTICAL WHERE REQUIRED.  
DEFLECT PIPE WHERE POSSIBLE: MAX. DEFLECTION- 6"-8"-12" = 5'

**- WATER MAIN CONSTRUCTION ONLY -**

SCALE:  
1"=20'

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U24

PREPARED BY _____	DATE _____
CHECKED BY _____	DATE _____
APPROVED BY _____	DATE _____

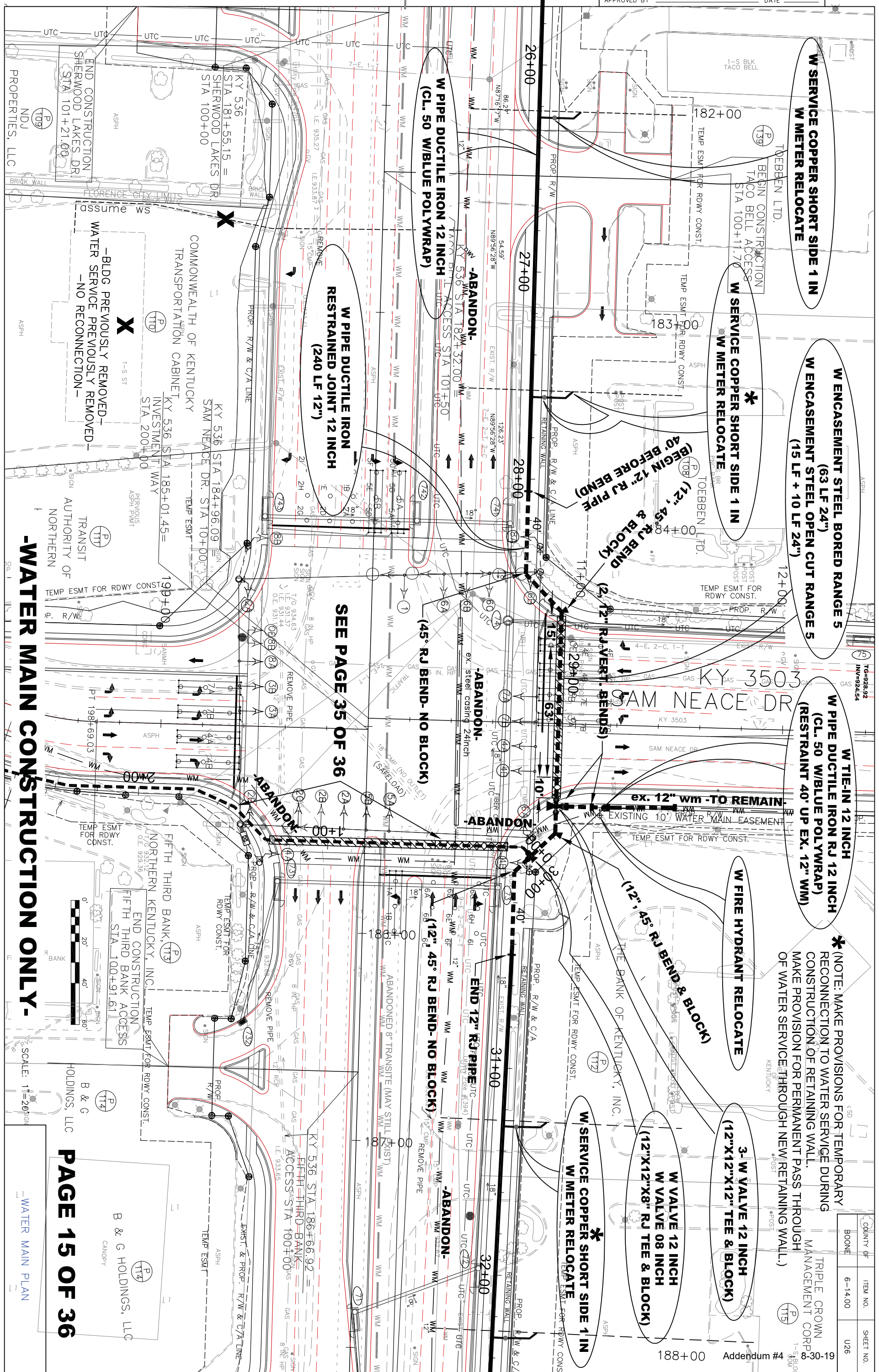


HORIZONTAL ~ 1"=20'  
 VERTICAL ~ 1"=2'

**- WATER MAIN CONSTRUCTION ONLY -**

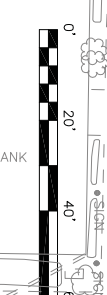
COUNTRY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U25

Addendum #4 -- 8-30-19



**-WATER MAIN CONSTRUCTION ONLY-**

**SEE PAGE 35 OF 36**



SCALE: 1" = 20'

COUNTY OF	ITEM NO.	SHEET NO.
BONE	6-14.00	U26

VIOX PN: 100815002

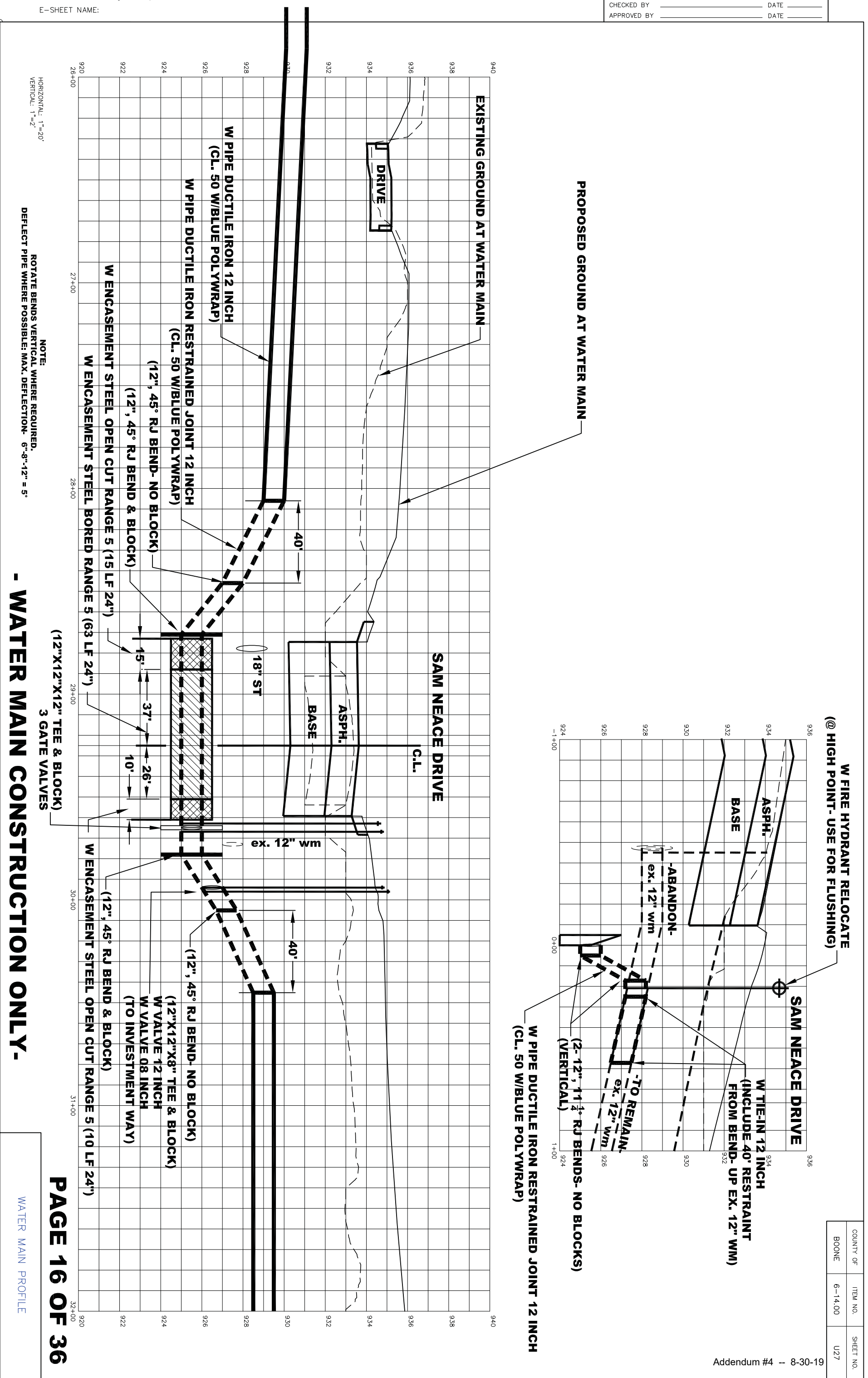
USER: \$\$\$\$USER\$\$\$\$

DATE: \$\$\$\$DATE\$\$\$\$

FILE NAME: \$\$\$\$design\$file\$specification\$\$\$\$

E-SHEET NAME:

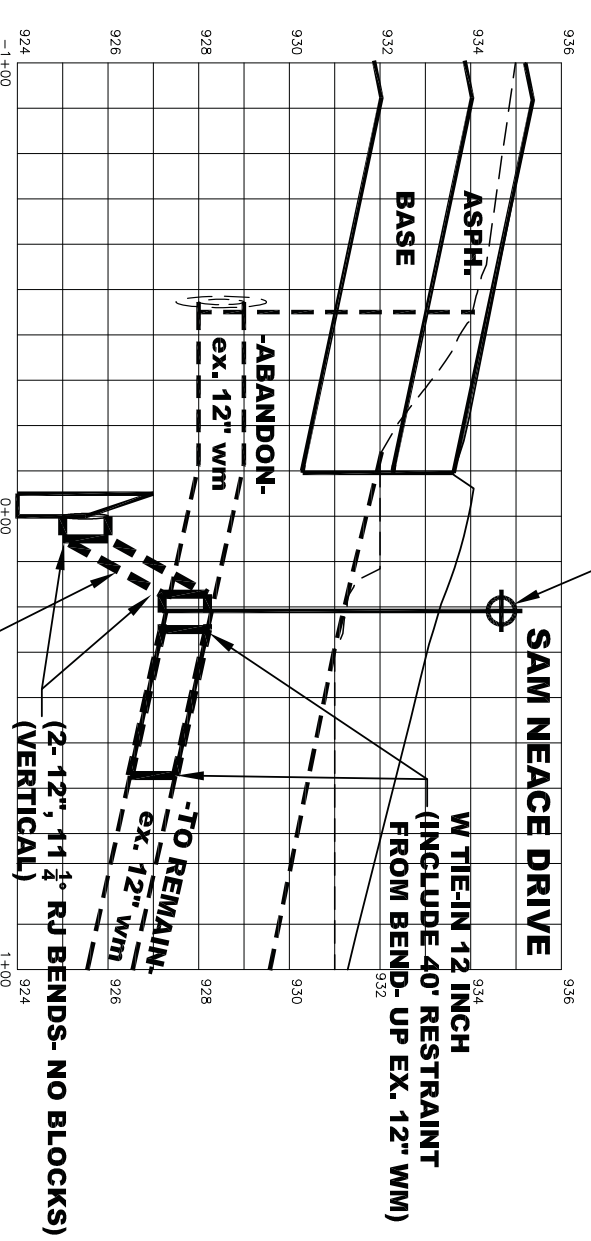
PREPARED BY	_____	DATE	_____
CHECKED BY	_____	DATE	_____
APPROVED BY	_____	DATE	_____



NOTE:  
 ROTATE BENDS VERTICAL WHERE REQUIRED.  
 DEFLECT PIPE WHERE POSSIBLE: MAX. DEFLECTION- 6"-8"-12" = 5'

**- WATER MAIN CONSTRUCTION ONLY -**

**W FIRE HYDRANT RELOCATE (@ HIGH POINT - USE FOR FLUSHING)**



COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U27

Addendum #4 -- 8-30-19

PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

**\* (NOTE: MAKE PROVISIONS FOR TEMPORARY RECONNECTION TO WATER SERVICE DURING CONSTRUCTION OF RETAINING WALL. MAKE PROVISION FOR PERMANENT PASS THROUGH OF WATER SERVICE THROUGH NEW RETAINING WALL.)**

**(TEMP 8" PLUG & FLUSHING DEVICE) (2-8", 45° RJ BEND- NO BLOCK)**

**W PIPE DCTL IRON RESTRAINED JOINT 08 INCH (131 LF-40' PAST TIE-IN) (2-8", 45° RJ BEND- NO BLOCK)**

**W FIRE HYDRANT RELOCATE**

**W VALVE 08 INCH (12"X12"X8" RJ TEE -NO BLOCK)**

**W PIPE DUCTILE IRON 12 INCH (CL. 50 W/BLUE POLYWRAP)**

**W PIPE DCTL IRON RSTRND JOINT 12 INCH (40 LF 12") (20' EACH WAY OF TEE)**

**W PIPE DCTL IRON RSTRND JOINT 08 INCH (144.5 LF 8") W ENGAGEMENT STEEL BORED RANGE 4 (60 LF-16") W ENGAGEMENT STEEL OPEN CUT RANGE 4 (30+15=45 LF-16")**

**W PIPE DUCTILE IRON 08 INCH (CL. 50 W/BLUE POLYWRAP)**

**W PIPE DCTL IRON RSTRND JOINT 12 INCH (BEGIN 20' BEFORE TEE)**

**(2-8", 45° BEND & BLOCK) (INCLUDE TEMP 8" PLUG) W TIE-IN 08 INCH**

**VALVE CUT-IN 08 INCH**

**W VALVE 08 INCH (8"X8"X4" TEE & BLOCK) (4"X2" REDUCER) W TIE-IN 02 INCH**

**W FIRE HYDRANT ASSEMBLY (INSTALL ON WEST STEM) (8"X6" REDUCER)**

**W VALVE 12 INCH (12", 45° RJ BEND- NO BLOCK)**

**W VALVE 08 INCH (12"X12"X8" RJ TEE- NO BLOCK)**

**(2-12", 45° RJ BENDS- NO BLOCKS)**

**NOTE: EXISTING LINE VALVE @ 300' +/- - USE FOR SHUTDOWN- (8", 11 1/4" RJ BEND- NO BLOCKING)**

**(8", 22 1/2" RJ BEND- NO BLOCK)**

**(2-8", 45° RJ BEND- NO BLOCKS)**

**(12", 45° RJ BEND- NO BLOCK)**

**W VALVE 12 INCH (12"X12"X8" RJ TEE- NO BLOCK)**

**(2-8", 45° BEND & BLOCKS) (2-8", 11 1/4" VERTICAL BEND & BLOCKS)**

**VALVE CUT-IN 02 INCH**

**W PIPE DUCTILE IRON 08 INCH (CL. 50 W/BLUE POLYWRAP)**

P.I. STA.	100+83.53
D	14.58, 08.30 RT
T	26.28
L	52.25
R	200.00'
E	1.72
V	25mph
e	SEE XS

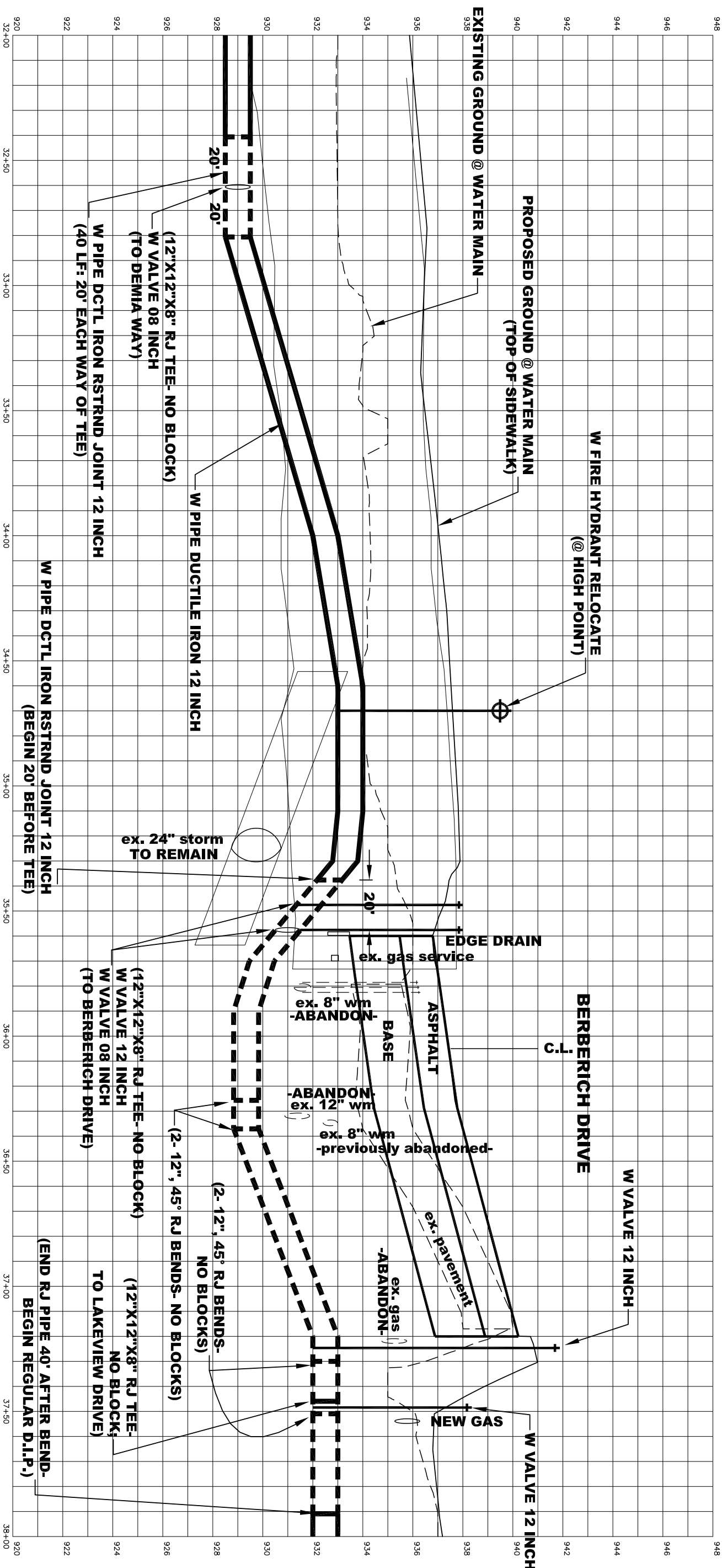
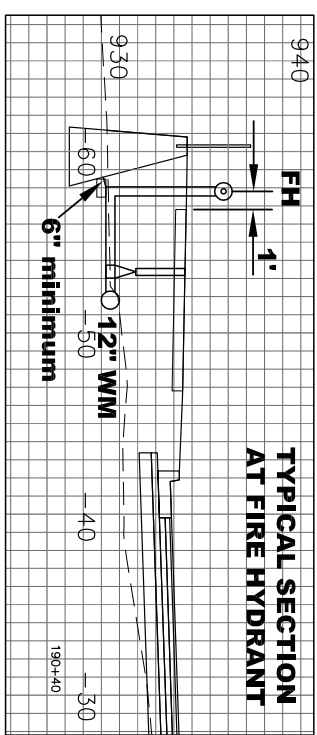
**- WATER MAIN CONSTRUCTION ONLY -**

SCALE: 1"=20'

WATER MAIN PLAN

QUANTITY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U28

VIOX PN: 100815002  
 USER:  
 DATE:  
 FILE NAME:  
 E-SHEET NAME:



HORIZONTAL: 1"=20'  
 VERTICAL: 1"=2'

NOTE:  
 ROTATE BENDS VERTICAL WHERE REQUIRED.  
 DEFLECT PIPE WHERE POSSIBLE: MAX. DEFLECTION- 6"-8"-12" = 5'

# - WATER MAIN CONSTRUCTION ONLY -

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U29



VIOX PN: 100815002

USER: \$\$\$USER\$\$\$

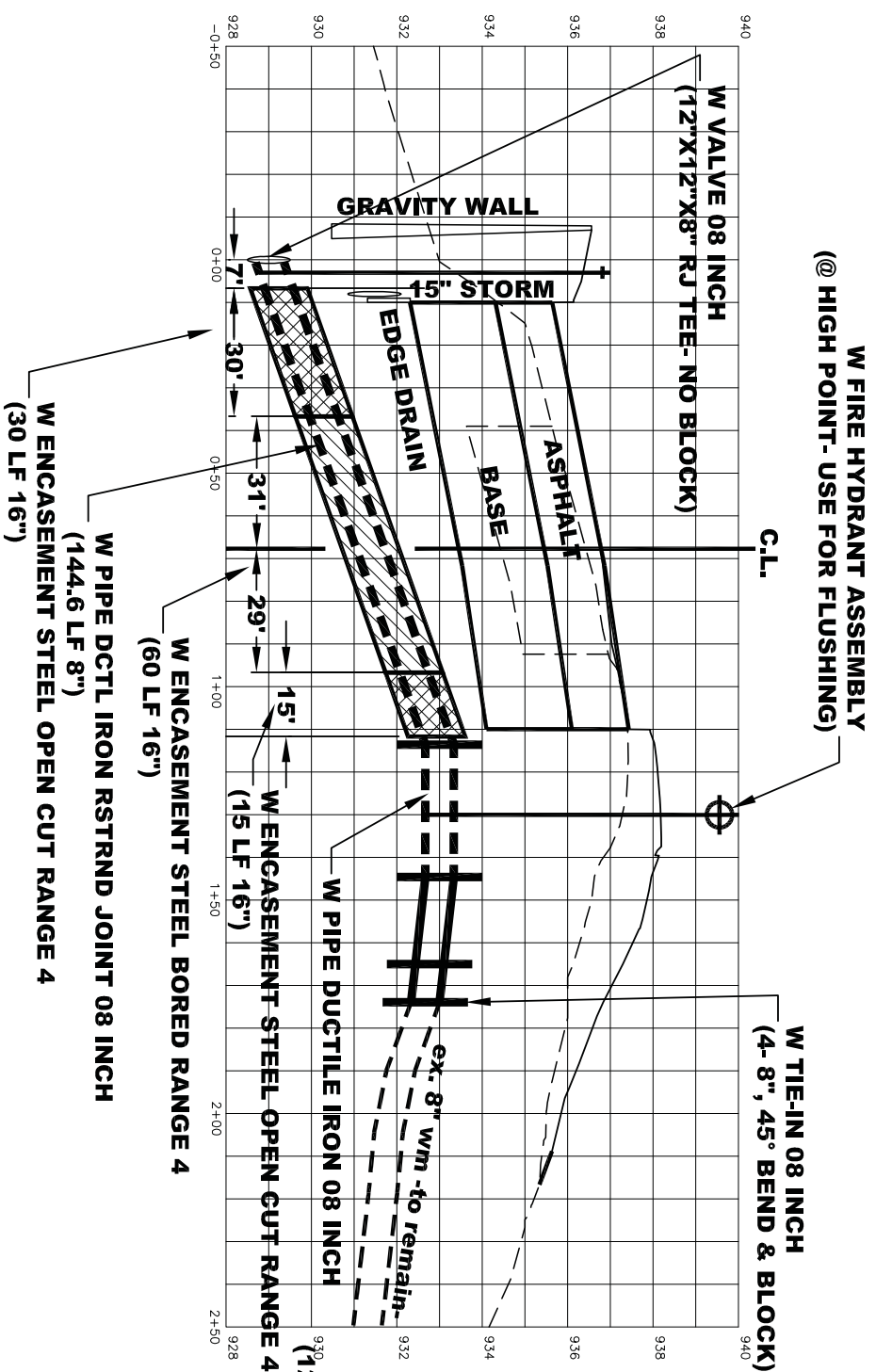
DATE: \$\$\$DATE\$\$\$

FILE NAME: \$\$\$design\$file\$specification\$\$\$

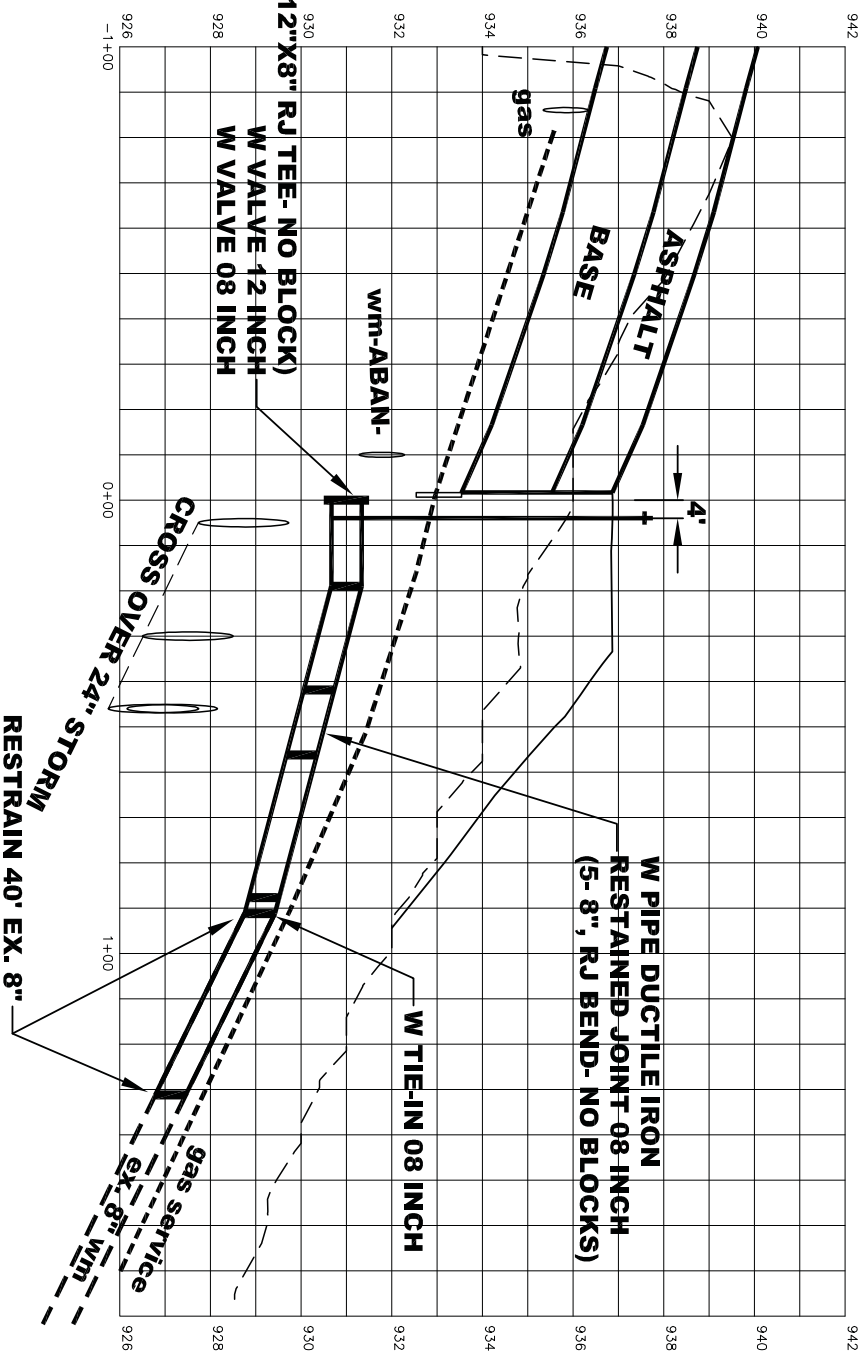
E-SHEET NAME:

PREPARED BY	_____	DATE	_____
CHECKED BY	_____	DATE	_____
APPROVED BY	_____	DATE	_____

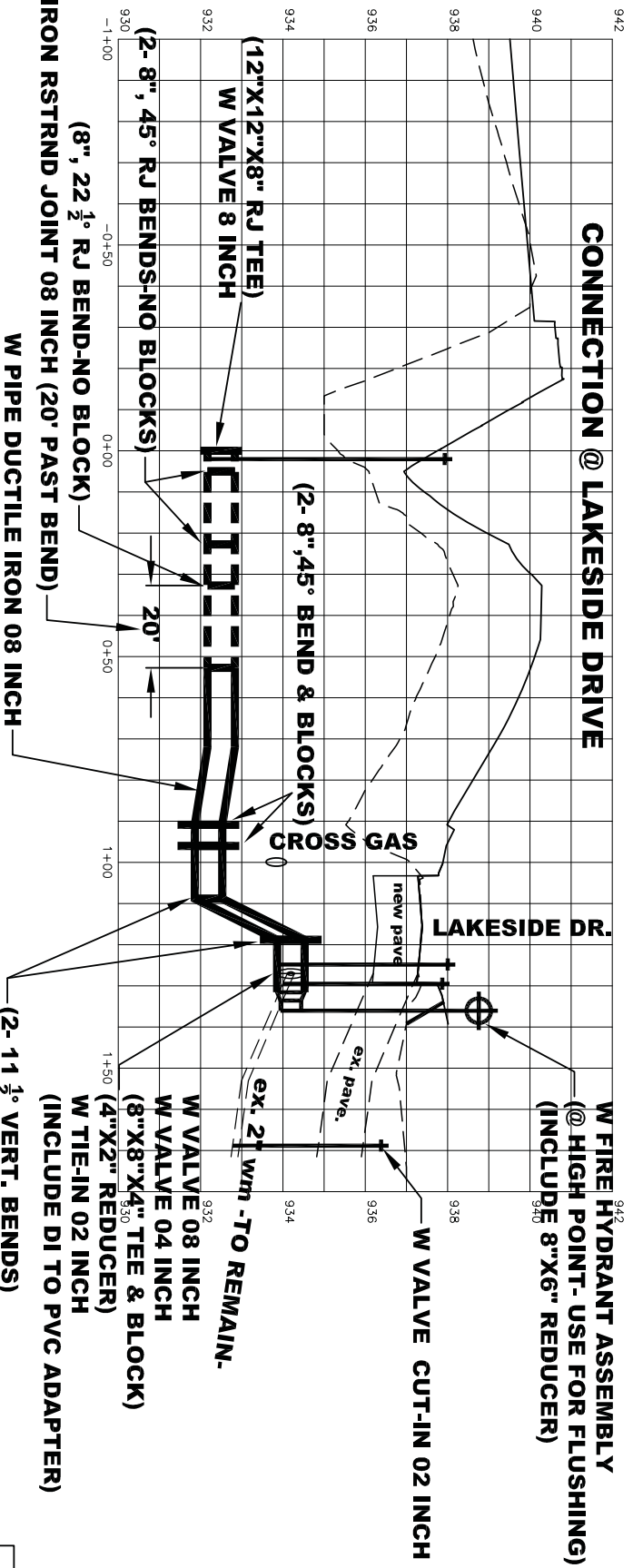
**CONNECTION @ DEMIA WAY**



**CONNECTION @ BERBERICH DRIVE**



**CONNECTION @ LAKESIDE DRIVE**



**- WATER MAIN CONSTRUCTION ONLY -**

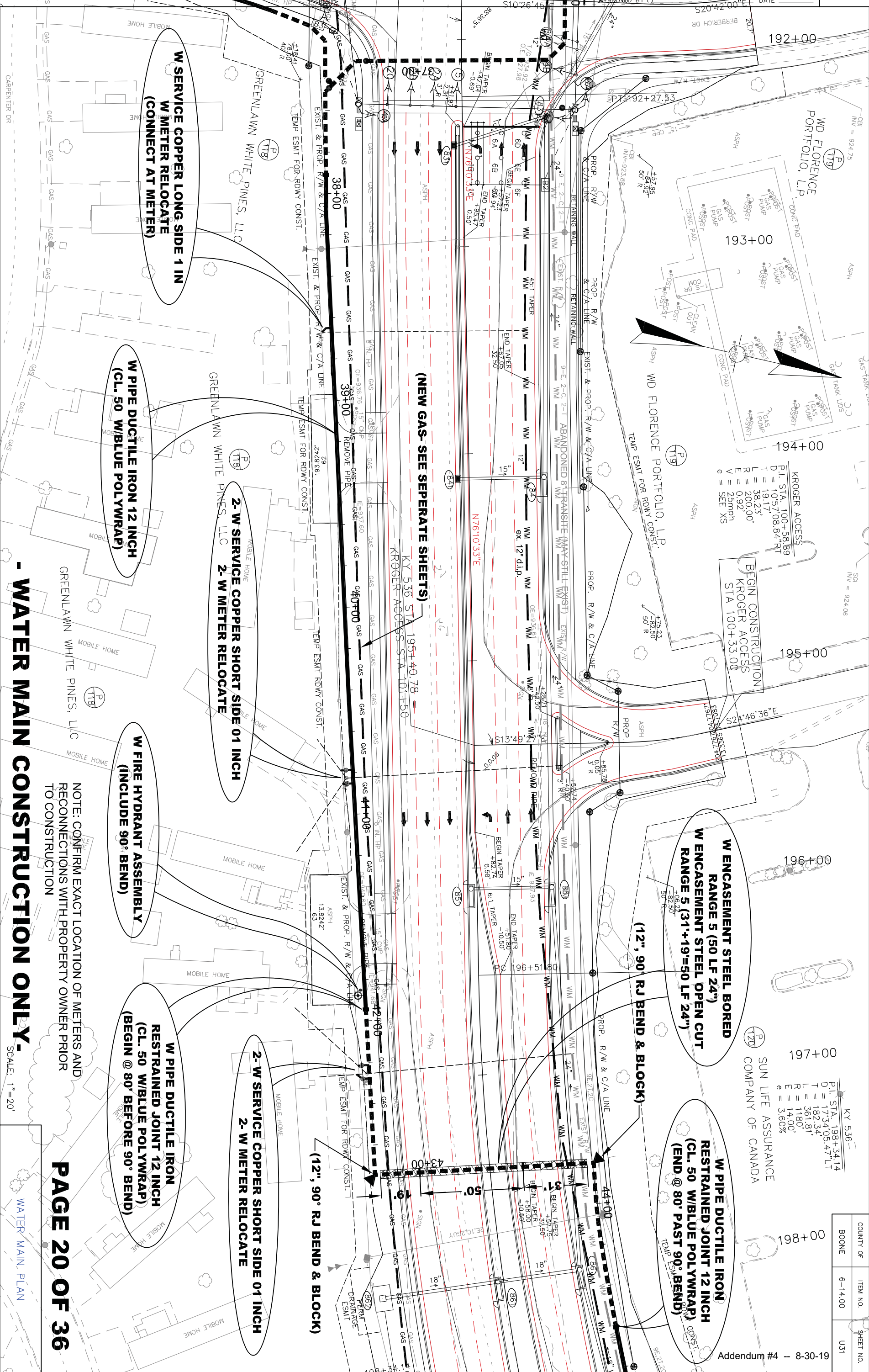
HORIZONTAL: 1"=20'  
VERTICAL: 1"=2'

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U30

VIOX PN: 100815002

USER: \$\$\$\$USER\$\$\$\$  
DATE: \$\$\$\$DATE\$\$\$\$  
FILE NAME: \$\$\$design\$file\$specification\$\$\$  
E-SHEET NAME:

DATE	DATE	DATE
DATE	DATE	DATE
DATE	DATE	DATE



W SERVICE COPPER LONG SIDE 1 IN  
W METER RELOCATE  
(CONNECT AT METER)

W PIPE DUCTILE IRON 12 INCH  
(CL. 50 W/BLUE POLYWRAP)

2-W SERVICE COPPER SHORT SIDE 01 INCH  
2-W METER RELOCATE

W FIRE HYDRANT ASSEMBLY  
(INCLUDE 90° BEND)

W PIPE DUCTILE IRON  
RESTRAINED JOINT 12 INCH  
(CL. 50 W/BLUE POLYWRAP)  
(BEGIN @ 80' BEFORE 90° BEND)

2-W SERVICE COPPER SHORT SIDE 01 INCH  
2-W METER RELOCATE

(12", 90° RJ BEND & BLOCK)

W ENCASEMENT STEEL BORED  
RANGE 5 (50 LF 24")  
W ENCASEMENT STEEL OPEN CUT  
RANGE 5 (31'+19'=50 LF 24")

W PIPE DUCTILE IRON  
RESTRAINED JOINT 12 INCH  
(CL. 50 W/BLUE POLYWRAP)  
(END @ 80' PAST 90° BEND)

(NEW GAS- SEE SEPERATE SHEETS)

KY 536 STA 195+40.78  
KROGER ACCESS STA 101+50

KROGER ACCESS  
P.I. STA. 100+58.89  
D = 10'57.08, 8.4' FT  
T = 19.17'  
L = 38.23'  
R = 200.00'  
E = 0.92  
V = 25mph  
e = SEE XS

BEGIN CONSTRUCTION  
KROGER ACCESS  
STA 100+33.00

KY 536  
P.I. STA. 198+34.14  
D = 17'34.05, 47" LT  
T = 182.34'  
L = 361.81'  
R = 1180'  
E = 14.00'  
V = 3.60%

SUN LIFE ASSURANCE  
COMPANY OF CANADA

Addendum #4 - 8-30-19

NOTE: CONFIRM EXACT LOCATION OF METERS AND RECONNECTIONS WITH PROPERTY OWNER PRIOR TO CONSTRUCTION

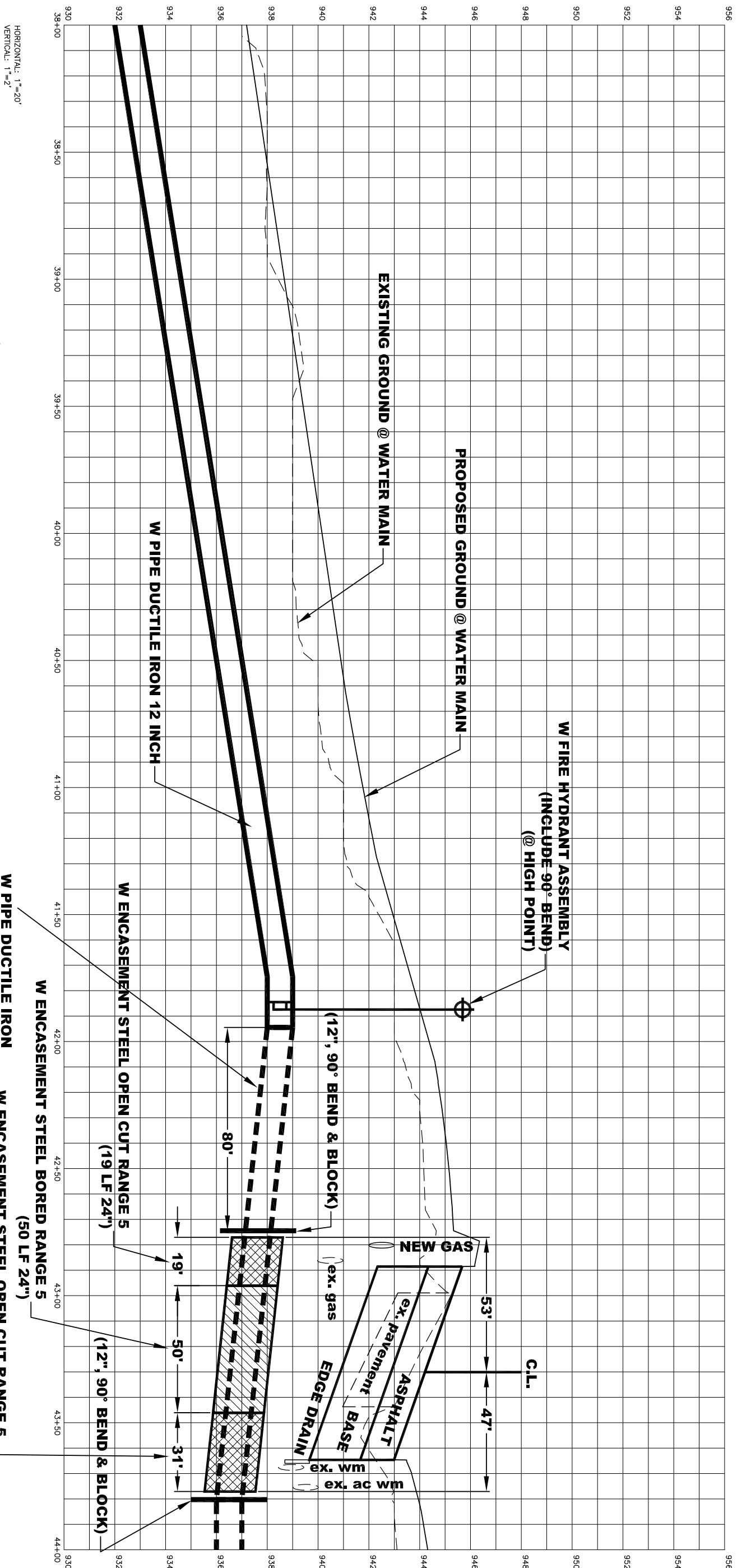
- WATER MAIN CONSTRUCTION ONLY -

SCALE: 1"=20'

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WATER MAIN PLAN

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U31



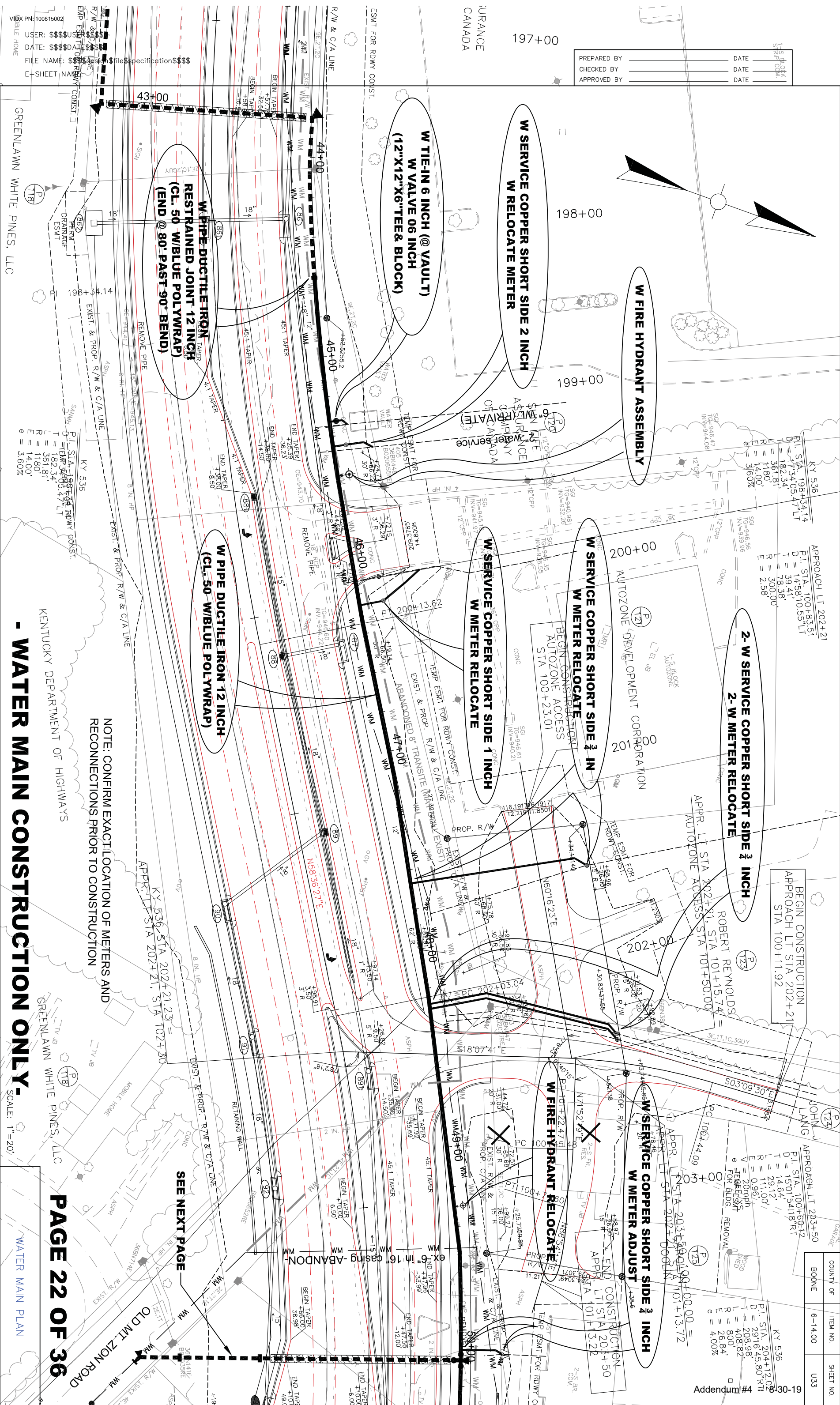
**NOTE:**  
ROTATE BENDS VERTICAL WHERE REQUIRED.  
DEFLECT PIPE WHERE POSSIBLE. MAX. DEFLECTION- 6"-8"-12" = 5'

**W PIPE DUCTILE IRON RESTRAINED JOINT 12 INCH (CL. 50 W/BLUE POLYWRAP) (BEGIN @ 80' BEFORE 90° BEND)**

**W ENCASEMENT STEEL OPEN CUT RANGE 5 (31 LF 24")**

**- WATER MAIN CONSTRUCTION ONLY -**

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U32



PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

USER: \$\$\$\$  
 DATE: \$\$\$  
 FILE NAME: \$\$\$\$  
 E-SHEET NAME: \$\$\$\$

KY 536  
 STA. 198+34.14  
 D = 173.405' LT  
 T = 182.34'  
 L = 361.81'  
 R = 1180.0'  
 E = 14.00'  
 e = 3.60%

KY 536  
 STA. 100+83.51  
 D = 1458.1055' LT  
 T = 39.41'  
 L = 78.38'  
 R = 300.00'  
 E = 2.58'

KY 536  
 STA. 204+12.09  
 D = 291.64580' RT  
 T = 208.98'  
 L = 408.82'  
 R = 800.84'  
 E = 26.84'  
 e = 4.00%

NOTE: CONFIRM EXACT LOCATION OF METERS AND RECONNECTIONS PRIOR TO CONSTRUCTION

- WATER MAIN CONSTRUCTION ONLY -

PAGE 22 OF 36

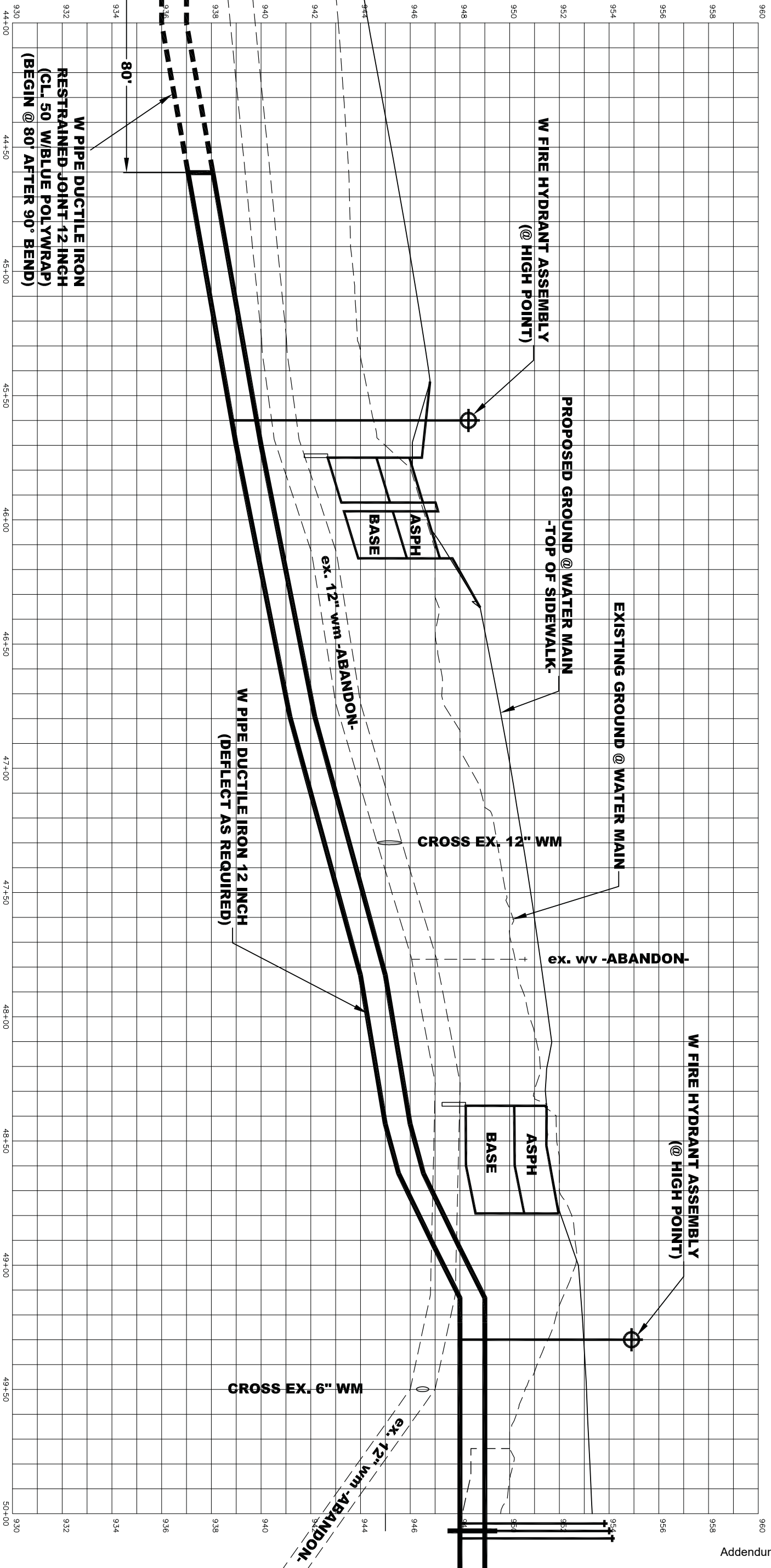
SEE NEXT PAGE

COUNTRY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U33

Addendum #4 8-30-19

PREPARED BY	_____	DATE	_____
CHECKED BY	_____	DATE	_____
APPROVED BY	_____	DATE	_____

HORIZONTAL: 1"=20'  
 VERTICAL: 1"=2'



NOTE:  
 ROTATE BENDS VERTICAL WHERE REQUIRED.  
 DEFLECT PIPE WHERE POSSIBLE: MAX. DEFLECTION - 6'-8"-12" = 5'

**- WATER MAIN CONSTRUCTION ONLY -**

COUNTRY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U34

VIOX PN: 10084002  
USER: \$\$\$\$\$\$USER\$\$\$\$\$  
DATE: \$\$\$\$DATE\$\$\$\$\$  
FILE NAME: \$\$\$\$Design\$files\$specification\$\$\$\$\$  
E-SHEET NAME:

PREPARED BY  
CHECKED BY  
APPROVED BY

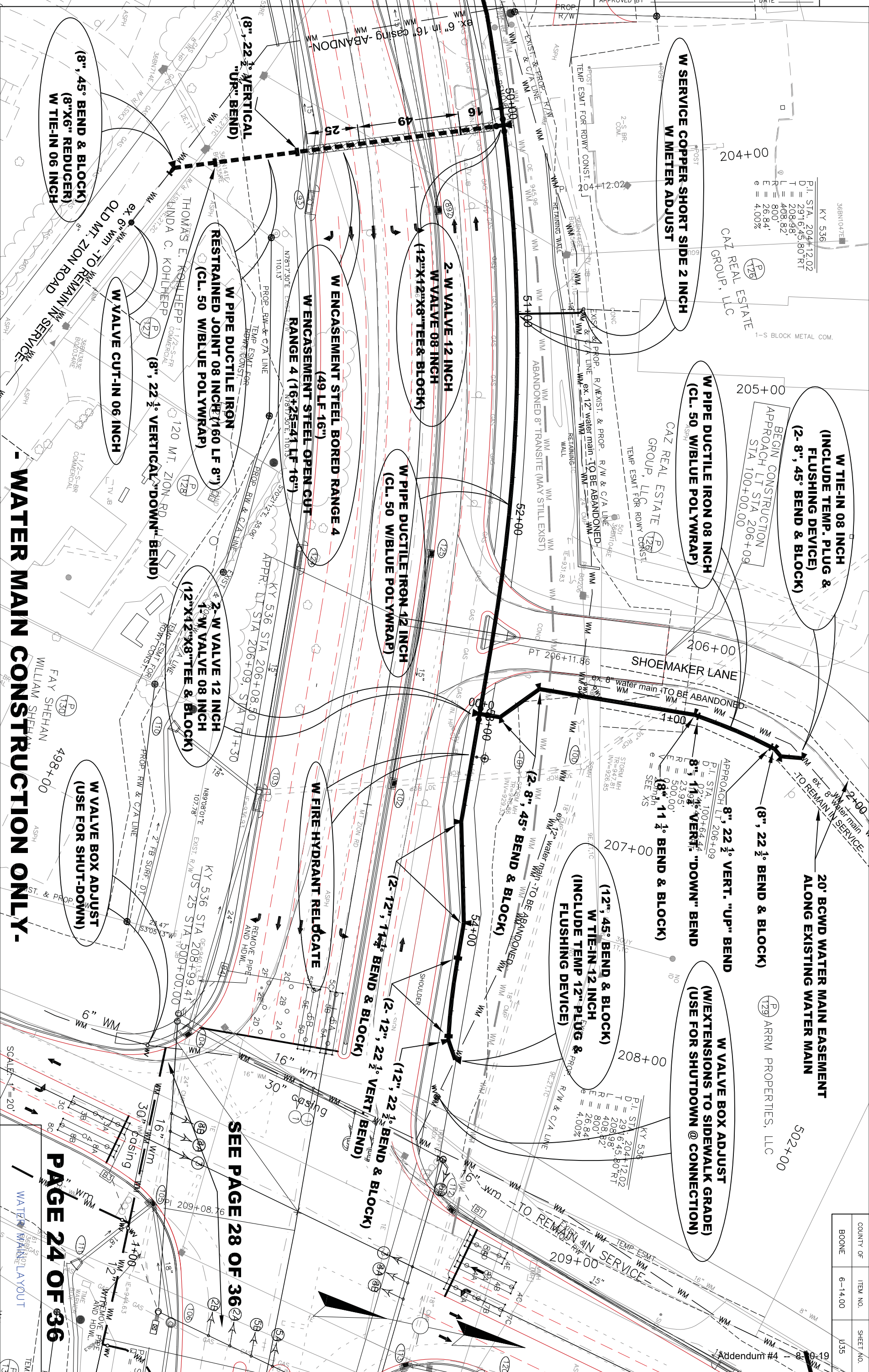
DATE  
DATE  
DATE

PI. STA. 204+12.02  
D = 2916.45, 80' RT  
T = 208.98'  
L = 408.82'  
R = 800'  
E = 26.84'  
e = 4.002%

PI. STA. 206+09  
D = 2916.45, 80' RT  
T = 208.98'  
L = 408.82'  
R = 800'  
E = 26.84'  
e = 4.002%

PI. STA. 206+09  
D = 2916.45, 80' RT  
T = 208.98'  
L = 408.82'  
R = 800'  
E = 26.84'  
e = 4.002%

PI. STA. 204+12.02  
D = 2916.45, 80' RT  
T = 208.98'  
L = 408.82'  
R = 800'  
E = 26.84'  
e = 4.002%



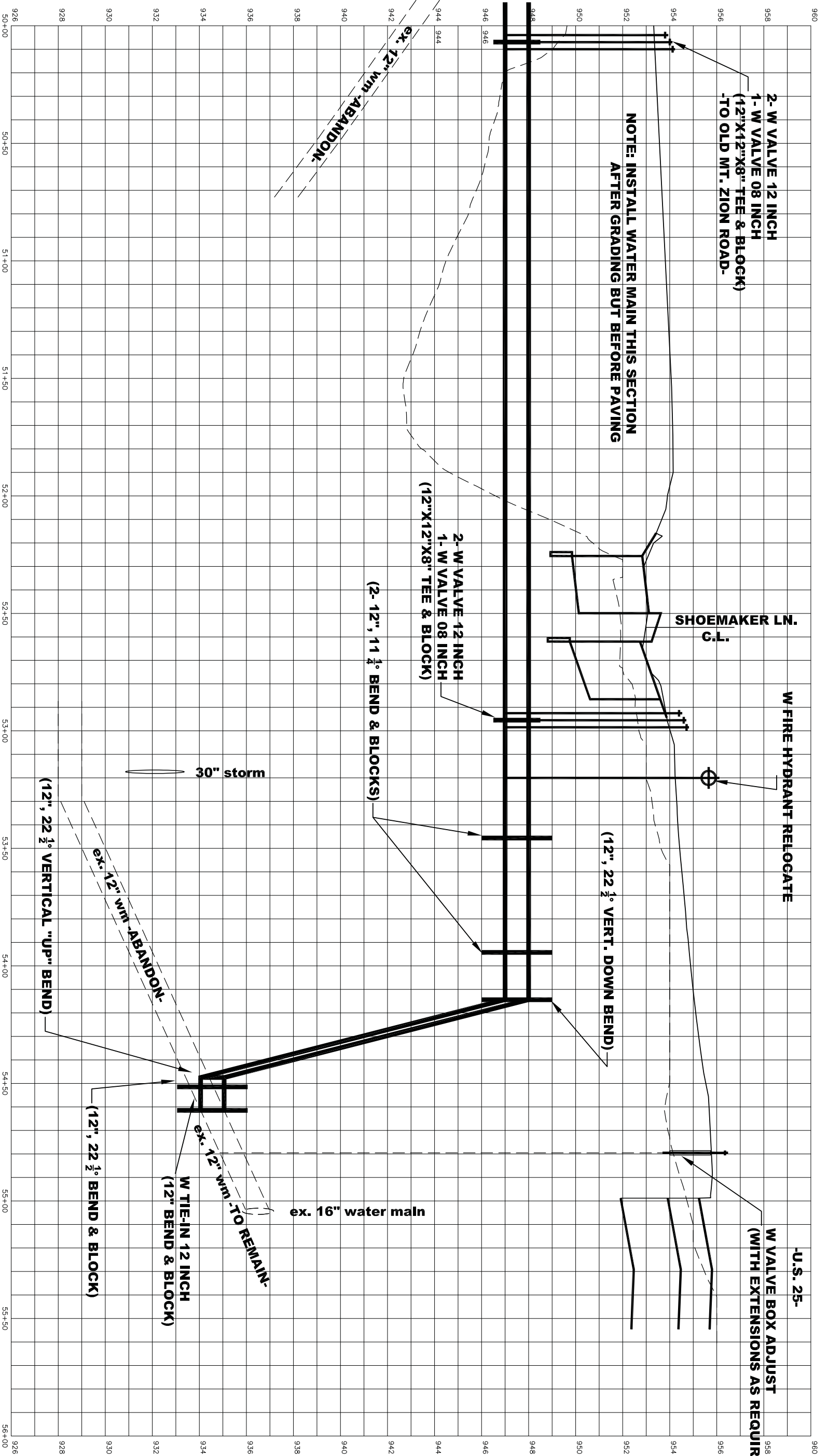
**- WATER MAIN CONSTRUCTION ONLY -**

SEE PAGE 28 OF 36

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COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U35

Addendum #4 - 8-10-19



**- WATER MAIN CONSTRUCTION ONLY -**

COUNTRY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U36

Addendum #4 - 8-30-19

HORIZONTAL: 1"=20'  
 VERTICAL: 1"=2'

VERTICAL: 1"=2'

VIOX PN: 100815002

USER: \$\$\$\$USER\$\$\$

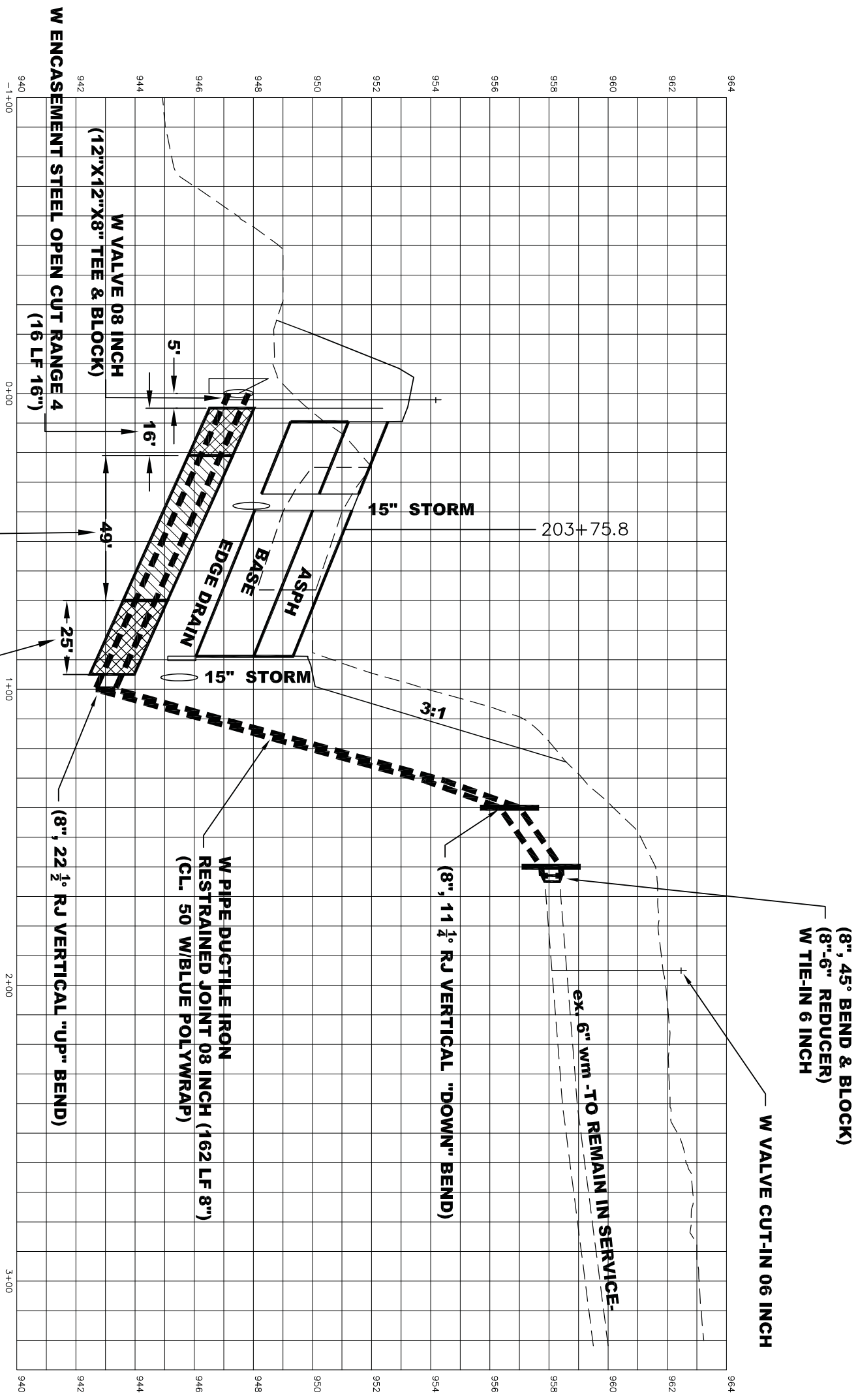
DATE: \$\$\$\$DATE\$\$\$

FILE NAME: \$\$\$\$design\$file\$specification\$\$\$

E-SHEET NAME:

PREPARED BY _____	DATE _____
CHECKED BY _____	DATE _____
APPROVED BY _____	DATE _____

# CONNECTION AT OLD MT. ZION ROAD



NOTE:  
 ROTATE BENDS VERTICAL, WHERE REQUIRED.  
 DEFLECT PIPE WHERE POSSIBLE: MAX. DEFLECTION- 6"-8"-12" = 5"

W ENCASEMENT STEEL BORED RANGE 4  
 (49 LF 16")

W ENCASEMENT STEEL OPEN CUT RANGE 4  
 (25 LF 16")

## - WATER MAIN CONSTRUCTION ONLY -

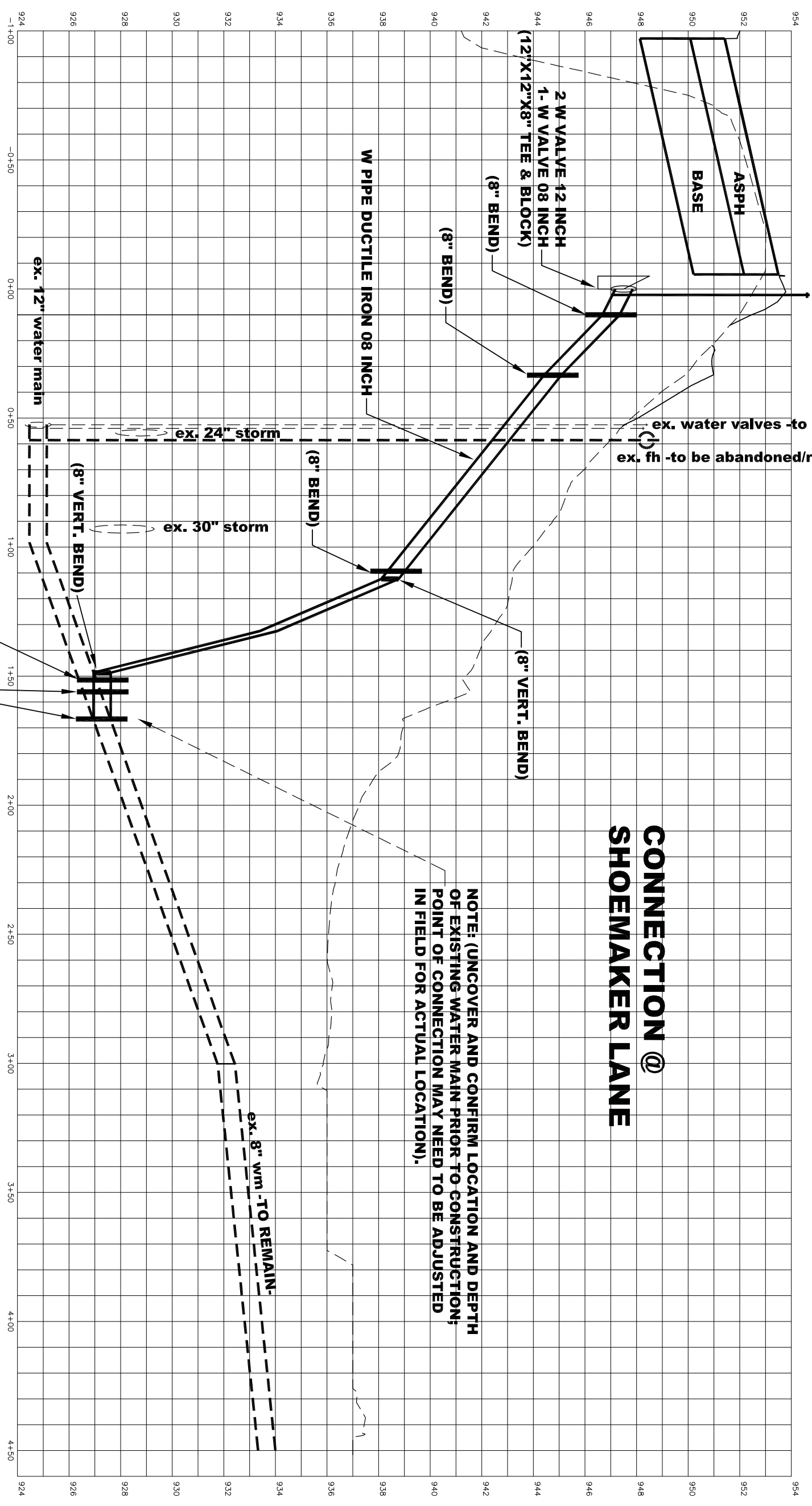
COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U37

Addendum #4 -- 8-30-19



HORIZONTAL: 1"=20  
 VERTICAL: 1"=2

NOTE:  
 ROTATE BENDS VERTICAL WHERE REQUIRED.  
 DEFLECT PIPE WHERE POSSIBLE: MAX. DEFLECTION- 6"-8"-12" = 5'



**CONNECTION @  
 SHOEMAKER LANE**

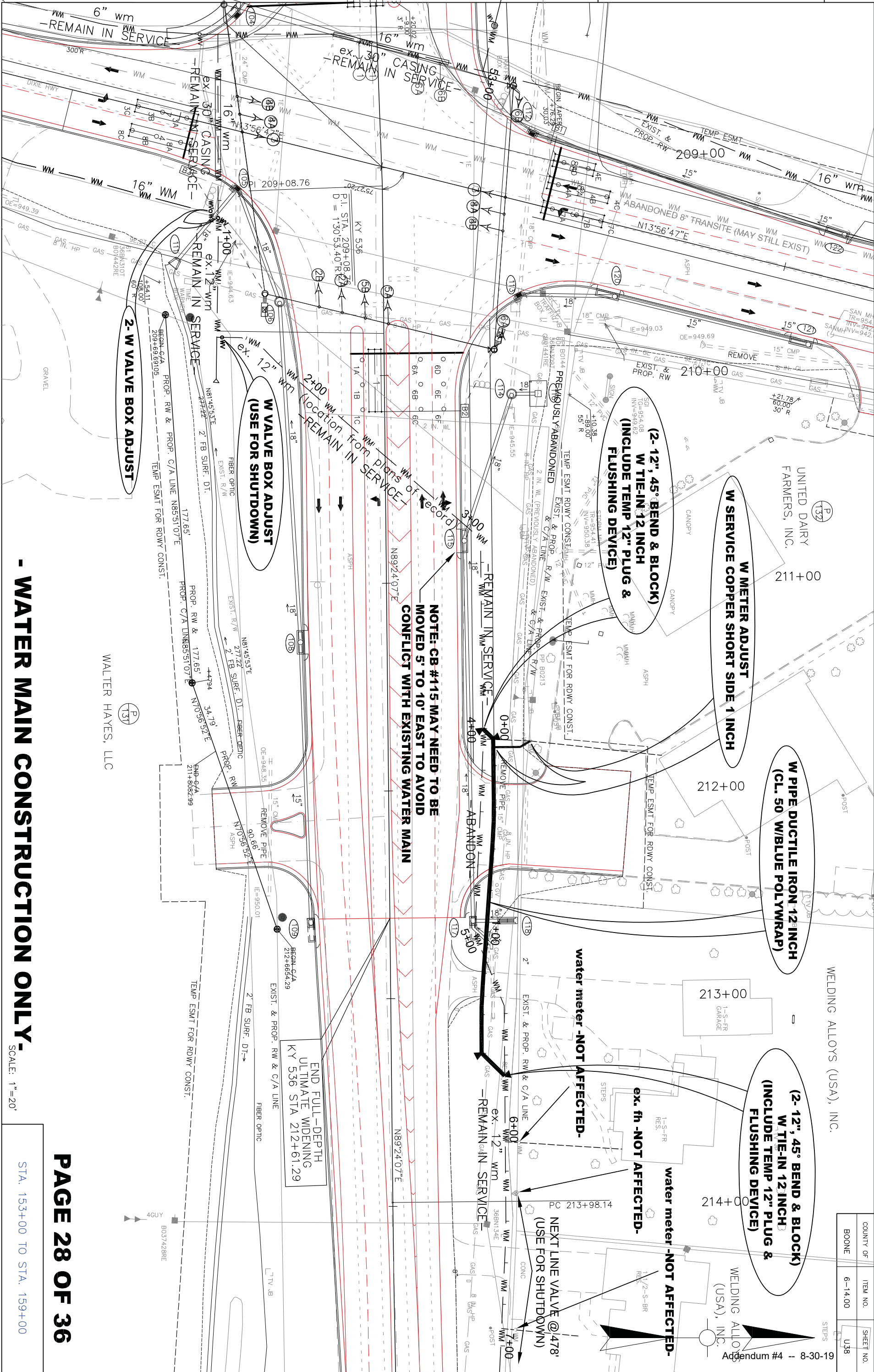
NOTE: (UNCOVER AND CONFIRM LOCATION AND DEPTH OF EXISTING WATER MAIN PRIOR TO CONSTRUCTION; POINT OF CONNECTION MAY NEED TO BE ADJUSTED IN FIELD FOR ACTUAL LOCATION).

ex. 8" wm -TO REMAIN-

**- WATER MAIN CONSTRUCTION ONLY -**

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U38

PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE



**- WATER MAIN CONSTRUCTION ONLY -**

SCALE: 1"=20'

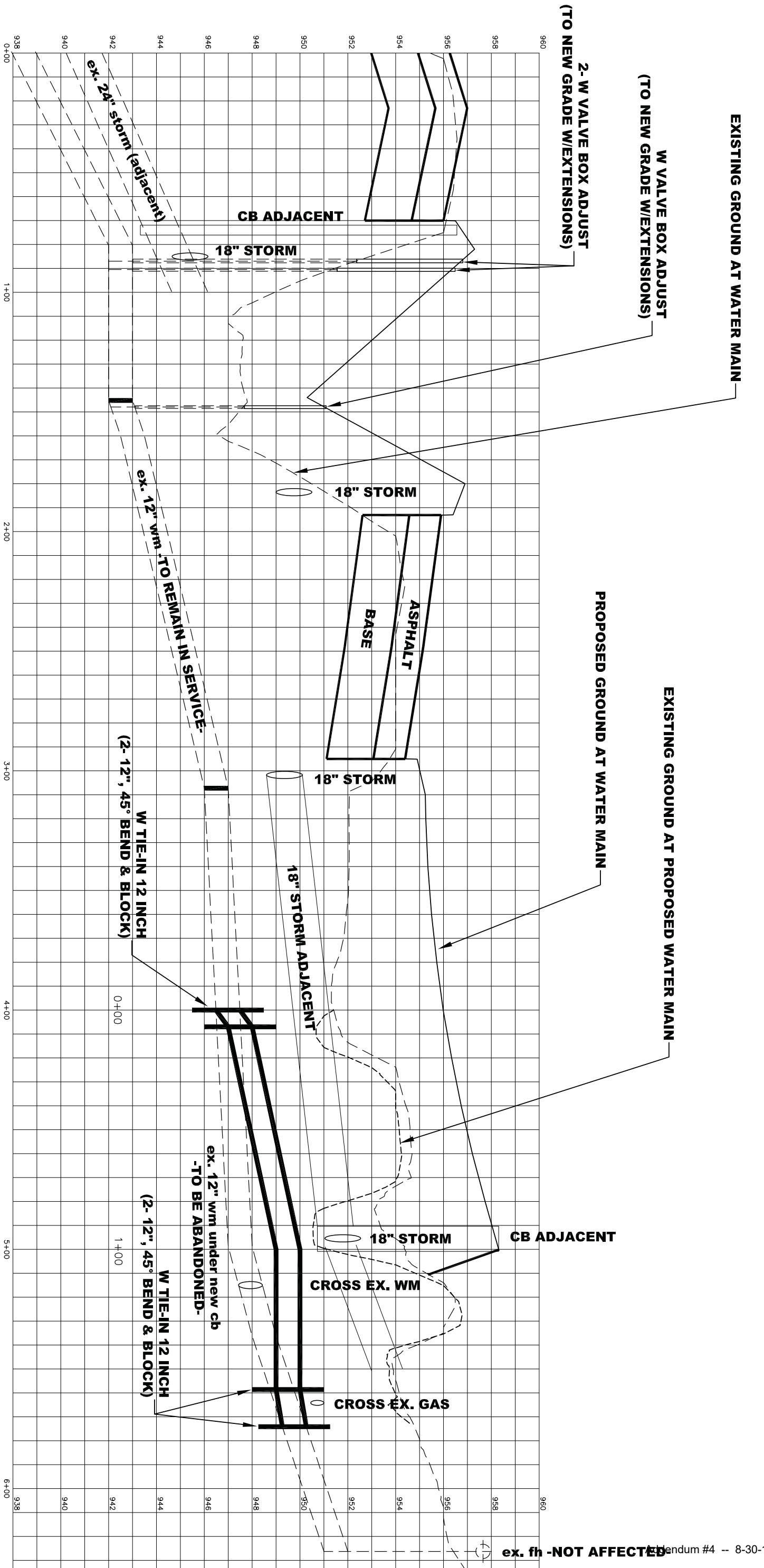
**PAGE 28 OF 36**

STA. 153+00 TO STA. 159+00

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U38

Appendum #4 - 8-30-19

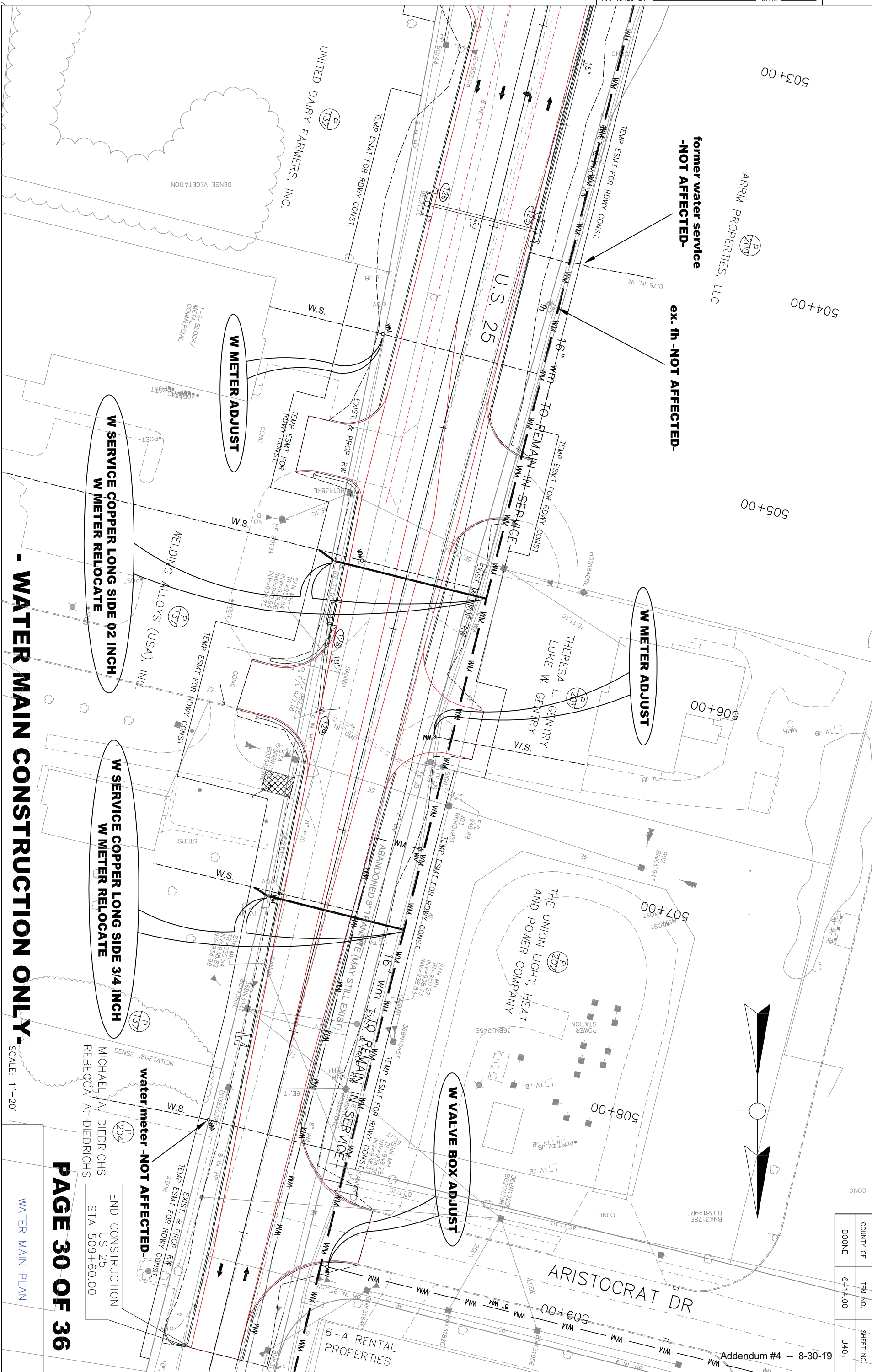
PREPARED BY	_____	DATE	_____
CHECKED BY	_____	DATE	_____
APPROVED BY	_____	DATE	_____



**- WATER MAIN CONSTRUCTION ONLY -**

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U39

PREPARED BY	_____	DATE	_____
CHECKED BY	_____	DATE	_____
APPROVED BY	_____	DATE	_____



**- WATER MAIN CONSTRUCTION ONLY -**

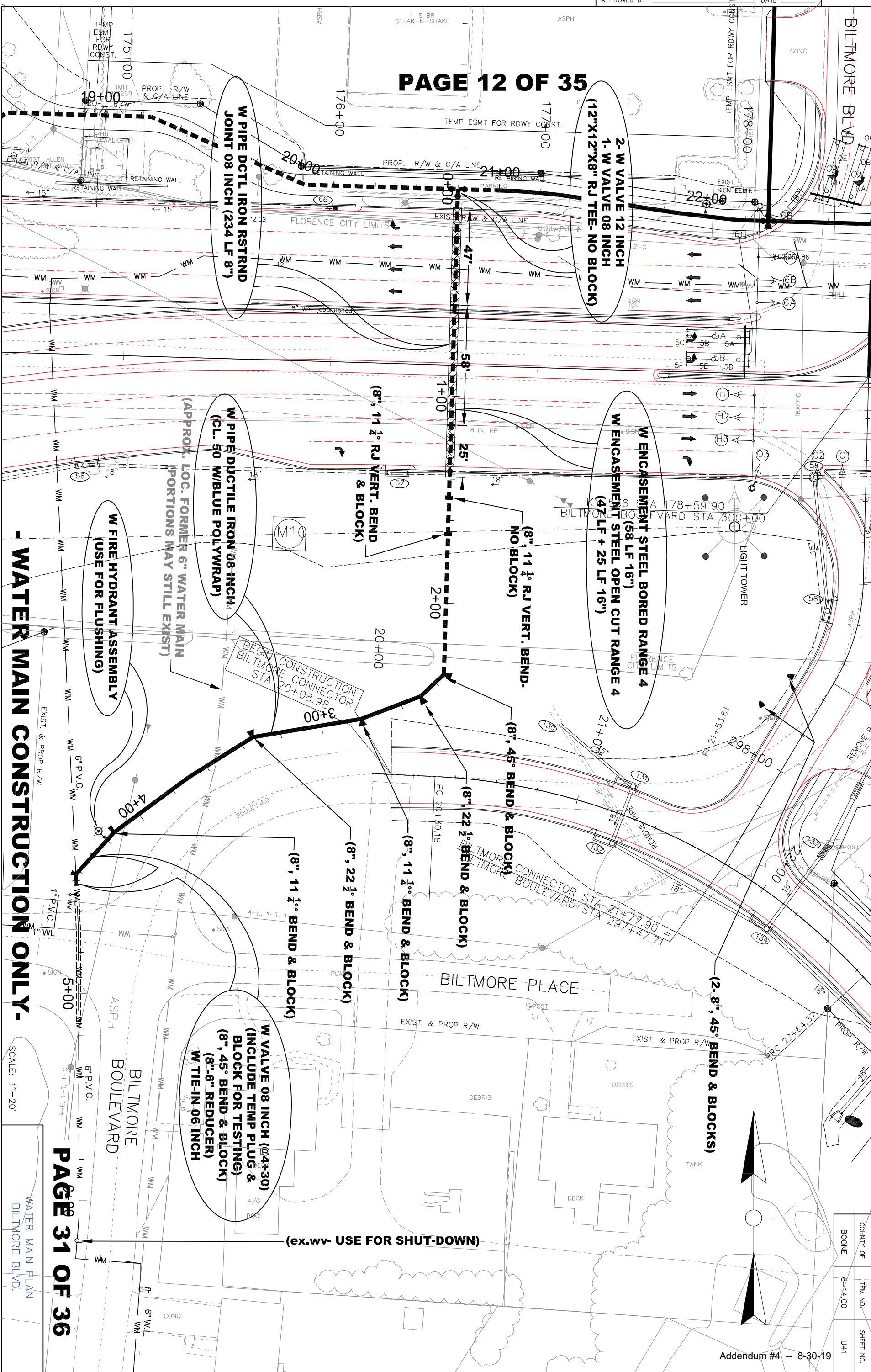
SCALE: 1"=20'

MICHAEL A. DIEDRICHS  
 REBECCA A. DIEDRICHS  
 END CONSTRUCTION  
 US 25  
 STA 509+60.00

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U40

PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

# PAGE 12 OF 35



**- WATER MAIN CONSTRUCTION ONLY -**

**PAGE 31 OF 36**

WATER MAIN PLAN  
BILTMORE BLVD.

SCALE: 1"=20'

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U41

Addendum #4 -- 8-30-19

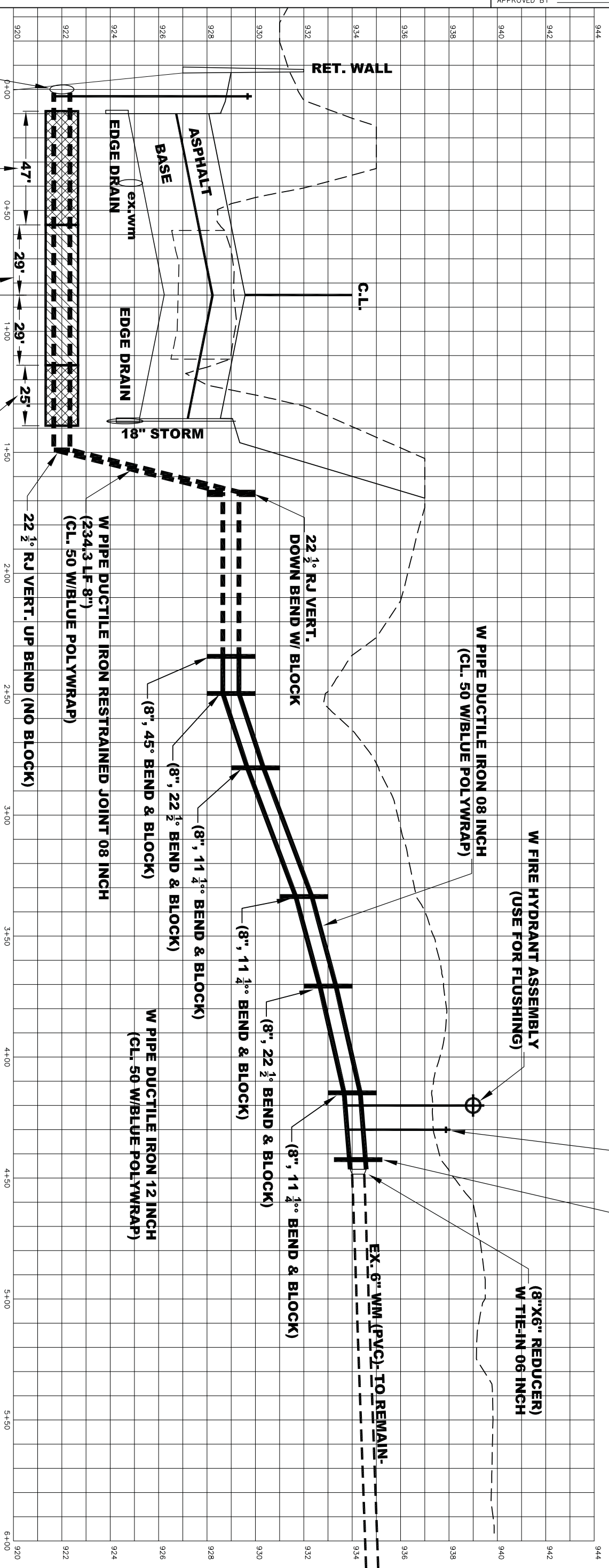
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E-SHEET NAME:

PREPARED BY \_\_\_\_\_ DATE \_\_\_\_\_  
CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
APPROVED BY \_\_\_\_\_ DATE \_\_\_\_\_

# BILTMORE SOUTH

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U42

Addendum #4 -- 8-30-19



HORIZONTAL: 1"=20'  
VERTICAL: 1"=2'

2- W VALVE 12 INCH  
1- W VALVE 08 INCH  
(12"X12"X8" RJ TEE- NO BLOCK)

W ENCASEMENT STEEL OPEN CUT RANGE 4  
(47 LF 16")

W ENCASEMENT STEEL BORED RANGE 4  
(58 LF 16")

W ENCASEMENT STEEL OPEN CUT RANGE 4  
(25 LF 16")

W PIPE DUCTILE IRON RESTRAINED JOINT 08 INCH  
(234.3 LF 8")  
(CL. 50 W/BLUE POLYWRAP)

22 1/2 RJ VERT. UP BEND (NO BLOCK)  
(25 LF 16")

W PIPE DUCTILE IRON 08 INCH  
(CL. 50 W/BLUE POLYWRAP)

W FIRE HYDRANT ASSEMBLY  
(USE FOR FLUSHING)

W VALVE 08 INCH  
(8", 45° BEND & BLOCK)

(8"X6" REDUCER)  
W TIE-IN 06 INCH

EX. 6" WM (PVC) TO REMAIN

W PIPE DUCTILE IRON 12 INCH  
(CL. 50 W/BLUE POLYWRAP)

(8", 11 1/4° BEND & BLOCK)

(8", 22 1/2° BEND & BLOCK)

(8", 45° BEND & BLOCK)

(8", 11 1/4° BEND & BLOCK)

(8", 11 1/4° BEND & BLOCK)

(8", 22 1/2° BEND & BLOCK)

(8", 11 1/4° BEND & BLOCK)

22 1/2 RJ VERT. DOWN BEND W/ BLOCK

ASPHALT

BASE

EDGE DRAIN

EDGE DRAIN

18" STORM

C.L.

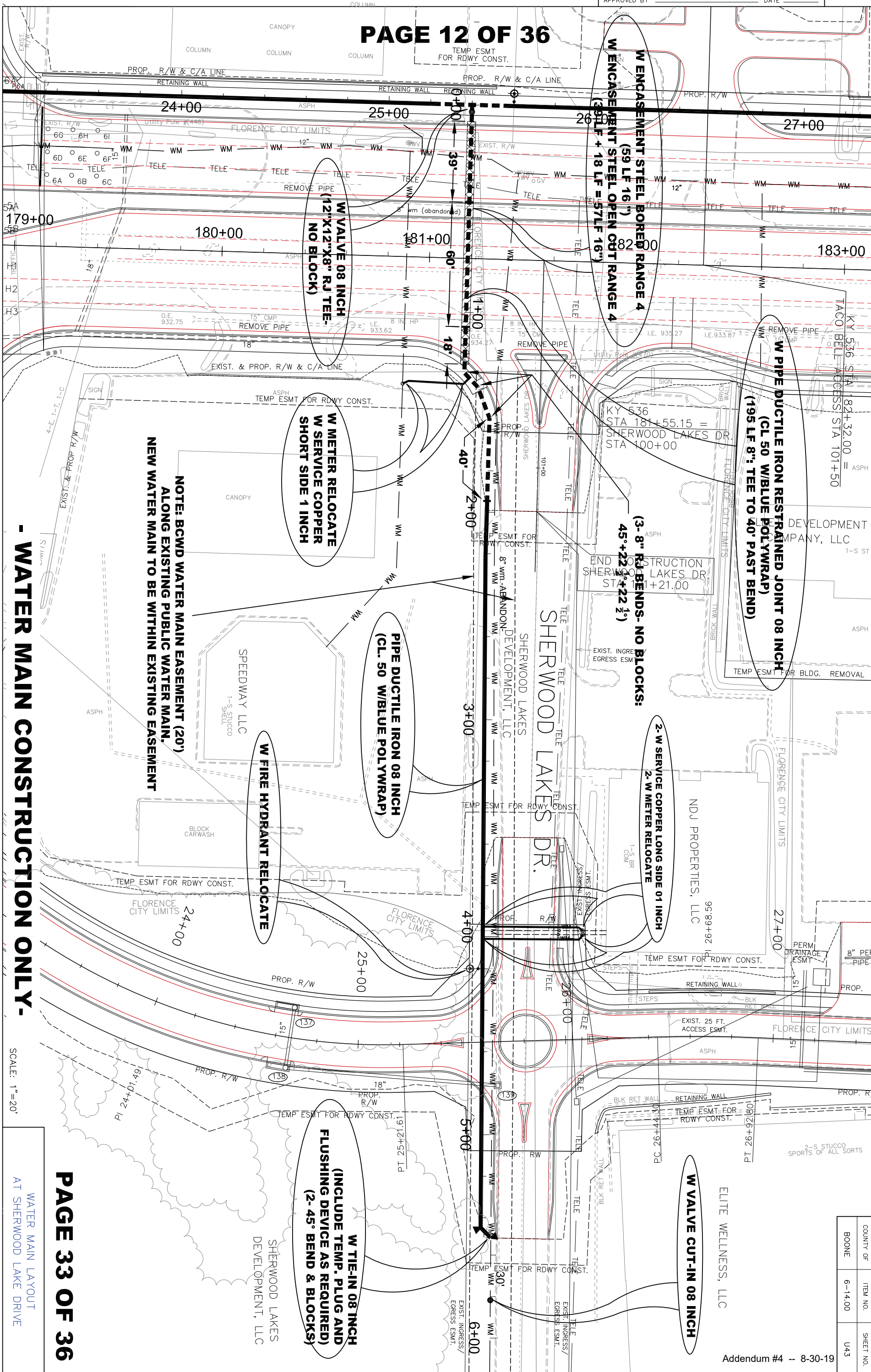
RET. WALL

## - WATER MAIN CONSTRUCTION ONLY -

SCALE: 1"=20'

PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

# PAGE 12 OF 36



SCALE: 1"=20'

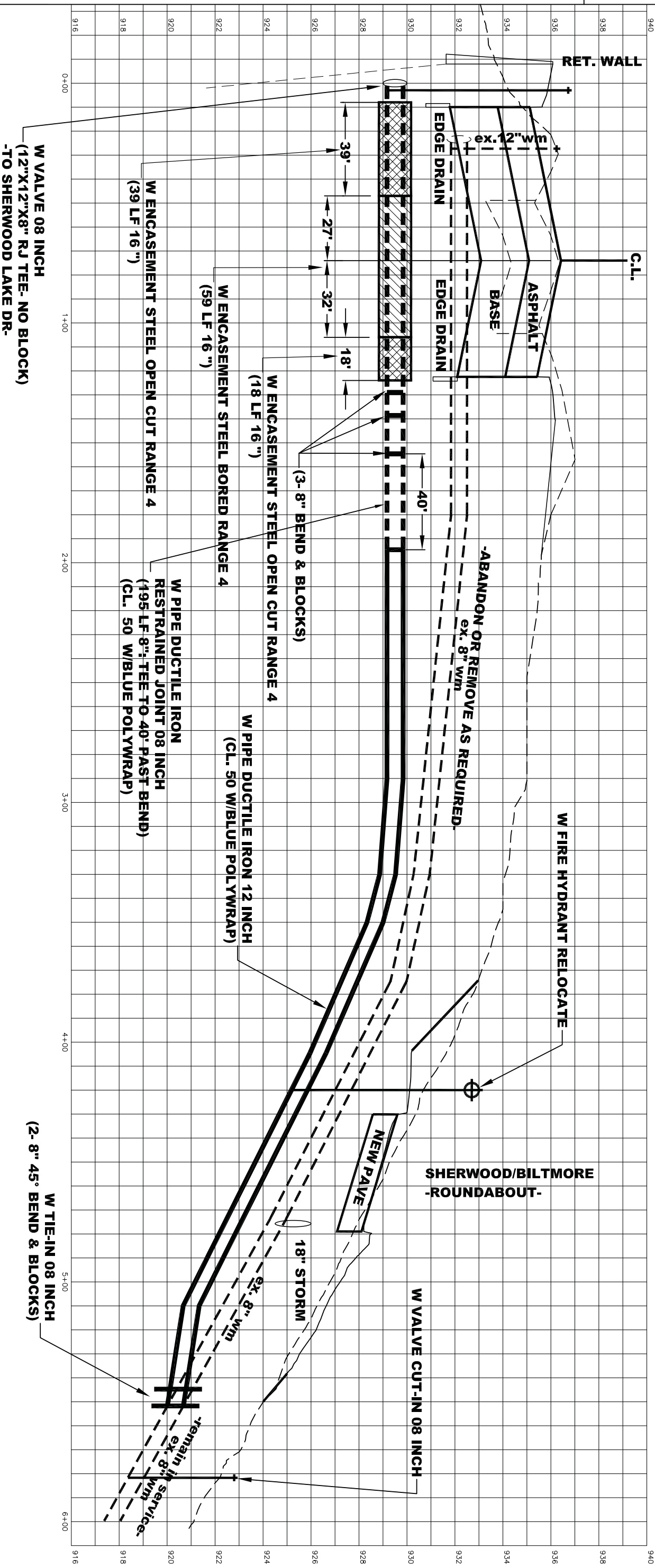
# PAGE 33 OF 36

WATER MAIN LAYOUT AT SHERWOOD LAKE DRIVE

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U43

Addendum #4 -- 8-30-19

PREPARED BY	_____	DATE	_____
CHECKED BY	_____	DATE	_____
APPROVED BY	_____	DATE	_____



NOTE:  
 ROTATE BENDS VERTICAL WHERE REQUIRED.  
 DEFLECT PIPE WHERE POSSIBLE; MAX. DEFLECTION- 6'-8"-12" = 5'

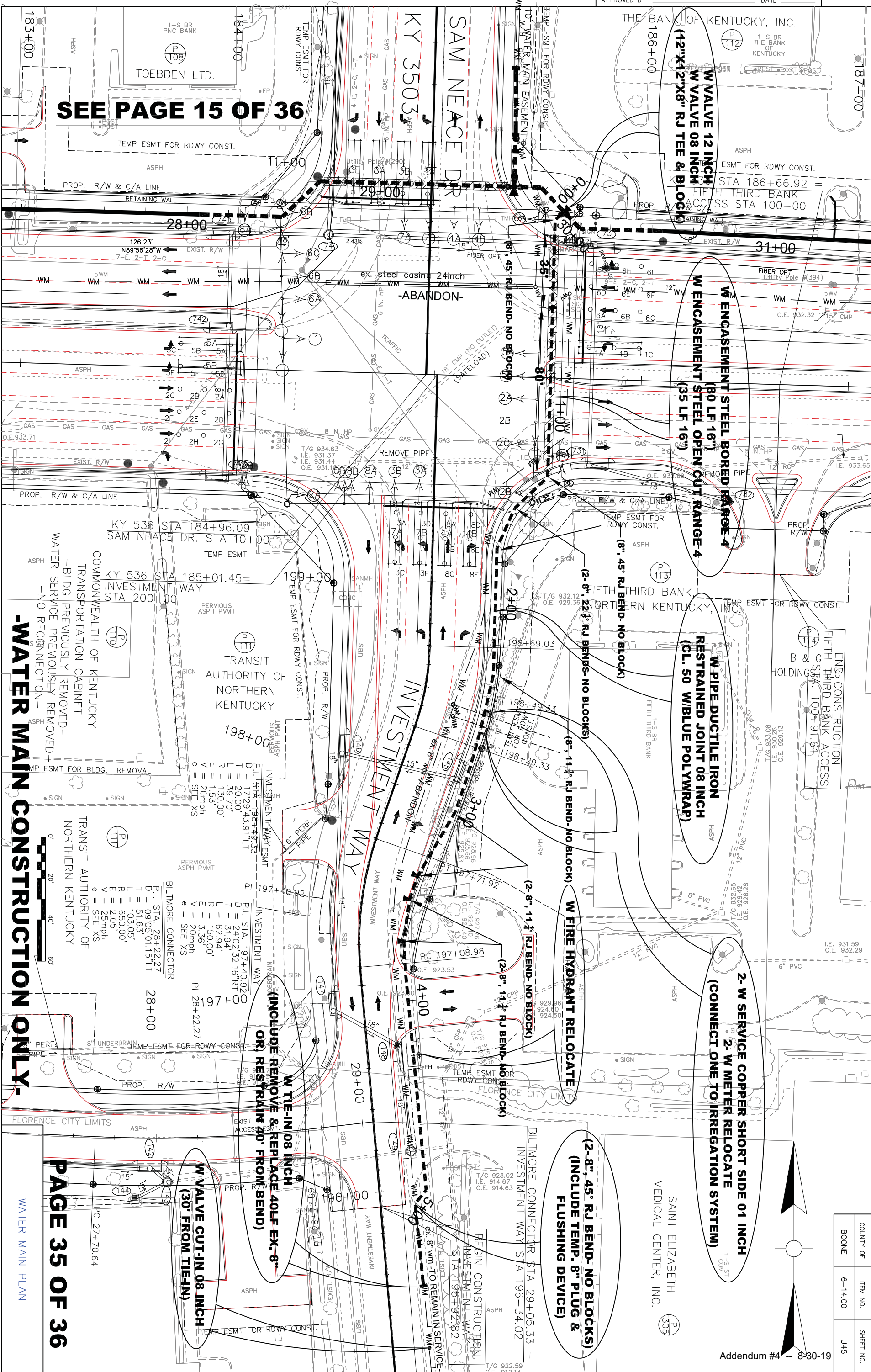
**- WATER MAIN CONSTRUCTION ONLY -**

SCALE: 1"=20'

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U44



PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE



SEE PAGE 15 OF 36

-WATER MAIN CONSTRUCTION ONLY-

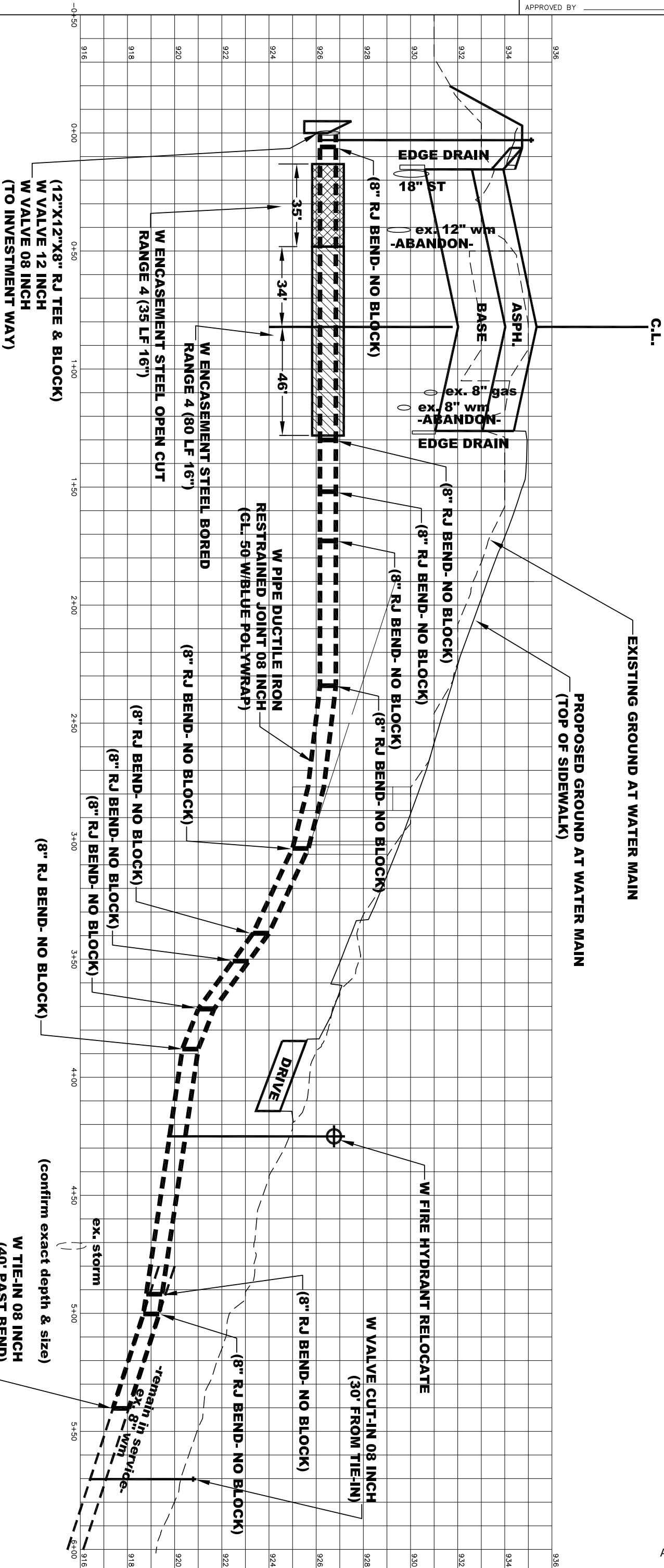
PAGE 35 OF 36

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U45

Addendum #4 - 8-30-19

PREPARED BY	_____	DATE	_____
CHECKED BY	_____	DATE	_____
APPROVED BY	_____	DATE	_____

# INVESTMENT WAY - PROPOSED WATER MAIN



NOTE:  
 ROTATE BENDS VERTICAL WHERE REQUIRED.  
 DEFLECT PIPE WHERE POSSIBLE: MAX. DEFLECTION- 6'-8"-12" = 5'

HORIZONTAL: 1"=20'  
 VERTICAL: 1"=2'

**- WATER MAIN CONSTRUCTION ONLY -**

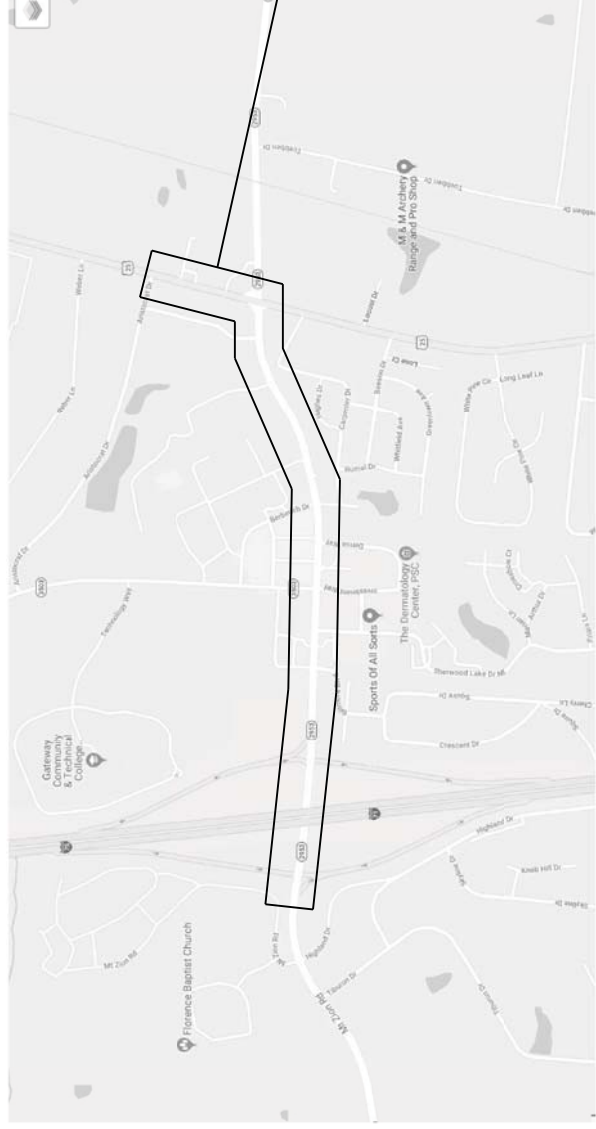
COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-14.00	U47

MATERIAL LIST

ITEM	DESCRIPTION	STOCK NO.	EST	ACTUAL
AN3	ANODE, MG, 17lb, HIGH POTENTIAL, PACKAGED W/ 10FT. red #12 AWG CU wire	0050056182	6	
B10	BOX, TERMINAL, W/ CT RIM AND LID, F/ CATHODIC TEST WIRE & TRACER WIRE	0050057325	6	
CA27	CAP. BUTT FUSION, 2" IPS	0050057346	2	
CA28	CAP. BUTT FUSION, 4" IPS	0050057347	4	
CA45	CAP. BUTT FUSION, 8" IPS, BLACK HDPE, SDR 17.0 END	0050131443	4	
CA69	CAP. WELD, 8" IPS, Gr Y52, STD/5CH 40 WALL	1526441	3	
CO39	CONPL, E-F, 2" IPS	0050057409	3	
CO41	CONPL, ELECTROFUSION, 4" IPS, PL-PL	0050057407	5	
CO47	CONPL, ELECTROFUSION, 8" IPS, PL-PL	0050092525	5	
EL37	ELL, BF, 90 DEG., 2" IPS	0050057553	3	
EL39	ELL, BF, 90 DEG., 4" IPS	0050057555	2	
EL43	ELL, BF, 45 DEG., 6" IPS	0050088405	4	
EL59	ELL, BF, 45 DEG., 8" IPS, BLACK HDPE, SDR 17.0 ENDS	50131429	7	
EL61	ELL, BF, 90 DEG., 8" IPS, BLACK HDPE, SDR 17.0 ENDS	50131431	9	
P19	PIPE, HDPE, 2IN IPS, SDR 11.0, 500FT ROLL	0050056008	543'	
P22	PIPE, HDPE, 4IN IPS, SDR 11.5, 40FT STICK	0050056058	177'	
P27	PIPE, HDPE, 6IN IPS, SDR 13.5, 40FT STICK	0050088398	731'	
P63	PIPE, HDPE, 8IN IPS, SDR 17.0, BLACK, 40FT STICK	50131194	6052'	
RE11	REDUCER, BF, HDPE, MOLDED, 4IN (SDR 11) x 2IN (SDR 11)	0050057758	2	
RE15	REDUCER, BF, HDPE, MOLDED, 6IN (SDR 13.5) x 4IN (SDR 11.5)	0050088410	4	
RE29	REDUCER, BF, HDPE, MOLDED, 8IN (SDR 17) x 6IN (SDR13.5)	1458380	5	
SA12	SADDLE, EF x BF BRANCH, SDR 11.5 HDPE, 4" IPS RUN x 4" IPS OUT	0050122075	2	
TE07	TEE, TAP, WELD, 3-WAY, SCARFED BOTTOM, 2IN IPS, 285psi RATED ALL CLASS LOCATIONS. INCLUDES COMPLETION PLUG, O-RING, & THREADED CAP	0050057869	1	
TE11	TEE, TAP, WELD, SPHERICAL, 3-WAY, 8IN IPS, ANSI 150 FLANGE, 285psi RATED ALL CLASS LOCATIONS. INCLUDES COMPLETION PLUG, O-RING, GASKET, BLIND FLANGE, STUDS & NUTS	0050057874	3	
TE87	TEE, PIPE, BF, HDPE, 8IN IPS, SDR 17.0 ENDS	50131442	6	
TF01	TRANSITION FITTING, BF x WELD, 2IN PE2708 SDR 11 x 2IN STEEL Gr B, 0.154" wall	0050057594	1	
TF04	TRANSITION FITTING, BF x WELD, 6IN PE2708 SDR 13.5 x 6IN STEEL Gr B, 0.280" wall	0050088407	1	
TF13	TRANSITION FITTING, BF x WELD, 8IN PE4710 SDR 17.0 x 8IN IPS STEEL Gr A, 0.322" wall	50133016	3	
TW1	WIRE/CABLE, ELECTRICAL, TRACER, 1300V, YELLOW, 32 MIL HDPE JACKET, WOVE CONDUCTOR, 19 AWG, TIN COATED CU, SOL. LID, SHAFT, 5-1/4" DIA. CAST IRON, WITH A, 3/8IN HOLE DRILLED IN LID, MARKED GAS	1479146	7454'	
TWTEST	ANODE, 5LB ZINC, W/ 10FT OF RED PE INSULATED 12AWG CU WIRE	50057324	40	
	CONNECTOR, ELECTRICAL, WIRE NUT, WING CRIP, BLUE, HOLDS 3-6 (12AWG) WIRES	1458186	40	
	MARKER BALL, FOR 3M LOCATING TOOL	1458304	40	
	CONNECTOR, SPLICE, MARLINE END TO END, POLYCARBONATE FILLED W/ WATER BLOCKING GEL, SELF PIERCING, FOR USE W/ NEPTCO TRACE-SAFE WIRE	1479149	40	
	BOX, VALVE, 15-1/2IN LG, CAST IRON TOP SECTION (UPPER CENTER), F/ 5-1/4" SHAFT X	50057322	40	
VAT3	VALVE, BALL, FULL PORT, HDPE, EF x MPT, 4IN IPS, 80psi	0050122081	2	

REV-19	8-15-19	MER
REV-2	8-15-19	MER
REV-3	8-15-19	MER

DUKE ENERGY



VICINITY MAP  
N.T.S.

AREA OF WORK

COUNTY OF	BOONE
ITEM NO.	06-415.00
SHEET NO.	UXX

GAS DEPARTMENT  
DUKE ENERGY

ERLANGER DISTRICT

CONTACT GAS SYSTEMS OPERATIONS SUPERVISOR PRIOR TO STARTING JOB TO VERIFY GAS FLOW

CALL K.U.P.I.  
2 BUSINESS DAY BEFORE YOU DIG #811

37

<p>DESIGN REVIEW OF COMPLETED CONSTRUCTION JOB</p> <p>SPONSOR _____ DATE _____</p>	<p>EST. PIPE LENGTH</p> <p>ACTUAL PIPE LENGTH</p> <p>ACTUAL FITTING &amp; VALVE LENGTH</p>	<p>WALL THICKNESS</p> <p>KIND</p> <p>SIZE</p> <p>TOTAL</p>	<p>CORROSION ENGINEERING</p> <p>CONDITION OF PIPE COATING WHEN DELIVERED TO JOB:</p> <p>APPR. BY: _____</p> <p>COATING TYPE: _____</p> <p>INSPECTION: _____</p> <p>VISUAL: _____</p> <p>TYPE PATCH MATERIAL: _____</p>	<p>PERMITS REQUIRED</p> <p>-----</p>
<p>SYSTEM OPERATION SUPERVISOR VALVES AND NUMBERS REVIEWED</p> <p>REVIEWED BY _____</p> <p>DATE _____</p> <p>VALVES THAT HAVE BEEN ABANDONED AND BOX REMOVED</p> <p>* _____</p> <p>* _____</p> <p>* _____</p> <p>* _____</p> <p>* _____</p> <p>* _____</p>	<p>CORROSION ENGINEERING TEST CONN. PER STD. 7.7.1 NO. PROPOSED _____</p> <p>NO. INSTALLED _____</p> <p>NO. TESTED OK (P/S INDICATOR) _____</p> <p>PLASTIC SEPARATIONS INSTALLED _____</p> <p>CONTINUITY OF COUPLINGS CHECKED _____</p> <p>CASING CHECKED FOR SHORT _____</p>	<p>FIELD PRESSURE LEAK TEST</p> <p>ALL PIPE LINES REQUIRE LEAK TESTING BEFORE PLACING IN SERVICE. FORMS SHOULD BE FORWARDED TO GAS ENGINEERING.</p> <p>REQUIRED TEST PRESSURE RANGE:</p> <p>MIN. 90 PSIG TO MAX. 100 PSIG</p> <p>HOURS 24 MEDIUM AIR _____</p> <p>TESTED BY _____ DATE _____</p>	<p>PROJECT CONTACTS</p> <p>CONSTRUCTION:</p> <p>MELISSA VAUGHAN GREG MENETREY (W) 513-287-2325 (W) 513-979-5405 (C) 513-312-9744 (C) 513-659-0066</p> <p>JOB SPONSOR:</p> <p>GERRY HELM (W) 859-534-4357 (C) 859-912-0820</p>	<p>COMPLETION CONTRACTOR _____</p> <p>VERIFICATION INSPECTOR _____</p>
<p>PROJECT ACTIVITY</p> <p>INSTALLATION MX9244894 I</p> <p>ABANDONMENT R</p> <p>RENEW SERVICE M-C MCRP70 I</p> <p>RENEW SERVICE C-M CMRP70 I</p> <p>RELOCATE METER GMSMOVE X</p>	<p>PROJECT NO. 029244894</p> <p>DOCUMENT NO. 029244894</p>	<p>MT. ZION KY 536</p> <p>STREET IMPROVEMENT</p> <p>FLORENCE, BOONE CO., KY</p>	<p>DATE PLACED _____</p> <p>IN SERVICE _____</p> <p>PERMIT NO. _____</p>	<p>DRAWN _____</p> <p>CHECKED _____</p> <p>APPROVED _____</p> <p>CLOSED BY _____</p> <p>EST. FOOTAGE 7503'</p>

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-415.00	UXX

**GAS DEPARTMENT**  
DUKE ENERGY

ERLANGER DISTRICT

2  
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Service Tag Number	Service Address	Date Installed	Actual Length (')	Nominal Diameter	Material	Near House Distance (')	Near House Direction	JCF Filled Out	Comments
608918	None	11/14/2013	76	1.25	Plastic	10	WW		
605972	10094 INVESTMENT WAY, FLORENCE, KY, 41042	8/24/2004	31	2	Plastic	17	EW		
606913	10080 SAM NEACE DR, FLORENCE, KY, 41042	7/23/2007	64	1.25	Plastic	6	NN		
606949	393 MT ZION RD, FLORENCE, KY, 41042	10/1/2007	8	1	Plastic	30	EW		
605571	Multiple - 280 MT ZION RD, FLORENCE, KY, 41042	12/26/2002	95	2	Plastic	77	EE		
460701	None	9/27/1993	19	1	Plastic	7	EE		
605226	9925 BERBERICH DR, FLORENCE, KY, 41042	12/26/2002	96	2	Plastic	78	EE		
513561	450 MT ZION RD, FLORENCE, KY, 41042	10/13/1999	63	1.25	Plastic	7	WW		
606128	Multiple - 9910 BERBERICH DR, FLORENCE, KY, 41042	1/6/2005	48	2	Plastic	14	NN		
513026	330 MT ZION RD, FLORENCE, KY, 41042	11/8/1998	62	1	Plastic	8	EE		
347173	None	1/1/1973	43	0.75	Plastic	10	NN		
512980	Multiple - 440 MT ZION RD, FLORENCE, KY, 41042	11/17/1998	88	2	Plastic	58	WW		
515943	335 MT ZION RD, FLORENCE, KY, 41042	10/8/2002	4	1	Plastic	24	EW		
487480	411 MT ZION RD, FLORENCE, KY, 41042	8/25/1995	4	1.25	Plastic	49	EE		
511097	550 MT ZION RD, FLORENCE, KY, 41042	7/26/2007	106	1.25	Plastic	Unknown	Unknown		
606965	400 MT ZION RD, FLORENCE, KY, 41042	10/17/2007	14	1	Plastic	1	SN		

Service Tag Number	Service Address	Date Installed	Actual Length (')	Nominal Diameter	Material	Near House Distance (')	Near House Direction	JCF Filled Out	Comments
513953	Multiple - 310 MT ZION RD, FLORENCE, KY, 41042	2/22/2000	93	2	Plastic	18	EE		
513002	8535 DIXIE HWY, FLORENCE, KY, 41042	11/5/1998	3	2	Coated Steel	102	NN		
512852	168 MT ZION RD, FLORENCE, KY, 41042	8/27/1998	7	1	Plastic	14	EW		
607024	136 SHOEMAKER LN, FLORENCE, KY, 41042	1/8/2008	4	1.25	Plastic	14	WW		
395954	8535 DIXIE HWY, FLORENCE, KY, 41042	5/3/1991	3	1.25	Plastic		SS		
397508	8560 DIXIE HWY, FLORENCE, KY, 41042	5/2/1991	57	1	Plastic	20	NN		
605222	130 MT ZION RD, FLORENCE, KY, 41042	1/15/2003	120	2	Plastic	39	SS		
494998	None	2/29/1996	1	1	Plastic		WW		
607512	196 MT ZION RD, FLORENCE, KY, 41042	12/31/2010	97	1	Plastic	12	EE		
494996	170 MT ZION RD, INDEPENDENCE, KY, 41051	2/29/1996	1	1	Plastic		WW		
332644	8535 DIXIE HWY, FLORENCE, KY, 41042	5/1/1991	2	1	Plastic	2	NN		
606419	166 MT ZION RD, FLORENCE, KY, 41042	11/29/2005	3	1	Plastic	8	EE		
410657	10060 DIXIE HWY, FLORENCE, KY, 41042	5/9/1991	3	1.25	Plastic	16	NN		
494997	172 MT ZION RD, FLORENCE, KY, 41042	2/29/1996	1	1	Plastic	2	WW		

REV-1 MER	8-19-19
REV-2 MER	8-15-19
REV-3 MER	8-19-19

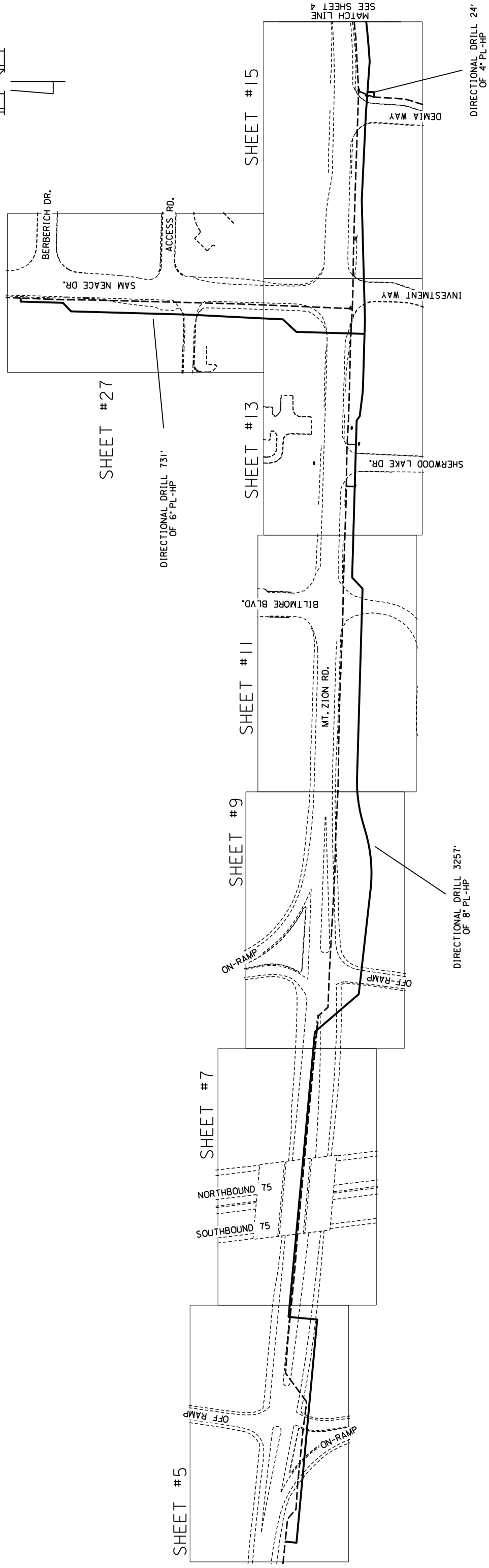
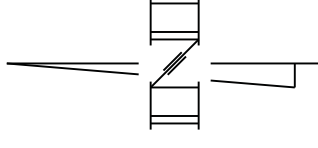
COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-415.00	

GAS DEPARTMENT  
DUKE ENERGY

ERLANGER DISTRICT



3  
37



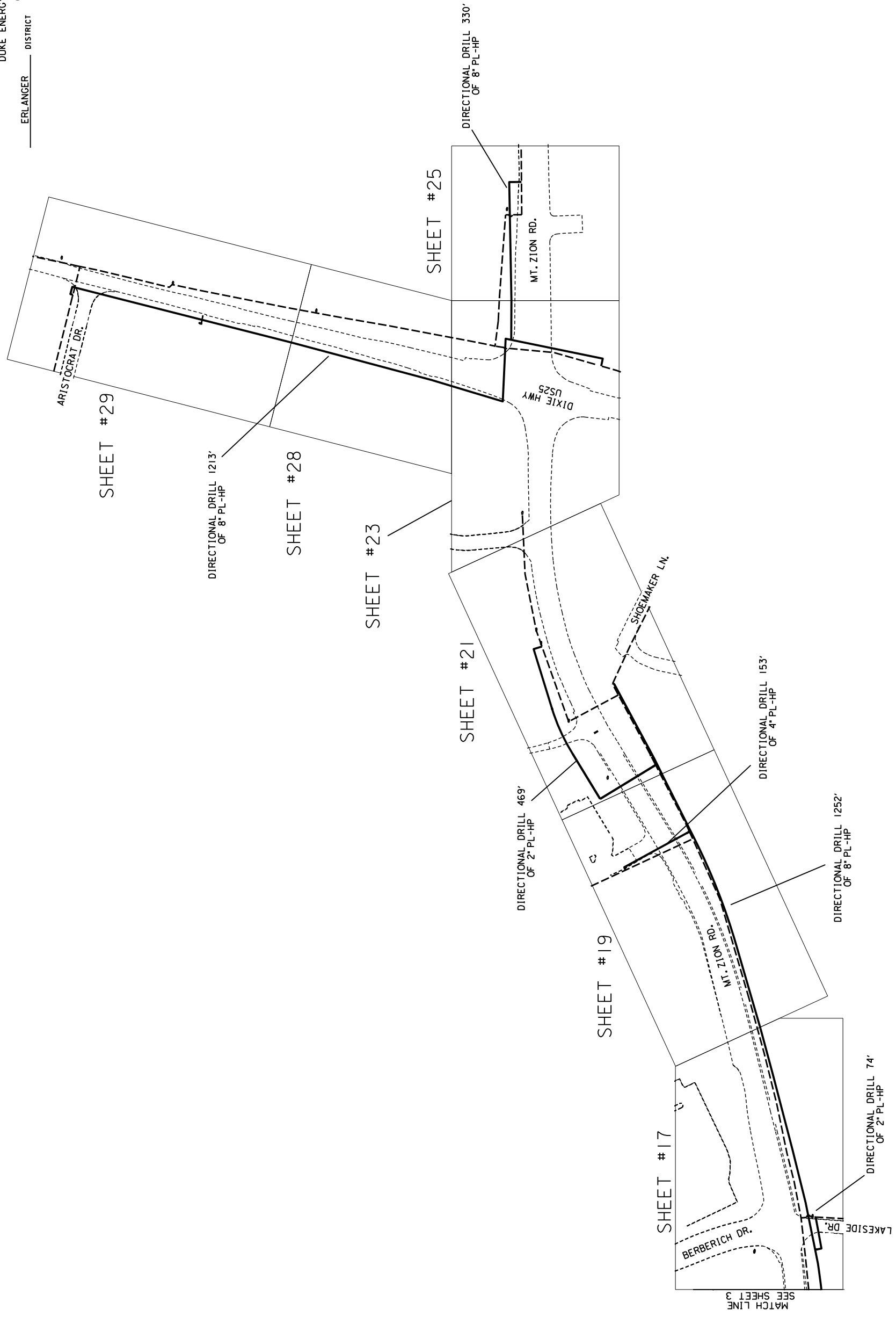
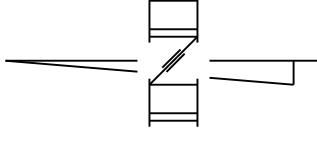
SITE LAYOUT

REV-1 MER	6-23-19
REV-2 MER	8-15-19
REV-3 MER	8-19-19

COUNTY OF	BOONE	SHEET NO.	4
ITEM NO.	06-415.00		
			37
			UXX

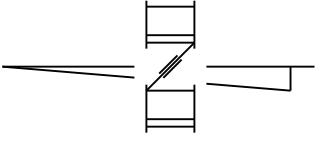
**GAS DEPARTMENT**  
DUKE ENERGY

ERLANGER DISTRICT



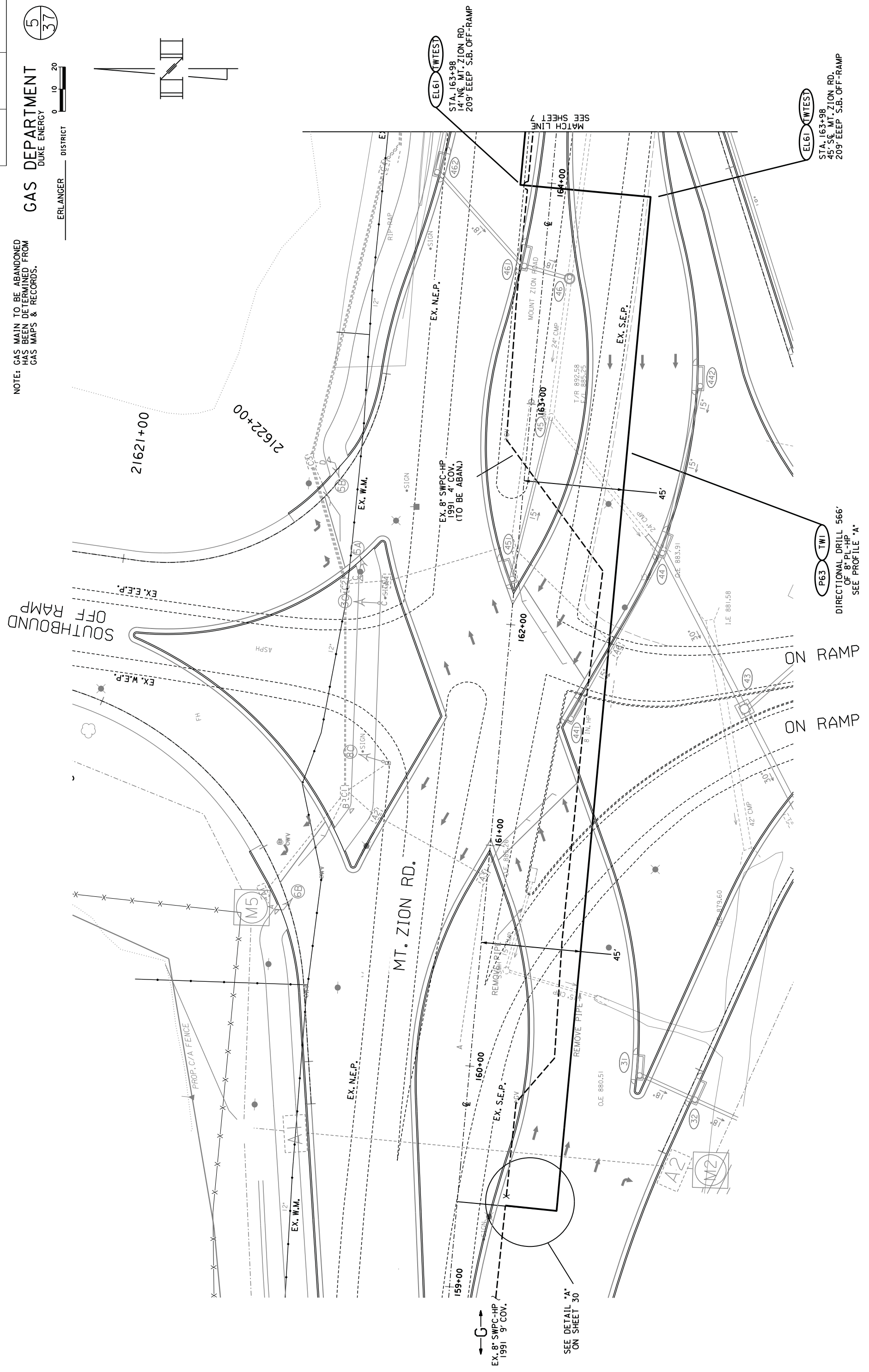
SITE LAYOUT

REVISIONS	ADDENDUM #4 -- 8-30-19
REV1 MER	6-23-19
REV-2 MER	8-15-19
REV-3 MER	8-19-19



NOTE: GAS MAIN TO BE ABANDONED HAS BEEN DETERMINED FROM GAS MAPS & RECORDS.

5  
37



REVISIONS	6-23-19	REV1 MER
	8-15-19	REV-2 MER
	8-15-19	REV-3 MER
	8-19-19	

Addendum #4 -- 8-30-19

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-415.00	UXX

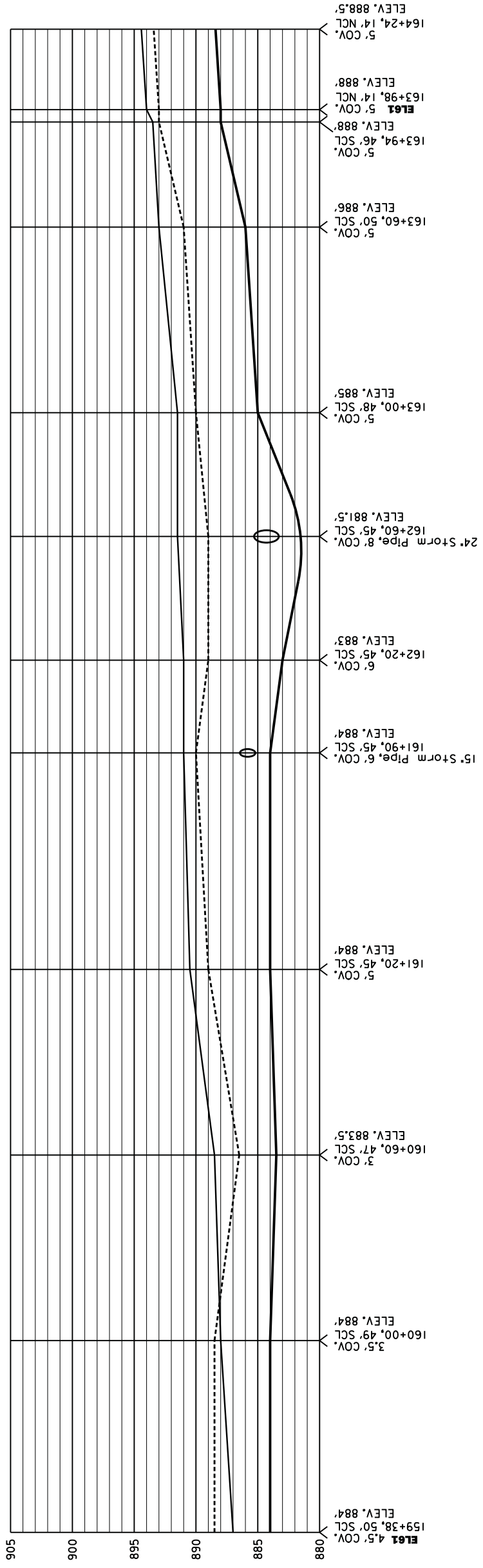
**GAS DEPARTMENT**  
DUKE ENERGY

ERLANGER DISTRICT

NTS



NOTE: COVER BASED ON  
EXISTING GRADE



PROFILE "A"

FROM SHEET 5

HORIZ. SCALE 0 10 20

VERT. SCALE 0 2.5 5

PROP. GAS MAIN ———

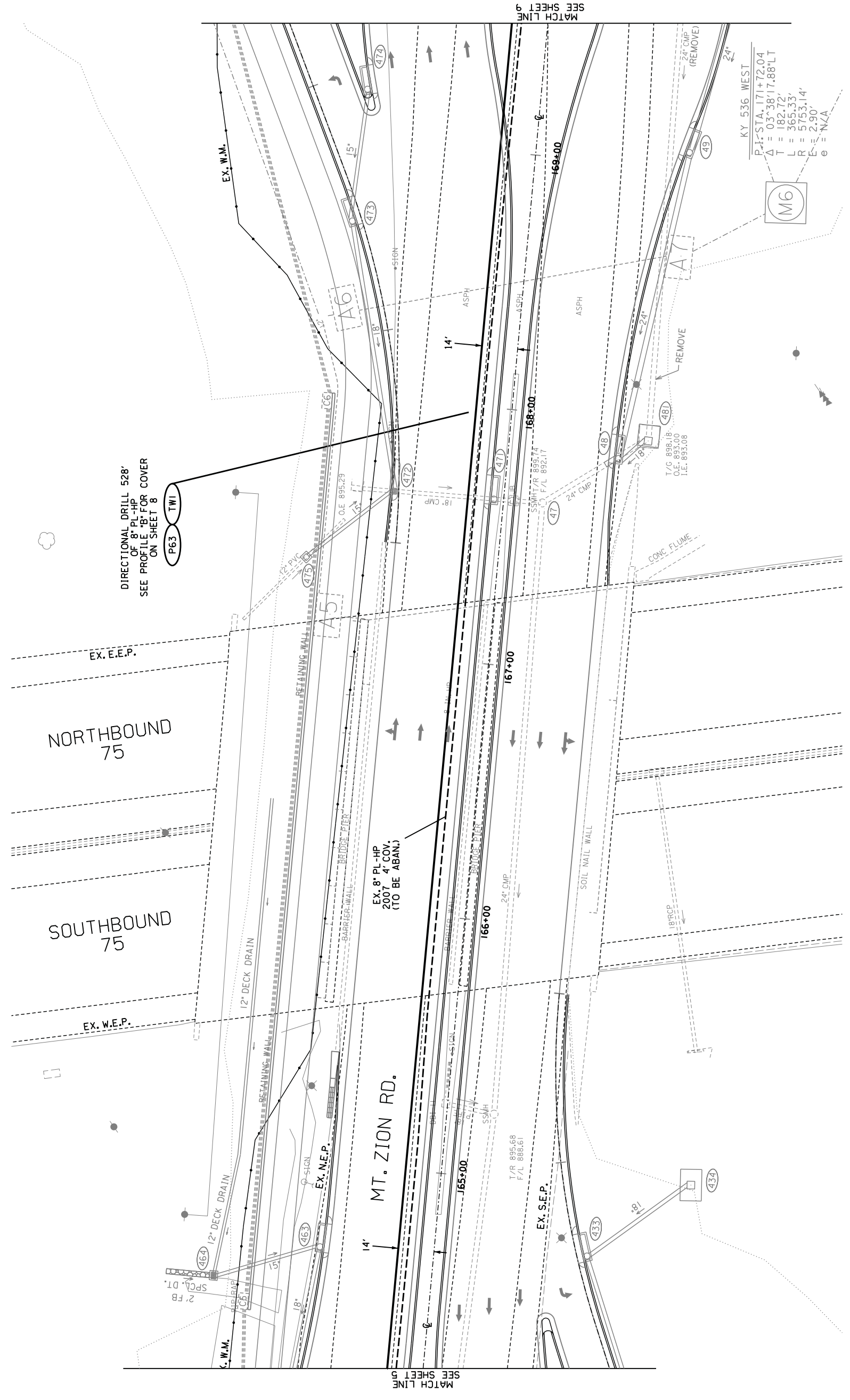
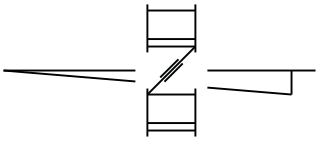
PROP. GRADE ———

EX. GRADE - - - - -

REVISIONS	6-23-19	REV1 MER
	8-15-19	REV-2 MER
	8-19-19	REV-3 MER



NOTE: GAS MAIN TO BE ABANDONED HAS BEEN DETERMINED FROM GAS MAPS & RECORDS.



MATCH LINE 5  
 SEE SHEET 5

MATCH LINE 9  
 SEE SHEET 9

REVISION	6-23-19	REV1 MER
REVISION	8-15-19	REV-2 MER
REVISION	8-15-19	REV-3 MER
REVISION	8-19-19	

COUNTY OF	BOONE	ITEM NO.	06-415.00	SHEET NO.	UXX
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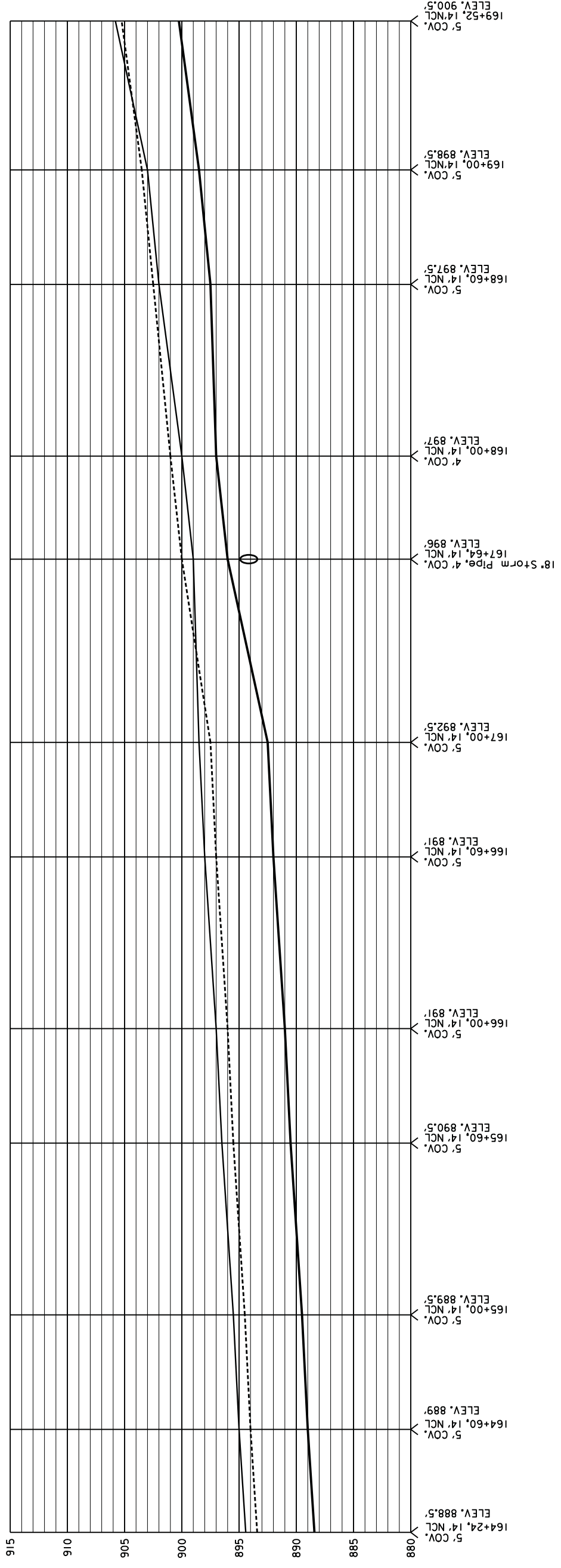
**GAS DEPARTMENT**  
DUKE ENERGY

ERTLANGER DISTRICT

NTS

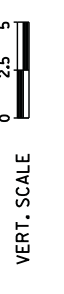
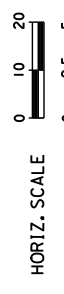



NOTE: COVER BASED ON  
EXISTING GRADE



PROFILE "B"

FROM SHEET 7



- PROP. GAS MAIN
- PROP. GRADE
- EX. GRADE

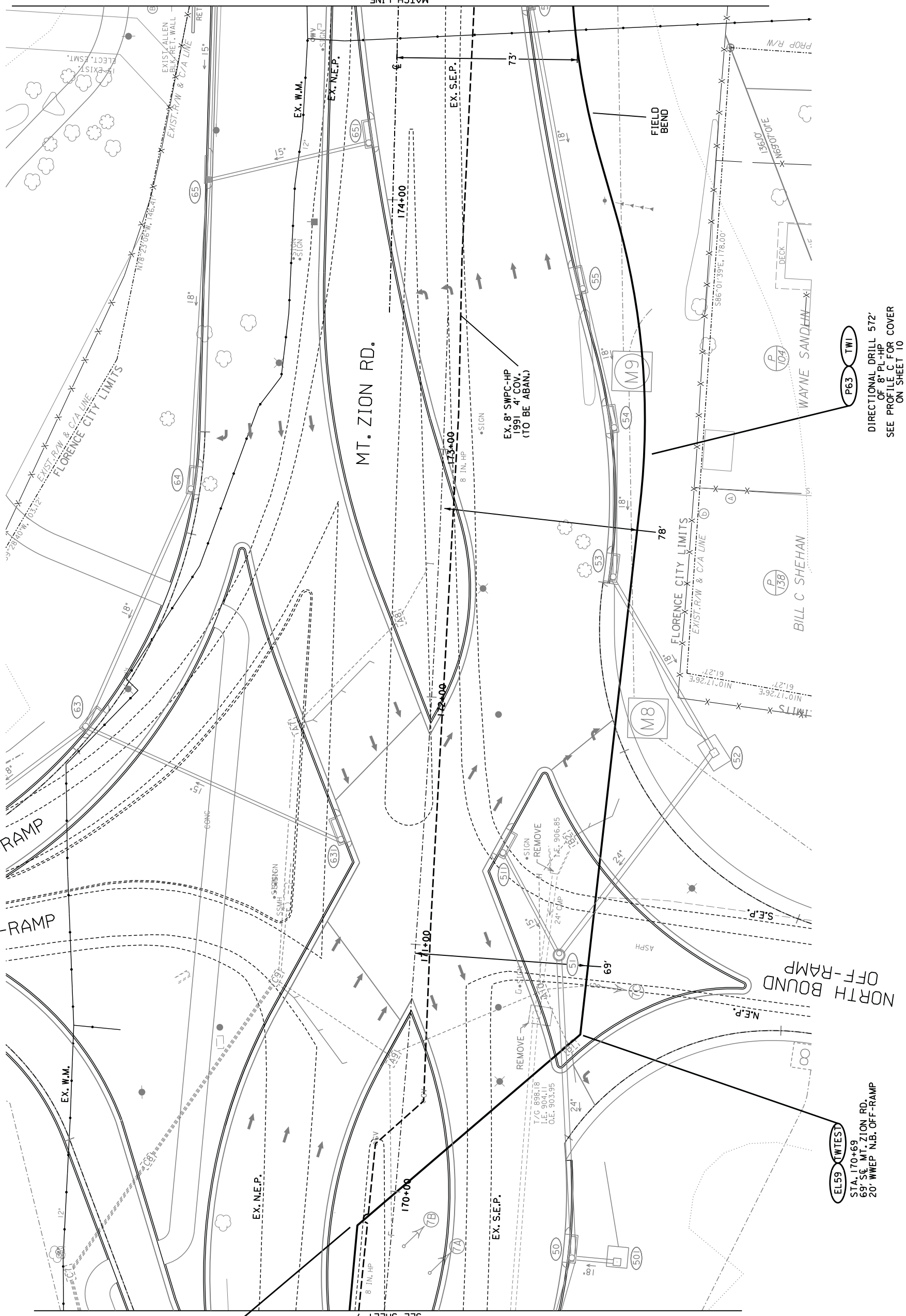
REVISIONS
REVI MER 6-23-19
REV-2 MER 8-15-19
REV-3 MER 8-19-19

**GAS DEPARTMENT**  
 DUKE ENERGY

NOTE: GAS MAIN TO BE ABANDONED  
 HAS BEEN DETERMINED FROM  
 GAS MAPS & RECORDS.



ERLANGER DISTRICT



EL59 TWTEST  
 STA. 169+85  
 15' N.E. MT. ZION RD.  
 108' W.WEP N.B. OFF-RAMP

MATCH LINE  
 SEE SHEET 7

MATCH LINE  
 SEE SHEET 11

EL59 TWTEST  
 STA. 170+69  
 69' S.E. MT. ZION RD.  
 20' W.WEP N.B. OFF-RAMP

P63 TW1  
 DIRECTIONAL DRILL 572'  
 OF 8" PL-HP  
 SEE PROFILE C FOR COVER  
 ON SHEET 10

REVISIONS	6-23-19	REV-1 MER
	8-15-19	REV-2 MER
	8-15-19	REV-3 MER
	8-19-19	

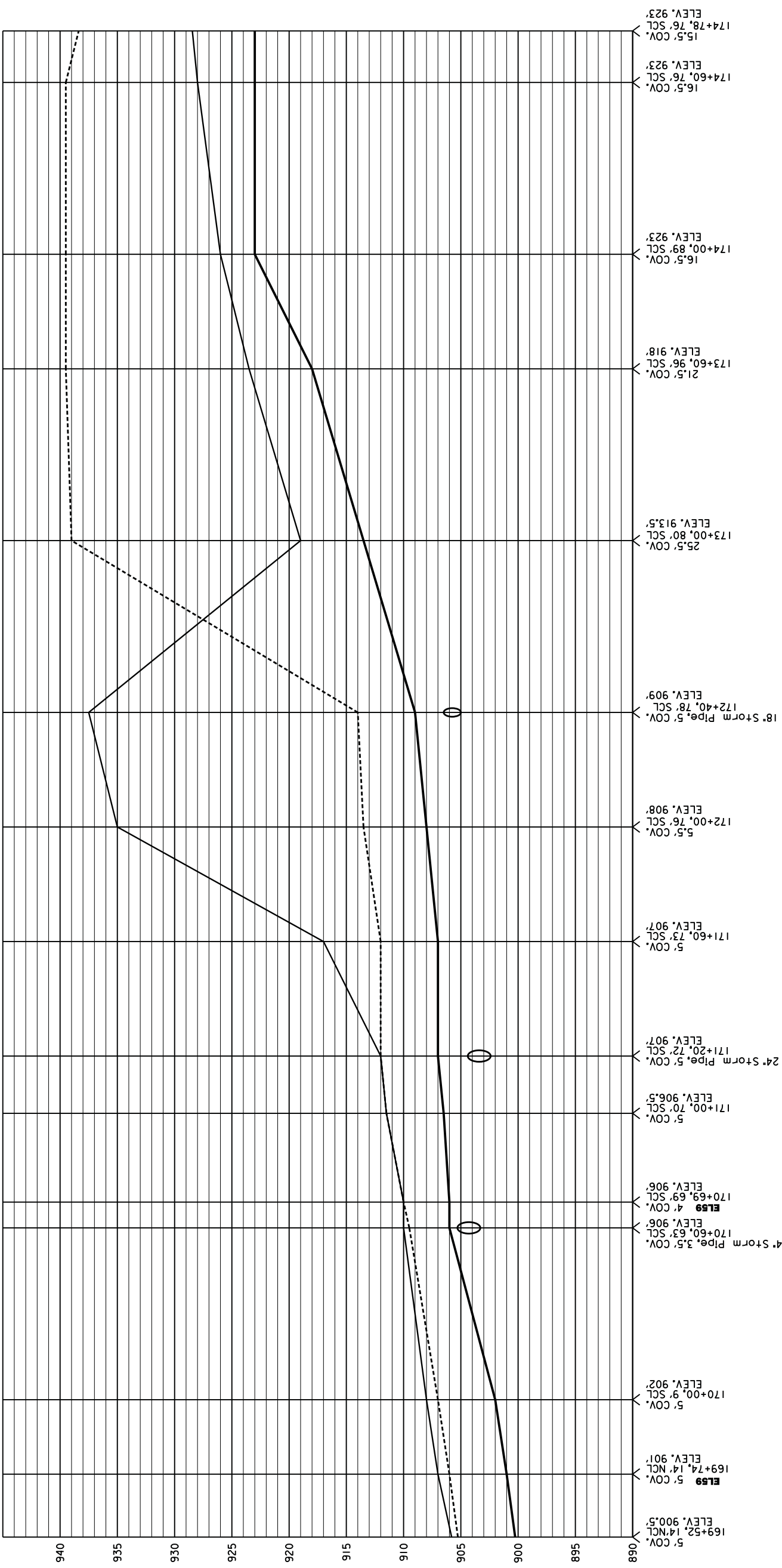
SHEET NO.	ITEM NO.	COUNTY OF
UXX	06-415.00	BOONE

10  
37

**GAS DEPARTMENT**  
DUKE ENERGY

ERTLANGER DISTRICT

NOTE: COVER BASED ON  
EXISTING GRADE



**PROFILE "C"**

FROM SHEET 9

HORIZ. SCALE 0 10 20

VERT. SCALE 0 2.5 5

- PROP. GAS MAIN
- PROP. GRADE
- EX. GRADE

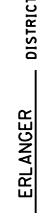
REV-1 MER	6-23-19
REV-2 MER	8-15-19
REV-3 MER	8-19-19

COUNTY OF	BOONE	ITEM NO.	06-415.00	SHEET NO.	UXX
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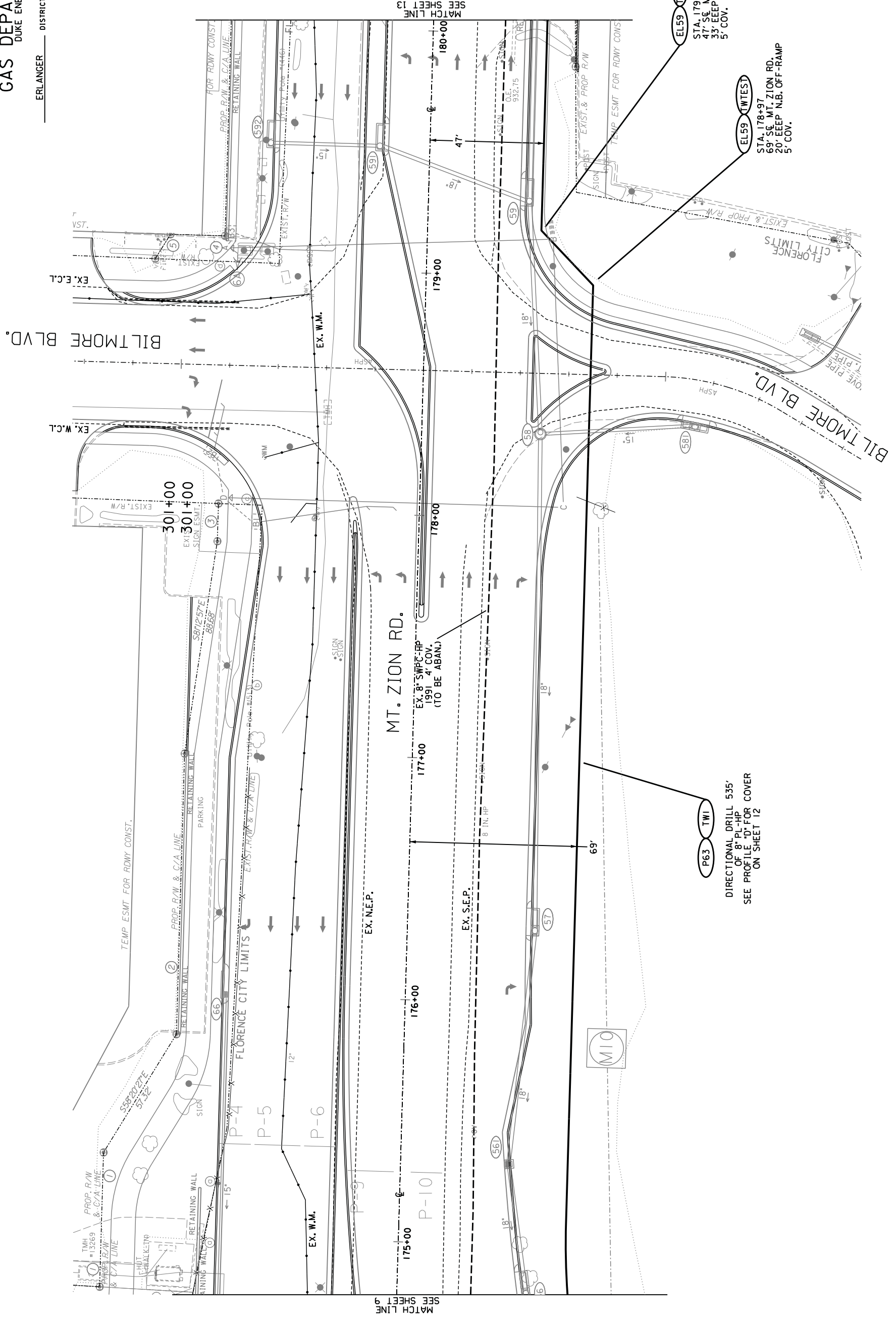


**GAS DEPARTMENT**  
DUKE ENERGY

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED HAS BEEN DETERMINED FROM GAS MAPS & RECORDS.



MATCH LINE 9 SEE SHEET 9

MATCH LINE 13 SEE SHEET 13

REVISIONS	8-23-19	REV-1 MER
	6-23-19	REV-2 MER
	8-15-19	REV-3 MER
	8-19-19	

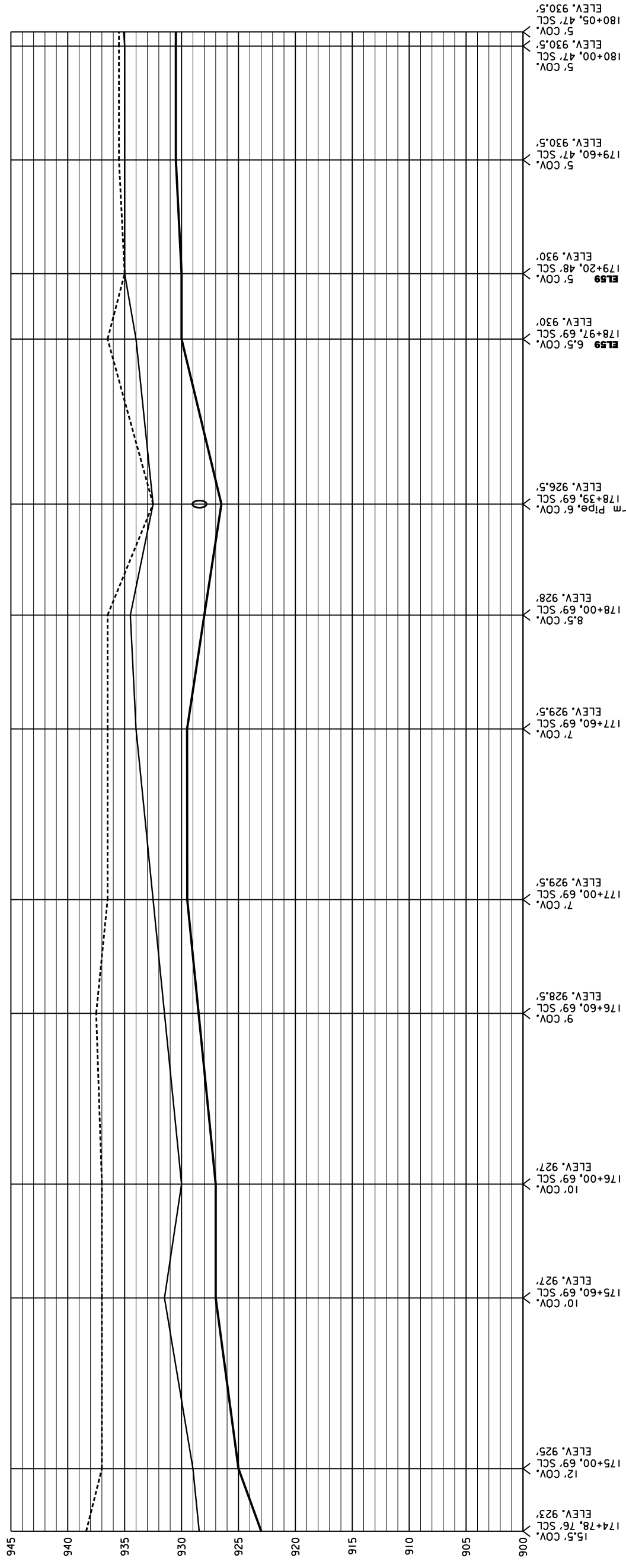
SHEET NO.	ITEM NO.	COUNTY OF
UXX	06-415.00	BOONE

12/37

**GAS DEPARTMENT**  
DUKE ENERGY

ERTLANGER DISTRICT

NOTE: COVER BASED ON  
EXISTING GRADE



PROFILE "D"

FROM SHEET 11

HORIZ. SCALE 0 10 20

VERT. SCALE 0 2.5 5

PROP. GAS MAIN

PROP. GRADE

EX. GRADE

Addendum #4 -- 8-30-19

REV-3 MER	8-19-19
REV-2 MER	8-15-19
REV-1 MER	6-23-19

COUNTY OF	BOONE
ITEM NO.	06-415.00
SHEET NO.	UXX

13  
37

**GAS DEPARTMENT**  
DUKE ENERGY

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED HAS BEEN DETERMINED FROM GAS MAPS & RECORDS.

EL43 TWTEST  
STA. 184+44  
111' N.E. MT. ZION RD.  
19' W.W.E.P. SAM NEACE DR.  
5' COV.

EL43 TWTEST  
STA. 184+19  
82' N.E. MT. ZION RD.  
43' W.W.E.P. SAM NEACE DR.  
5' COV.

EL59 TWTEST  
STA. 182+50  
53' S.E. MT. ZION RD.  
77' E.E.C.L. SHERWOOD LAKES

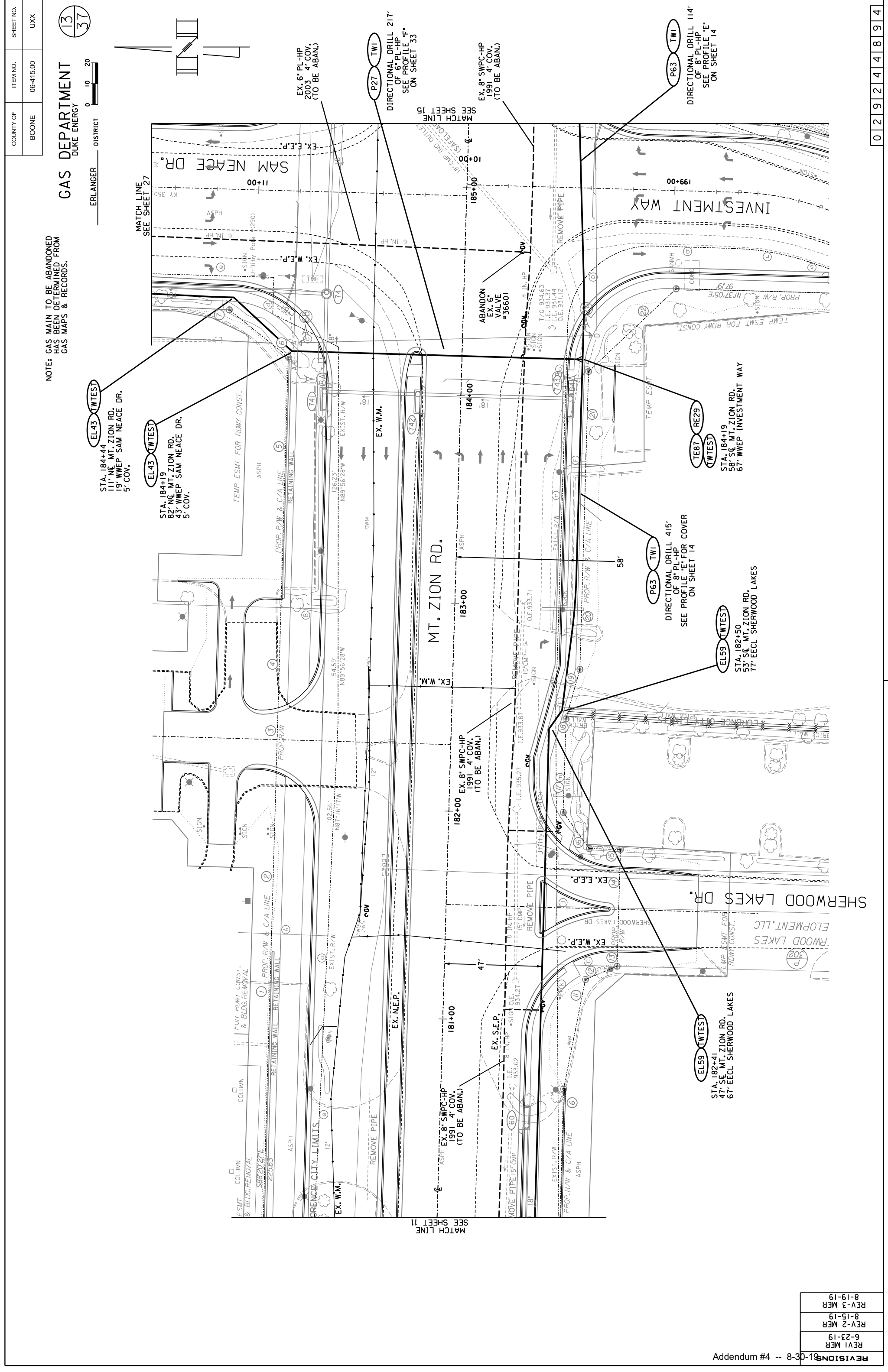
EL59 TWTEST  
STA. 182+41  
47' S.E. MT. ZION RD.  
67' E.E.C.L. SHERWOOD LAKES

P63 TWI  
DIRECTIONAL DRILL 415'  
OF 8" PL-HP  
SEE PROFILE 'E' FOR COVER  
ON SHEET 14

TE87 RE29 TWTEST  
STA. 184+19  
58' S.E. MT. ZION RD.  
67' W.W.E.P. INVESTMENT WAY

P63 TWI  
DIRECTIONAL DRILL 114'  
OF 8" PL-HP  
SEE PROFILE 'E'  
ON SHEET 14

P27 TWI  
DIRECTIONAL DRILL 217'  
OF 6" PL-HP  
SEE PROFILE 'F'  
ON SHEET 33



MATCH LINE SEE SHEET 11

MATCH LINE SEE SHEET 27

MATCH LINE SEE SHEET 15

REVISIONS	6-23-19	REV-1 MER
	8-15-19	REV-2 MER
	8-15-19	REV-3 MER
	8-19-19	

Addendum #4 -- 8-30-19

0 2 9 2 4 1 8 9 4

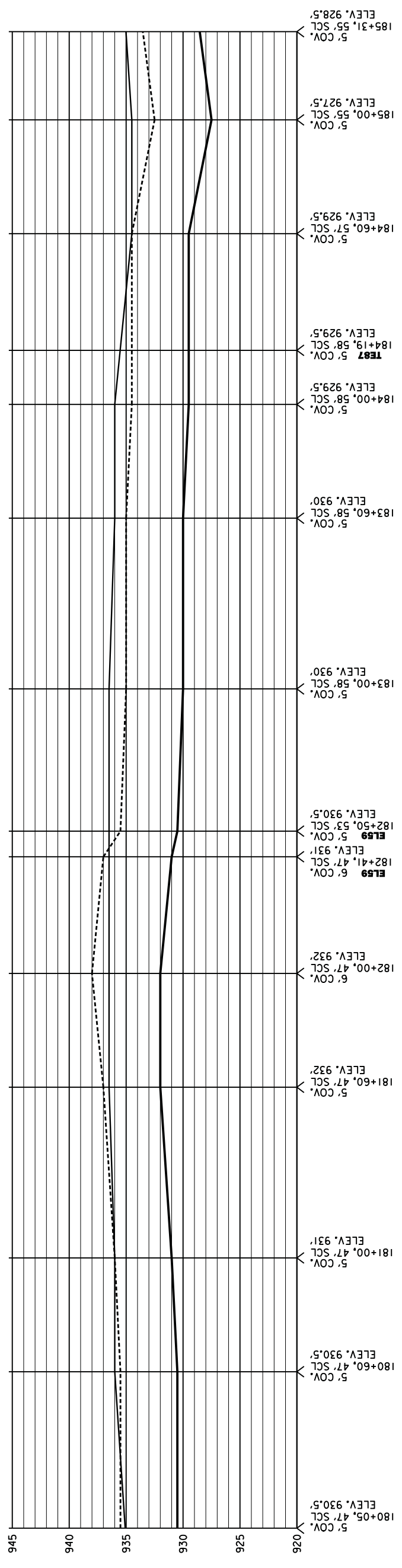
COUNTY OF	BOONE	ITEM NO.	06-415.00	SHEET NO.	UXX
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**GAS DEPARTMENT**  
DUKE ENERGY

ERLANGER DISTRICT

NOTE: COVER BASED ON  
EXISTING GRADE

14  
37



PROFILE "E"

FROM SHEET 13

HORIZ. SCALE 0 10 20

VERT. SCALE 0 2.5 5

PROP. GAS MAIN

PROP. GRADE

EX. GRADE

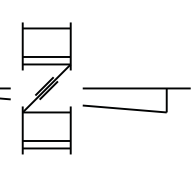
REVISIONS	6-23-19	REV1 MER
	8-15-19	REV-2 MER
	8-19-19	REV-3 MER



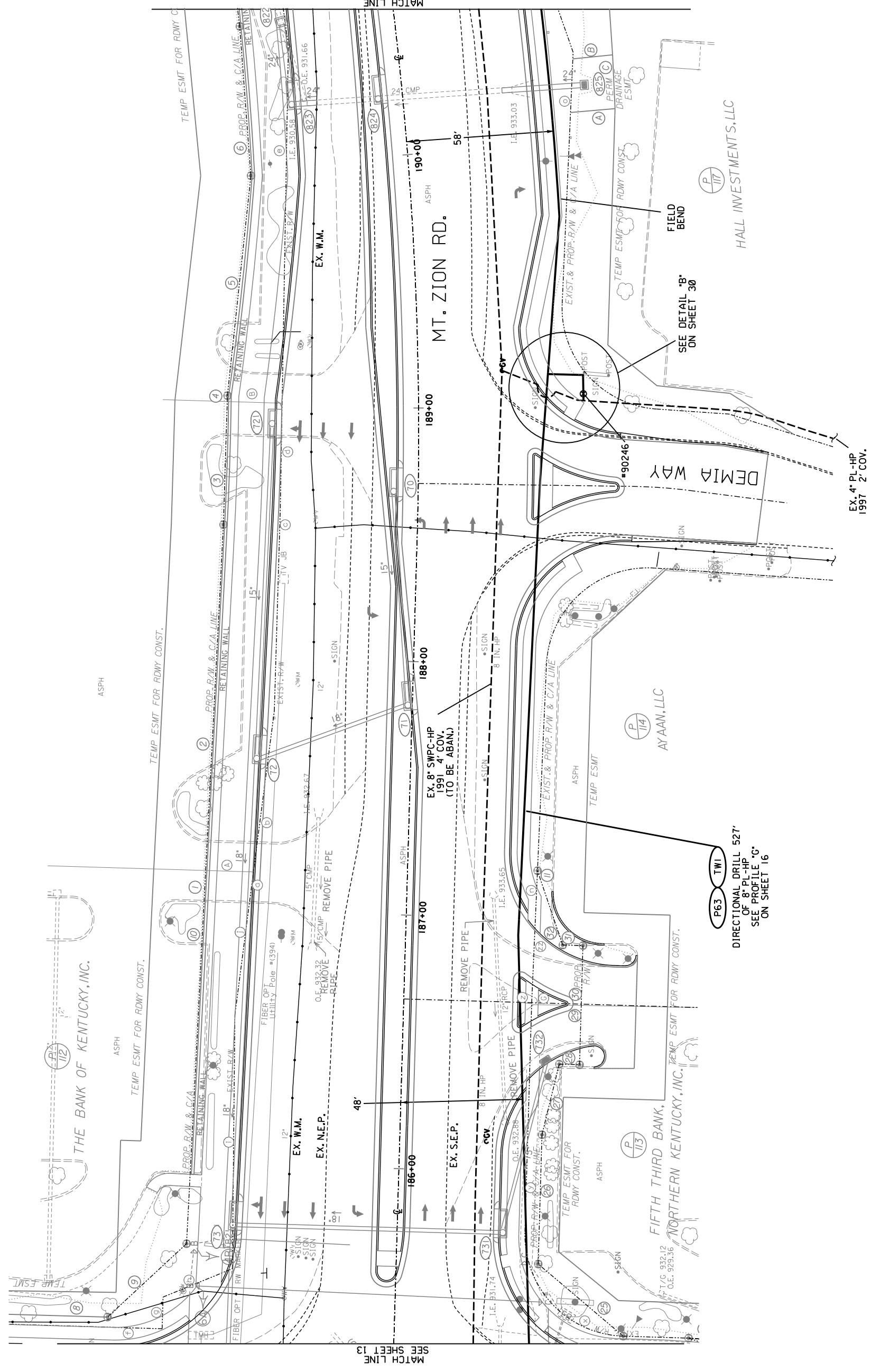
COUNTY OF	BOONE	ITEM NO.	06-415.00	SHEET NO.	UXX
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**GAS DEPARTMENT**  
DUKE ENERGY

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED HAS BEEN DETERMINED FROM GAS MAPS & RECORDS.



MATCH LINE SEE SHEET 17

MATCH LINE SEE SHEET 13

REVISION	6-23-19	REV-1 MER
REVISION	8-15-19	REV-2 MER
REVISION	8-15-19	REV-3 MER
REVISION	8-19-19	

Addendum #4 -- 8-30-19

0 2 9 2 4 4 8 9 4

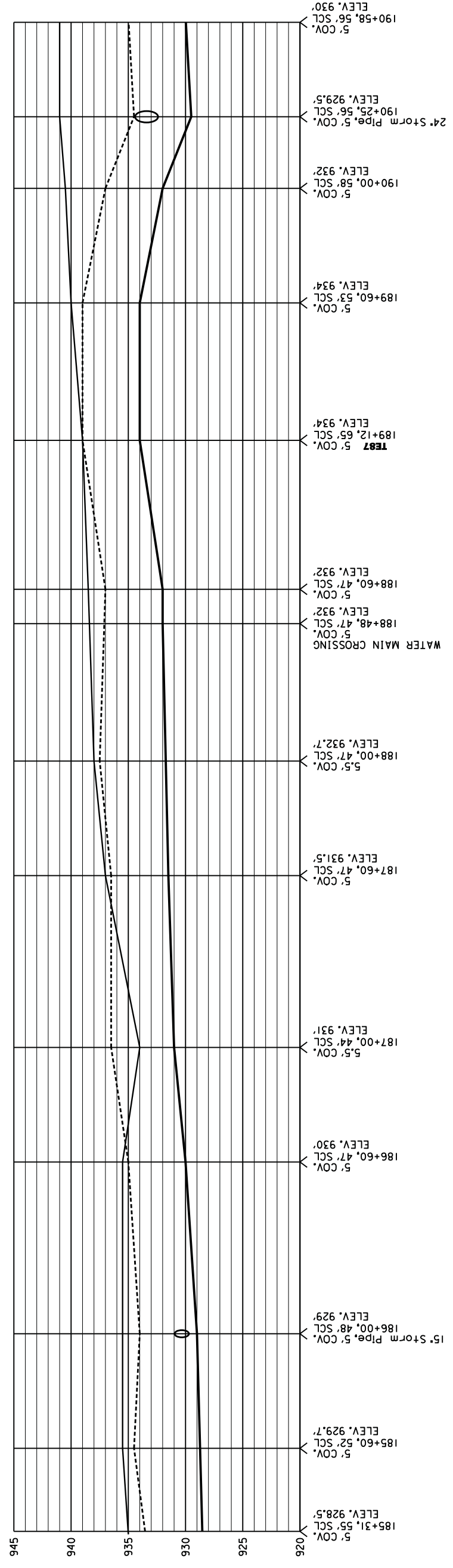
COUNTY OF	BOONE	ITEM NO.	06-415.00	SHEET NO.	UXX
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**GAS DEPARTMENT**  
DUKE ENERGY

ERLANGER DISTRICT

NOTE: COVER BASED ON  
EXISTING GRADE

16  
37



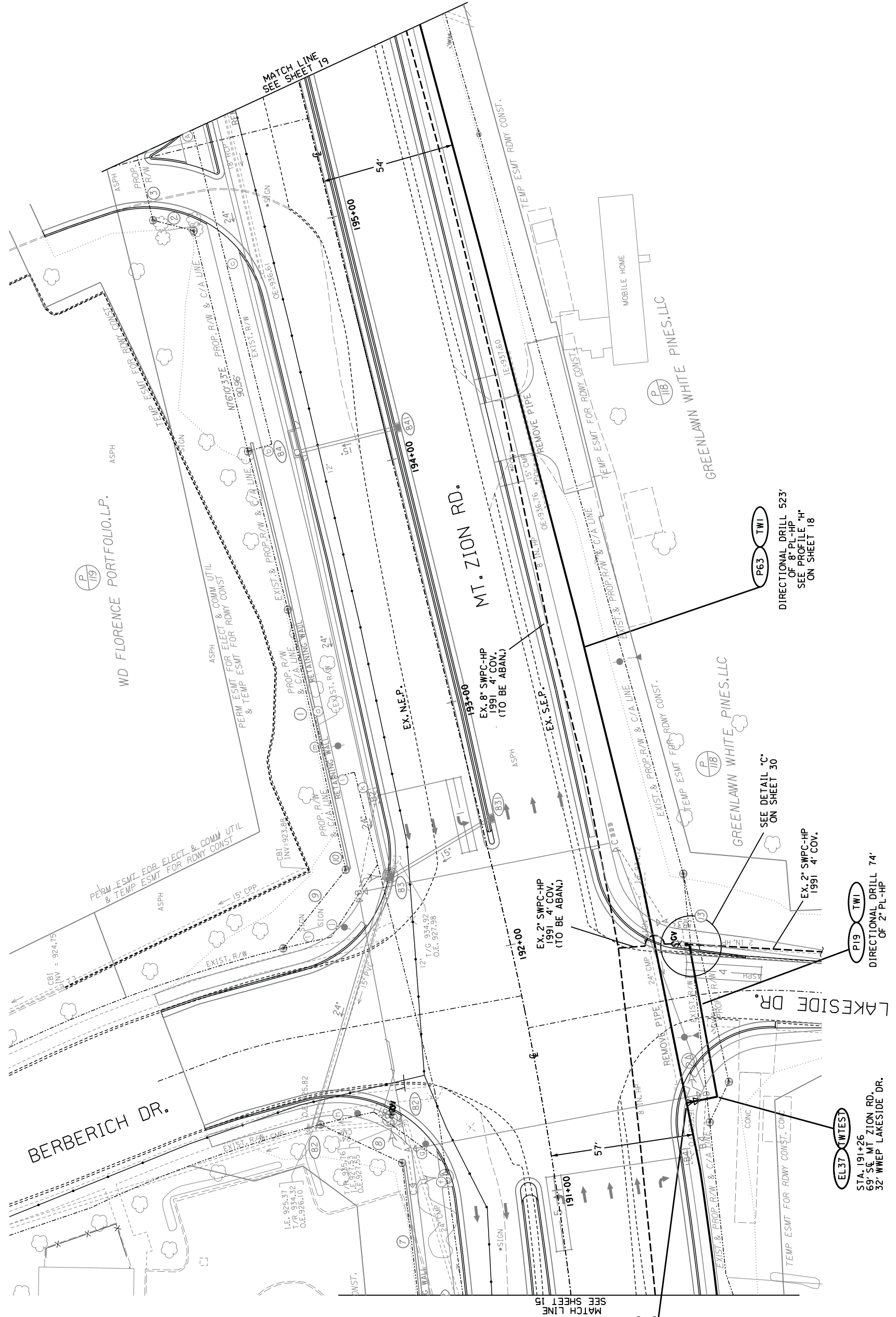
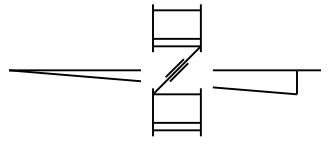
**PROFILE "G"**  
FROM SHEET 15

HORIZ. SCALE 0 10 20  
VERT. SCALE 0 2.5 5

PROP. GAS MAIN  
PROP. GRADE  
EX. GRADE

REVISIONS	6-23-19	REV1 MER
	8-15-19	REV-2 MER
	8-19-19	REV-3 MER

NOTE: GAS MAIN TO BE ABANDONED HAS BEEN DETERMINED FROM GAS MAPS & RECORDS.



TE87 (WTESI) RE11  
 RE29 RE15 CO39  
 STA. 191+26  
 57' S.C. MT ZION RD.  
 36' WNEP LAKESIDE DR.

REV-19	8-19-19
REV-3 MER	8-15-19
REV-2 MER	8-15-19
REV-1 MER	6-23-19

REVISIONS Addendum #4 -- 8-30-19

P63 (TWI)  
 DIRECTIONAL DRILL 523'  
 OF 8" PL-HP  
 SEE PROFILE 'H'  
 ON SHEET 18

SEE DETAIL 'C'  
 ON SHEET 30

P19 (TWI)  
 DIRECTIONAL DRILL 74'  
 OF 2" PL-HP

EL37 (WTESI)  
 STA. 191+26  
 69' S.C. MT ZION RD.  
 32' WNEP LAKESIDE DR.

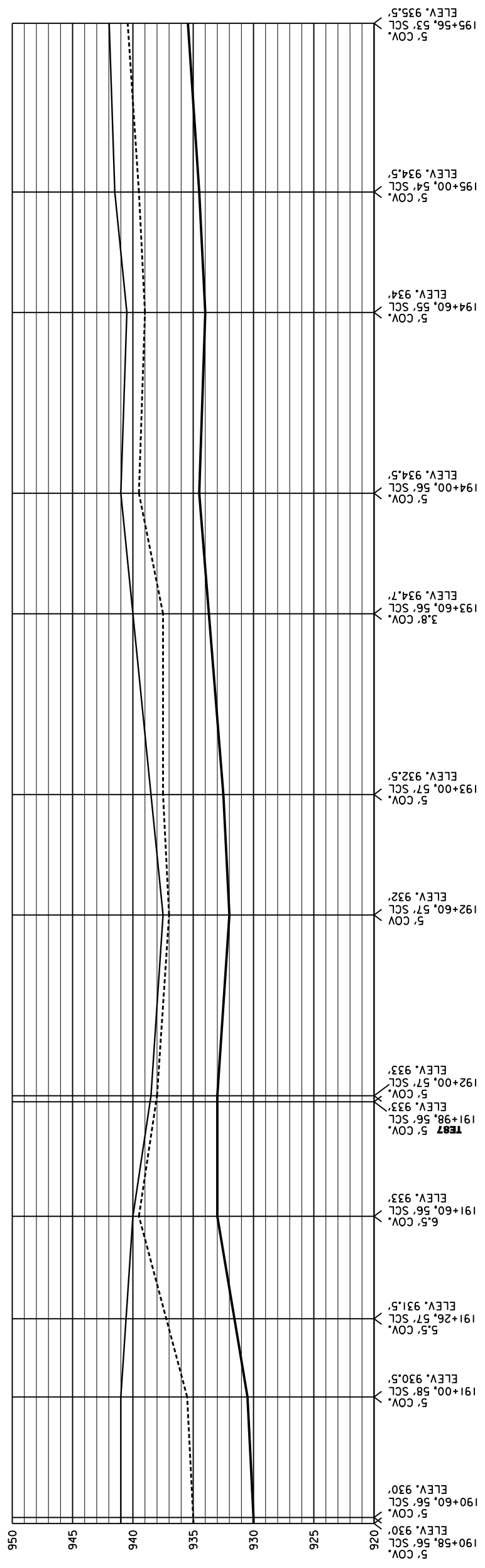
COUNTY OF	BOONE	ITEM NO.	06-415.00	SHEET NO.	UXX
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18  
37

**GAS DEPARTMENT**  
DUKE ENERGY

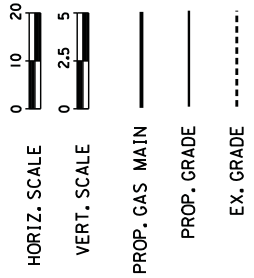
ERTLANGER DISTRICT

NOTE: COVER BASED ON  
EXISTING GRADE



PROFILE "H"

FROM SHEET 17



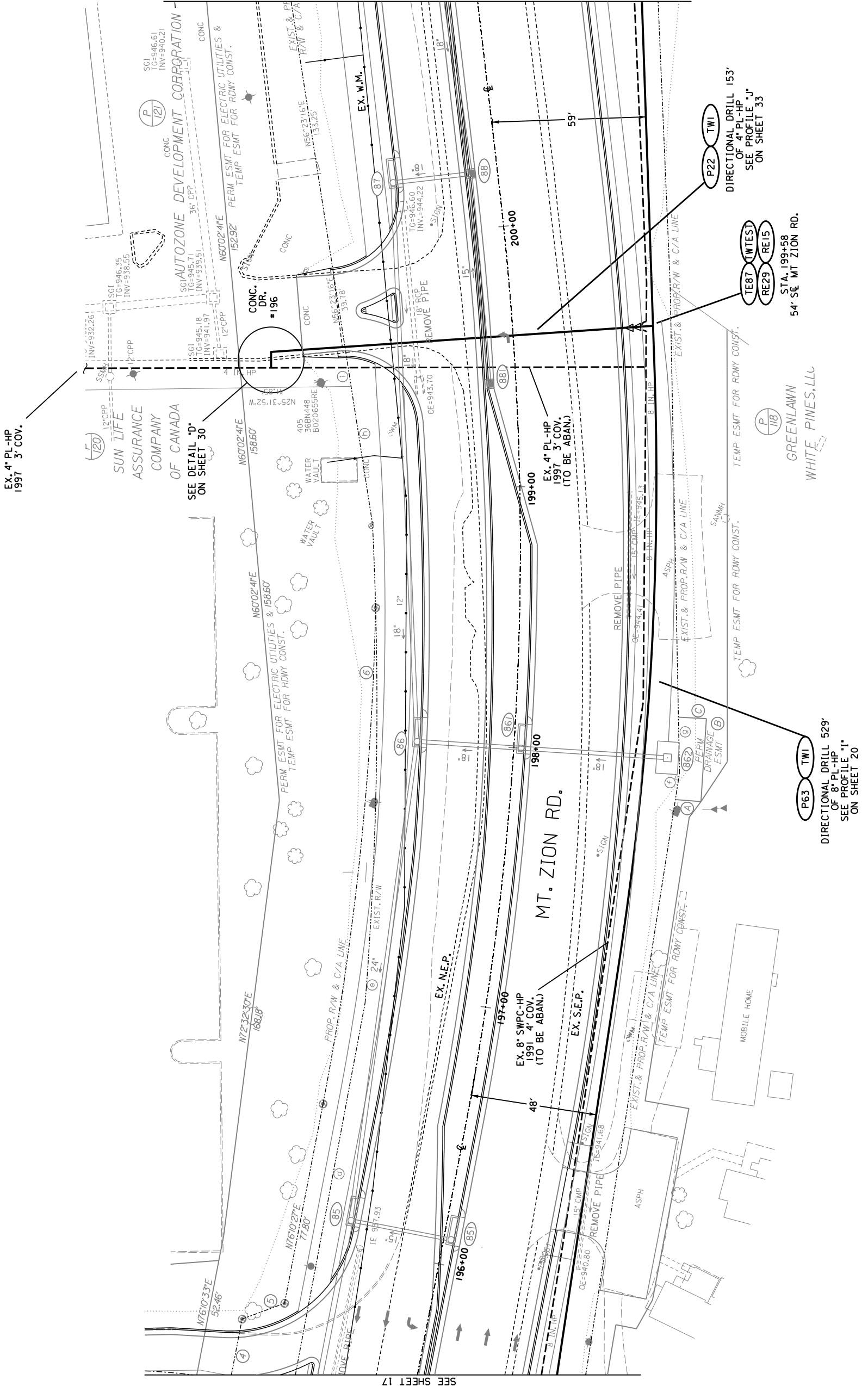
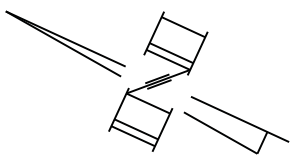
REV-1 MER	6-23-19
REV-2 MER	8-15-19
REV-3 MER	8-19-19

SHEET NO.	ITEM NO.	COUNTY OF
19	06-415.00	BOONE
37		

**GAS DEPARTMENT**  
DUKE ENERGY

ERLANGER DISTRICT

NOTE: GAS MAIN TO BE ABANDONED HAS BEEN DETERMINED FROM GAS MAPS & RECORDS.



EX. 4\"/>

SUN LIFE ASSURANCE COMPANY OF CANADA  
SEE DETAIL 'D' ON SHEET 30

CONC. DR. #196

MT. ZION RD.

EX. 8\"/>

EX. S.E.P.

MOBILE HOME

GREENLAWN WHITE PINES, LLC

DIRECTIONAL DRILL 529' OF 8\"/>

TEST TWIST RE29 RE15 STA. 199+58 54' SE MT ZION RD.

DIRECTIONAL DRILL 153' OF 4\"/>

MATCH LINE SEE SHEET 17

MATCH LINE SEE SHEET 21

REVISION	DATE	BY
REV-3 MER	8-19-19	
REV-2 MER	8-15-19	
6-23-19		

Addendum #4 -- 8-30-19

0 2 9 2 4 4 8 9 4

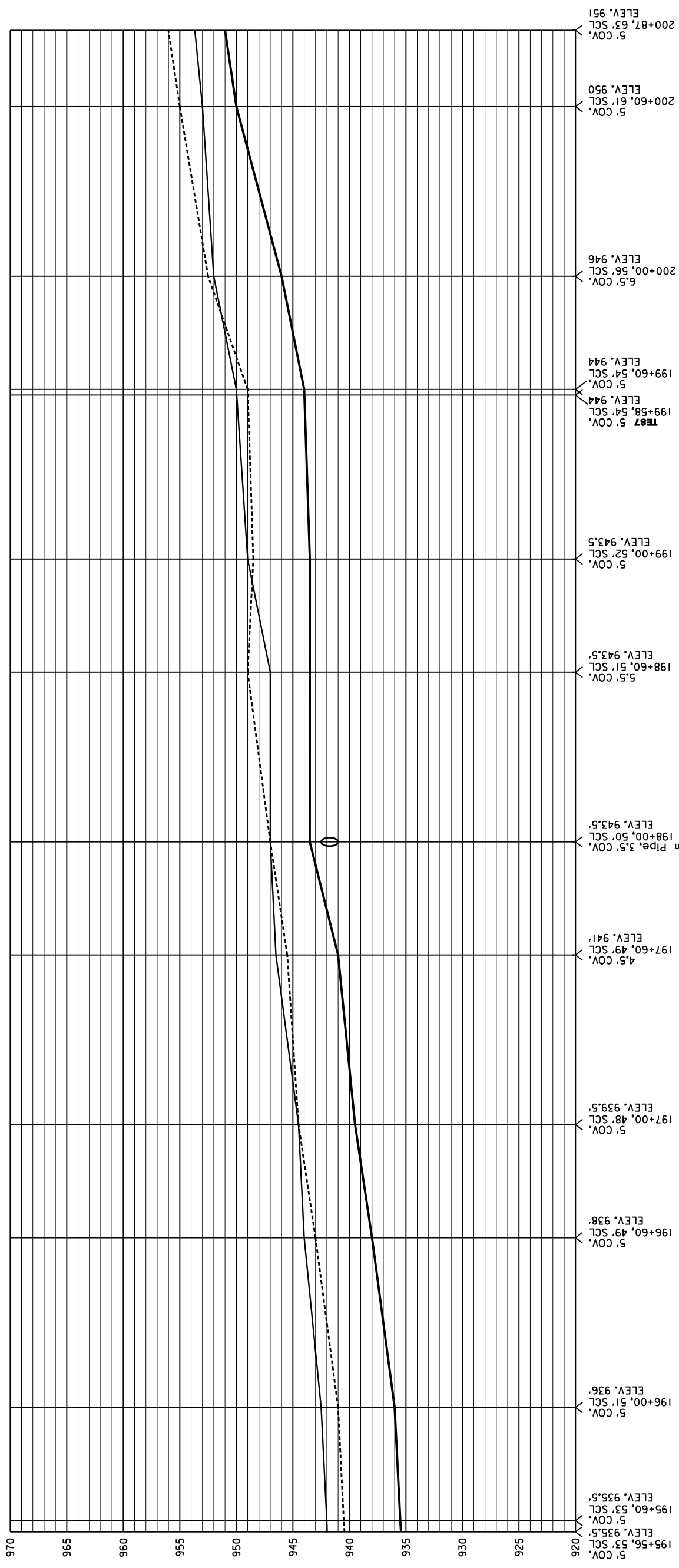
SHEET NO.	ITEM NO.	COUNTY OF
UXX	06-415.00	BOONE



**GAS DEPARTMENT**  
DUKE ENERGY

ERLANGER DISTRICT

NOTE: COVER BASED ON  
EXISTING GRADE



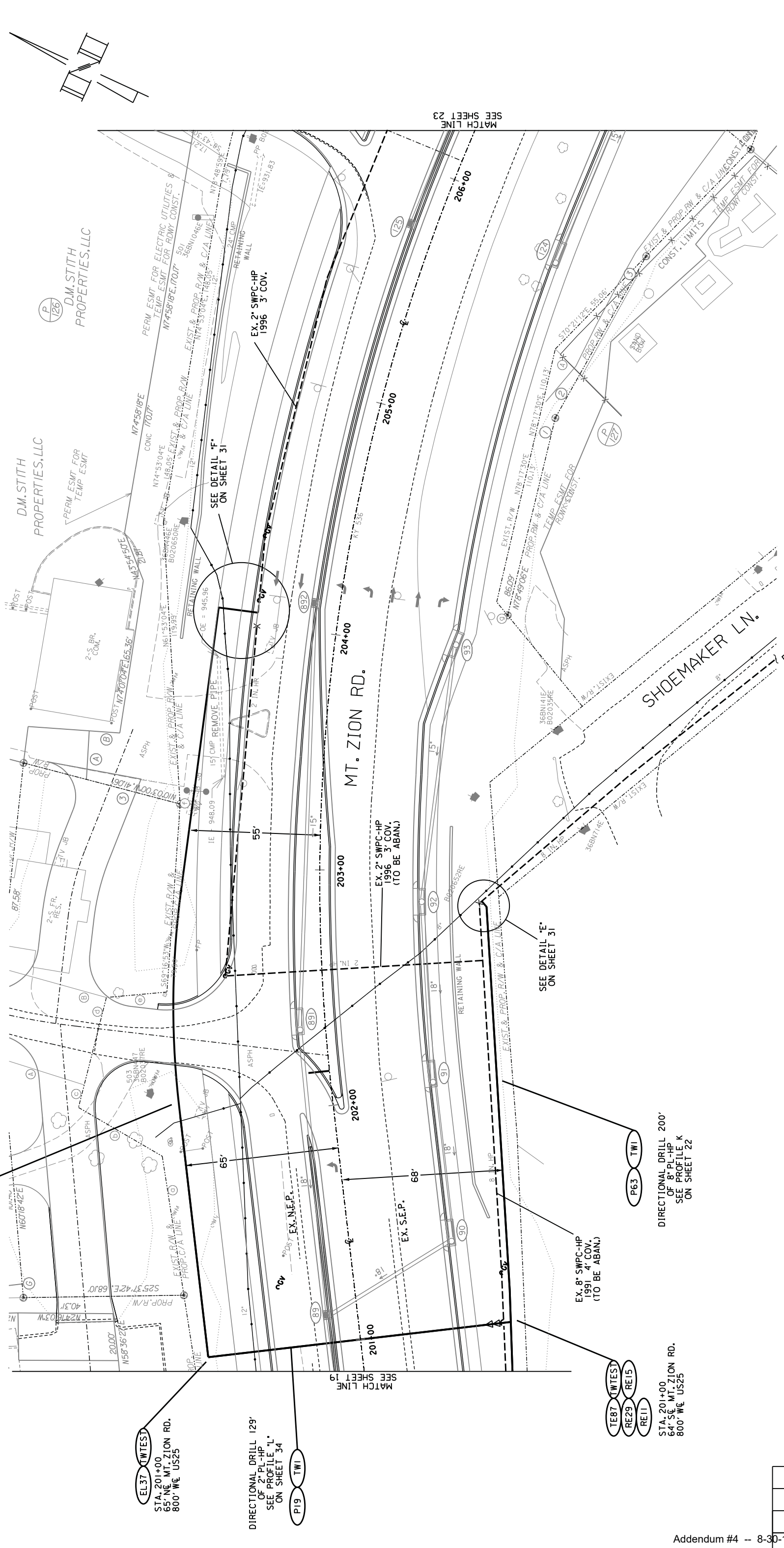
**PROFILE "I"**  
FROM SHEET 19

HORIZ. SCALE 0 10 20  
VERT. SCALE 0 2.5 5

PROP. GAS MAIN ———  
PROP. GRADE ———  
EX. GRADE - - - - -

REV-1 MER	6-23-19
REV-2 MER	8-15-19
REV-3 MER	8-19-19

NOTE: GAS MAIN TO BE ABANDONED HAS BEEN DETERMINED FROM GAS MAPS & RECORDS.



DIRECTIONAL DRILL 340' OF 2" PL-HP. SEE PROFILE 'M' ON SHEET 22  
 P19 TWI

EL37 TWI  
 STA. 201+00  
 65' N.E. MT. ZION RD.  
 800' W.E. US25

DIRECTIONAL DRILL 129' OF 2" PL-HP. SEE PROFILE 'L' ON SHEET 34  
 P19 TWI

MATCH LINE SEE SHEET 19

EX. 2" SWPC-HP 1996 3' COV. (TO BE ABAN.)

EX. S.E.P.

SEE DETAIL 'E' ON SHEET 31

EX. 8" SWPC-HP 1991 4' COV. (TO BE ABAN.)

TE87 TWI TEST  
 RE29 RE15  
 RE11

STA. 201+00  
 64' S.E. MT. ZION RD.  
 800' W.E. US25

DIRECTIONAL DRILL 200' OF 8" PL-HP. SEE PROFILE 'K' ON SHEET 22  
 P63 TWI

REV-3 MER	8-19-19
REV-2 MER	8-15-19
REV-1 MER	6-23-19

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-415.00	UXX

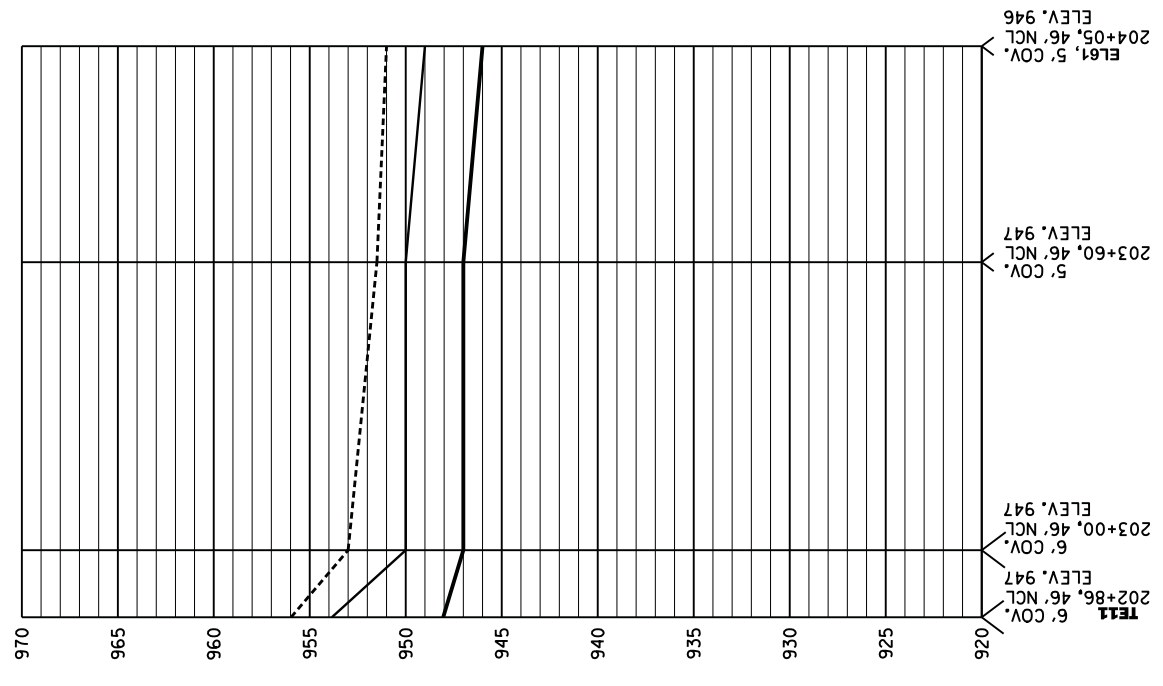
ERLANGER DISTRICT

**GAS DEPARTMENT**  
DUKE ENERGY

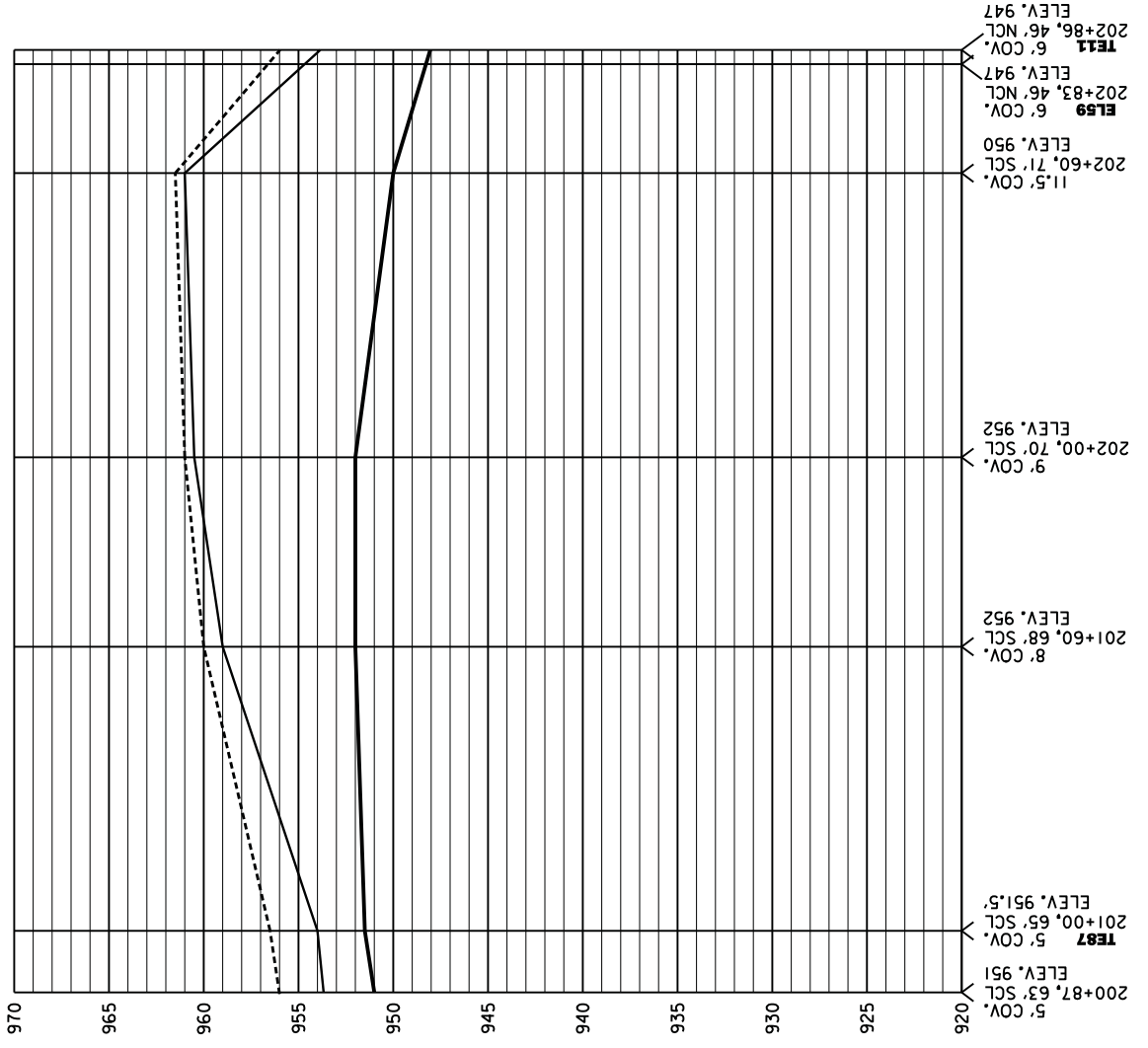
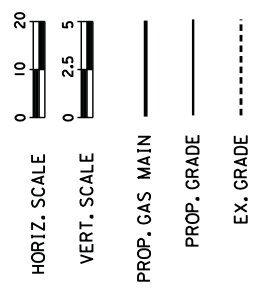
NTS

NOTE: COVER BASED ON  
EXISTING GRADE

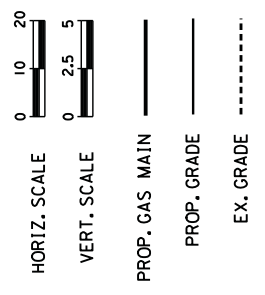
22  
37



PROFILE "M"  
FROM SHEET 21



PROFILE "K"  
FROM SHEET 21



REVISIONS	6-23-19	REV1 MER
	8-15-19	REV-2 MER
	8-19-19	REV-3 MER



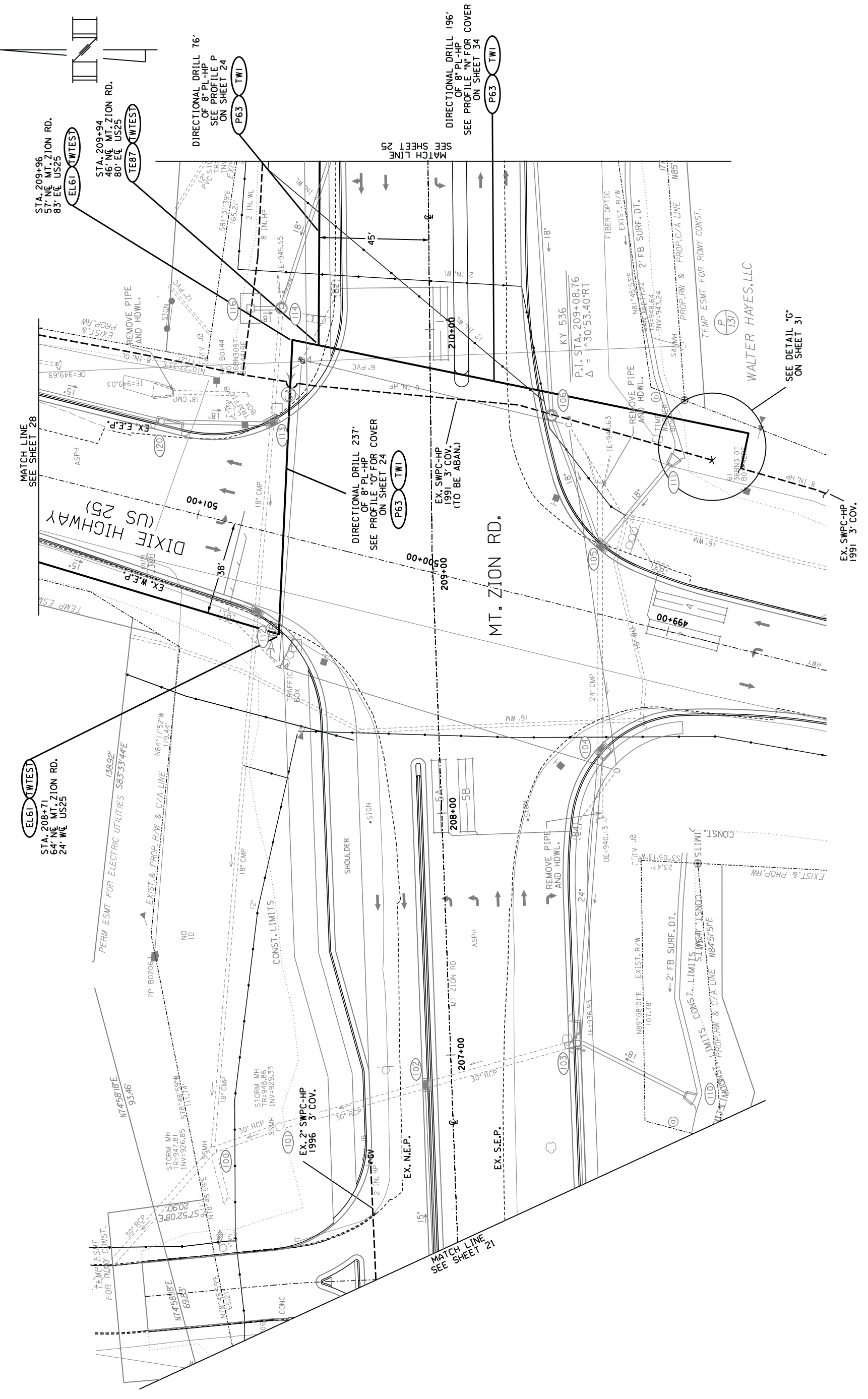
COUNTY OF	BOONE	ITEM NO.	06-415.00	SHEET NO.	UXX
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**GAS DEPARTMENT**  
DUKE ENERGY

ERLANGER DISTRICT

23  
37

NOTE: GAS MAIN TO BE ABANDONED HAS BEEN DETERMINED FROM GAS MAPS & RECORDS.



REVISION	DATE	DESCRIPTION
REV-1 MER	6-23-19	
REV-2 MER	8-15-19	
REV-3 MER	8-19-19	

Addendum #4 -- 8-30-19

0 2 9 2 4 1 8 9 4

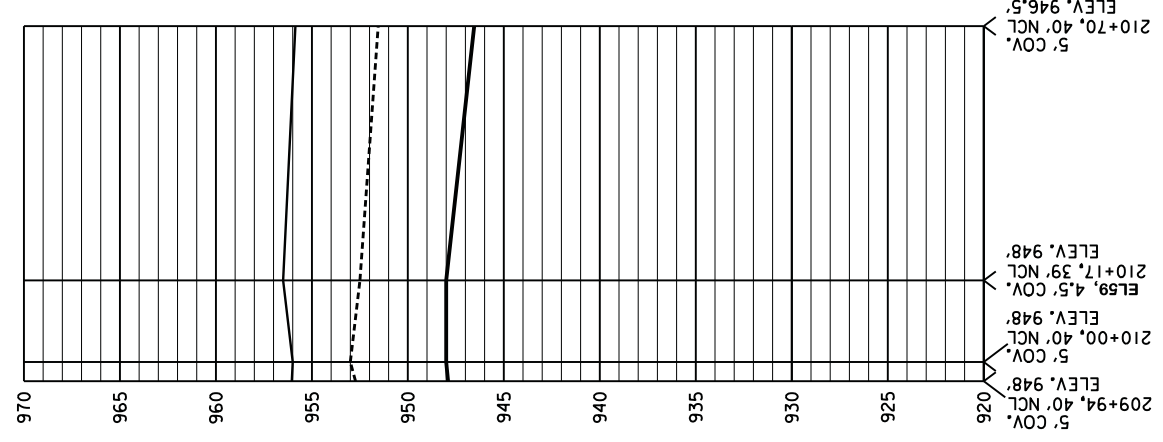
COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-415.00	LXXX

**GAS DEPARTMENT**  
DUKE ENERGY

ERLANGER DISTRICT



NOTE: COVER BASED ON  
EXISTING GRADE

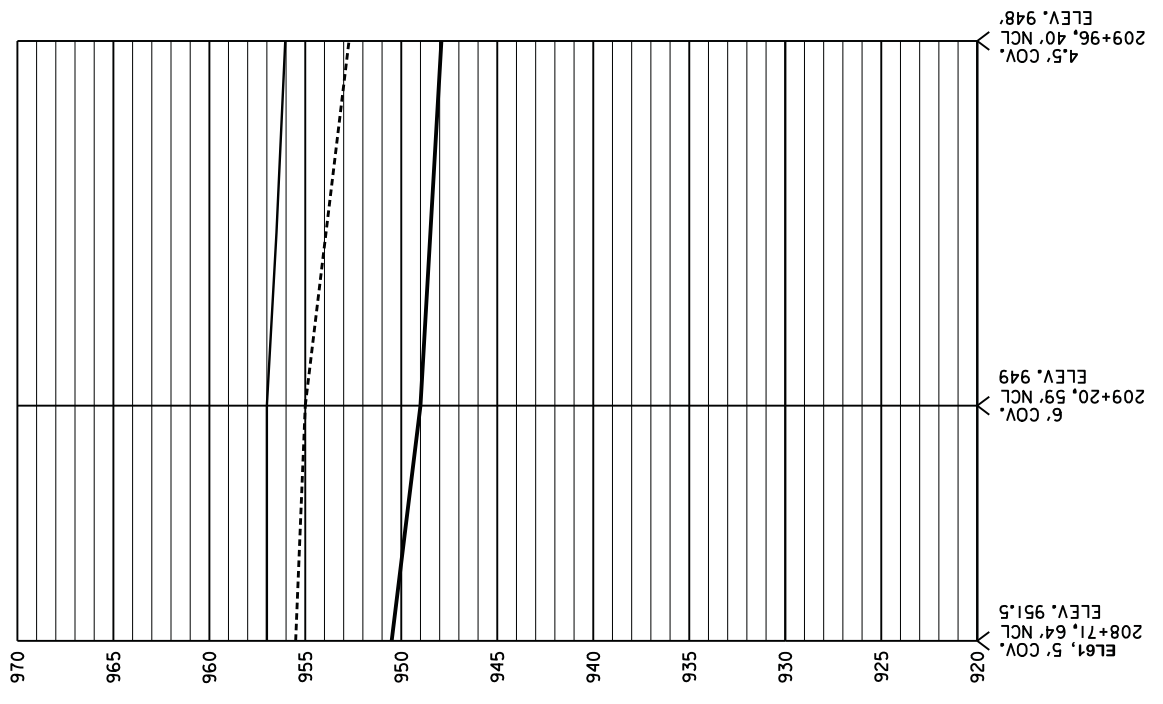


PROFILE "P"

FROM SHEET 23



- PROP. GAS MAIN
- PROP. GRADE
- EX. GRADE



PROFILE "O"

FROM SHEET 23



- PROP. GAS MAIN
- PROP. GRADE
- EX. GRADE

REVISIONS	6-23-19	REV1 MER
	8-23-19	REV-2 MER
	8-15-19	REV-3 MER
	8-19-19	

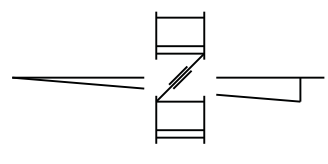
COUNTY OF	BOONE	ITEM NO.	06-415.00	SHEET NO.	
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**GAS DEPARTMENT**  
DUKE ENERGY

ERLANGER DISTRICT

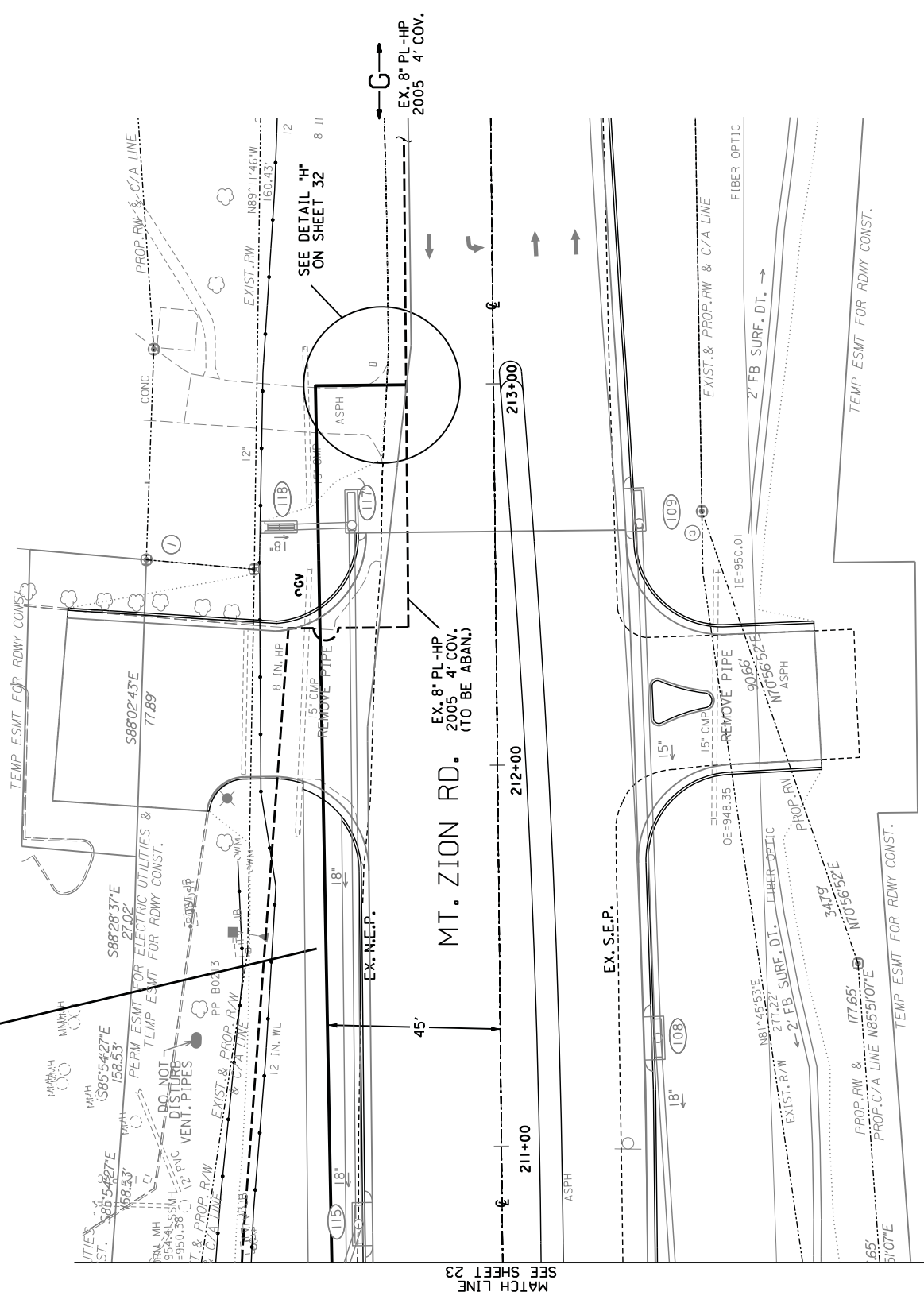
25  
37

NOTE: GAS MAIN TO BE ABANDONED HAS BEEN DETERMINED FROM GAS MAPS & RECORDS.



DIRECTIONAL DRILL 254' OF 8" PL-HP. SEE PROFILE 'Q' ON SHEET 26

P63 TWI



MATCH LINE SEE SHEET 23

REVISIONS	6-23-19	REV1 MER
	8-15-19	REV-2 MER
	8-19-19	REV-3 MER

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-415.00	UXX

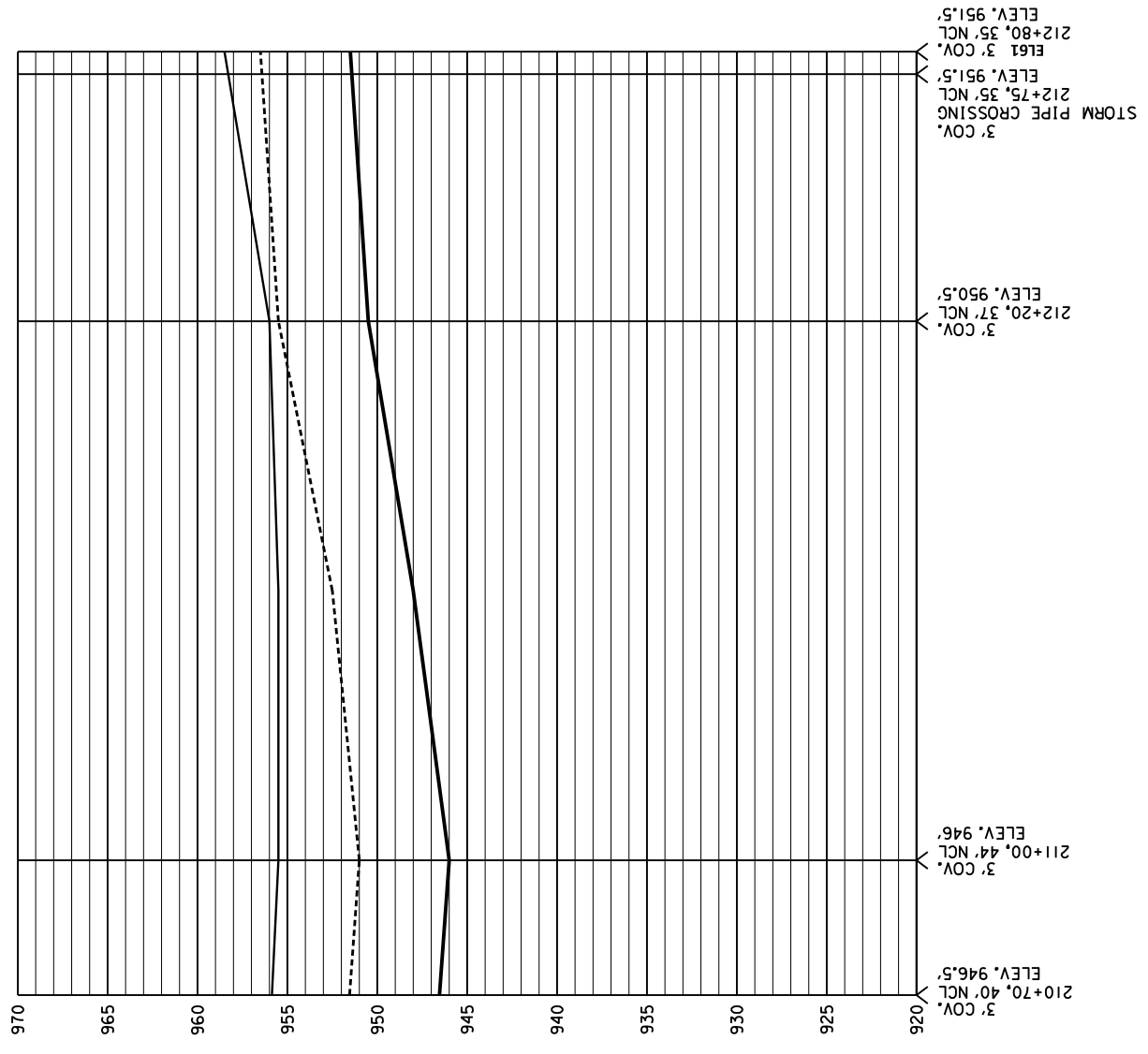
**GAS DEPARTMENT**  
DUKE ENERGY

ERLANGER DISTRICT

NTS



NOTE: COVER BASED ON  
EXISTING GRADE



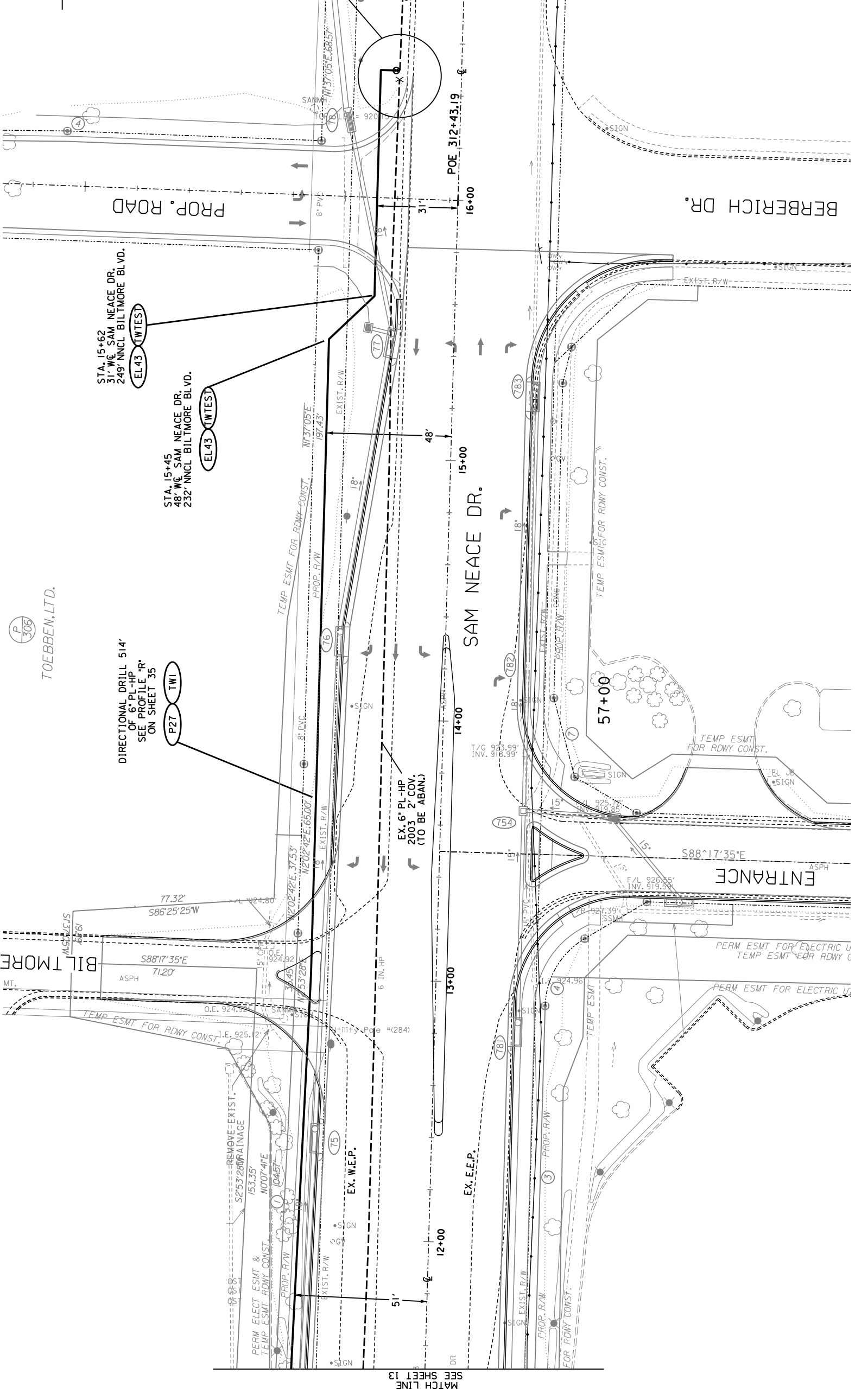
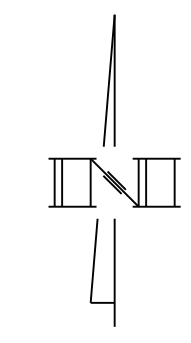
**PROFILE "Q"**  
FROM SHEET 25

HORIZ. SCALE 0 10 20  
VERT. SCALE 0 2.5 5

PROP. GAS MAIN ———  
PROP. GRADE - - - - -  
EX. GRADE ······

REVISIONS	REVI MER	6-23-19
	REV-2 MER	8-15-19
	REV-3 MER	8-19-19

NOTE: GAS MAIN TO BE ABANDONED HAS BEEN DETERMINED FROM GAS MAPS & RECORDS.



TOEBBEN, LTD.

STA. 15+45  
 48" WC SAM NEACE DR.  
 232' NNCL BILTMORE BLVD.  
 EL43 TWTEST

STA. 15+62  
 31" WC SAM NEACE DR.  
 249' NNCL BILTMORE BLVD.  
 EL43 TWTEST

DIRECTIONAL DRILL 514'  
 OF 6" PL-HP  
 SEE PROFILE "R"  
 ON SHEET 35  
 P27 TWI

SEE DETAIL "1"  
 ON SHEET 32

EX. 6" PL-HP  
 2003 2' COV.

SAM NEACE DR.

BERBERICH DR.

ENTRANCE

BILTMORE BLVD.

MATCH LINE  
 SEE SHEET 13

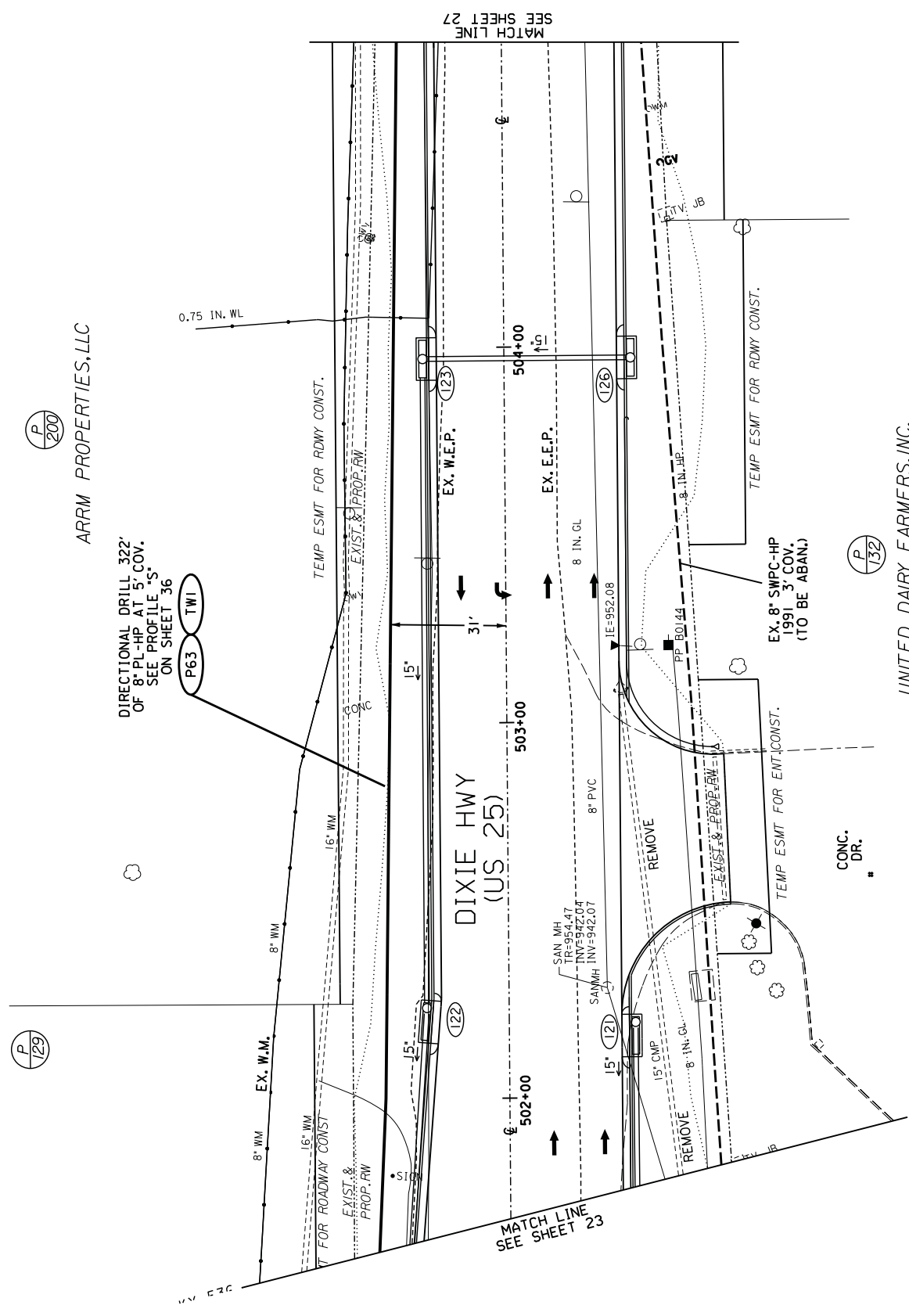
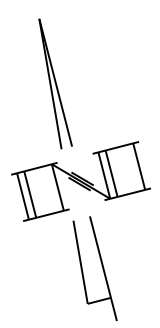
REVISIONS	6-23-19	REV-1 MER
	8-15-19	REV-2 MER
	8-15-19	REV-3 MER
	8-19-19	

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-415.00	UXX

**GAS DEPARTMENT**  
DUKE ENERGY

ERLANGER DISTRICT

NOTE: GAS MAIN TO BE ABANDONED HAS BEEN DETERMINED FROM GAS MAPS & RECORDS.



ARRM PROPERTIES, LLC

UNITED DAIRY FARMERS, INC.

P 129

P 200

P 132

REVISIONS	6-23-19	REV1 MER
	8-15-19	REV-2 MER
	8-15-19	REV-3 MER
	8-19-19	

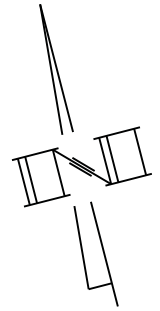
Addendum #4 -- 8-30-19

0 2 9 2 4 4 8 9 4

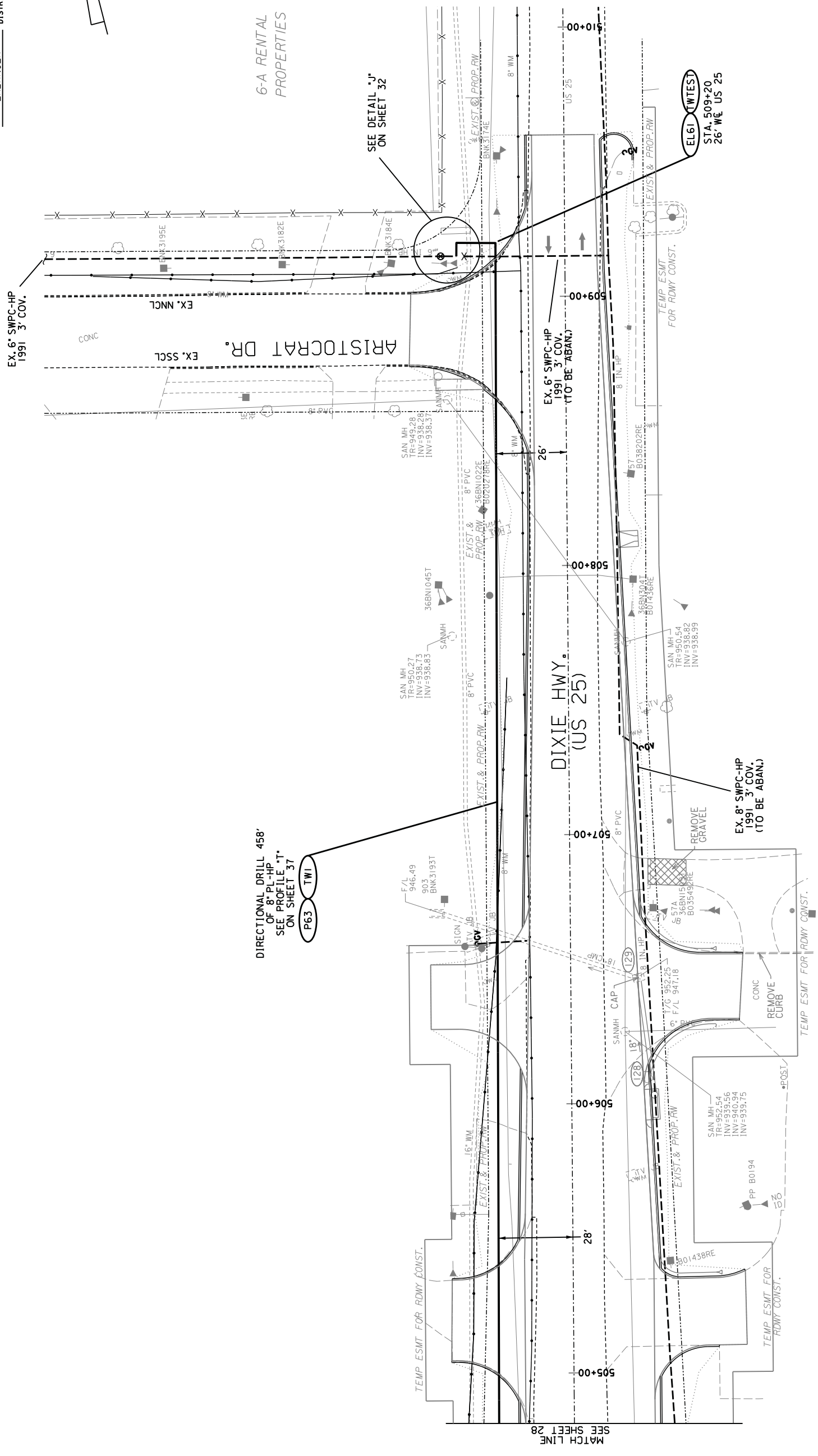
COUNTY OF	BOONE	ITEM NO.	06-415.00	SHEET NO.	UXX
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**GAS DEPARTMENT**  
DUKE ENERGY

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED HAS BEEN DETERMINED FROM GAS MAPS & RECORDS.



DIRECTIONAL DRILL 458'  
OF 8" PL-HP  
SEE PROFILE 'T'  
ON SHEET 37

P63 TWI

SEE DETAIL 'J'  
ON SHEET 32

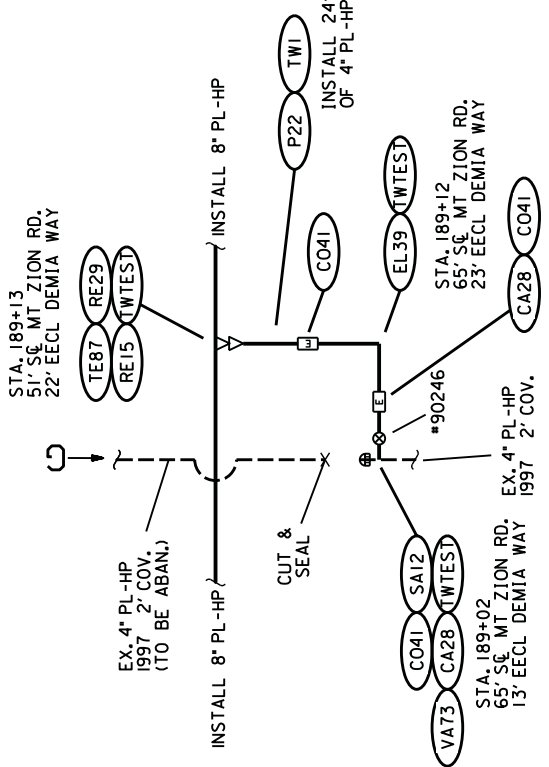
MATCH LINE  
SEE SHEET 28

REVISIONS	8-30-19
REV-1	6-23-19
REV-2	8-15-19
REV-3	8-19-19

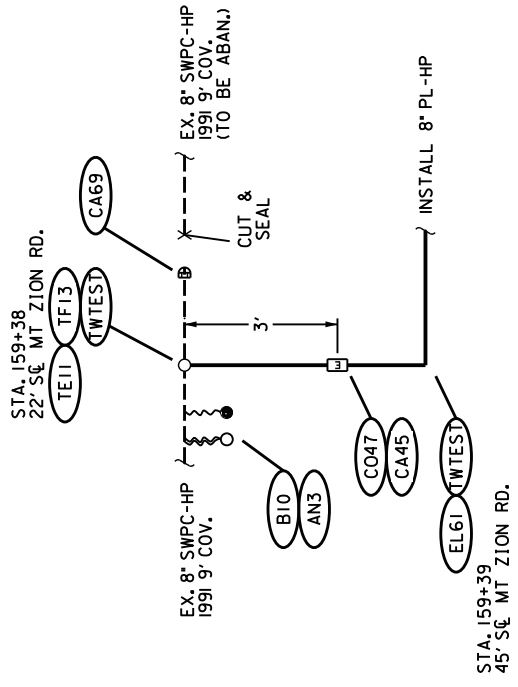
Addendum #4 -- 8-30-19

0 2 9 2 4 4 8 9 4

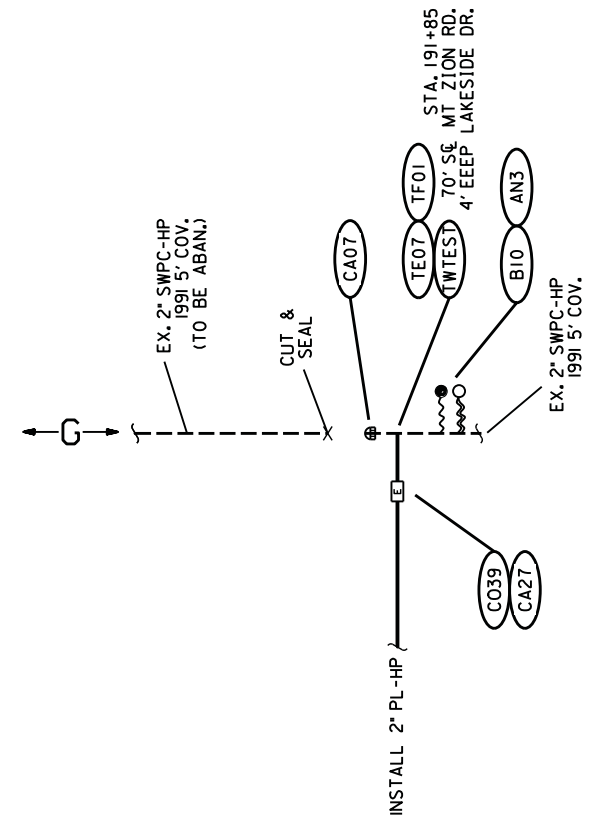
VALVE #	90246	SIZE	4"
MANUFACTURER		SER.#	
MODEL #		W.D.G./M.O.P.	
GATE	<input type="checkbox"/> PLUG <input type="checkbox"/> OTHER		
TURNS TO OPEN			
LOCATION:	FT	IN	
	FT	IN	
	FT	IN	
BOX <input type="checkbox"/> PIT <input type="checkbox"/> COVER AT MAIN	FT	IN	
PRESSURE STEMS LOCATED	N	S	E W
REMARKS			



**DETAIL "B"**  
 N.T.S.  
 FROM SHEET 15

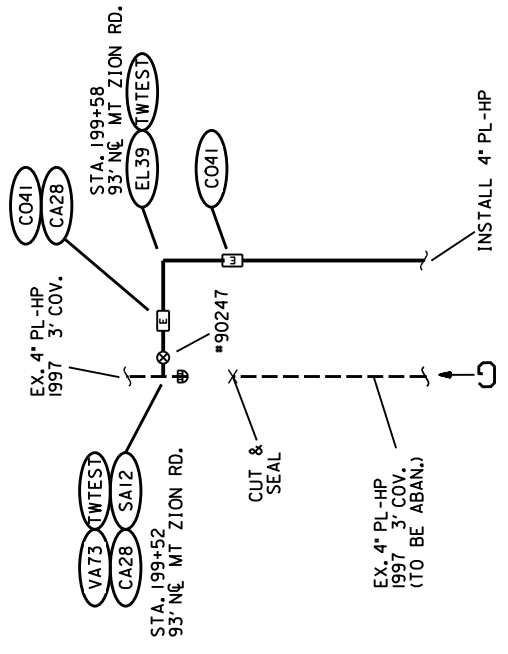


**DETAIL "A"**  
 N.T.S.  
 FROM SHEET 5



**DETAIL "C"**  
 N.T.S.  
 FROM SHEET 17

VALVE #	90247	SIZE	4"
MANUFACTURER		SER.#	
MODEL #		W.D.G./M.O.P.	
GATE	<input type="checkbox"/> PLUG <input type="checkbox"/> OTHER		
TURNS TO OPEN			
LOCATION:	FT	IN	
	FT	IN	
	FT	IN	
BOX <input type="checkbox"/> PIT <input type="checkbox"/> COVER AT MAIN	FT	IN	
PRESSURE STEMS LOCATED	N	S	E W
REMARKS			



**DETAIL "D"**  
 N.T.S.  
 FROM SHEET 19

REV-3	8-19-19
REV-2	8-15-19
REV-1	6-23-19

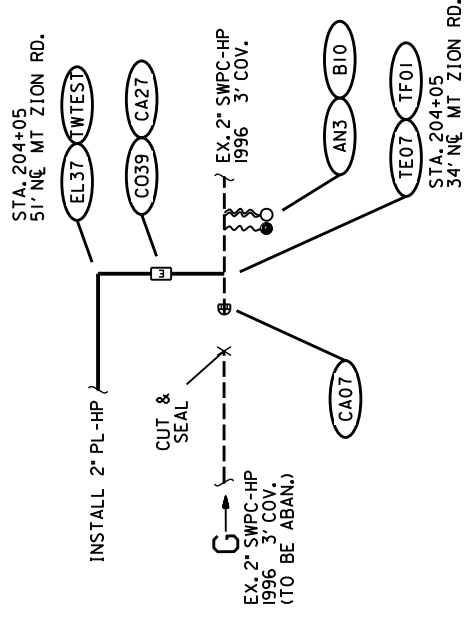


COUNTY OF	BOONE	ITEM NO.	06-415.00	SHEET NO.	UXX
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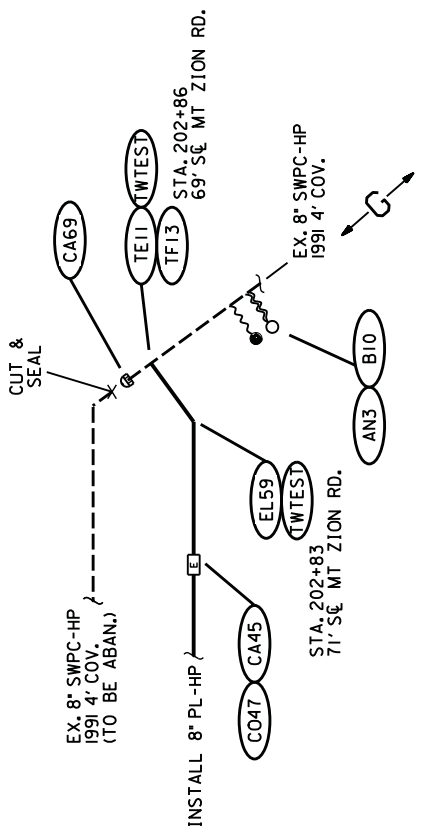
**GAS DEPARTMENT**  
DUKE ENERGY

ERLANGER DISTRICT

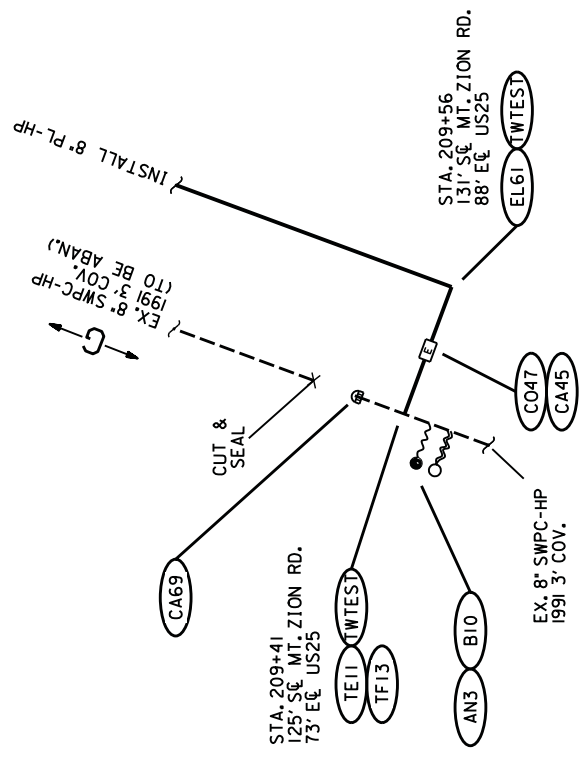
31  
37



**DETAIL "F"**  
N.T.S.  
FROM SHEET 21

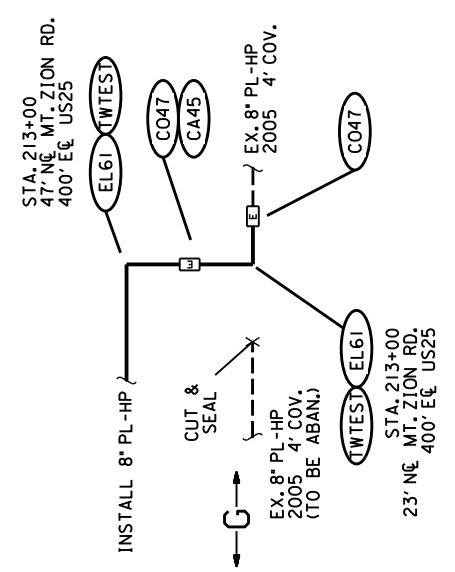
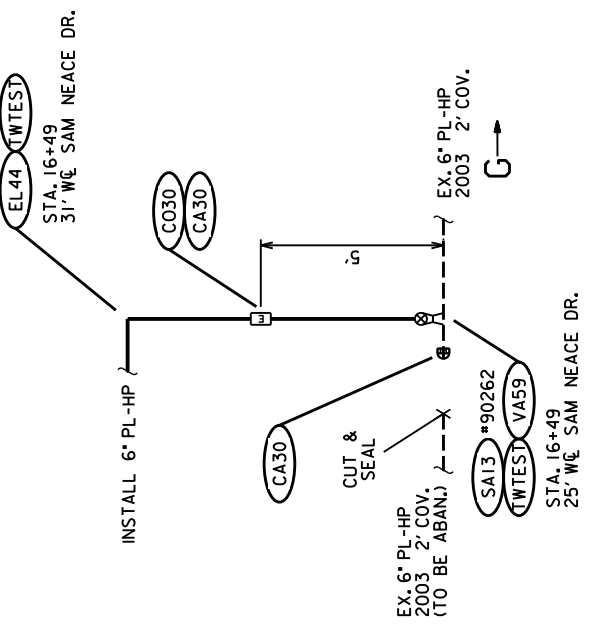


**DETAIL "E"**  
N.T.S.  
FROM SHEET 21



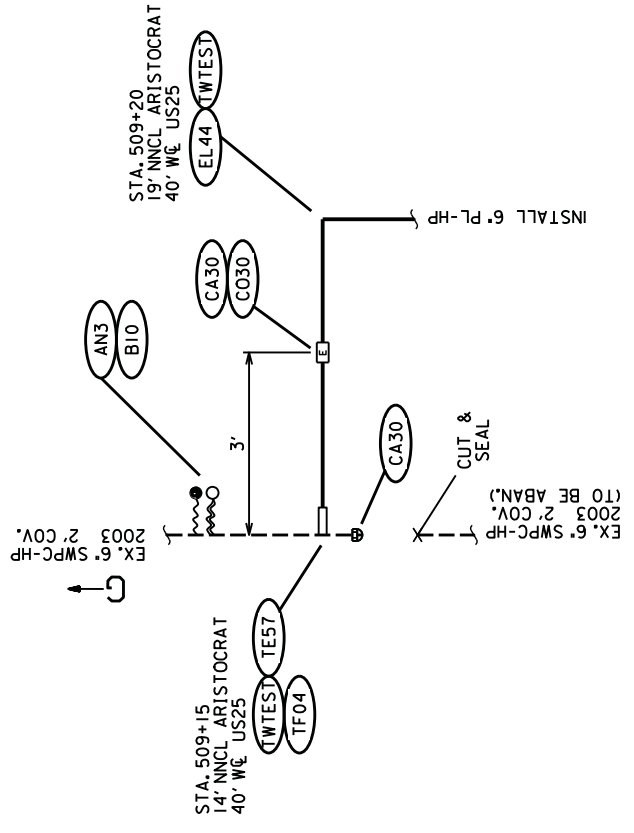
**DETAIL "G"**  
N.T.S.  
FROM SHEET 23

REVISION	6-23-19
REV-2 MER	8-15-19
REV-3 MER	8-19-19



**DETAIL "H"**  
N.T.S.  
FROM SHEET 25

**DETAIL "I"**  
N.T.S.  
FROM SHEET 27



**DETAIL "J"**  
N.T.S.  
FROM SHEET 29

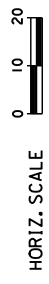
VALVE	90262	SIZE	6"
MANUFACTURER		SER.#	
MODEL		W.D.C./M.O.P.	
GATE	<input type="checkbox"/>	PLUG	<input type="checkbox"/>
OTHER			
URNS TO OPEN			
LOCATION:			
	FT	IN	
	FT	IN	
	FT	IN	
BOX	<input type="checkbox"/>	PIT	<input type="checkbox"/>
COVER AT MAIN			
PRESSURE STEMS LOCATED	N	S	E
REMARKS			

REVISION	6-23-19
REV1 MER	8-15-19
REV-2 MER	8-15-19
REV-3 MER	8-19-19

NOTE: COVER BASED ON  
EXISTING GRADE

PROFILE "F"

FROM SHEET 13



HORIZ. SCALE

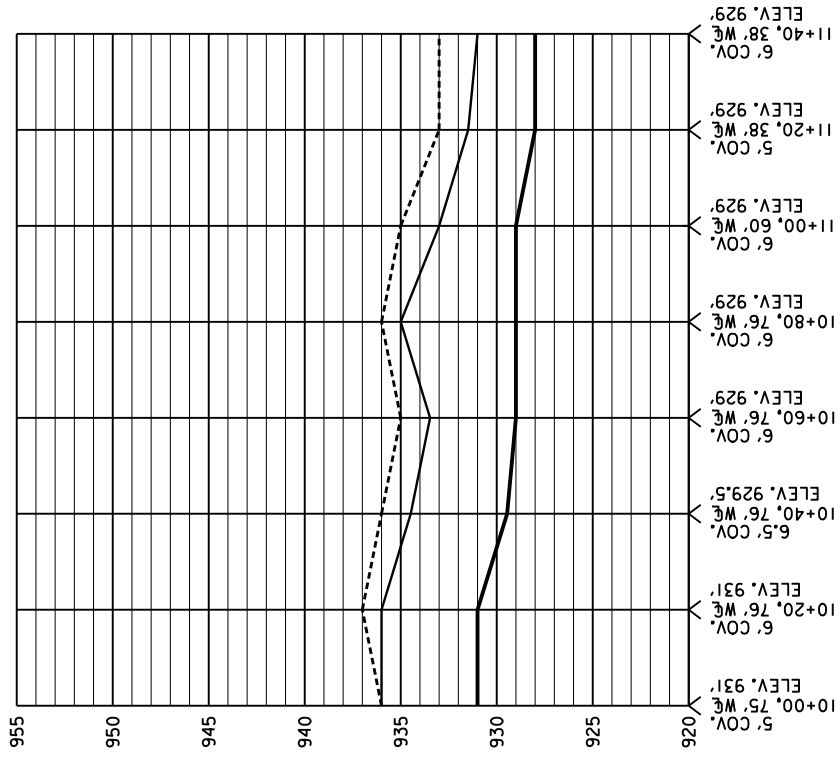


VERT. SCALE

PROP. GAS MAIN

PROP. GRADE

EX. GRADE



NOTE: COVER BASED ON  
EXISTING GRADE

PROFILE "J"

FROM SHEET 19



HORIZ. SCALE

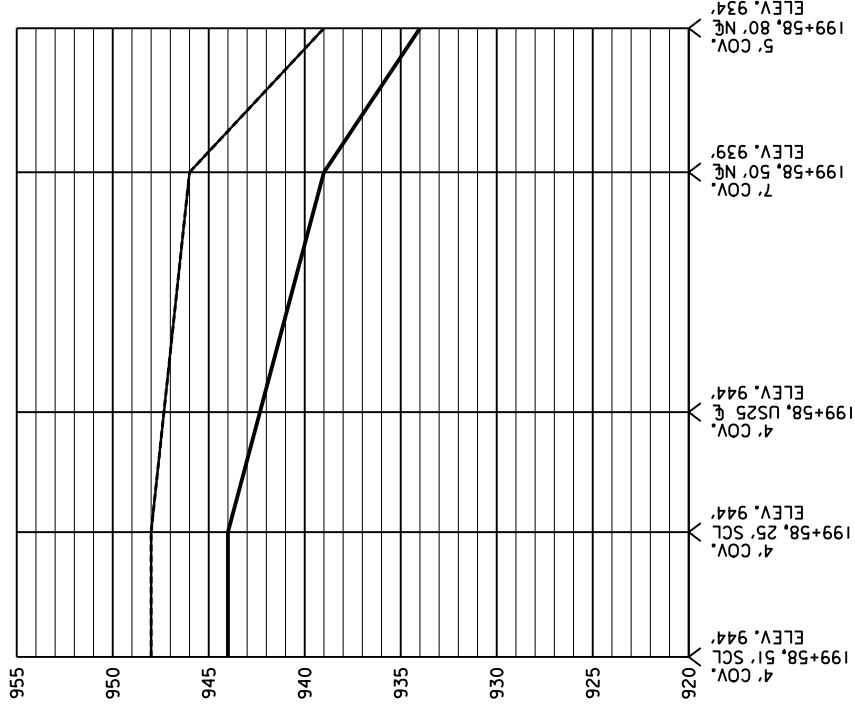


VERT. SCALE

PROP. GAS MAIN

PROP. GRADE

EX. GRADE



COUNTY OF	BOONE
ITEM NO.	06-415.00
SHEET NO.	

ERLANGER DISTRICT

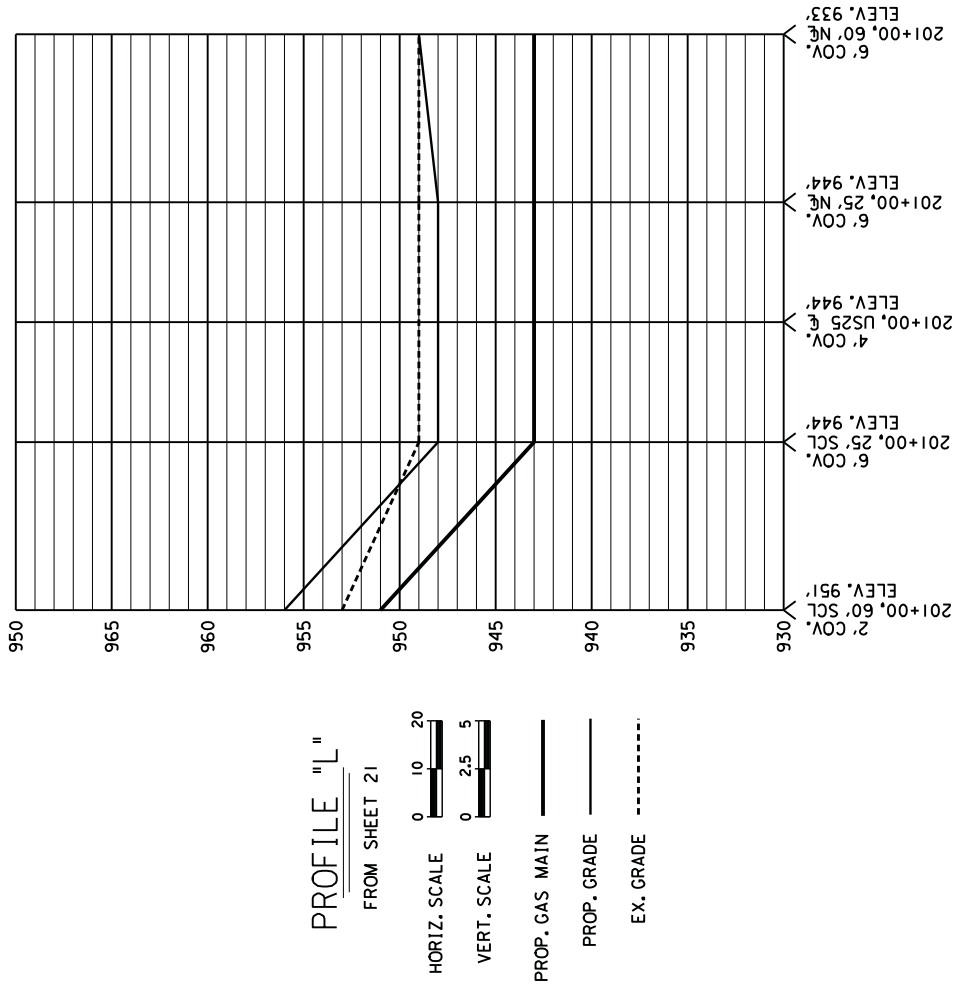
**GAS DEPARTMENT**  
DUKE ENERGY



33  
37

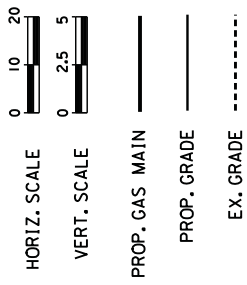
REV-1 MER	6-23-19
REV-2 MER	8-15-19
REV-3 MER	8-19-19

NOTE: COVER BASED ON  
EXISTING GRADE

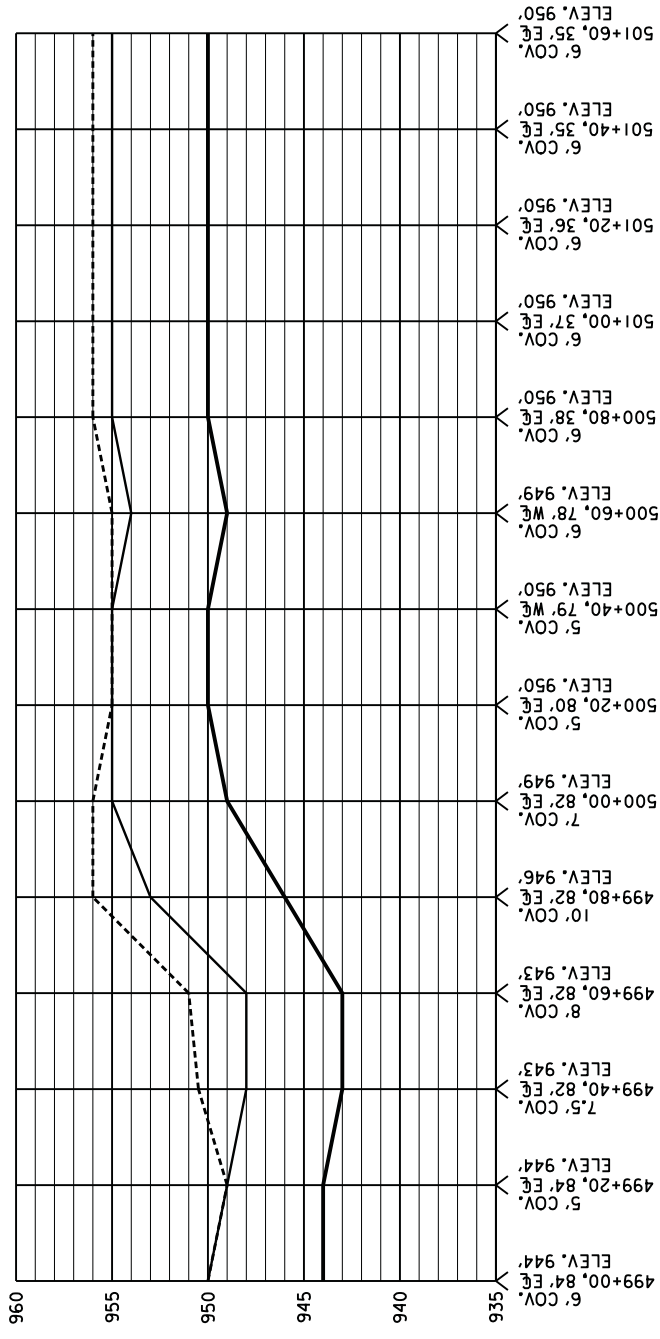


PROFILE "L"

FROM SHEET 21

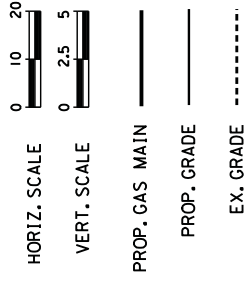


NOTE: COVER BASED ON  
EXISTING GRADE



PROFILE "N"

FROM SHEET 23



REV1 MER	6-23-19
REV-2 MER	8-15-19
REV-3 MER	8-19-19

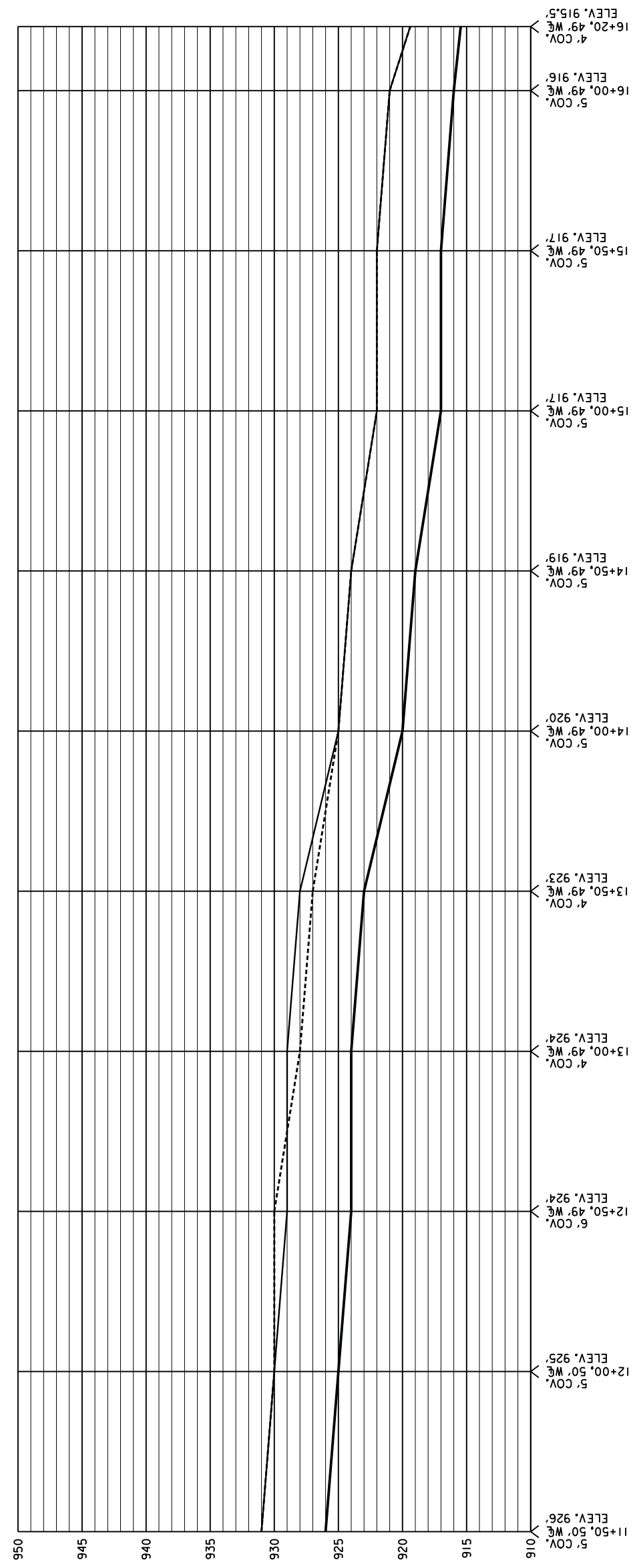
COUNTY OF	BOONE	ITEM NO.	06-415.00	SHEET NO.	
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**GAS DEPARTMENT**  
DUKE ENERGY  
ERLANGER DISTRICT



NTS

NOTE: COVER BASED ON  
EXISTING GRADE



**PROFILE "R"**  
FROM SHEET 27

HORIZ. SCALE: 0 10 20  
VERT. SCALE: 0 2.5 5

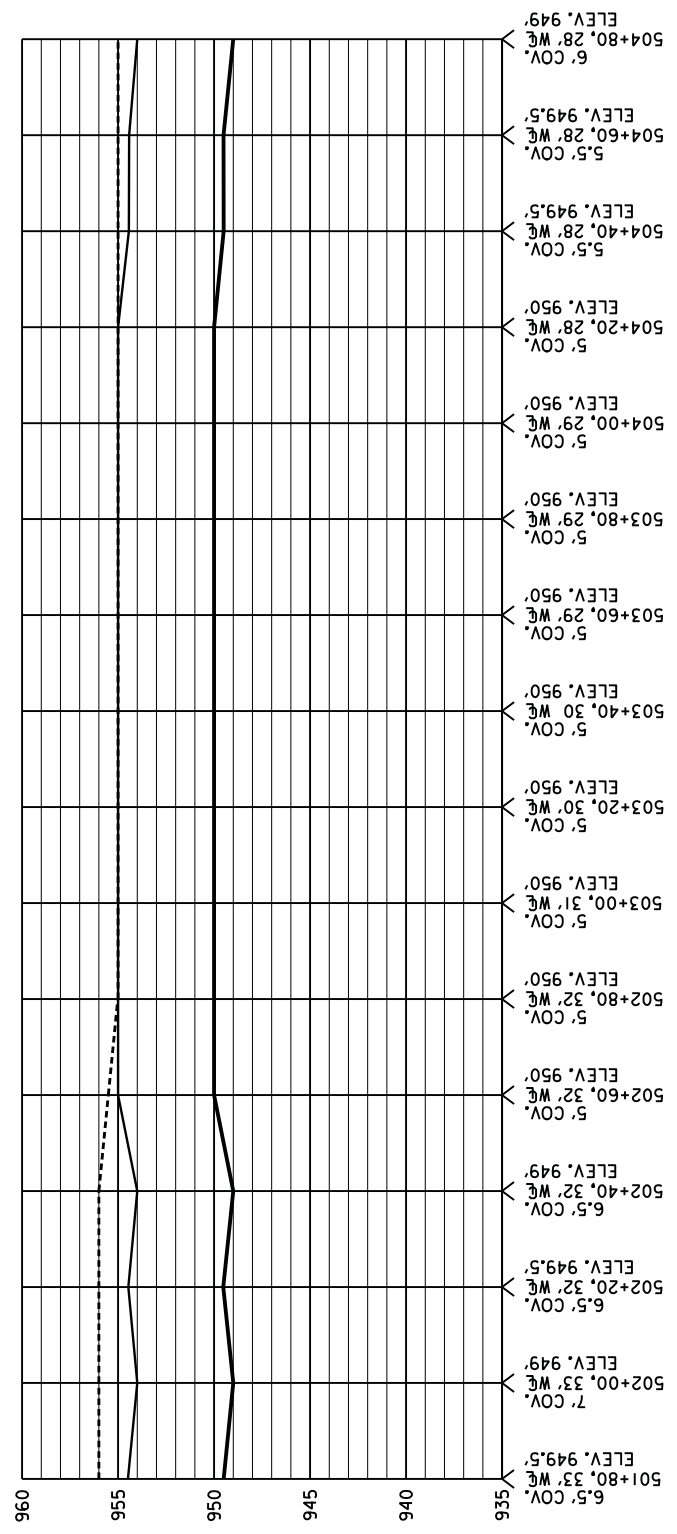
PROP. GAS MAIN ———  
PROP. GRADE - - - - -  
EX. GRADE ······

REV-1 MER	6-23-19
REV-2 MER	8-15-19
REV-3 MER	8-19-19

COUNTY OF	BOONE	ITEM NO.	06-415.00	SHEET NO.	
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**GAS DEPARTMENT**  
 DUKE ENERGY  
 ERLANGER DISTRICT

NOTE: COVER BASED ON EXISTING GRADE



**PROFILE "S"**  
 FROM SHEET 28

HORIZ. SCALE 0 10 20  
 VERT. SCALE 0 2.5 5

PROP. GAS MAIN  
 PROP. GRADE  
 EX. GRADE

REVISIONS	6-23-19	REV1 MER
	8-15-19	REV-2 MER
	8-19-19	REV-3 MER

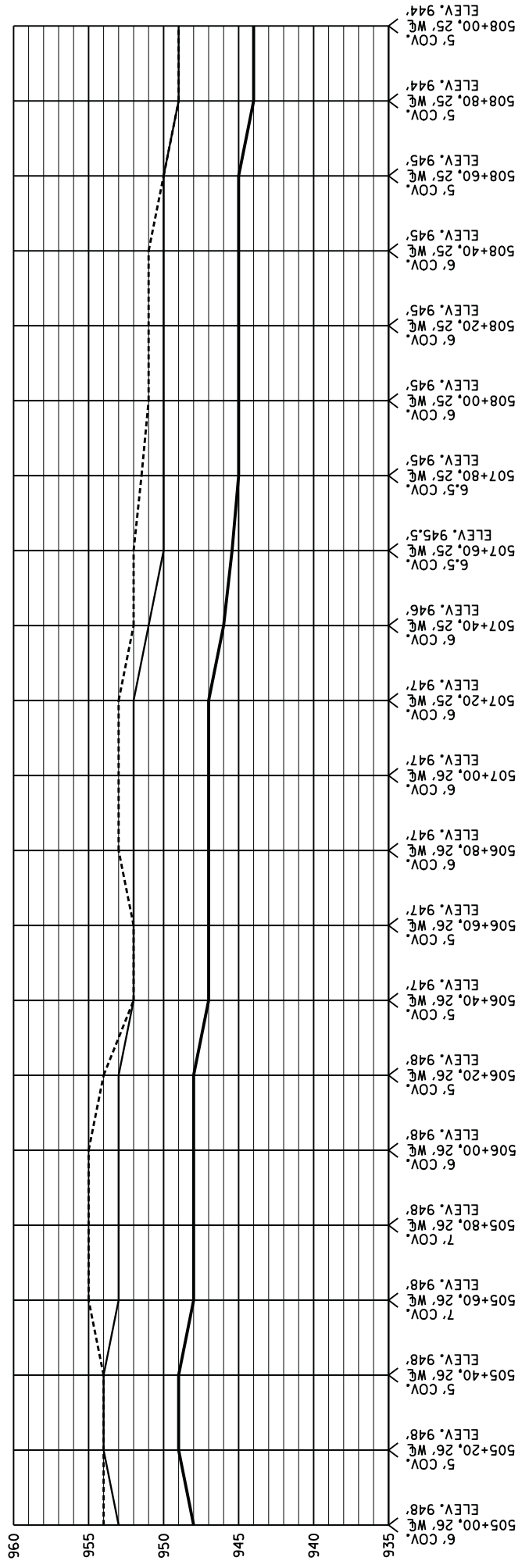
COUNTY OF	BOONE	ITEM NO.	06-415.00	SHEET NO.	
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**GAS DEPARTMENT**  
DUKE ENERGY

ERLANGER DISTRICT

NTS

NOTE: COVER BASED ON  
EXISTING GRADE



**PROFILE "T"**  
FROM SHEET 29

HORIZ. SCALE 0 10 20  
VERT. SCALE 0 2.5 5

PROP. GAS MAIN ———  
PROP. GRADE ———  
EX. GRADE - - - - -

Addendum #4 -- 8-30-19

REV-3 MER	8-19-19
REV-2 MER	8-15-19
REV1 MER	6-23-19

# WATER MAIN SUMMARY

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-18.00	U39

WIDENING OF KY 338/  
I-75 INTERCHANGE/ U.S. 25  
WM REVISED 8/27/19

PREPARED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 APPROVED BY \_\_\_\_\_ DATE \_\_\_\_\_

ITEM CODE	ITEM	UNIT	TOTALS																
				6" BEND & BLOCK	8" BEND & BLOCK	12" BEND & BLOCK	16" BEND & BLOCK	8" RESTRAINED JOINT BEND & BLOCK	8" RESTRAINED JOINT BEND- NO BLOCK	12" RESTRAINED JOINT BEND & BLOCK	12" RESTRAINED JOINT BEND- NO BLOCK	16" RESTRAINED JOINT BEND & BLOCK	16" RESTRAINED JOINT BEND- NO BLOCK	8" PLUG & BLOCK	12" PLUG & BLOCK	12" X 8" REDUCER	12" X 6" REDUCER	16" X 12" REDUCER	
14005	W ENCASEMENT CONCRETE	LF	30																
14011	W ENCASEMENT STEEL BORED RANGE 6 (26")	LF	54																
14017	W ENCASEMENT STEEL OPEN CUT RANGE 6 (26")	LF	69																
14018	W FIRE HYDRANT ADJUST	EA	4																
14019	W FIRE HYDRANT ASSEMBLY	EA	12																
14020	W FIRE HYDRANT RELOCATE	EA	21																
14021	W FIRE HYDRANT REMOVE	EA	4																
14029	W METER ADJUST	EA	5																
14030	W METER RELOCATE	EA	21																
14031	W METER VAULT RANGE 1 (6")	EA	1																
14031	W METER VAULT RANGE 2 (8")	EA	1																
14036	W PIPE DUCTILE IRON 06 INCH	LF	20	2															
14037	W PIPE DUCTILE IRON 08 INCH	LF	1,342		13							1							
14039	W PIPE DUCTILE IRON 12 INCH	LF	8,980			61							1	1					
14040	W PIPE DUCTILE IRON 16 INCH	LF	1,115				7												
14048	W PIPE DUCTILE IRON RESTRAINED JOINT 06 INCH	LF	51																
14050	W PIPE DUCTILE IRON RESTRAINED JOINT 08 INCH	LF	787					9	11										
14050	W PIPE DUCTILE IRON RESTRAINED JOINT 12 INCH	LF	1,039							9	20								
14051	W PIPE DUCTILE IRON RESTRAINED JOINT 16 INCH	LF	270									3	1						
14076	W REMOVE TRANSITE (AC) PIPE	LF	1,400											2					
14145	W SERVICE COPPER LONG SIDE 1 INCH	EA	4																
14149	W SERVICE COPPER SHORT SIDE 1 INCH	EA	6																
14151	W SERVICE COPPER SHORT SIDE 2 INCH	EA	5																
14152	W SERVICE COPPER SHORT SIDE 3/4 INCH	EA	7																
14088	W STRUCTURE REMOVAL	EA	1																
14090	W TAPPING SLEEVE AND VALVE SIZE 2 (16"x8")	EA	1																
14094	W TIE-IN 06 INCH	EA	2																
14095	W TIE-IN 08 INCH	EA	7																
14097	W TIE-IN 12 INCH	EA	5																
14098	W TIE-IN 16 INCH	EA	1																
14105	W VALVE 06 INCH	EA	2																
14106	W VALVE 08 INCH	EA	9																
14108	W VALVE 12 INCH	EA	24																
14109	W VALVE 16 INCH	EA	6																
14113	W VALVE BOX ADJUST	EA	13																
14118	W VALVE CUT-IN 08 INCH	EA	2																

\* NOTES \*

1. Contractor shall supply field notes upon completion of project in sufficient detail to prepare "Record Drawings".
2. Location of utilities and structures, both existing and proposed, are shown on the plans from data available at time of bidding, and are not necessarily complete or correct. During construction the contractor shall use diligence in protecting from damage all existing utilities and structures whether shown on the plans or not. If damage is caused, the contractor will be responsible for repair or restoration of same to the satisfaction of the Engineer and the utility company.
3. Contractor to uncover and confirm exact location of existing water mains and services at connection points prior to construction. (incidental)
4. Prior to start of any water main construction, a "Sequence of Construction" shall be provided in writing to the Boone County Water District.
5. Contractor to coordinate and expedite the water main construction in the proper phases of the project and minimize the shut-down time of the water mains.
6. Contractor to coordinate all shut-down times with the Boone County Water District. Water shutdown for tie-ins may be required to be performed at night at the discretion of Boone County Water District. PHONE: 859-586-6155
7. Contractor may be required to make temporary water main and service connections, using approved BCWD materials and methods, during phasing sequences to provide continuous water service. This is "incidental" to the cost of water main construction.
8. All abandoned water meters to be marked, removed, and services disconnected by Boone County Water District prior to construction. Contractor to confirm disconnect with BCWD prior to construction.
9. Items and instruction labels in (parenthesis) are incidentals to the construction and cost of item.
10. Any adjustments or relocations of items to final grades and locations will be considered "incidental" to cost and construction of item.
11. ALL D.I.P. TO BE CLASS 50 WITH BLUE POLYWRAP
12. ALL P.V.C. TO BE C-900 DR 14
13. Tees, Bends, Caps, Plugs or any other fittings installed with new main are to be considered incidental and included in pipe price. These items are not paid separately and do not have separate bid item quantities.
14. Excavation in paved areas outside of road construction shall be backfilled above initial bedding with flowable fill to subgrade of the existing pavement. The pavement shall be saw cut to neat lines and replaced in-kind. Alternative backfill or pavement restoration methods shall be approved by the KYTC Section Engineer before use. All costs for restoration of areas outside of road construction shall be considered incidental to water main construction.
15. Blasting of rock shall not be permitted on this project.
16. Temporary blocking and flushing device to be included at all "tie-ins" (Incidental to all tie-ins).

FOR FURTHER INSTRUCTIONS AND EXPLANATIONS,  
 SEE BID SPECIFICATIONS !!!

**WATER MAIN PLAN PREPARED FOR:  
BOONE COUNTY WATER DISTRICT  
2475 Burlington Pike  
Burlington, Ky 41005-0018**

**WATER MAIN PLAN PREPARED BY:**

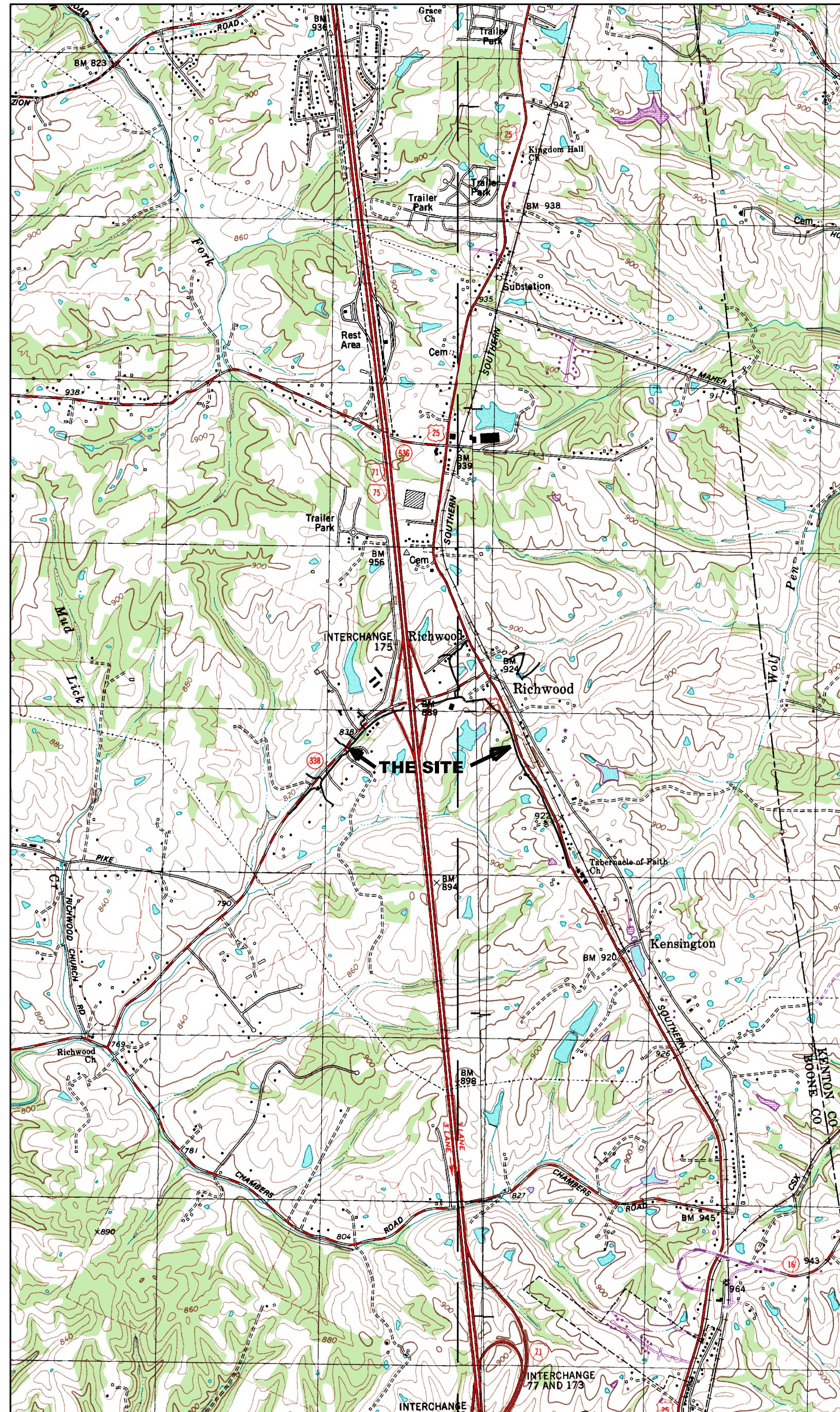


PAGE 1 OF 59

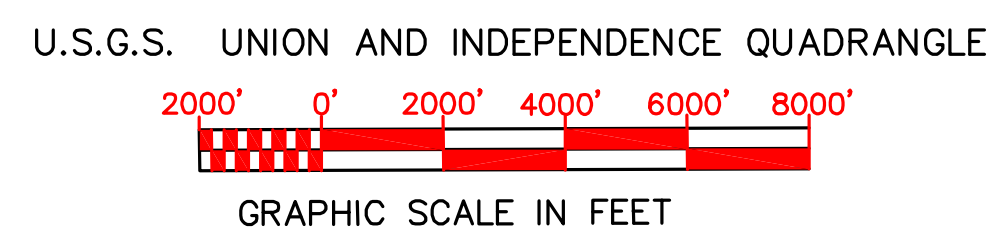
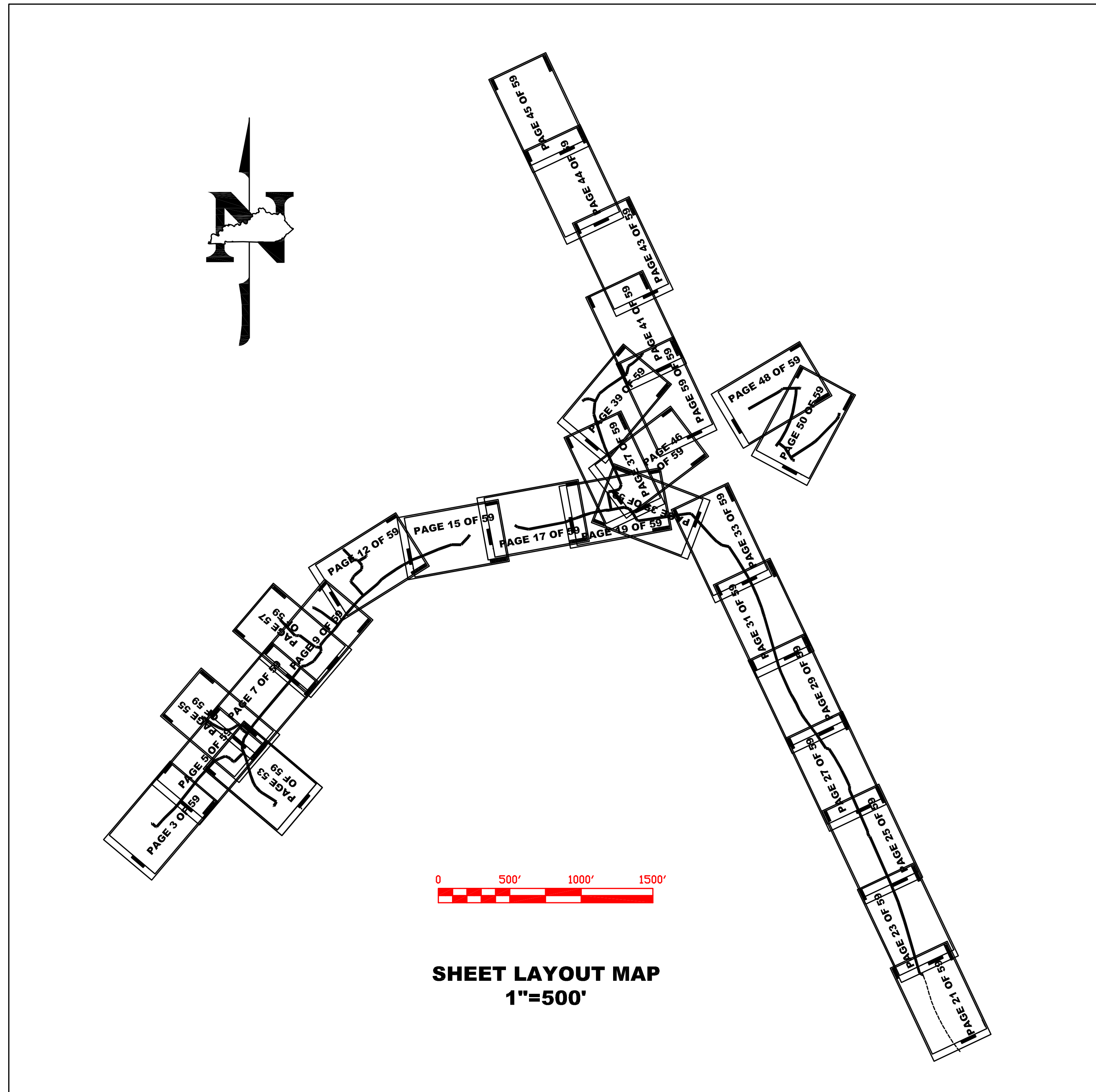
## - BOONE COUNTY WATER DISTRICT - WATER MAIN CONSTRUCTION ONLY

WATER MAIN SUMMARY





PREPARED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 APPROVED BY \_\_\_\_\_ DATE \_\_\_\_\_



- \* NOTES \*
- Contractor shall supply field notes upon completion of project in sufficient detail to prepare "Record Drawings".
  - Location of utilities and structures, both existing and proposed, are shown on the plans from data available at time of bidding, and are not necessarily complete or correct. During construction the contractor shall use diligence in protecting from damage all existing utilities and structures whether shown on the plans or not. If damage is caused, the contractor will be responsible for repair or restoration of same to the satisfaction of the Engineer and the utility company.
  - Contractor to uncover and confirm exact location of existing water mains and services at connection points prior to construction. (incidental)
  - Prior to start of any water main construction, a "Sequence of Construction" shall be provided in writing to the Boone County Water District.
  - Contractor to coordinate and expedite the water main construction in the proper phases of the project and minimize the shut-down time of the water mains.
  - Contractor to coordinate all shut-down times with the Boone County Water District. Water shutdown for tie-ins may be required to be performed at night at the discretion of Boone County Water District. PHONE: 859-586-6155
  - Contractor may be required to make temporary water main and service connections, using approved BCWD materials and methods, during phasing sequences to provide continuous water service. This is "incidental" to the cost of water main construction.
  - All abandoned water meters to be marked, removed, and services disconnected by Boone County Water District prior to construction. Contractor to confirm disconnect with BCWD prior to construction.
  - Items and instruction labels in (parenthesis) are incidentals to the construction and cost of item.
  - Any adjustments or relocations of items to final grades and locations will be considered "incidental" to cost and construction of item.
  - ALL D.I.P. TO BE CLASS 50 WITH BLUE POLYWRAP
  - ALL P.V.C. TO BE C-900 DR 14
  - Tees, Bends, Caps, Plugs or any other fittings installed with new main are to be considered incidental and included in pipe price. These items are not paid separately and do not have separate bid item quantities.
  - Excavation in paved areas outside of road construction shall be backfilled above initial bedding with flowable fill to subgrade of the existing pavement. The pavement shall be saw cut to neat lines and replaced in-kind. Alternative backfill or pavement restoration methods shall be approved by the KYTC Section Engineer before use. All costs for restoration of areas outside of road construction shall be considered incidental to water main construction.
  - Blasting of rock shall not be permitted on this project.
  - Temporary blocking and flushing device to be included at all "tie-ins" (incidental to all tie-ins).

FOR FURTHER INSTRUCTIONS AND EXPLANATIONS, SEE BID SPECIFICATIONS !!!

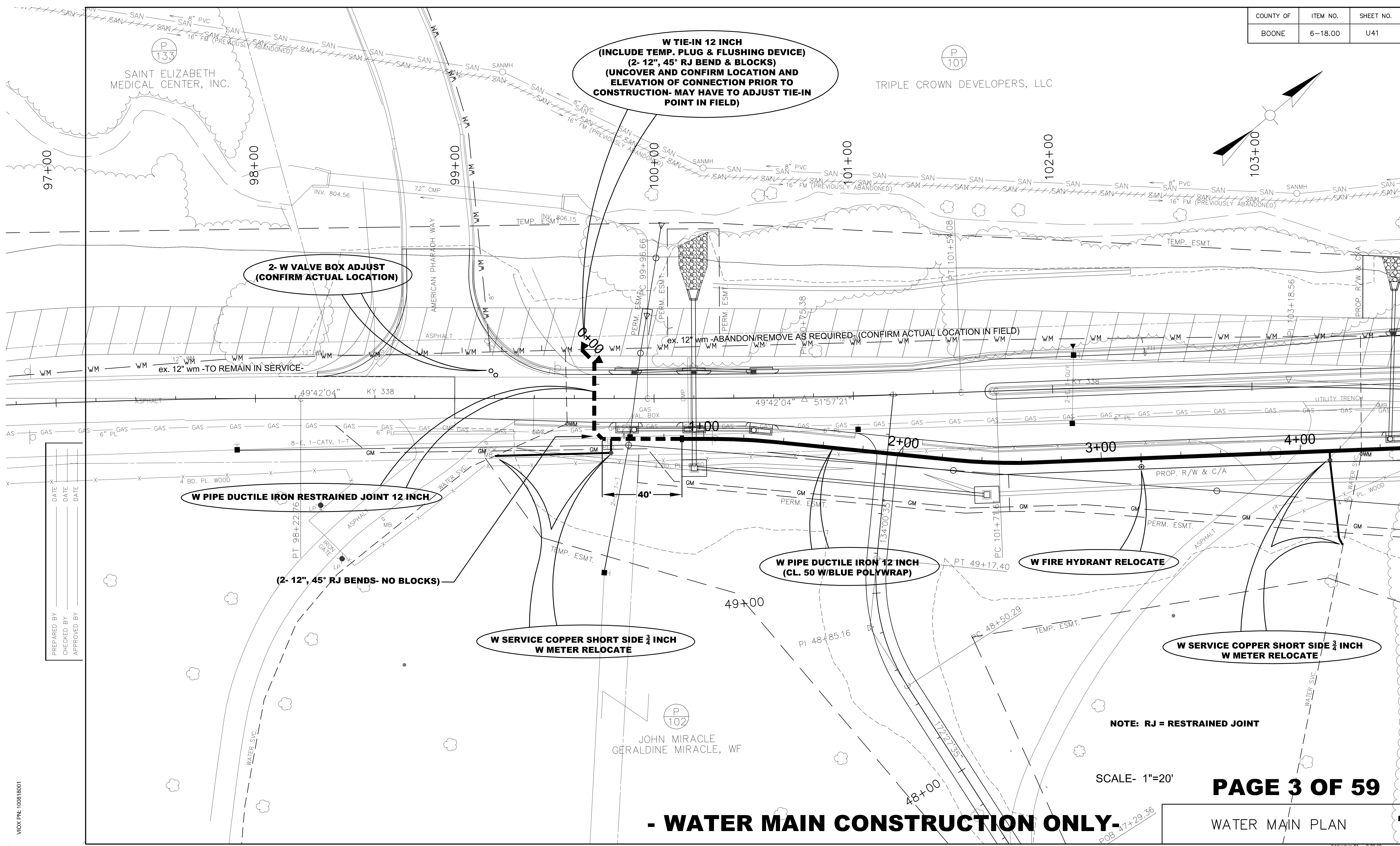
**WATER MAIN PLAN PREPARED FOR:**  
**BOONE COUNTY WATER DISTRICT**  
 2475 Burlington Pike  
 Burlington, Ky 41005-0018  
 ph: 859-586-6155

WATER MAIN PLAN PREPARED BY:



**PAGE 2 OF 59**

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-18.00	U41

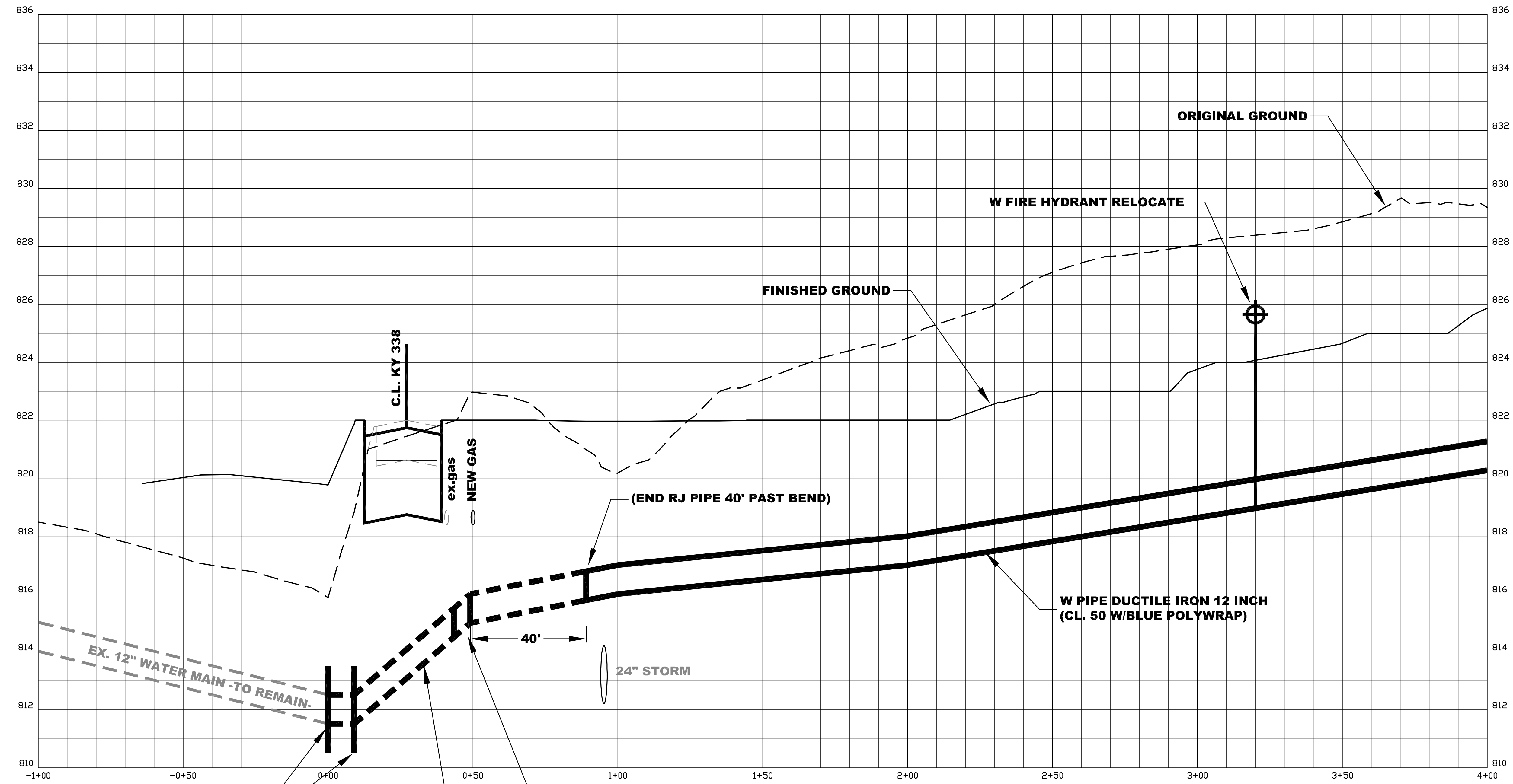


DATE \_\_\_\_\_  
 PREPARED BY \_\_\_\_\_  
 DATE \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_  
 DATE \_\_\_\_\_  
 APPROVED BY \_\_\_\_\_

VICX PN: 100818001

P:\BCMD (08)\KY 338-75 INTERCHANGE TO U.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC TO DGN\FCS-6-18-00\WM-TO DGN.dwg, 7/24/2019 11:39:20 AM

Addendum #4 - 8-30-19



**W TIE-IN 12 INCH  
(INCLUDE TEMP. PLUG & FLUSHING DEVICE)  
(2- 12", 45° RJ BENDS & BLOCKS)  
(UNCOVER AND CONFIRM LOCATION AND  
ELEVATION PRIOR TO CONSTRUCTION)**

**NOTE: RJ = RESTRAINED JOINT**

**W PIPE DUCTILE IRON RESTRAINED JOINT 12 INCH  
(CL. 50 W/BLUE POLYWRAP)  
BEGIN @ 0+00**

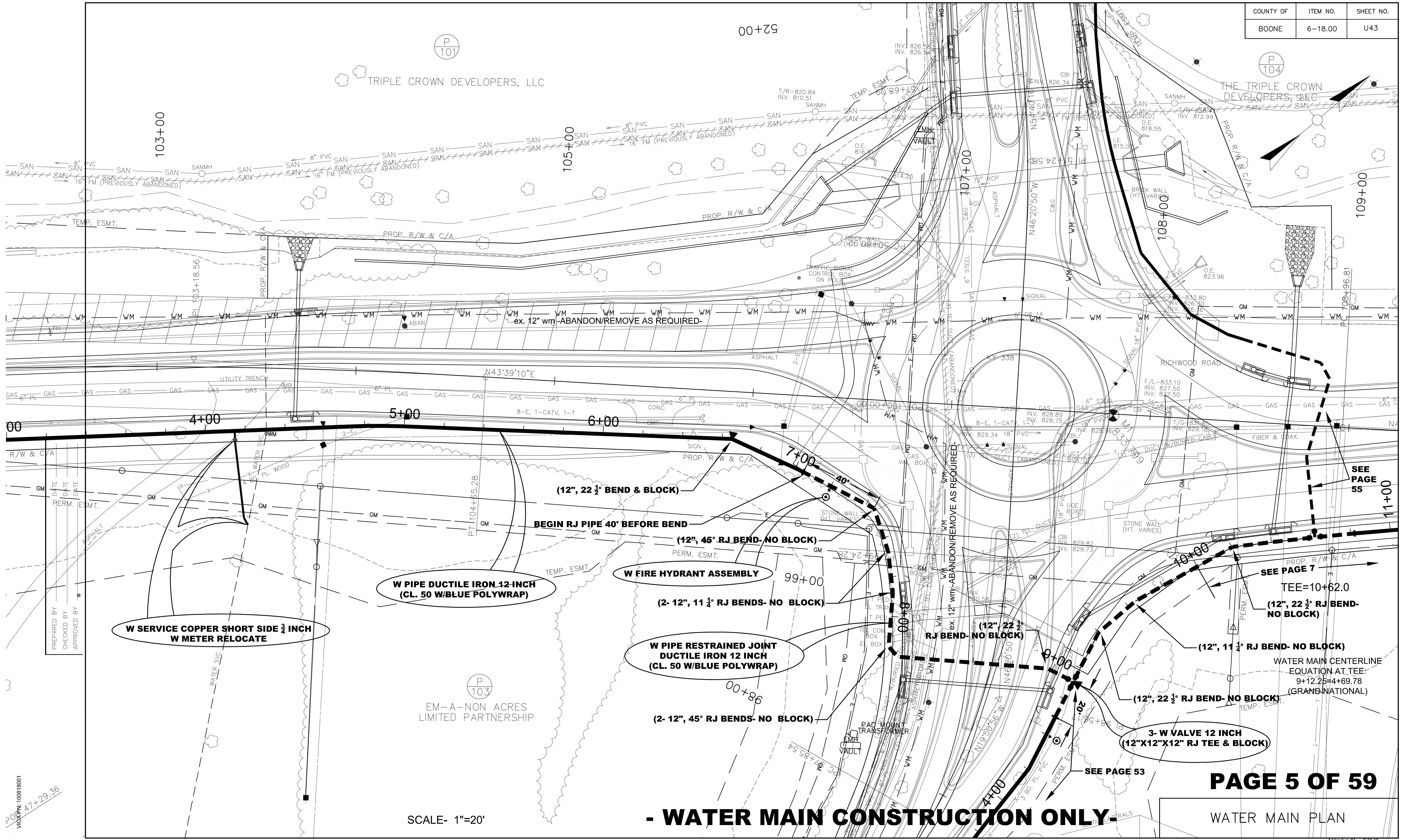
**(2- 12", 45° RJ BEND- NO BLOCKS)**

**NOTE:  
ROTATE BENDS VERTICAL WHERE REQUIRED.  
DEFLECT PIPE WHERE POSSIBLE: MAX. DEFLECTION- 6"-8"-12" = 5'**

HORIZONTAL: 1"=20'  
VERTICAL: 1"=2'

**- WATER MAIN CONSTRUCTION ONLY-**

PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE



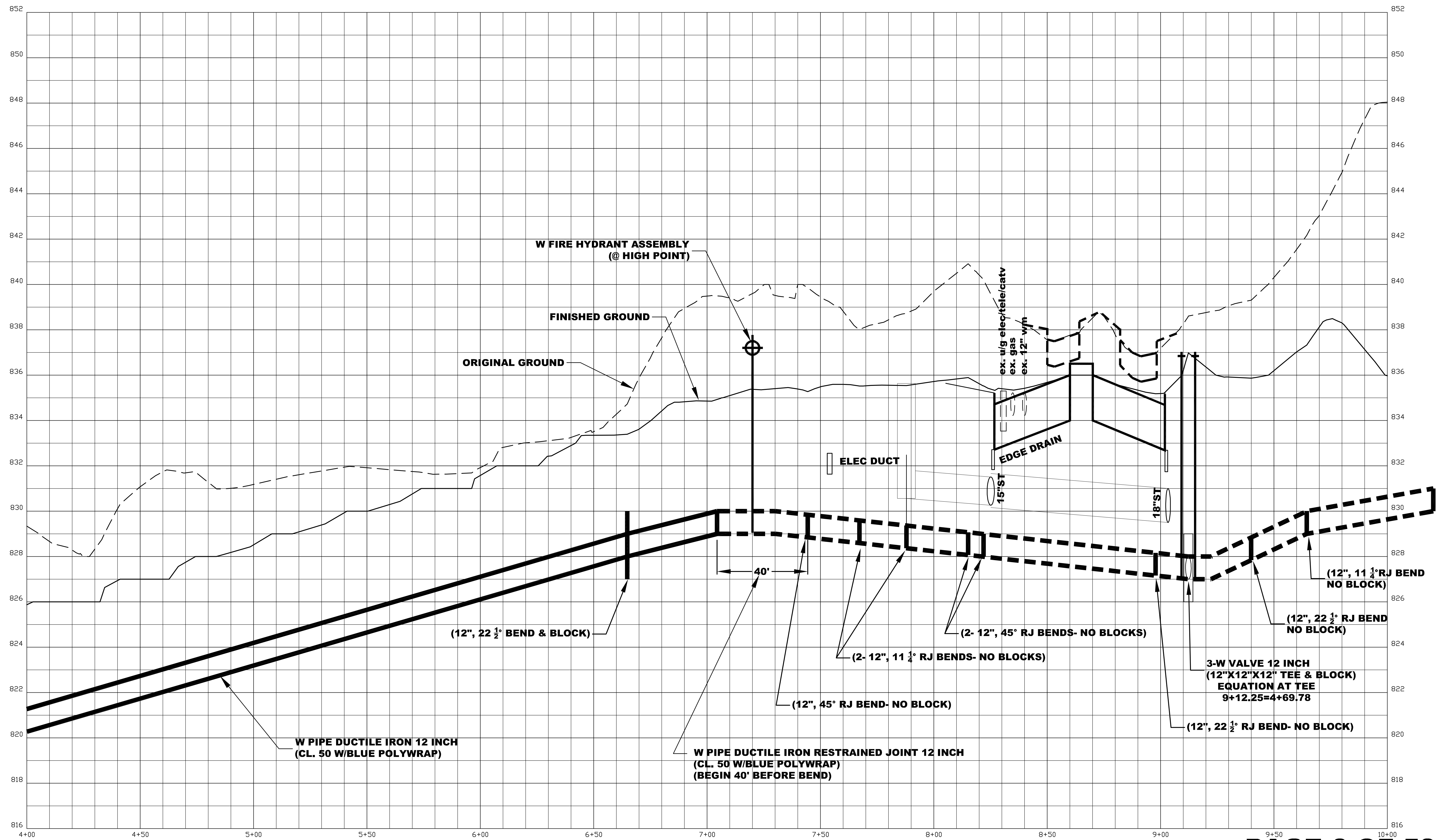
**- WATER MAIN CONSTRUCTION ONLY -**

SCALE- 1"=20'

PREPARED BY  
CHECKED BY  
APPROVED BY

VOX: 00818001  
2014.07+29.36

P:\BC\DW (08) KY 338-75 INTERCHANGE TO U.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC TO DGN\FPS-6-18.00\WM-TO DGN.dwg, 7/16/2019 11:50:28 AM



PREPARED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 APPROVED BY \_\_\_\_\_ DATE \_\_\_\_\_

HORIZONTAL: 1"=20'  
 VERTICAL: 1"=2'

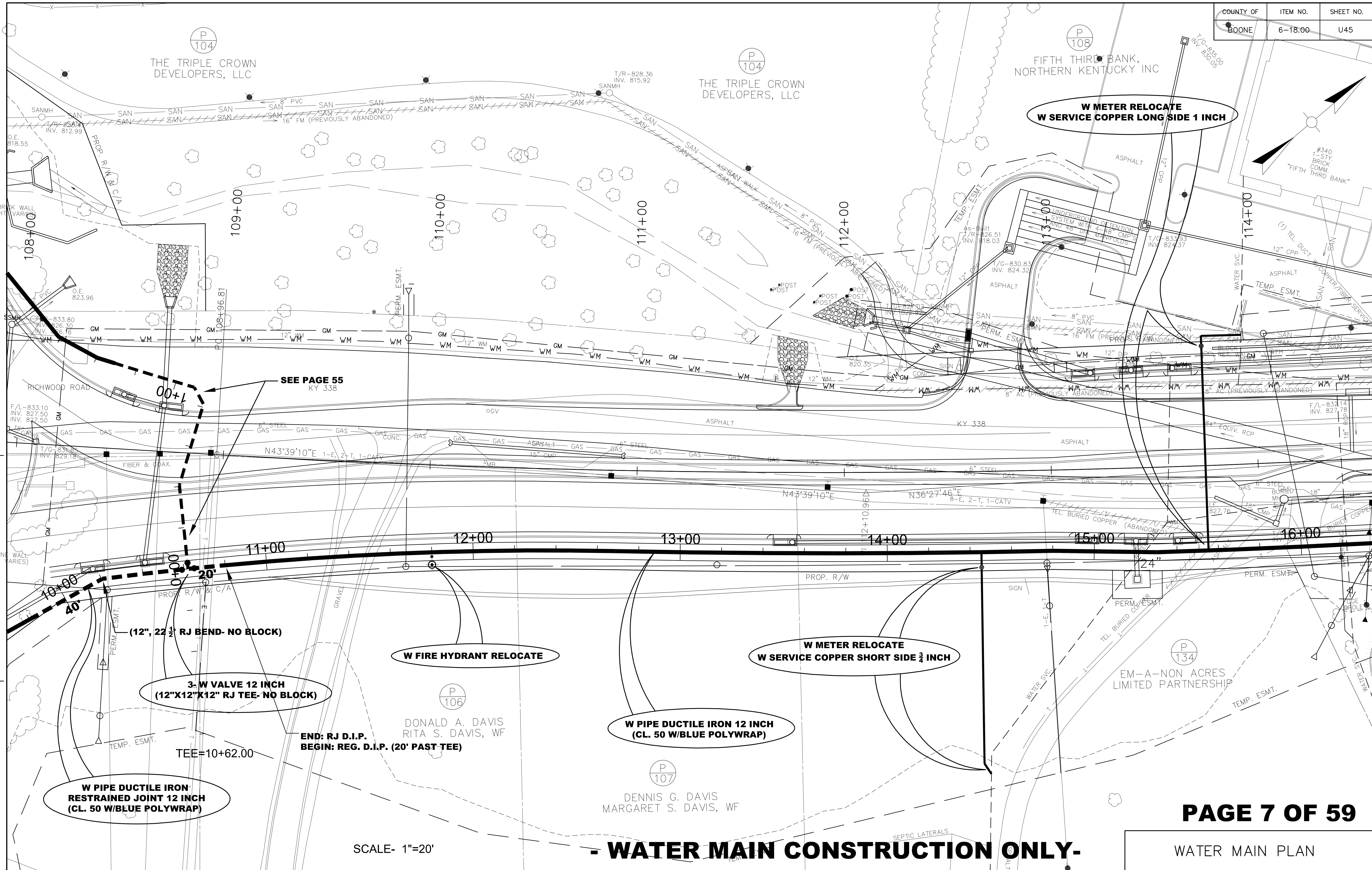
**NOTE:**  
 ROTATE BENDS VERTICAL WHERE REQUIRED.  
 DEFLECT PIPE WHERE POSSIBLE: MAX. DEFLECTION- 6"-8"-12" = 5"

**- WATER MAIN CONSTRUCTION ONLY -**

VICX PN: 100818001

Addendum #4 - 8-30-19

P:\BC\WD (08)\KY 338-75 INTERCHANGE TO U.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC (18001)\Engineering\DWG\PLAN SET\FIG-6-VM-LS-18-00.dwg, 7/12/2019 9:35:12 PM



PREPARED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 APPROVED BY \_\_\_\_\_ DATE \_\_\_\_\_

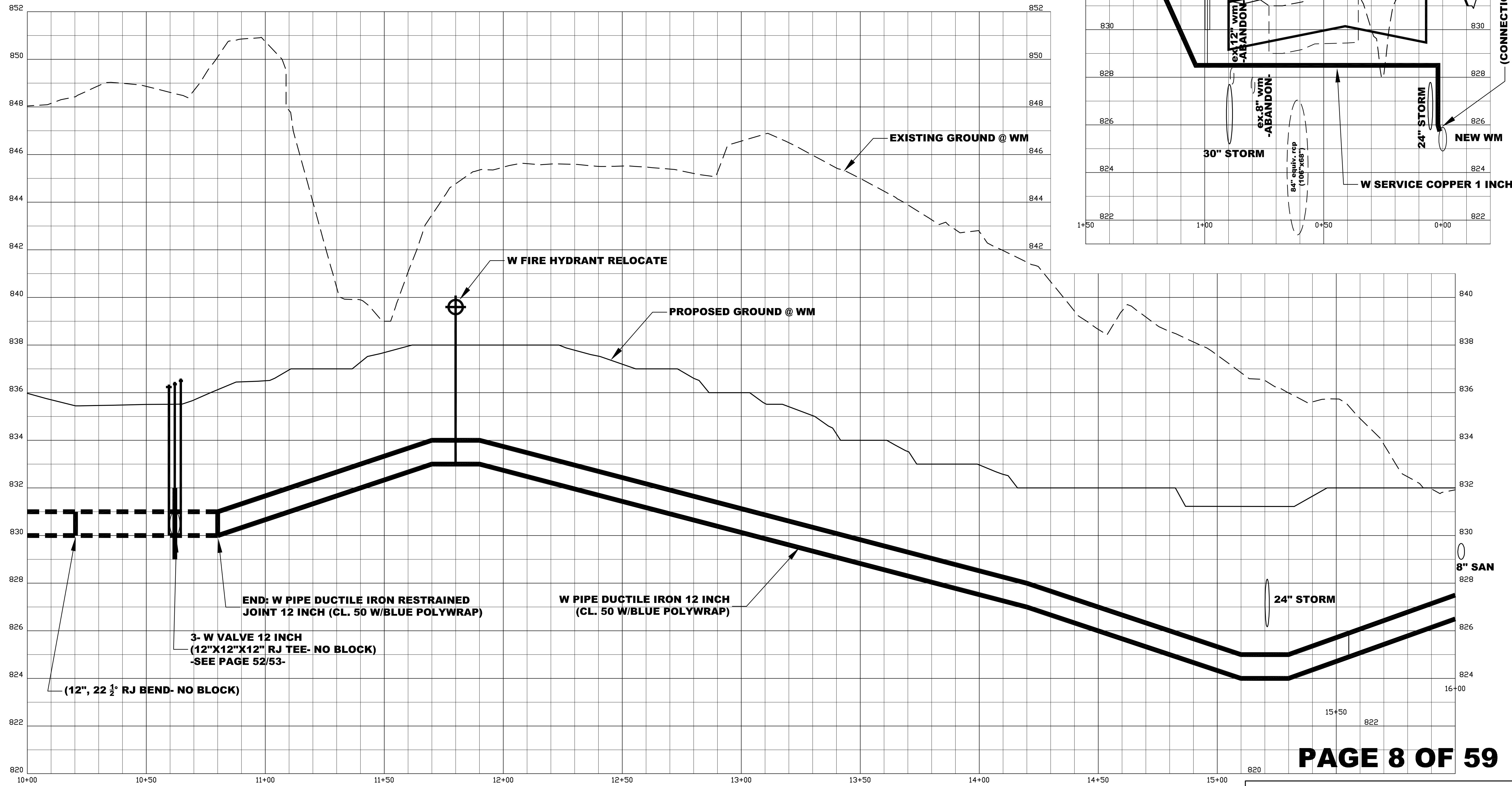
VIOX PN: 100818001

**- WATER MAIN CONSTRUCTION ONLY -**

SCALE- 1"=20'

ADDENDUM #4 - 8-30-19

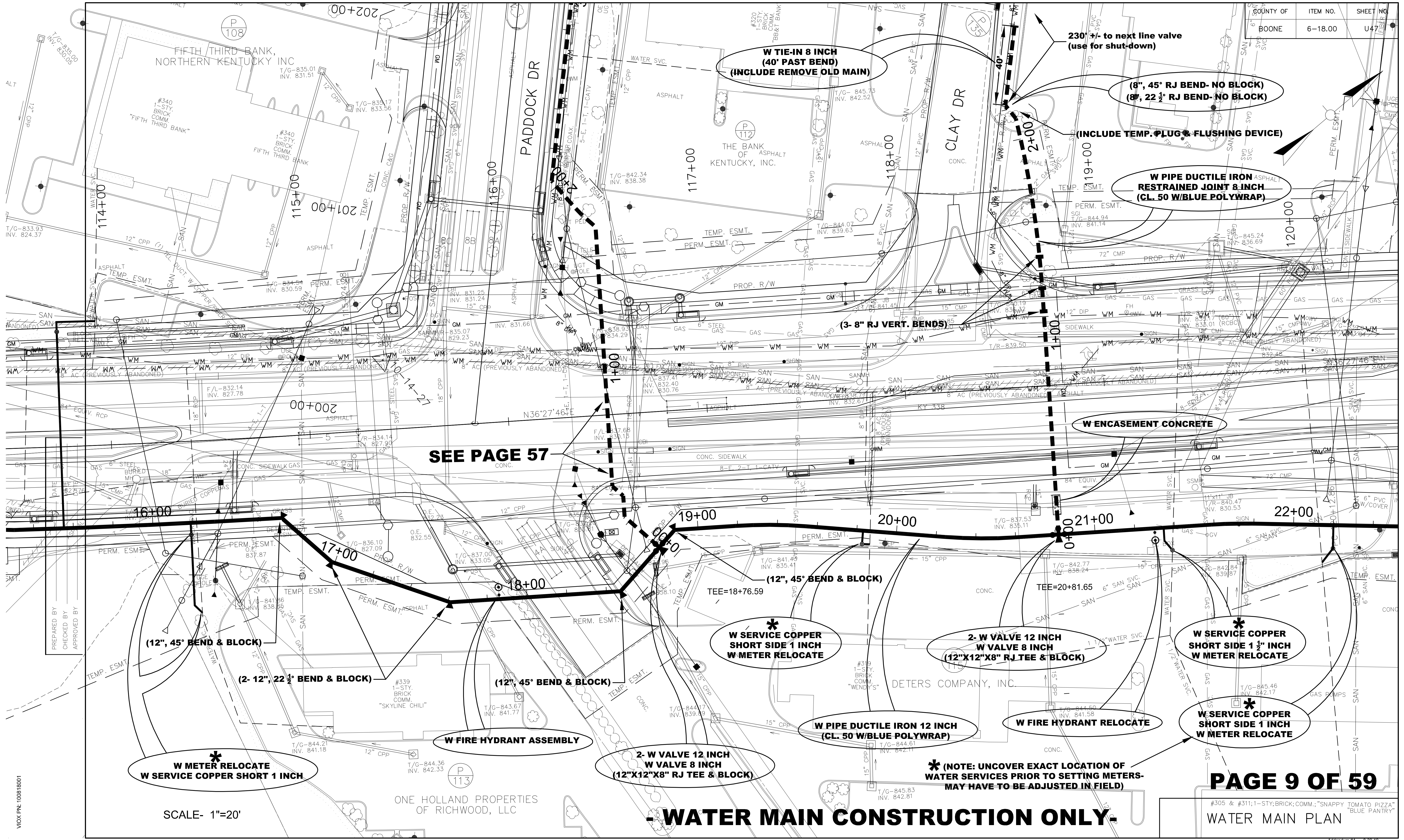
**NOTE:**  
 ROTATE BENDS VERTICAL WHERE REQUIRED.  
 DEFLECT PIPE WHERE POSSIBLE: MAX. DEFLECTION- 6"-8"-12" = 5°



PREPARED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 APPROVED BY \_\_\_\_\_ DATE \_\_\_\_\_

HORIZONTAL: 1"=20'  
 VERTICAL: 1"=2'

**- WATER MAIN CONSTRUCTION ONLY -**



**SEE PAGE 57**

**\* W METER RELOCATE  
W SERVICE COPPER SHORT 1 INCH**

SCALE- 1"=20'

ONE HOLLAND PROPERTIES  
OF RICHWOOD, LLC

**2- W VALVE 12 INCH  
W VALVE 8 INCH  
(12"X12"X8" RJ TEE & BLOCK)**

**- WATER MAIN CONSTRUCTION ONLY -**

**\* W SERVICE COPPER  
SHORT SIDE 1 INCH  
W METER RELOCATE**

**W PIPE DUCTILE IRON 12 INCH  
(CL. 50 W/BLUE POLYWRAP)**

**\* (NOTE: UNCOVER EXACT LOCATION OF  
WATER SERVICES PRIOR TO SETTING METERS-  
MAY HAVE TO BE ADJUSTED IN FIELD)**

**2- W VALVE 12 INCH  
W VALVE 8 INCH  
(12"X12"X8" RJ TEE & BLOCK)**

**W FIRE HYDRANT RELOCATE**

**\* W SERVICE COPPER  
SHORT SIDE 1 1/2 INCH  
W METER RELOCATE**

**\* W SERVICE COPPER  
SHORT SIDE 1 INCH  
W METER RELOCATE**

**W ENCASEMENT CONCRETE**

**(8", 45° RJ BEND- NO BLOCK)  
(8", 22 1/2° RJ BEND- NO BLOCK)**

**(INCLUDE TEMP. PLUG & FLUSHING DEVICE)**

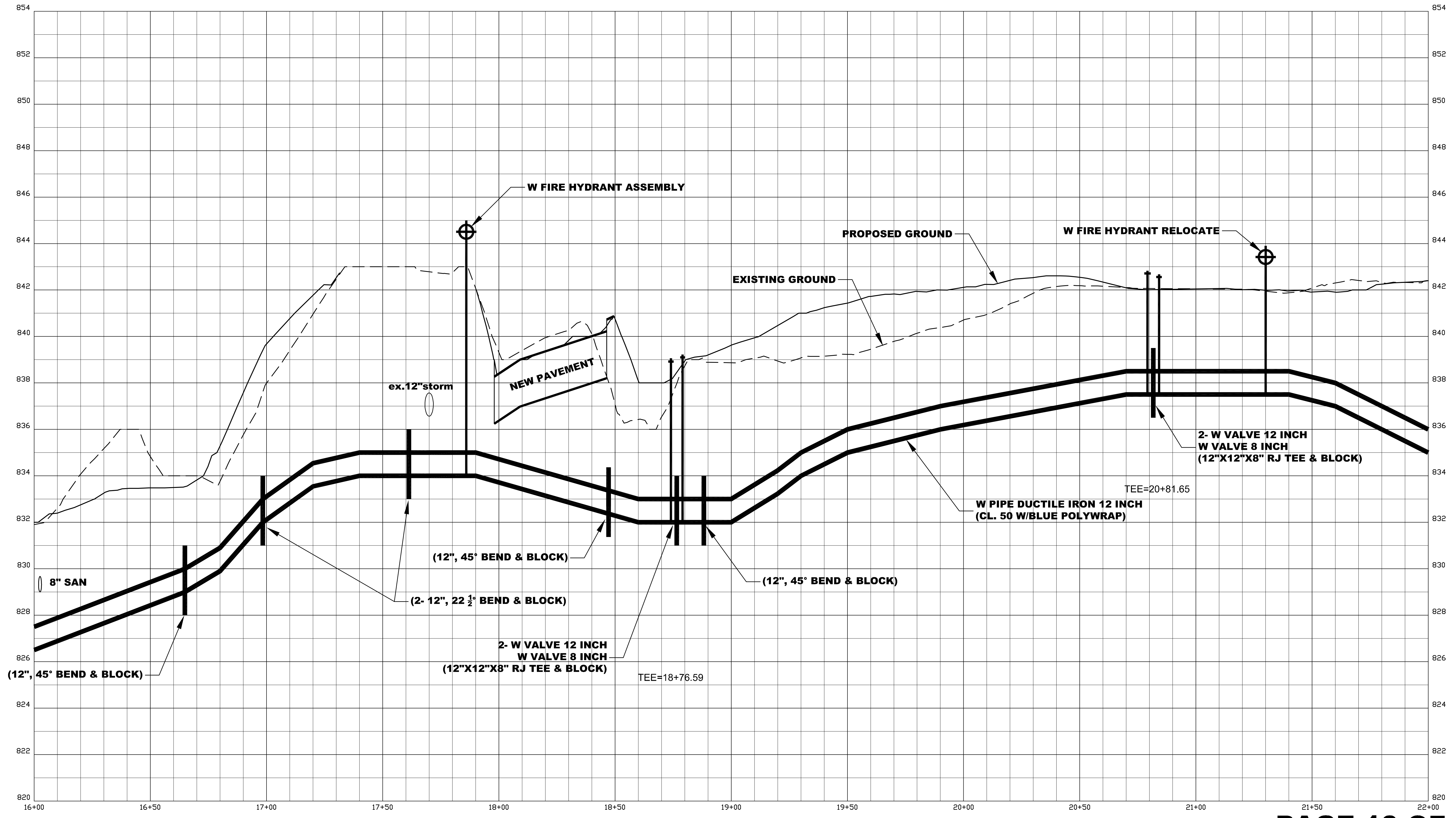
**W PIPE DUCTILE IRON  
RESTRAINED JOINT 8 INCH  
(CL. 50 W/BLUE POLYWRAP)**

**W TIE-IN 8 INCH  
(40' PAST BEND)  
(INCLUDE REMOVE OLD MAIN)**

**230' +/- to next line valve  
(use for shut-down)**

**(3- 8" RJ VERT. BENDS)**





PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

HORIZONTAL: 1"=20'  
VERTICAL: 1"=2'

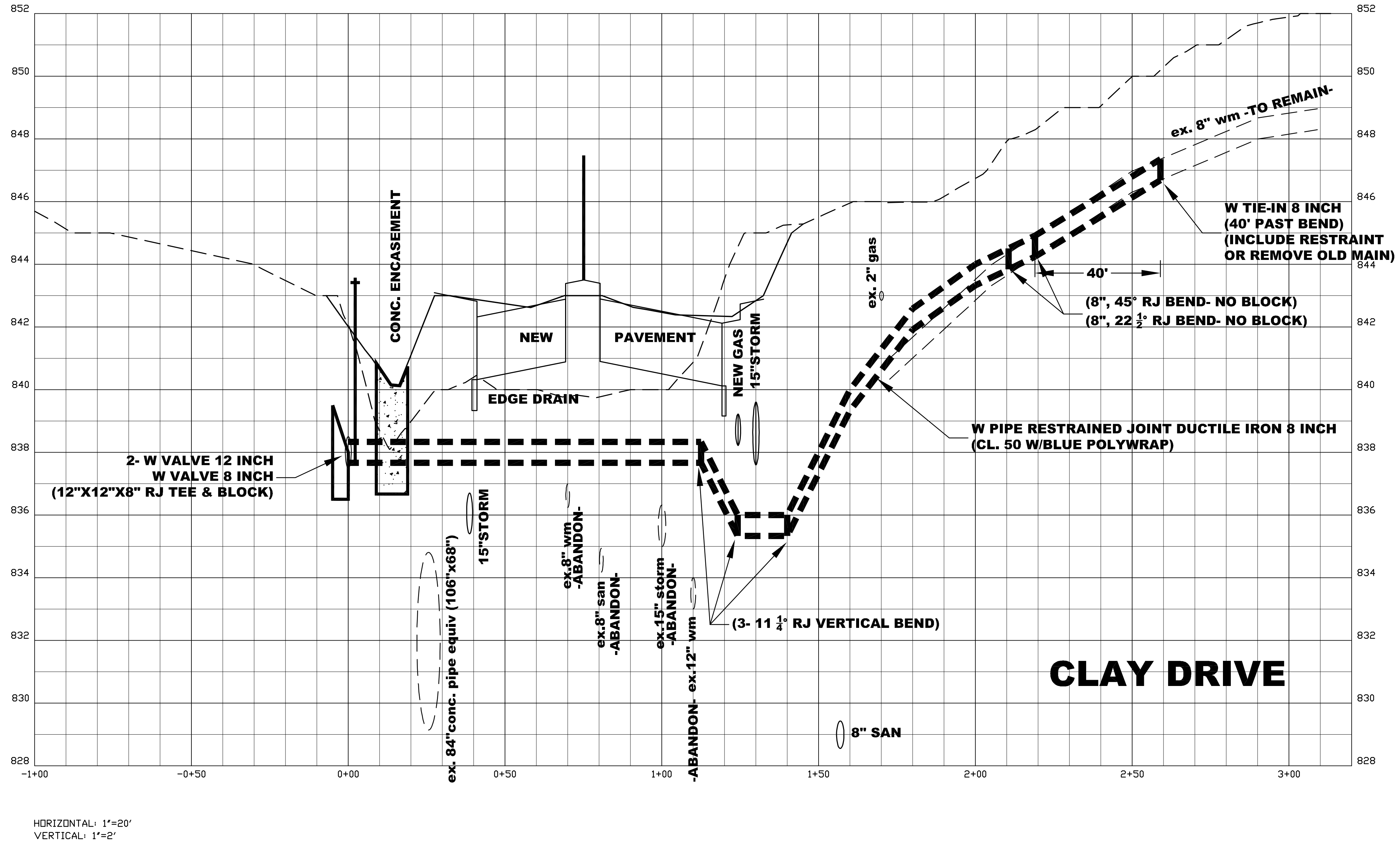
**NOTE:**  
ROTATE BENDS VERTICAL WHERE REQUIRED.  
DEFLECT PIPE WHERE POSSIBLE: MAX. DEFLECTION- 6"-8"-12" = 5"

**- WATER MAIN CONSTRUCTION ONLY -**

P:\BCWD (08)\KY 338-75 INTERCHANGE TO U.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC (18001)\Engineering\DWG\PLAN SET\PG-10\WM-6-18-00.dwg, 7/30/2019 3:46:30 PM

VICO PN: 100818001

Addendum #4 - 8-30-19



HORIZONTAL: 1"=20'  
 VERTICAL: 1"=2'

**NOTE:**  
 ROTATE BENDS VERTICAL WHERE REQUIRED.  
 DEFLECT PIPE WHERE POSSIBLE: MAX. DEFLECTION- 6"-8"-12" = 5°

**- WATER MAIN CONSTRUCTION ONLY -**

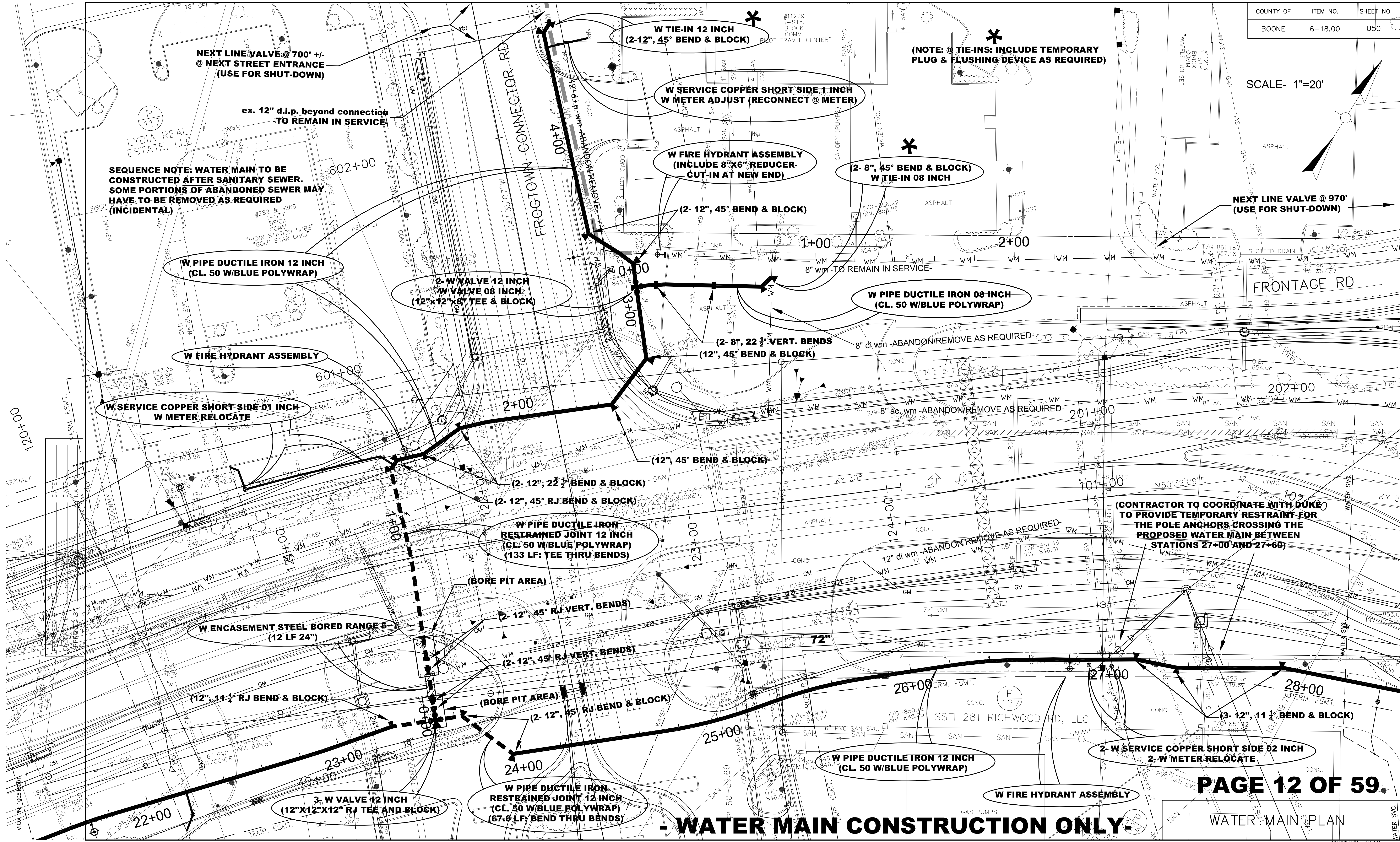
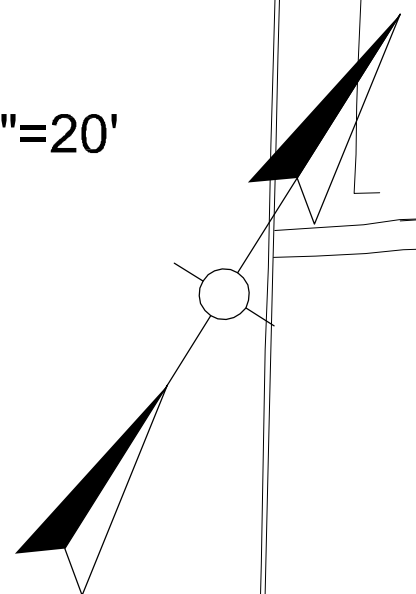
PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

P:\BC\MD (08)KY 338-75 INTERCHANGE TO U.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC (18001)Engineering\DWG\PLAN SET\PG-11\WM-6-18-00.dwg, 7/10/2019 5:33:40 PM

VICX PN: 100818001

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-18.00	U50

SCALE- 1"=20'



**SEQUENCE NOTE: WATER MAIN TO BE CONSTRUCTED AFTER SANITARY SEWER. SOME PORTIONS OF ABANDONED SEWER MAY HAVE TO BE REMOVED AS REQUIRED (INCIDENTAL)**

**NEXT LINE VALVE @ 700' +/- @ NEXT STREET ENTRANCE (USE FOR SHUT-DOWN)**

**ex. 12" d.i.p. beyond connection TO REMAIN IN SERVICE**

**W TIE-IN 12 INCH (2-12", 45° BEND & BLOCK)**

**W SERVICE COPPER SHORT SIDE 1 INCH W METER ADJUST (RECONNECT @ METER)**

**W FIRE HYDRANT ASSEMBLY (INCLUDE 8"x6" REDUCER-CUT-IN AT NEW END)**

**(NOTE: @ TIE-INS: INCLUDE TEMPORARY PLUG & FLUSHING DEVICE AS REQUIRED)**

**(2- 8", 45° BEND & BLOCK) W TIE-IN 08 INCH**

**W PIPE DUCTILE IRON 12 INCH (CL. 50 W/BLUE POLYWRAP)**

**2- W VALVE 12 INCH W VALVE 08 INCH (12"x12"x8" TEE & BLOCK)**

**W PIPE DUCTILE IRON 08 INCH (CL. 50 W/BLUE POLYWRAP)**

**W FIRE HYDRANT ASSEMBLY**

**W SERVICE COPPER SHORT SIDE 01 INCH W METER RELOCATE**

**(2- 8", 22 1/2" VERT. BENDS (12", 45° BEND & BLOCK)**

**(2- 12", 22 1/2" BEND & BLOCK)**

**W PIPE DUCTILE IRON RESTRAINED JOINT 12 INCH (CL. 50 W/BLUE POLYWRAP) (133 LF: TEE THRU BENDS)**

**(CONTRACTOR TO COORDINATE WITH DUKE TO PROVIDE TEMPORARY RESTRAINT FOR THE POLE ANCHORS CROSSING THE PROPOSED WATER MAIN BETWEEN STATIONS 27+00 AND 27+60)**

**W ENCASEMENT STEEL BORED RANGE 5 (12 LF 24")**

**(BORE PIT AREA)**

**(2- 12", 45° RJ VERT. BENDS)**

**(2- 12", 45° RJ VERT. BENDS)**

**(12", 11 1/4" RJ BEND & BLOCK)**

**(BORE PIT AREA)**

**(2- 12", 45° RJ BEND & BLOCK)**

**W PIPE DUCTILE IRON 12 INCH (CL. 50 W/BLUE POLYWRAP)**

**W FIRE HYDRANT ASSEMBLY**

**2- W SERVICE COPPER SHORT SIDE 02 INCH 2- W METER RELOCATE**

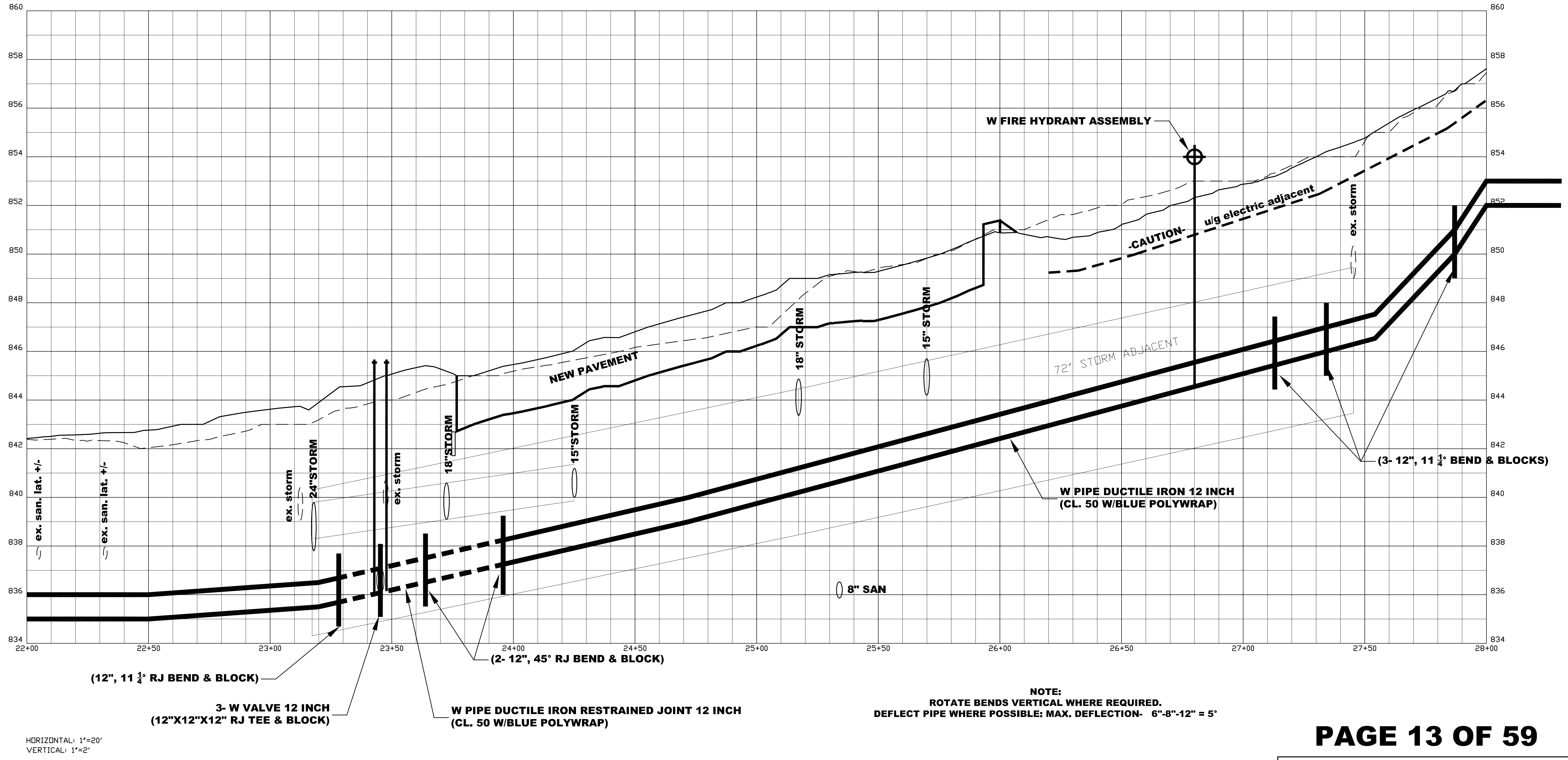
**3- W VALVE 12 INCH (12"x12"x12" RJ TEE AND BLOCK)**

**W PIPE DUCTILE IRON RESTRAINED JOINT 12 INCH (CL. 50 W/BLUE POLYWRAP) (67.6 LF: BEND THRU BENDS)**

**- WATER MAIN CONSTRUCTION ONLY -**

P:\BOWD\009\KY 338-75 INTERCHANGE TO U.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC-12"WM-6-18-00.dwg, 7/26/2019, 1:58:21 PM

ADDENDUM #4 - 8-30-19



PREPARED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 APPROVED BY \_\_\_\_\_ DATE \_\_\_\_\_

HORIZONTAL: 1"=20'  
 VERTICAL: 1"=2'

**NOTE:**  
 ROTATE BENDS VERTICAL WHERE REQUIRED.  
 DEFLECT PIPE WHERE POSSIBLE: MAX. DEFLECTION- 6"-8"-12" = 5"

**- WATER MAIN CONSTRUCTION ONLY -**

P:\BCWD (08)\KY 338-75 INTERCHANGE TO U.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC (18001)\Engineering\DWG\PLAN SET\PG-13\WM-6-18-00.dwg, 7/28/2019 2:01:37 PM

VICX PN: 100818001

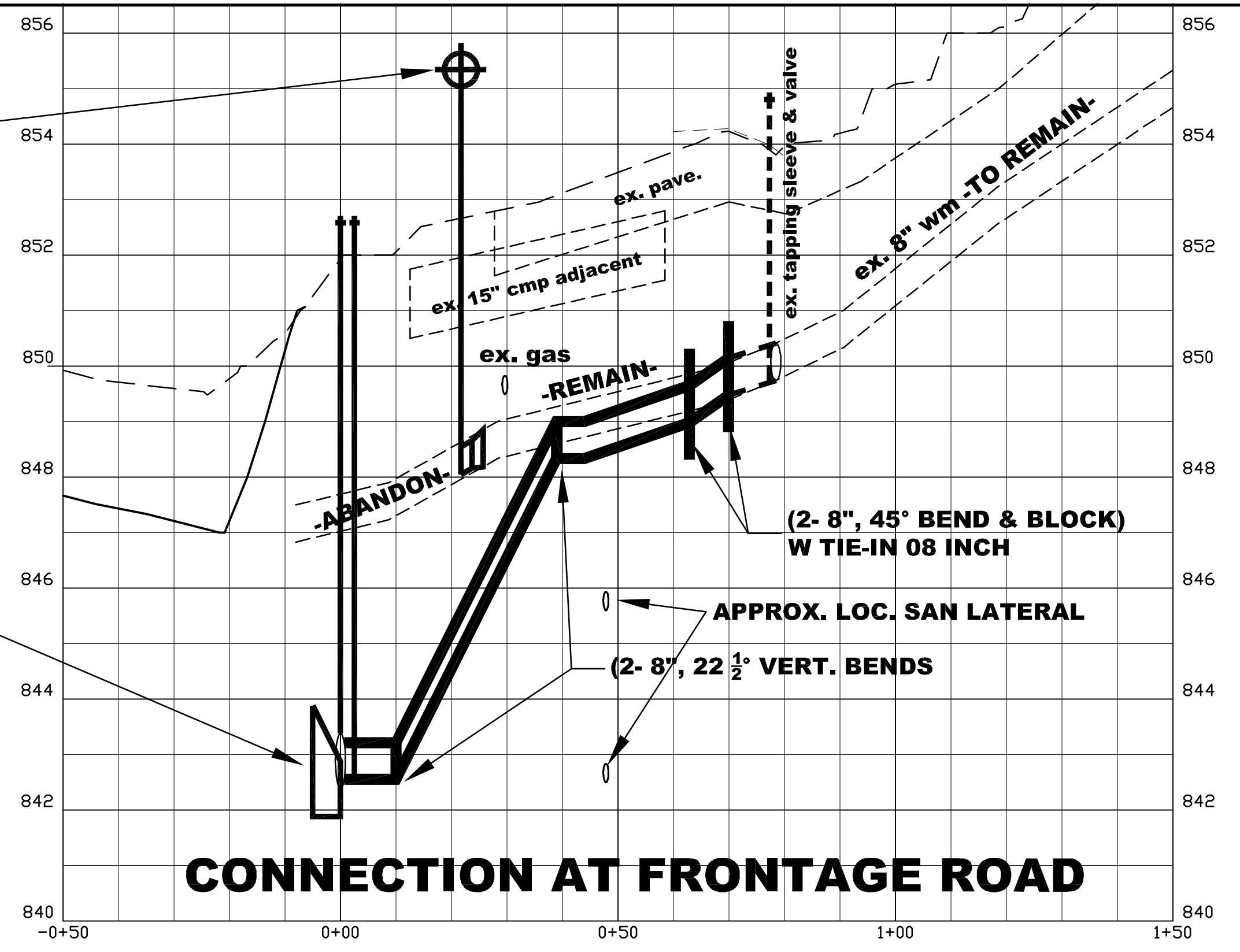
Addendum #4 - 8-30-19

HORIZONTAL: 1"=20'  
VERTICAL: 1"=2'

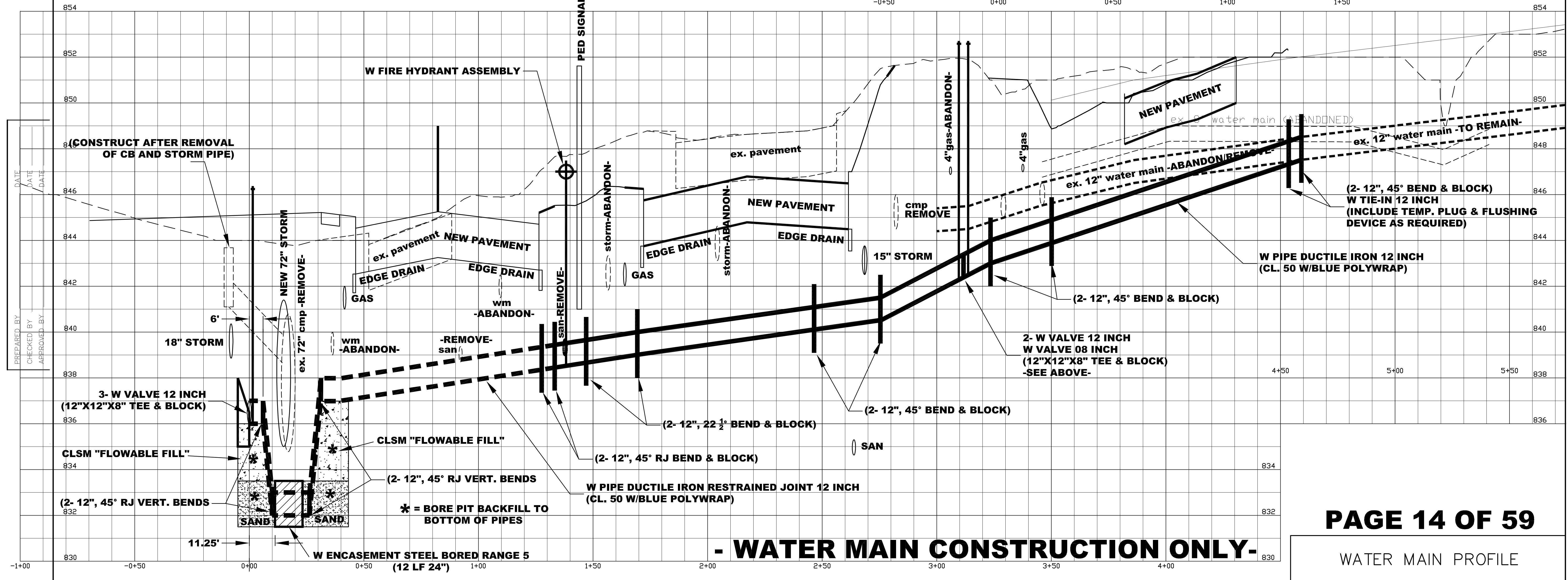
**NOTE:**  
ROTATE BENDS VERTICAL WHERE REQUIRED.  
DEFLECT PIPE WHERE POSSIBLE: MAX. DEFLECTION- 6"-8"-12" = 5"

**W FIRE HYDRANT ASSEMBLY  
(INCLUDE 8"X6" REDUCER,  
CUT IN AT NEW END)**

**2- W VALVE 12 INCH  
W VALVE 08 INCH  
(12"X12"X8" TEE & BLOCK)  
-SEE BELOW-**

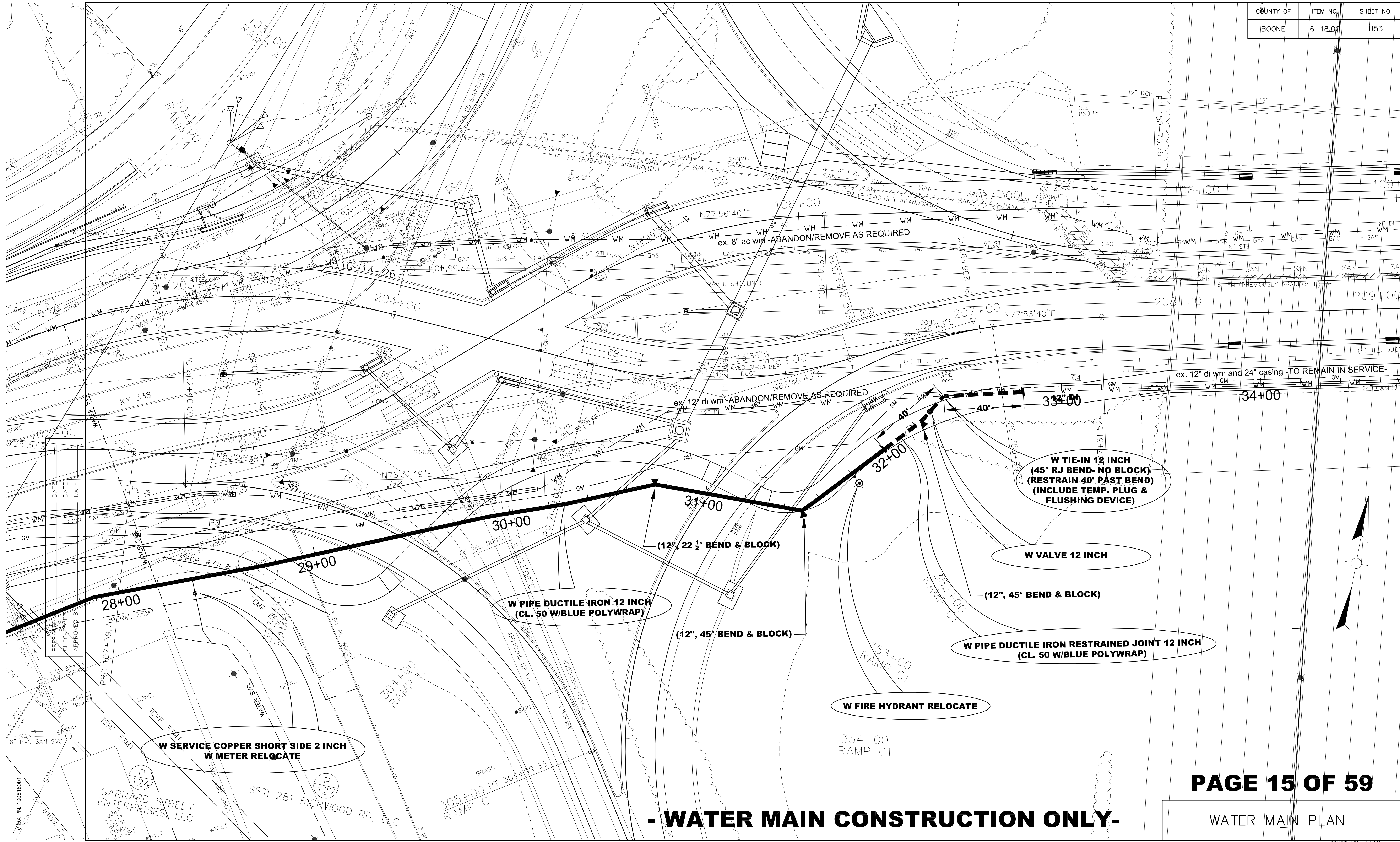


**CONNECTION AT FRONTAGE ROAD**



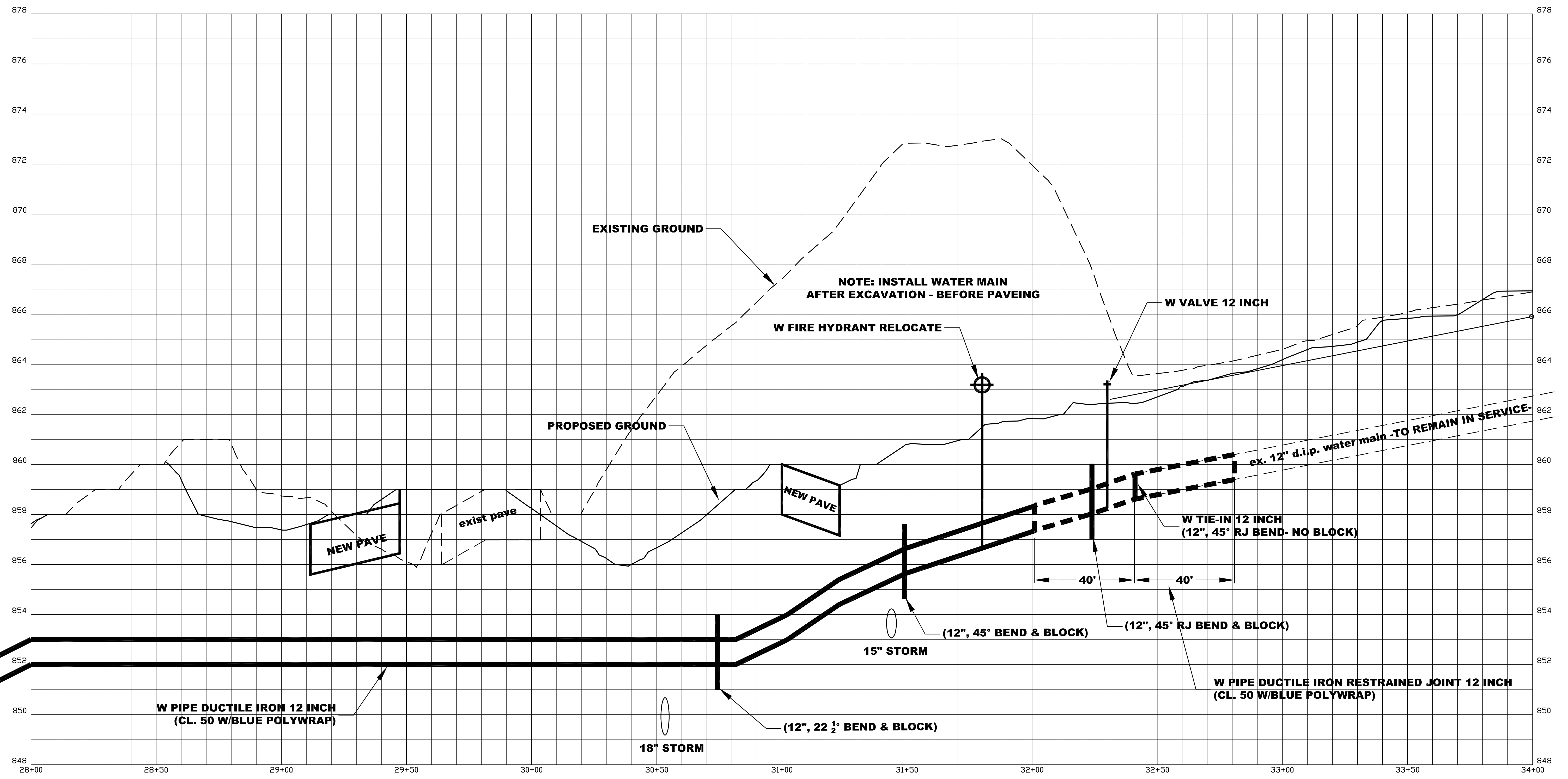
**- WATER MAIN CONSTRUCTION ONLY -**

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 PREPARED BY: \_\_\_\_\_ CHECKED BY: \_\_\_\_\_ APPROVED BY: \_\_\_\_\_  
 DATE: \_\_\_\_\_ DATE: \_\_\_\_\_ DATE: \_\_\_\_\_



**- WATER MAIN CONSTRUCTION ONLY -**

Addendum #4 - 8-30-19



PREPARED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 APPROVED BY \_\_\_\_\_ DATE \_\_\_\_\_

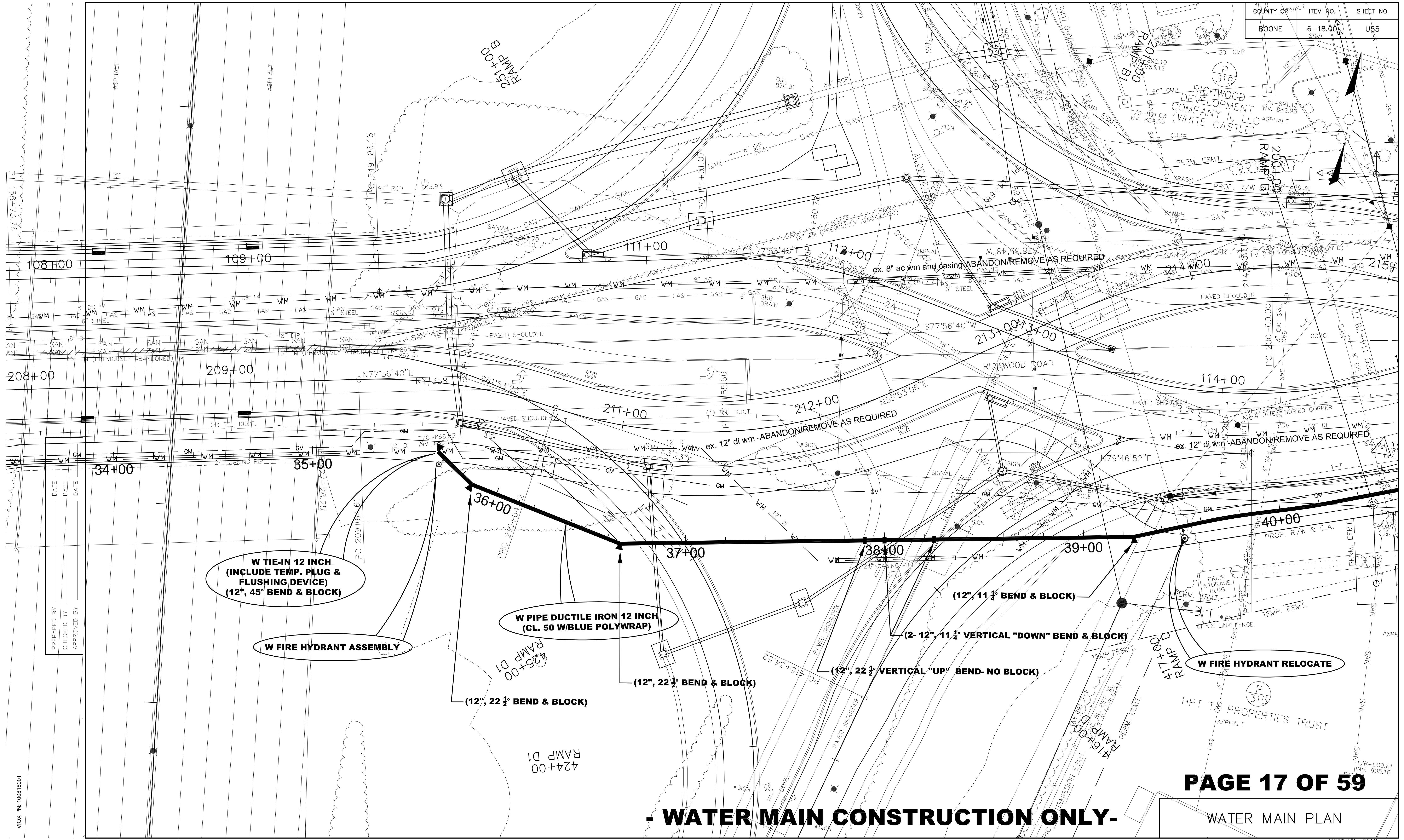
HORIZONTAL: 1"=20'  
 VERTICAL: 1"=2'

**- WATER MAIN CONSTRUCTION ONLY -**

VBOX PN: 100818001

P:\BOWD (08)\KY 338-75 INTERCHANGE TO U.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC (18001)\Engineering\DWG TO DGN\FG 6-5-18-00-WM-TO DGN.dwg, 7/29/2019 10:48:27 AM

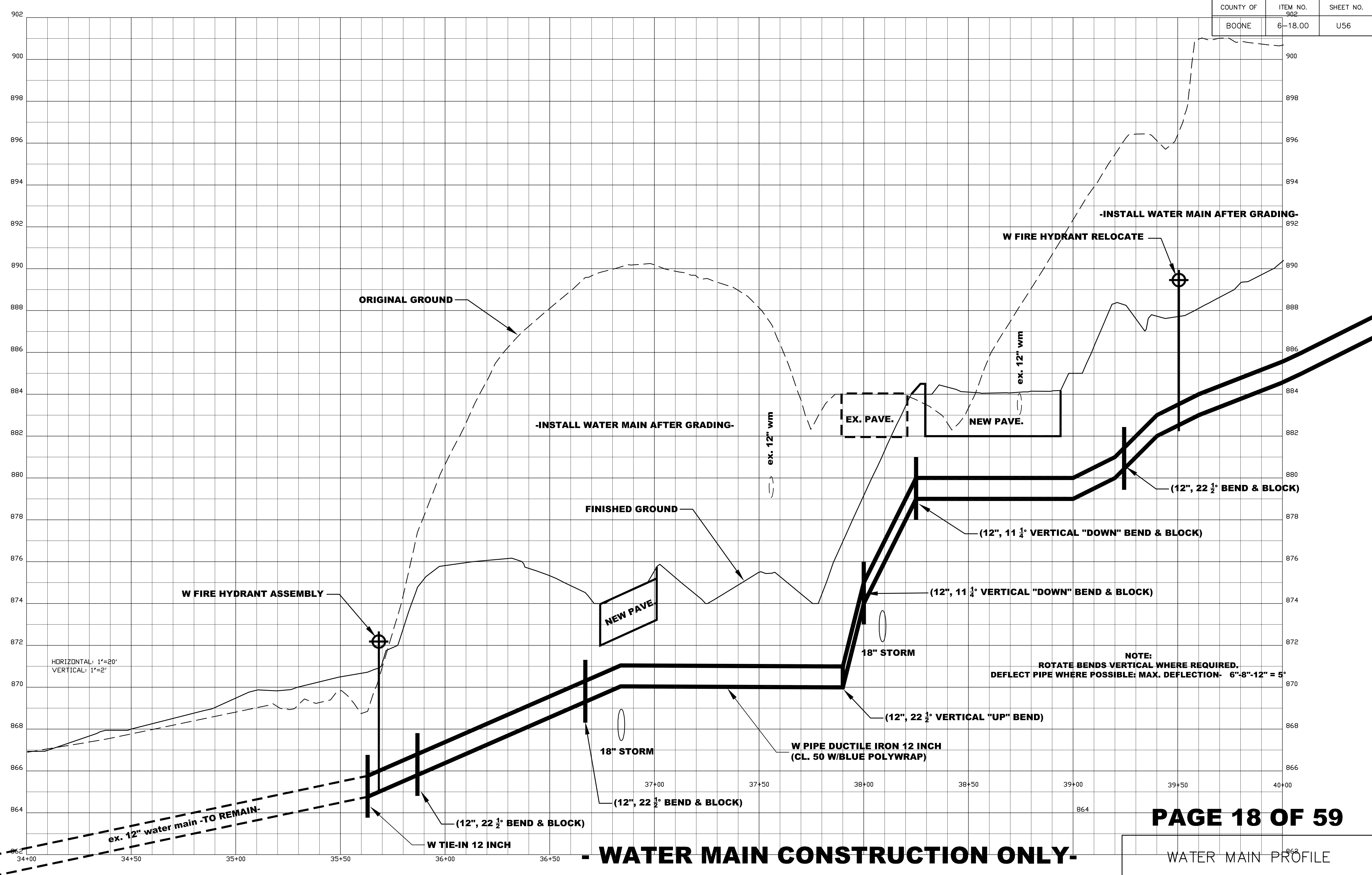
Addendum #4 - 8-30-19



**- WATER MAIN CONSTRUCTION ONLY -**

P:\BOWD (08)\KY 338-75 INTERCHANGE TO I-25 KYTC ITEM NO. 6-18.00 WM RELOC (18001)\Engineering\DWG\PLAN SET\PG-17-WM-6-18-00.dwg, 7/30/2019 4:54:19 PM  
 VICOX PN: 100818001



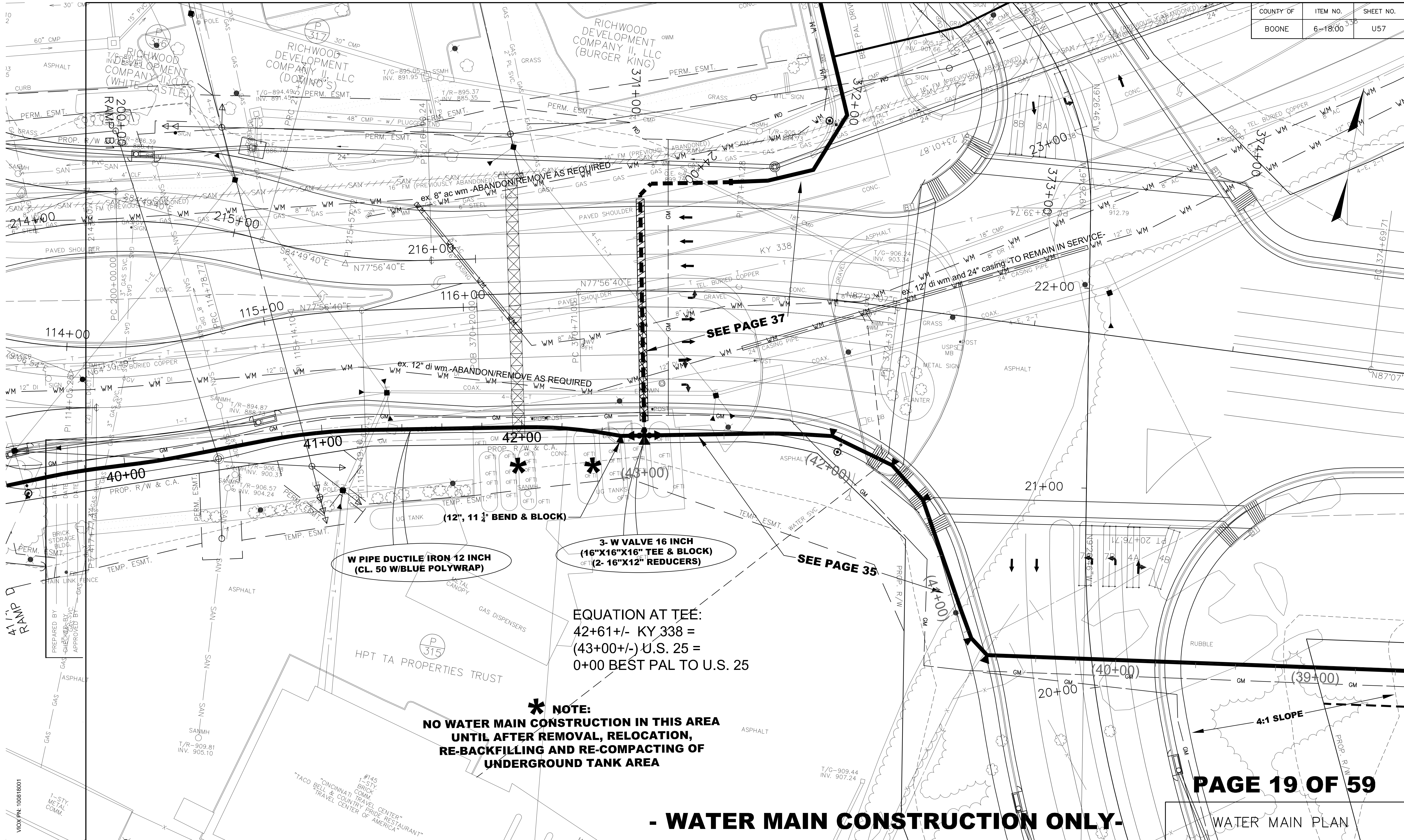


PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

VICX PN: 100818001

P:\BC\WD (08)KY 338-75 INTERCHANGE TO U.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC (18001)\Engineering\DWG\PLAN SET\PG-18-WM-6-18-00.dwg, 7/30/2019 4:59:49 PM

Addendum #4 - 8-30-19



**W PIPE DUCTILE IRON 12 INCH  
(CL. 50 W/BLUE POLYWRAP)**

**3- W VALVE 16 INCH  
(16"X16"X16" TEE & BLOCK)  
OFTI (2- 16"X12" REDUCERS)**

**EQUATION AT TEE:  
42+61+/- KY 338 =  
(43+00+/-) U.S. 25 =  
0+00 BEST PAL TO U.S. 25**

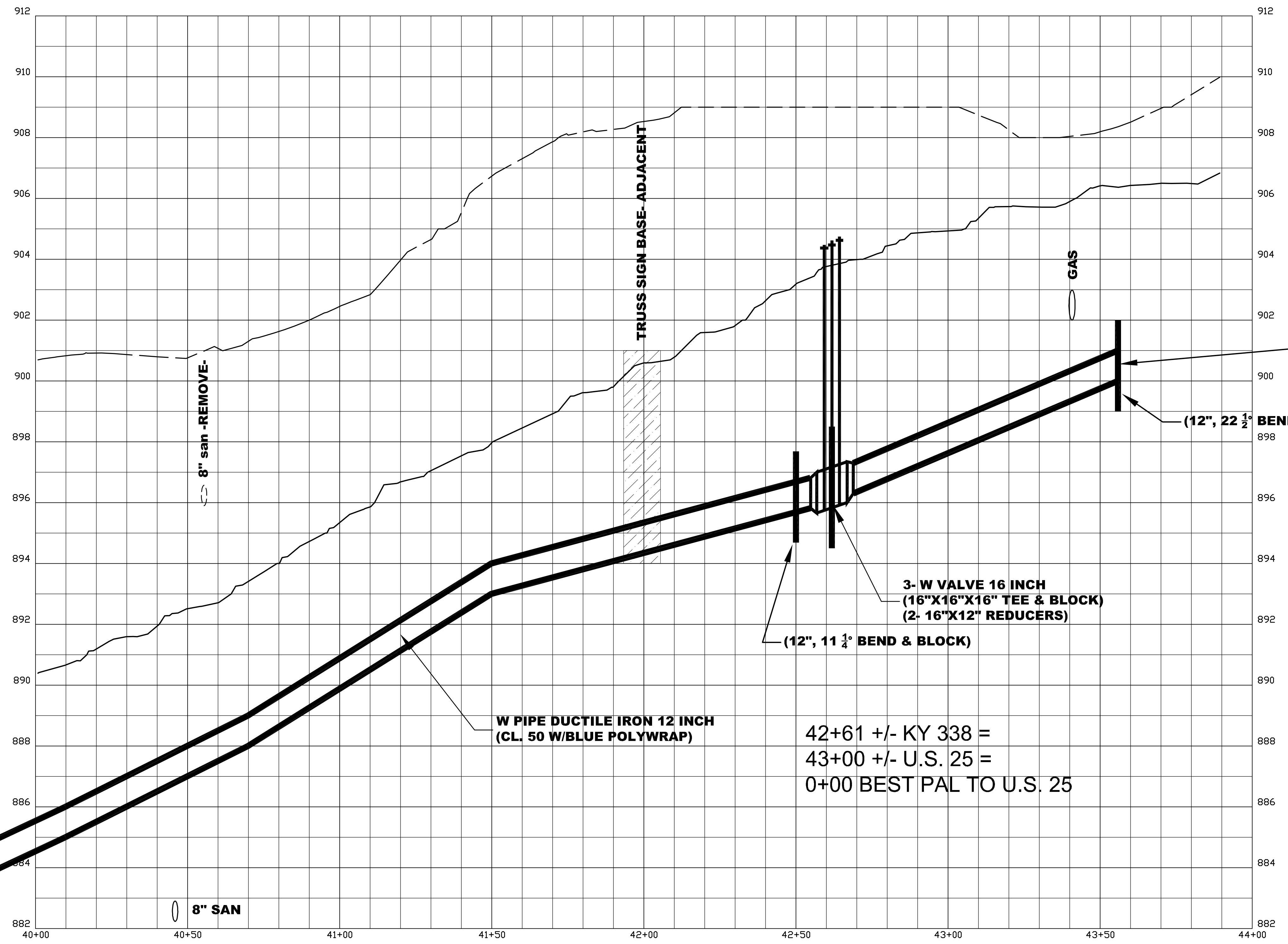
**\* NOTE:  
NO WATER MAIN CONSTRUCTION IN THIS AREA  
UNTIL AFTER REMOVAL, RELOCATION,  
RE-BACKFILLING AND RE-COMPACTING OF  
UNDERGROUND TANK AREA**

**- WATER MAIN CONSTRUCTION ONLY -**

**PAGE 19 OF 59**

WATER MAIN PLAN

V10X P/N: 100818001  
 PREPARED BY: [Name]  
 CHECKED BY: [Name]  
 APPROVED BY: [Name]  
 DATE: [Date]  
 DATE: [Date]  
 DATE: [Date]



**CONTINUE PAGE 35/36**

PREPARED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 APPROVED BY \_\_\_\_\_ DATE \_\_\_\_\_

HORIZONTAL: 1"=20'  
 VERTICAL: 1"=2'

**NOTE:**  
 ROTATE BENDS VERTICAL WHERE REQUIRED.  
 DEFLECT PIPE WHERE POSSIBLE: MAX. DEFLECTION- 6"-8"-12" = 5°

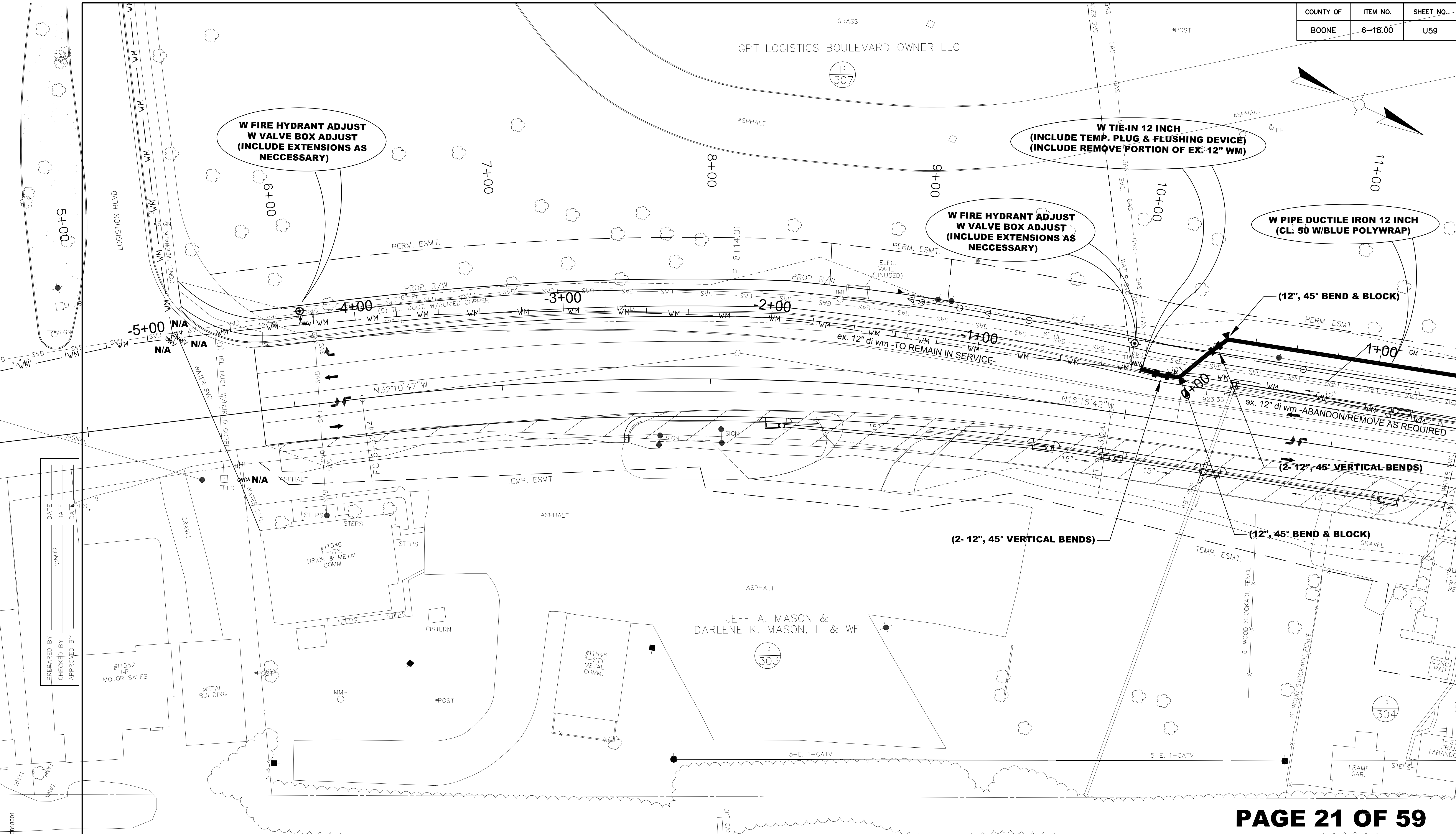
**- WATER MAIN CONSTRUCTION ONLY -**

42+61 +/- KY 338 =  
 43+00 +/- U.S. 25 =  
 0+00 BEST PAL TO U.S. 25

VICX PN: 100818001

P:\BC\WD (08)KY 338-75 INTERCHANGE TO U.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC (18001)\Engineering\DWG\PLAN SET\PG-20\WM-6-18-00.dwg, 7/24/2019 4:07:51 PM

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-18.00	U59

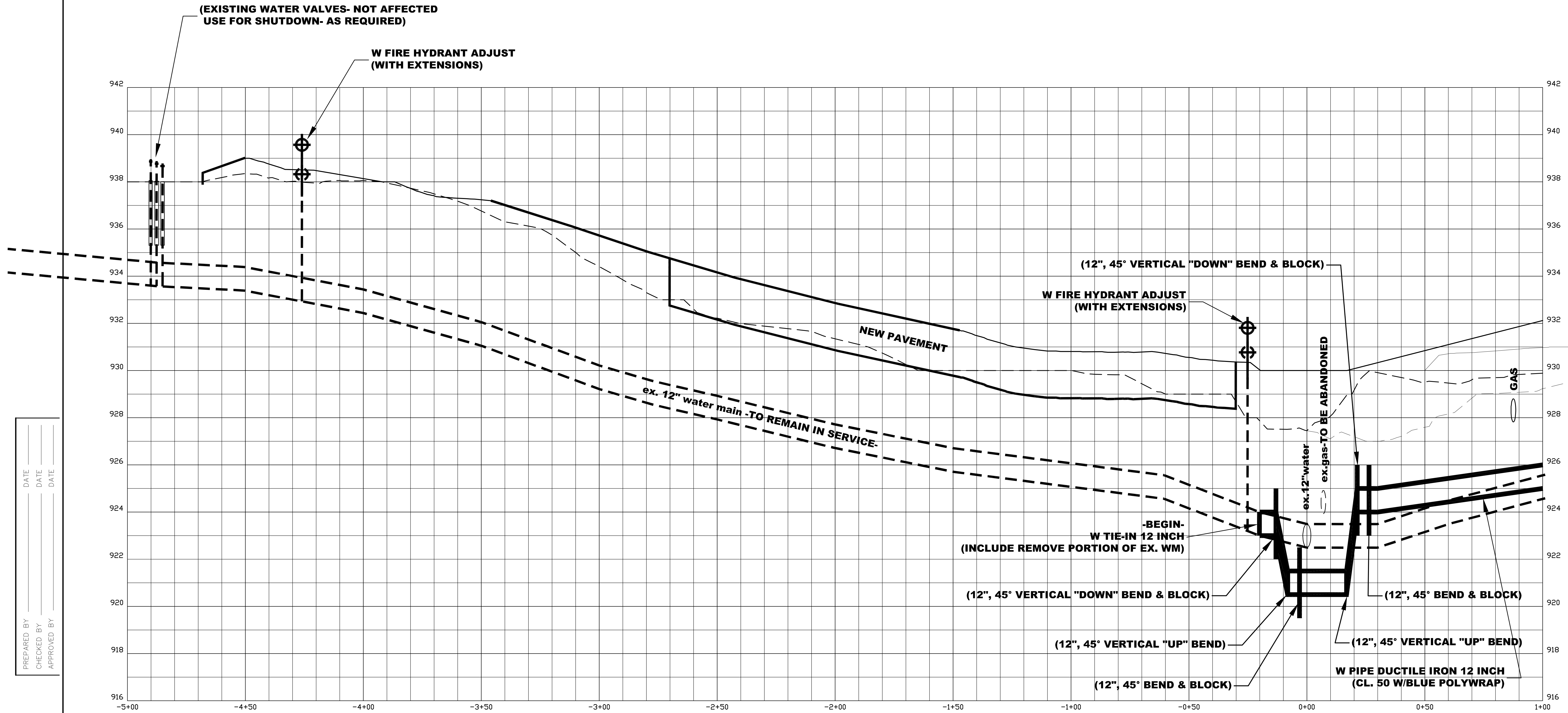


DATE	DATE	DATE
PREPARED BY	CHECKED BY	APPROVED BY

P:\BCWD (08)\KY 338-75 INTERCHANGE TO U.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC (18001)\Engineering\DWG\PLAN SET\PG-21-WM-6-18-00.dwg, 7/31/2019 9:38:32 AM

VIOX PN: 100818001

Addendum #4 - 8-30-19



HORIZONTAL: 1"=20  
 VERTICAL: 1"=2

PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

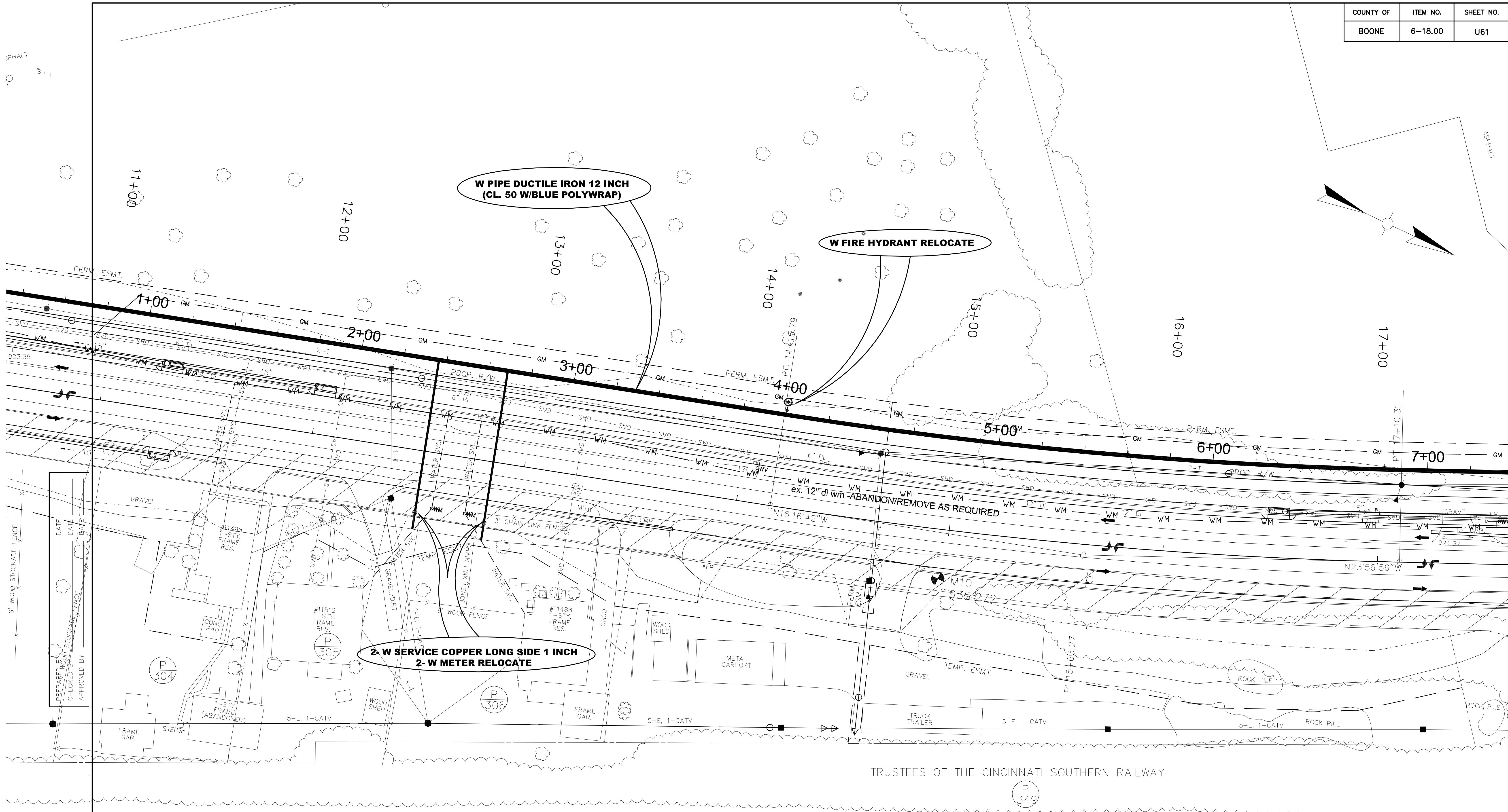
**- WATER MAIN CONSTRUCTION ONLY -**

P:\BC\MD (08)KY 338-75 INTERCHANGE TO U.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC (18001)Engineering\DWG\PLAN SET\FG-22-WM-6-18-00.dwg, 7/31/2019 9:41:30 AM

VICX PN: 100818001

Appendix #4 - 8-30-19

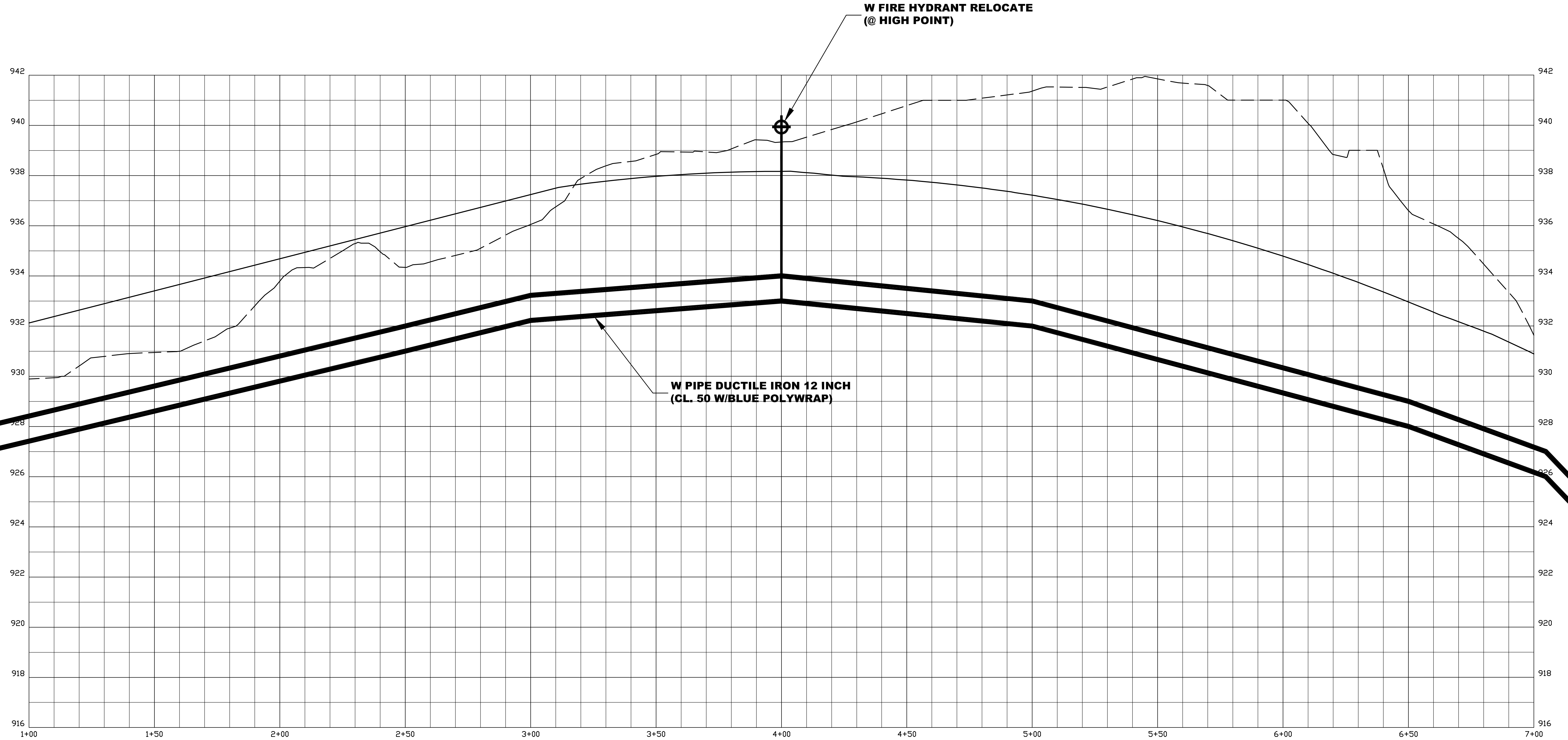
COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-18.00	U61



P:\BOWD (008)\KY 338-75 INTERCHANGE TO U.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC (18001)\Engineering\DWG\PLAN SET\PG-23-WM-6-18-00.dwg, 7/18/2019 5:10:13 PM  
 VICOX PIN: 100818001

addendum #4 - 8-30-19

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-18.00	U62

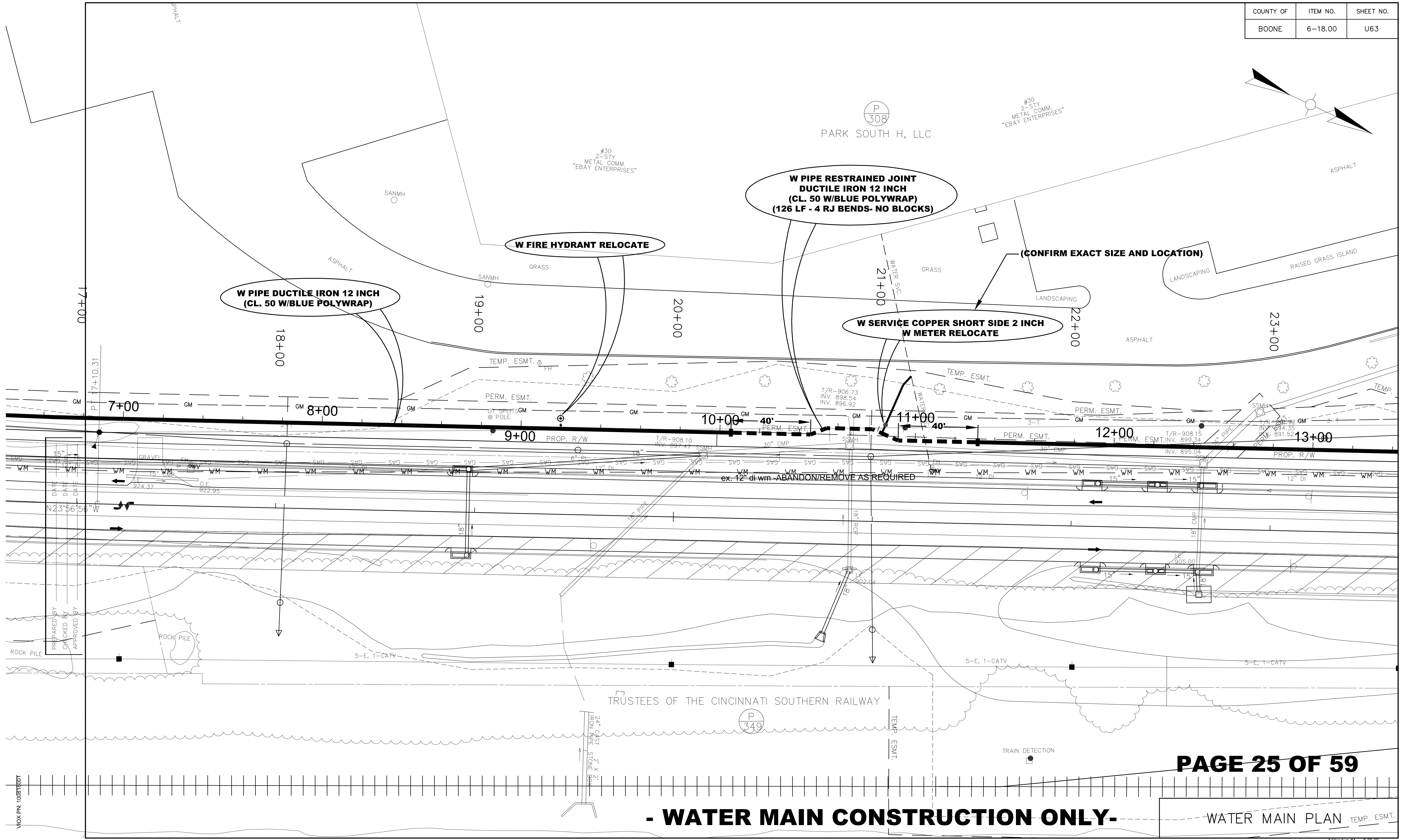


PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

HORIZONTAL: 1"=20  
 VERTICAL: 1"=2

**NOTE:**  
 ROTATE BENDS VERTICAL WHERE REQUIRED.  
 DEFLECT PIPE WHERE POSSIBLE: MAX. DEFLECTION- 6"-8"-12" = 5'

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-18.00	U63



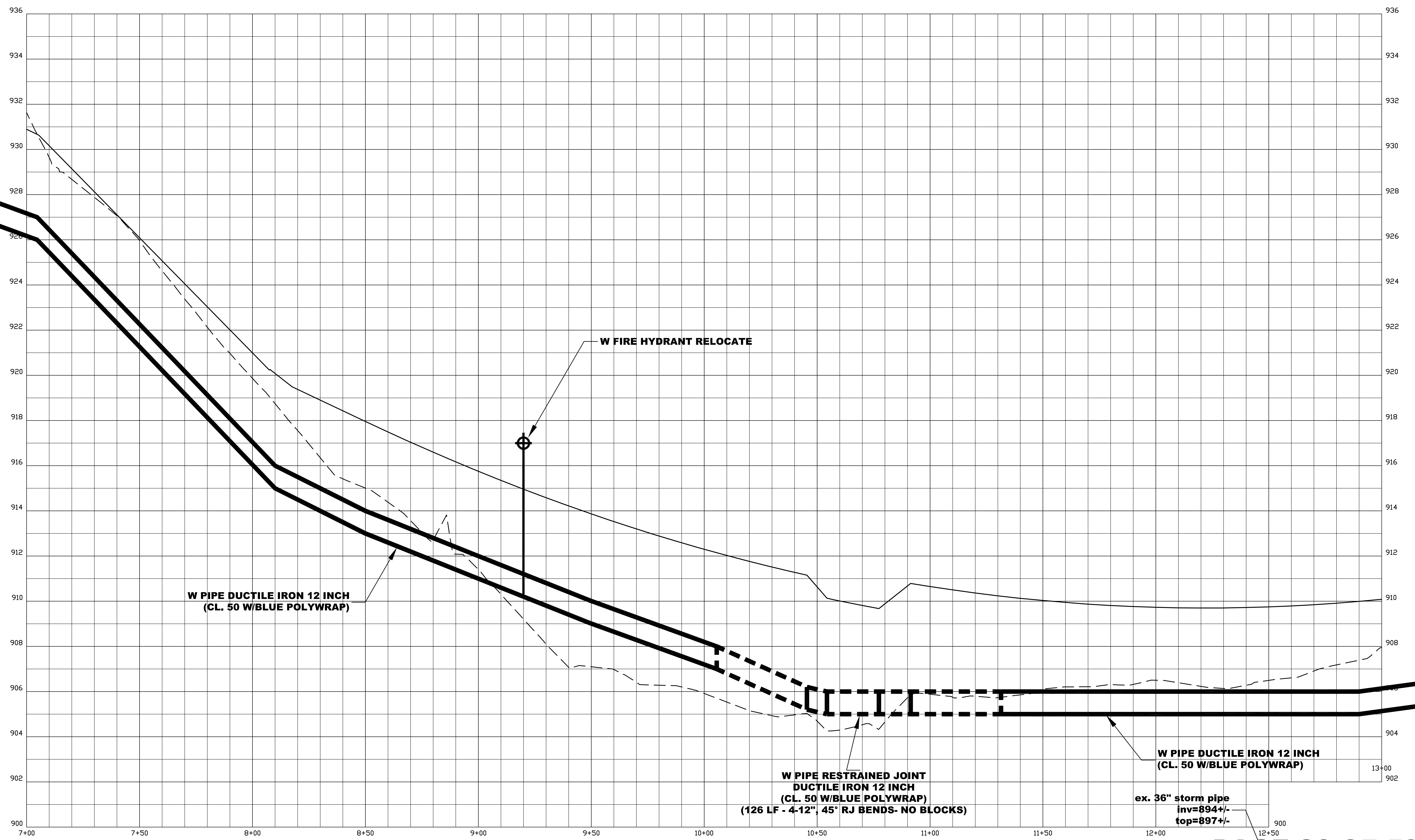
DATE	DATE	DATE
PREPARED BY	CHECKED BY	APPROVED BY

VICX PN: 100BT00T

**- WATER MAIN CONSTRUCTION ONLY -**

Addendum #4 - 8-30-19





PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

HORIZONTAL: 1"=20  
VERTICAL: 1"=2

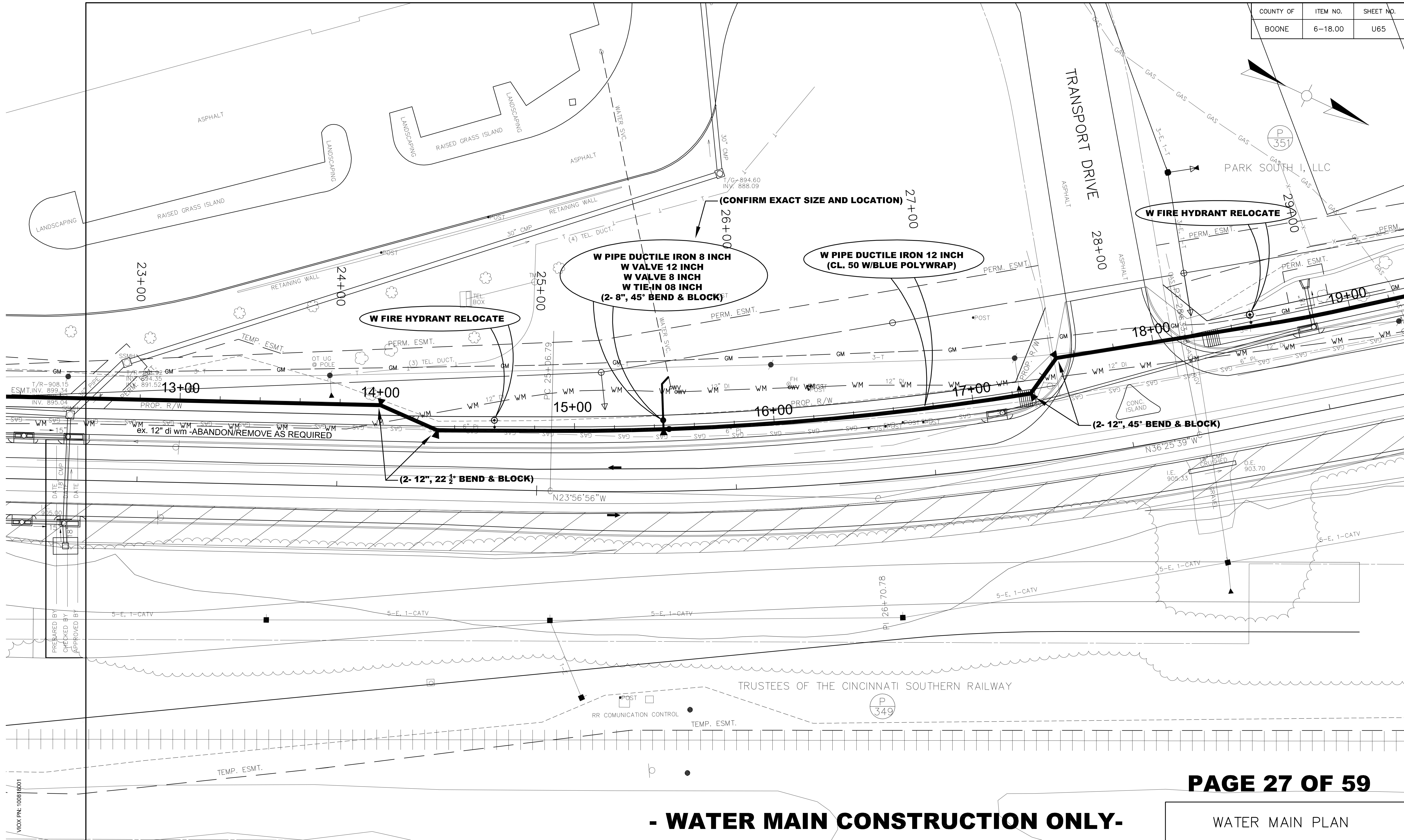
**NOTE:**  
ROTATE BENDS VERTICAL WHERE REQUIRED.  
DEFLECT PIPE WHERE POSSIBLE: MAX. DEFLECTION- 6"-8"-12" = 5"

**- WATER MAIN CONSTRUCTION ONLY -**

P:\BC\WD (08)\KY 338-75 INTERCHANGE TO U.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC (18001)\Engineering\DWG\PLAN SET\PG-26-WM-6-18-00.dwg, 7/31/2019 9:54:34 AM

VIOX PN: 100818001

Addendum #4 - 8-30-19

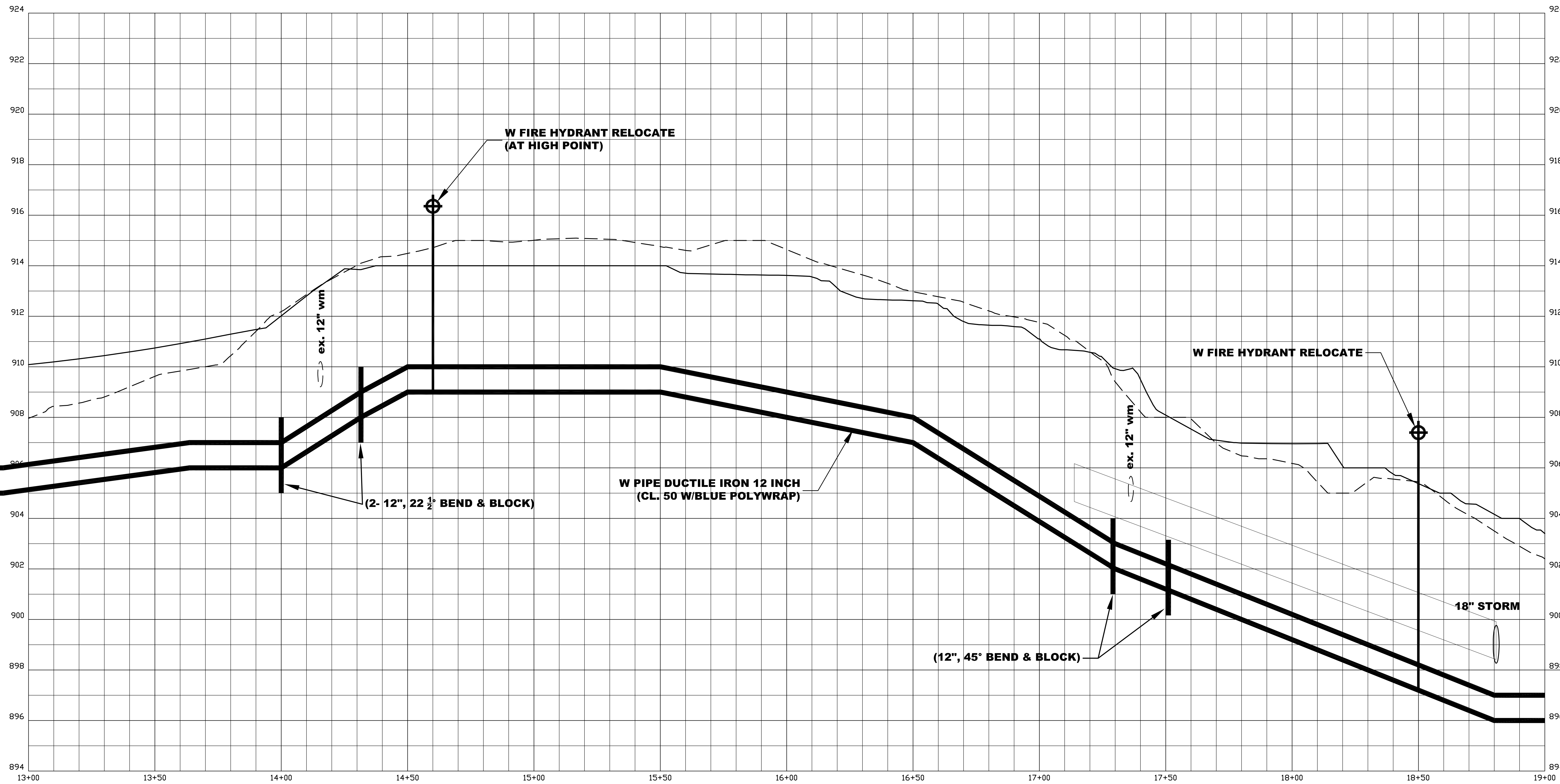


DATE	DATE	DATE
PREPARED BY	CHECKED BY	APPROVED BY

VICX PN: 100818001

**- WATER MAIN CONSTRUCTION ONLY -**

Addendum #4 - 8-30-19



PREPARED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 APPROVED BY \_\_\_\_\_ DATE \_\_\_\_\_

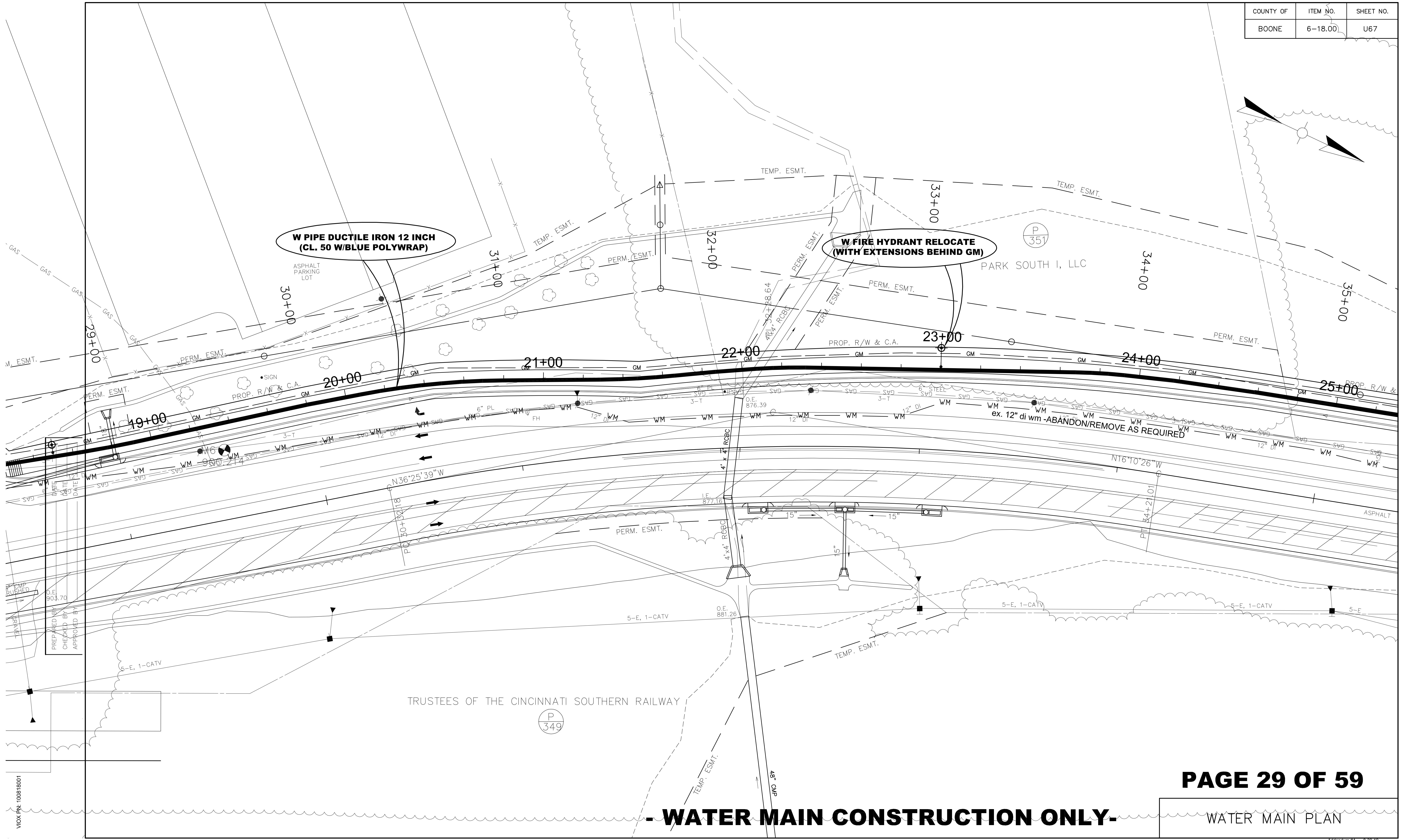
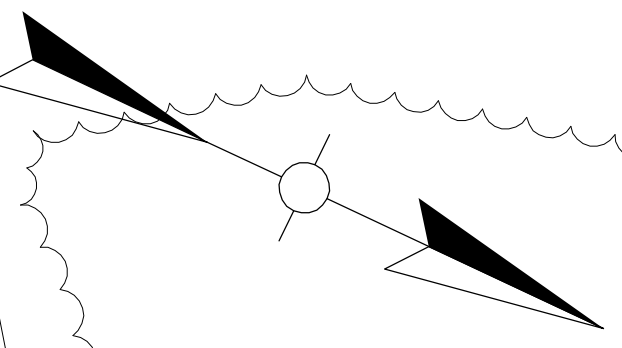
HORIZONTAL: 1"=20'  
 VERTICAL: 1"=2'

**NOTE:**  
 ROTATE BENDS VERTICAL WHERE REQUIRED.  
 DEFLECT PIPE WHERE POSSIBLE: MAX. DEFLECTION- 6"-8"-12" = 5"

**- WATER MAIN CONSTRUCTION ONLY -**

**PAGE 28 OF 59**

WATER MAIN PROFILE



**W PIPE DUCTILE IRON 12 INCH  
(CL. 50 W/BLUE POLYWRAP)**

**W FIRE HYDRANT RELOCATE  
(WITH EXTENSIONS BEHIND GM)**

P  
351

PARK SOUTH I, LLC

21+00

22+00

23+00

24+00

25+00

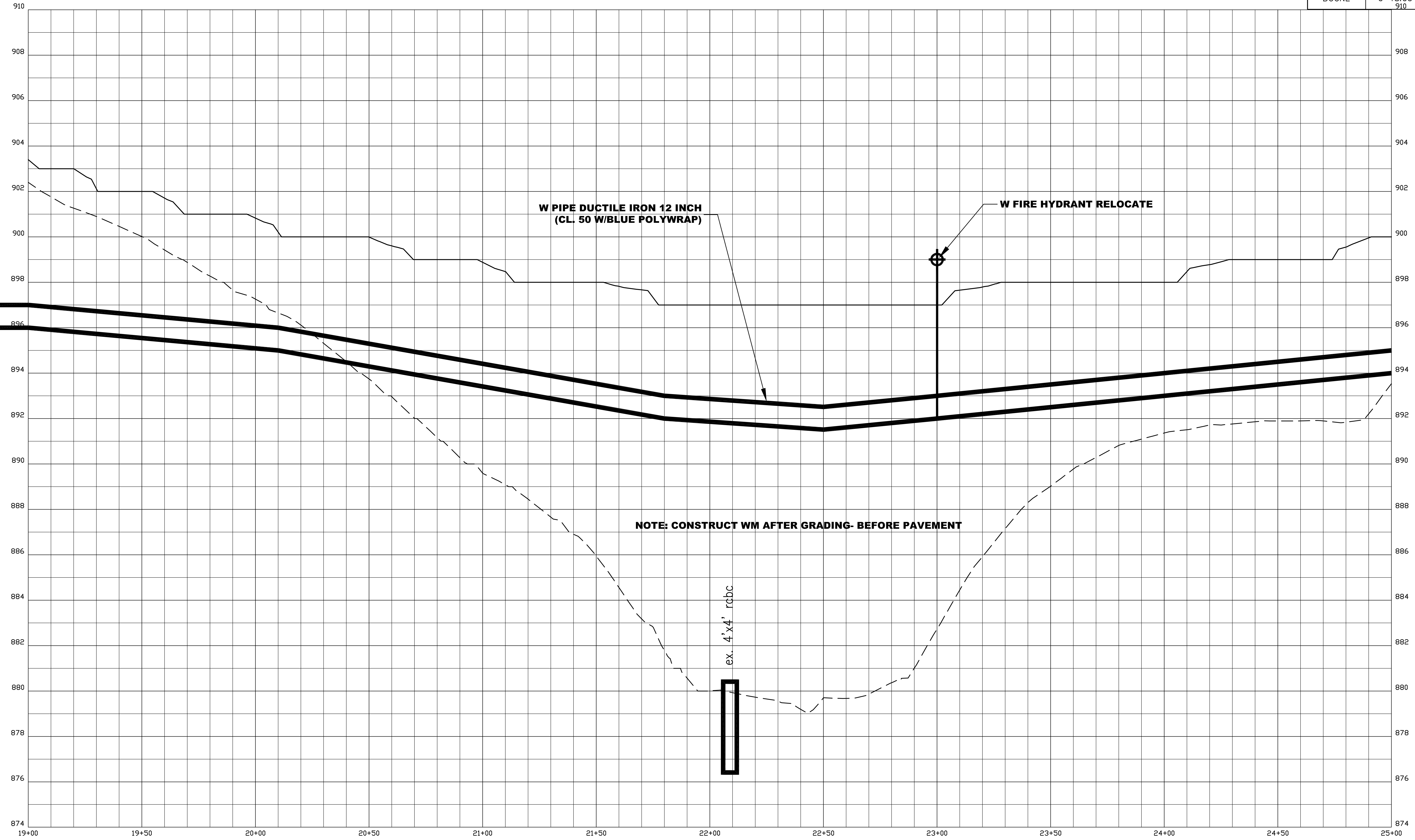
DATE: 06/11/19  
 PREPARED BY: [Signature]  
 CHECKED BY: [Signature]  
 APPROVED BY: [Signature]

TRUSTEES OF THE CINCINNATI SOUTHERN RAILWAY

P  
349

P:\BOWD (009)\KY 338-75 INTERCHANGE TO U.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC (18001)\Engineering\DWG\PLAN SET\PCG-29\WM-6-18.00.dwg, 7/12/2019 9:48:22 AM

Addendum #4 - 8-30-19



PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

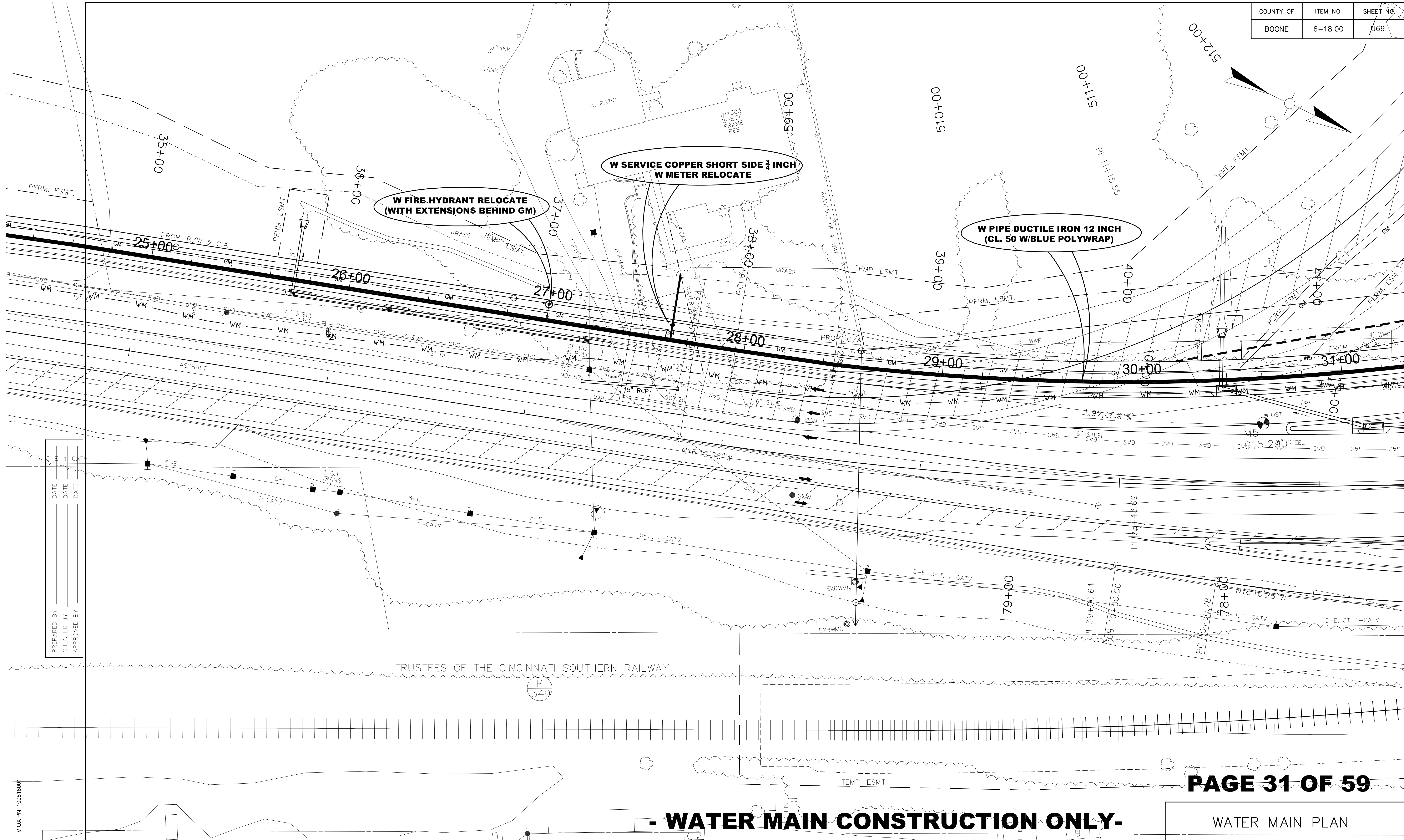
HORIZONTAL: 1"=20  
VERTICAL: 1"=2

**- WATER MAIN CONSTRUCTION ONLY -**

P:\BC\MD (08)\KY 338-75 INTERCHANGE TO U.S. 25, KYTC ITEM NO. 6-18.00 WM RELOC (18001)\Engineering\DWG\PLAN SET\PG-30\WM-6-18-00.dwg, 7/12/2019, 10:08:18 AM

VICX PN: 100818001

Addendum #4 - 8-30-19



**W FIRE HYDRANT RELOCATE  
(WITH EXTENSIONS BEHIND GM)**

**W SERVICE COPPER SHORT SIDE 3/4 INCH  
W METER RELOCATE**

**W PIPE DUCTILE IRON 12 INCH  
(CL. 50 W/BLUE POLYWRAP)**

PREPARED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 APPROVED BY \_\_\_\_\_ DATE \_\_\_\_\_

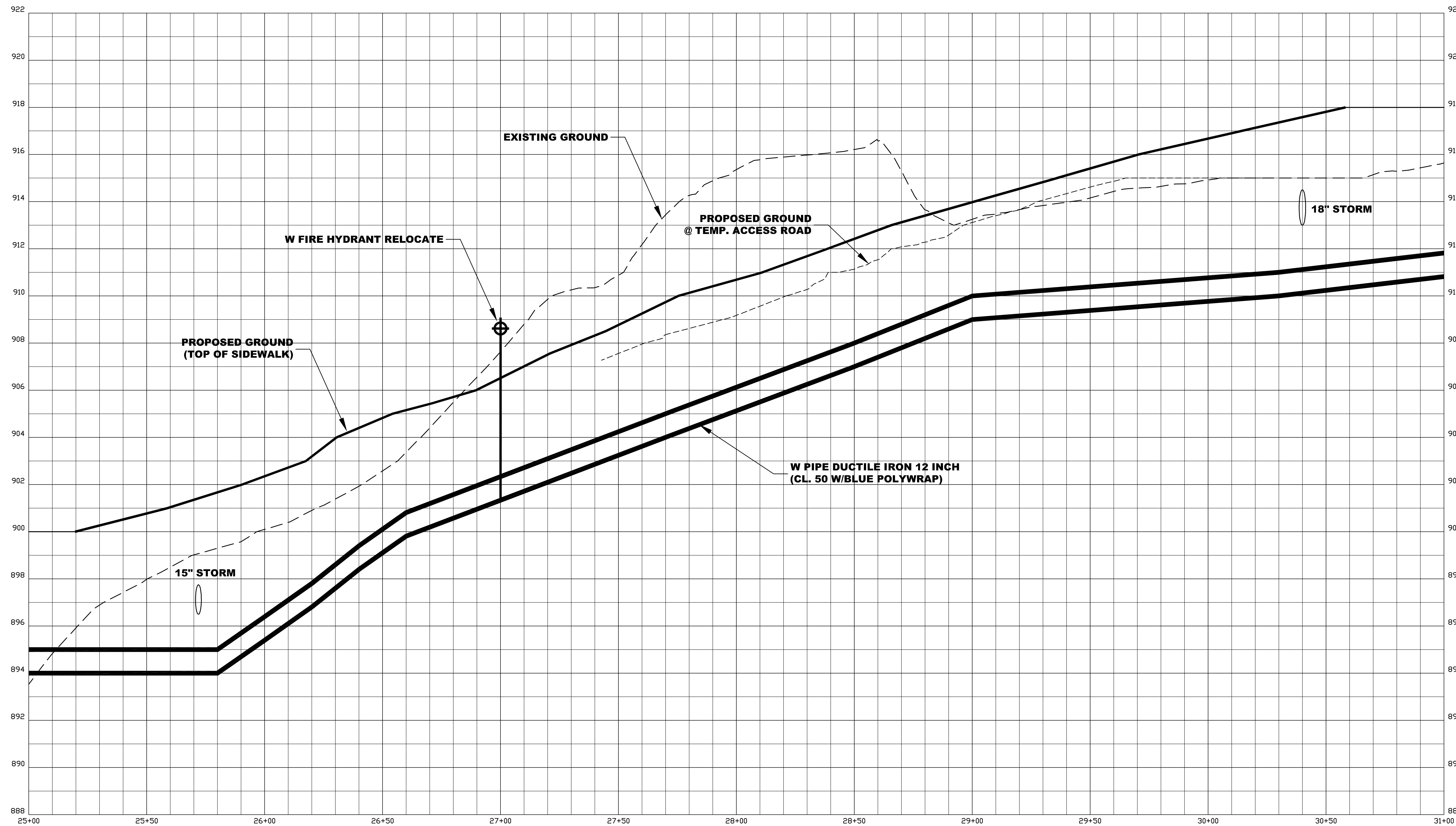
TRUSTEES OF THE CINCINNATI SOUTHERN RAILWAY

P 349

P:\BOWD (009)\KY 338-75 INTERCHANGE TO U.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC (18001)\Engineering\DWG\PLAN SET\PG-31-WM-6-18-00.dwg, 7/18/2019 5:15:04 PM

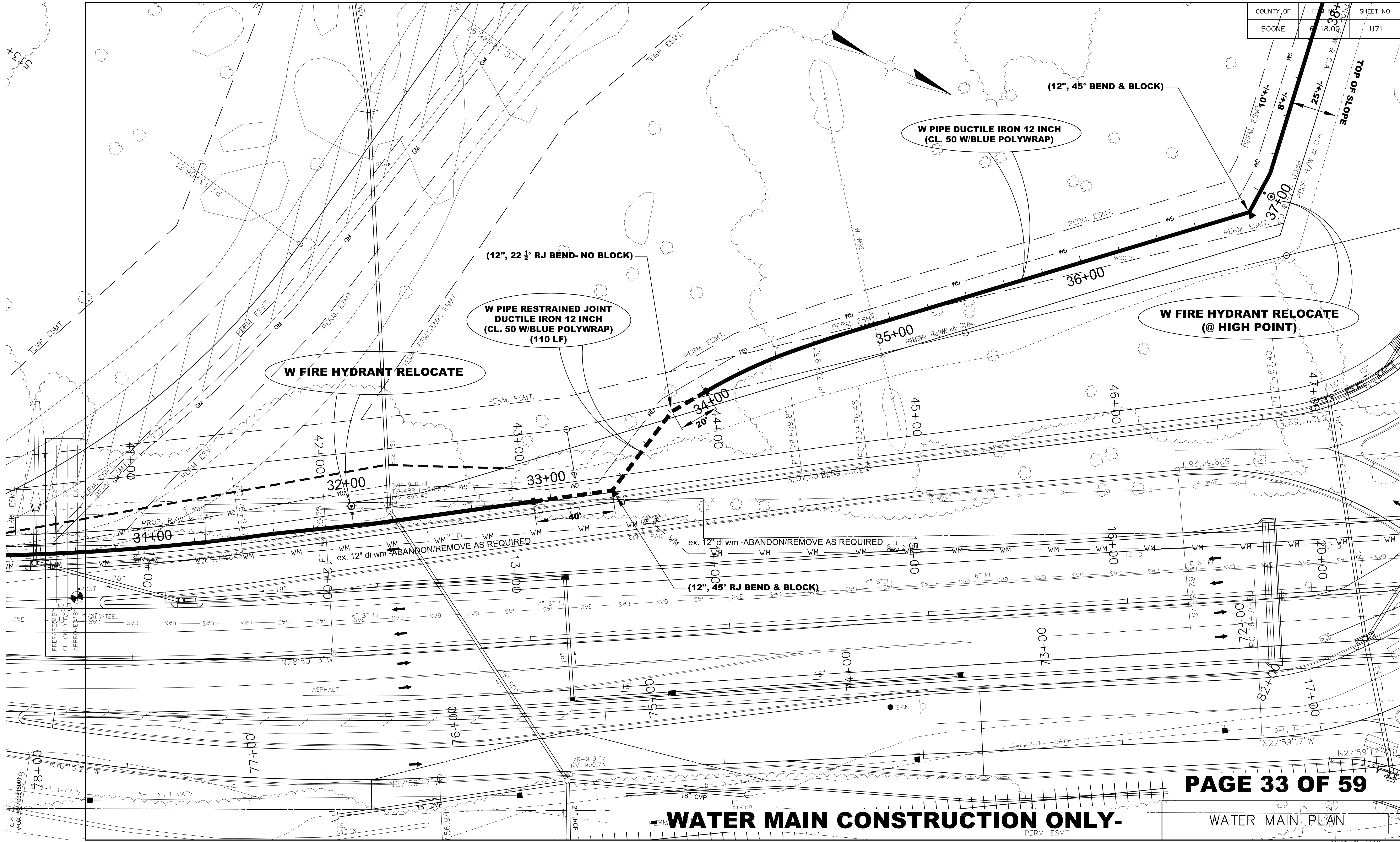
VICOX PN: 100818001

Addendum #4 - 8-30-19



PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

HORIZONTAL: 1"=20'  
VERTICAL: 1"=2'



**W FIRE HYDRANT RELOCATE**

**W PIPE RESTRAINED JOINT  
DUCTILE IRON 12 INCH  
(CL. 50 W/BLUE POLYWRAP)  
(110 LF)**

**W PIPE DUCTILE IRON 12 INCH  
(CL. 50 W/BLUE POLYWRAP)**

**W FIRE HYDRANT RELOCATE  
(@ HIGH POINT)**

**- WATER MAIN CONSTRUCTION ONLY -**

P:\BOWD (009)\KY 338-75 INTERCHANGE TO U.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC (18001)\Engineering\DWG\PLAN SET\PG-33-WM-6-18-00.dwg, 7/18/2019 4:58:12 PM  
 V:\6X-EN-10065\80078

Addendum #4 - 8-30-19



COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-18.00	U72

**W FIRE HYDRANT RELOCATE  
(@ HIGH POINT)**

**W FIRE HYDRANT RELOCATE**

**W PIPE DUCTILE IRON 12 INCH  
(CL. 50 W/BLUE POLYWRAP)**

**(12", 45° RJ BEND & BLOCK)**

**(12", 22 1/2° RJ BEND- NO BLOCK)**

**W PIPE RESTRAINED JOINT  
DUCTILE IRON 12 INCH  
(CL. 50 W/BLUE POLYWRAP)  
(109.6 LF)**

**existing 18" rcp storm pipe  
Inv=896+/-  
top=897.5+/-**

HORIZONTAL: 1"=20'  
VERTICAL: 1"=2'

**- WATER MAIN CONSTRUCTION ONLY -**

**PAGE 34 OF 59**

WATER MAIN PROFILE

PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

VICX PN: 100818001

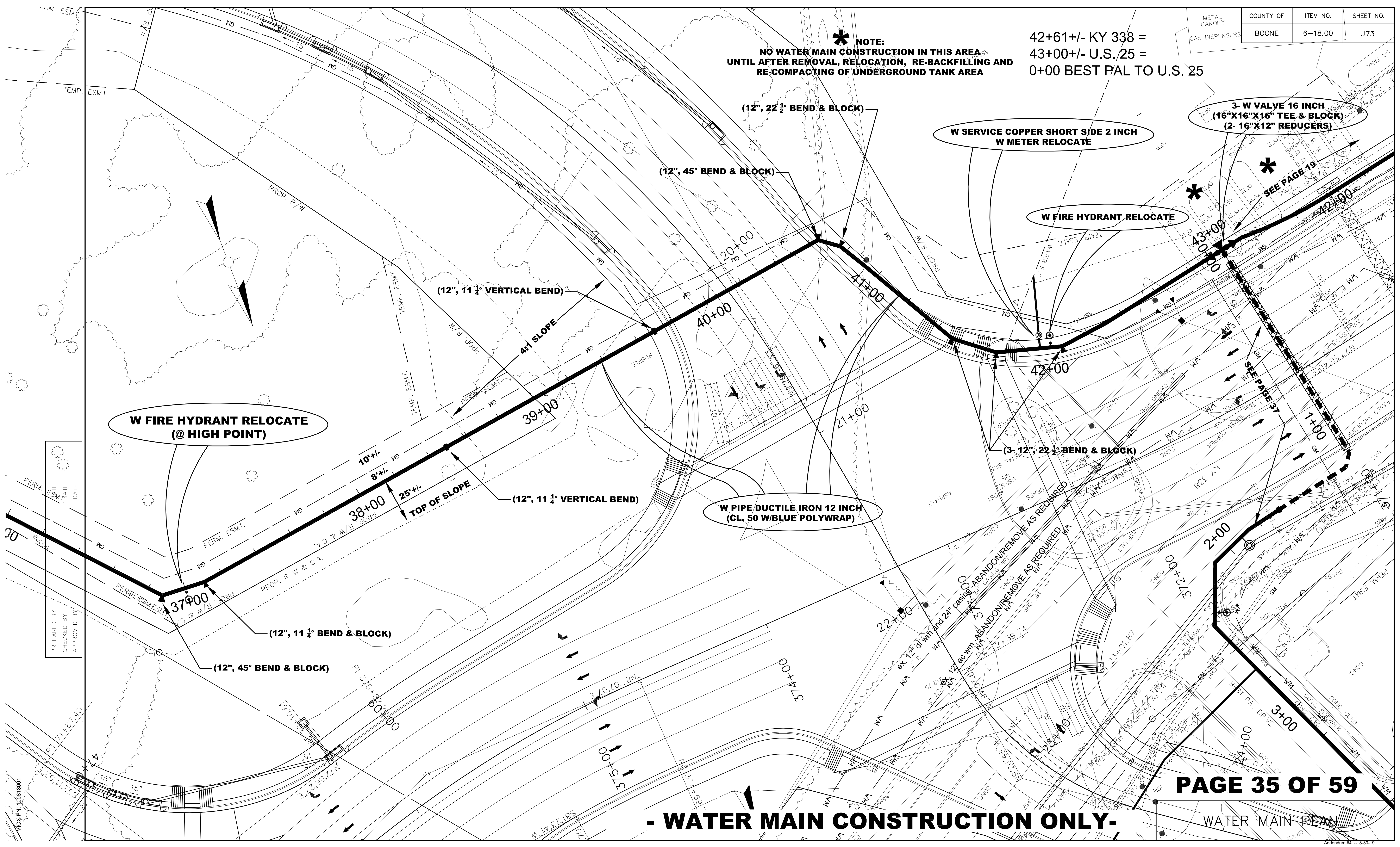
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Addendum #4 - 8-30-19

METAL CANOPY	COUNTY OF	ITEM NO.	SHEET NO.
GAS DISPENSERS	BOONE	6-18.00	U73

42+61+/- KY 338 =  
 43+00+/- U.S. 25 =  
 0+00 BEST PAL TO U.S. 25

**\* NOTE:**  
**NO WATER MAIN CONSTRUCTION IN THIS AREA**  
**UNTIL AFTER REMOVAL, RELOCATION, RE-BACKFILLING AND**  
**RE-COMPACTING OF UNDERGROUND TANK AREA**



**W FIRE HYDRANT RELOCATE**  
**(@ HIGH POINT)**

**W SERVICE COPPER SHORT SIDE 2 INCH**  
**W METER RELOCATE**

**W FIRE HYDRANT RELOCATE**

**W PIPE DUCTILE IRON 12 INCH**  
**(CL. 50 W/BLUE POLYWRAP)**

**3- W VALVE 16 INCH**  
**(16"X16"X16" TEE & BLOCK)**  
**(2- 16"X12" REDUCERS)**

**\* SEE PAGE 19**

**\* SEE PAGE 37**

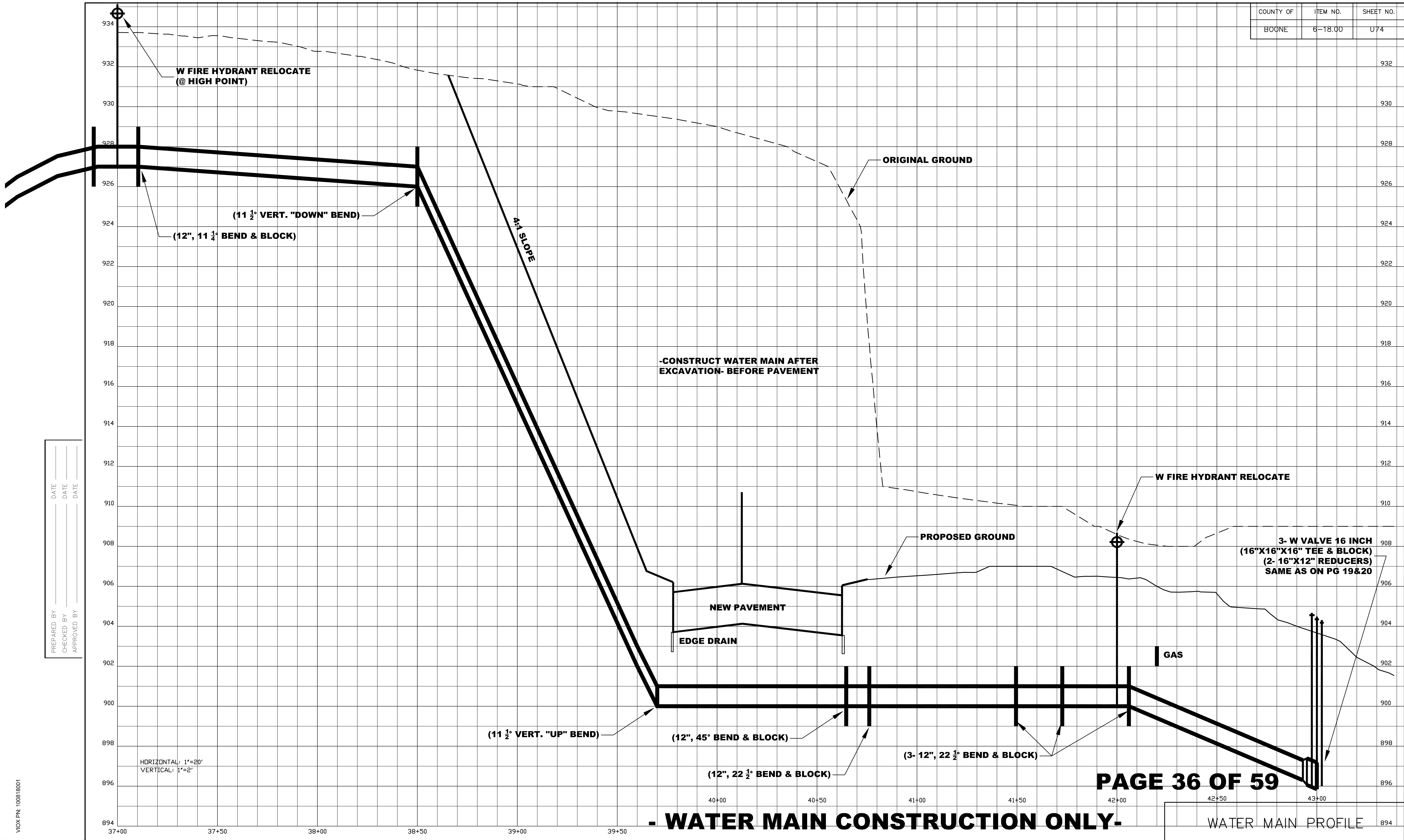
**- WATER MAIN CONSTRUCTION ONLY -**

WATER MAIN PLAN

P:\BOWD (08) KY 338-75 INTERCHANGE TO U.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC (18001) Engineering\DWG\PLAN SET\PG-35-WM-6-18-00.dwg, 7/28/2019, 3:14:26 PM  
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PREPARED BY \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_  
 APPROVED BY \_\_\_\_\_

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-18.00	U74

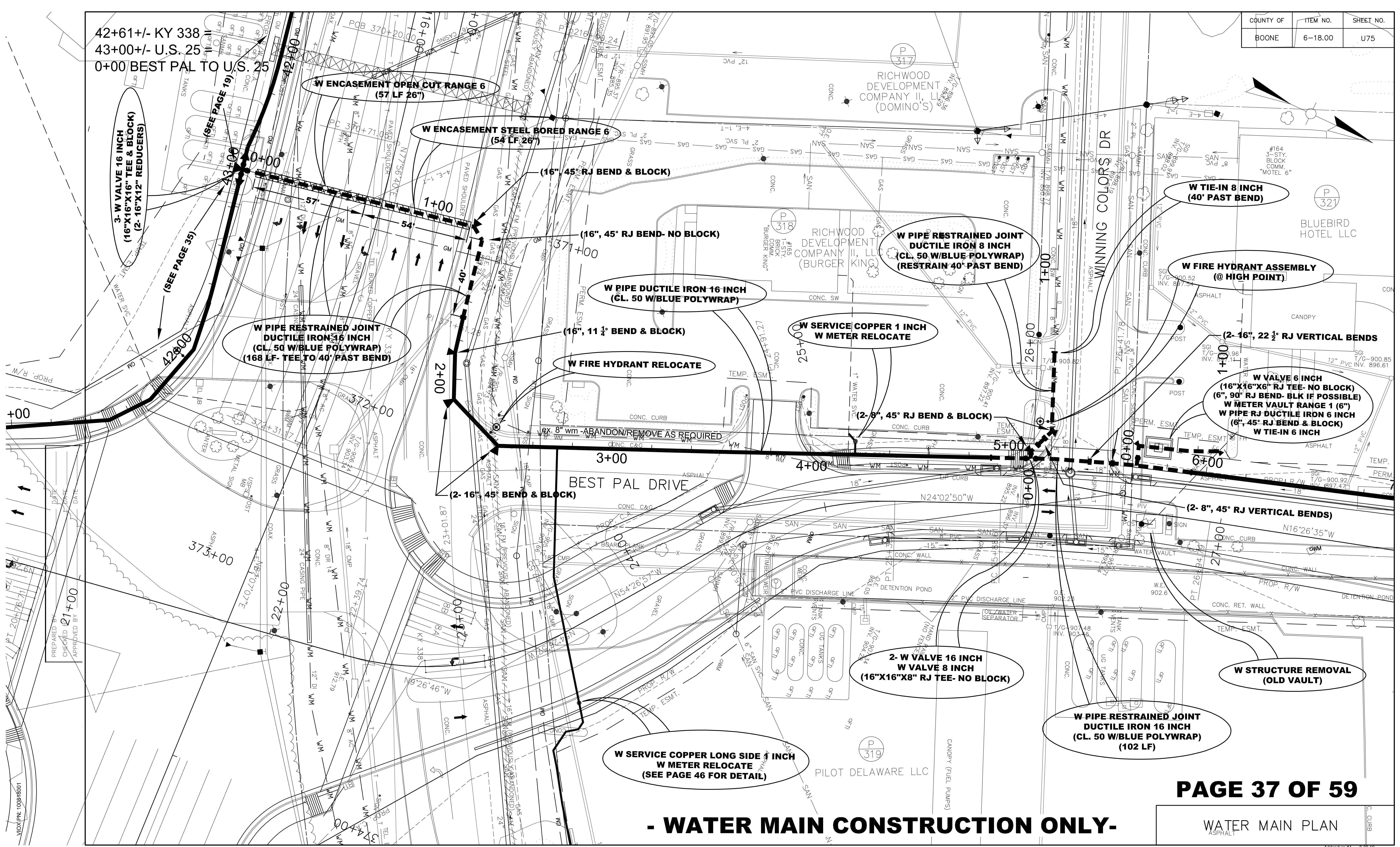


PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

P:\BC\MD (08)\KY 338-75 INTERCHANGE TO I.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC (18001)\Engineering\DWG\PLAN SET\PG-36-WM-6-18-00.dwg, 7/31/2019 10:10:56 AM

VICX PN: 100818001

42+61+/- KY 338  
 43+00+/- U.S. 25  
 0+00 BEST PAL TO U.S. 25



3- W VALVE 16 INCH  
 (16"X16"X16" TEE & BLOCK)  
 (2- 16"X12" REDUCERS)

W ENCASEMENT OPEN CUT RANGE 6  
 (57 LF 26")

W ENCASEMENT STEEL BORED RANGE 6  
 (54 LF 26")

(16", 45° RJ BEND & BLOCK)

(16", 45° RJ BEND- NO BLOCK)

W PIPE DUCTILE IRON 16 INCH  
 (CL. 50 W/BLUE POLYWRAP)

(16", 11 1/2° BEND & BLOCK)

W FIRE HYDRANT RELOCATE

W SERVICE COPPER 1 INCH  
 W METER RELOCATE

W PIPE RESTRAINED JOINT  
 DUCTILE IRON 8 INCH  
 (CL. 50 W/BLUE POLYWRAP)  
 (RESTRAIN 40' PAST BEND)

W TIE-IN 8 INCH  
 (40' PAST BEND)

W FIRE HYDRANT ASSEMBLY  
 (@ HIGH POINT)

(2- 16", 22 1/2° RJ VERTICAL BENDS)

W VALVE 6 INCH  
 (16"X16"X6" RJ TEE- NO BLOCK)  
 (6", 90° RJ BEND- BLK IF POSSIBLE)  
 W METER VAULT RANGE 1 (6")  
 W PIPE RJ DUCTILE IRON 6 INCH  
 (6", 45° RJ BEND & BLOCK)  
 W TIE-IN 6 INCH

(2- 8", 45° RJ BEND & BLOCK)

(2- 8", 45° RJ VERTICAL BENDS)

W SERVICE COPPER LONG SIDE 1 INCH  
 W METER RELOCATE  
 (SEE PAGE 46 FOR DETAIL)

2- W VALVE 16 INCH  
 W VALVE 8 INCH  
 (16"X16"X8" RJ TEE- NO BLOCK)

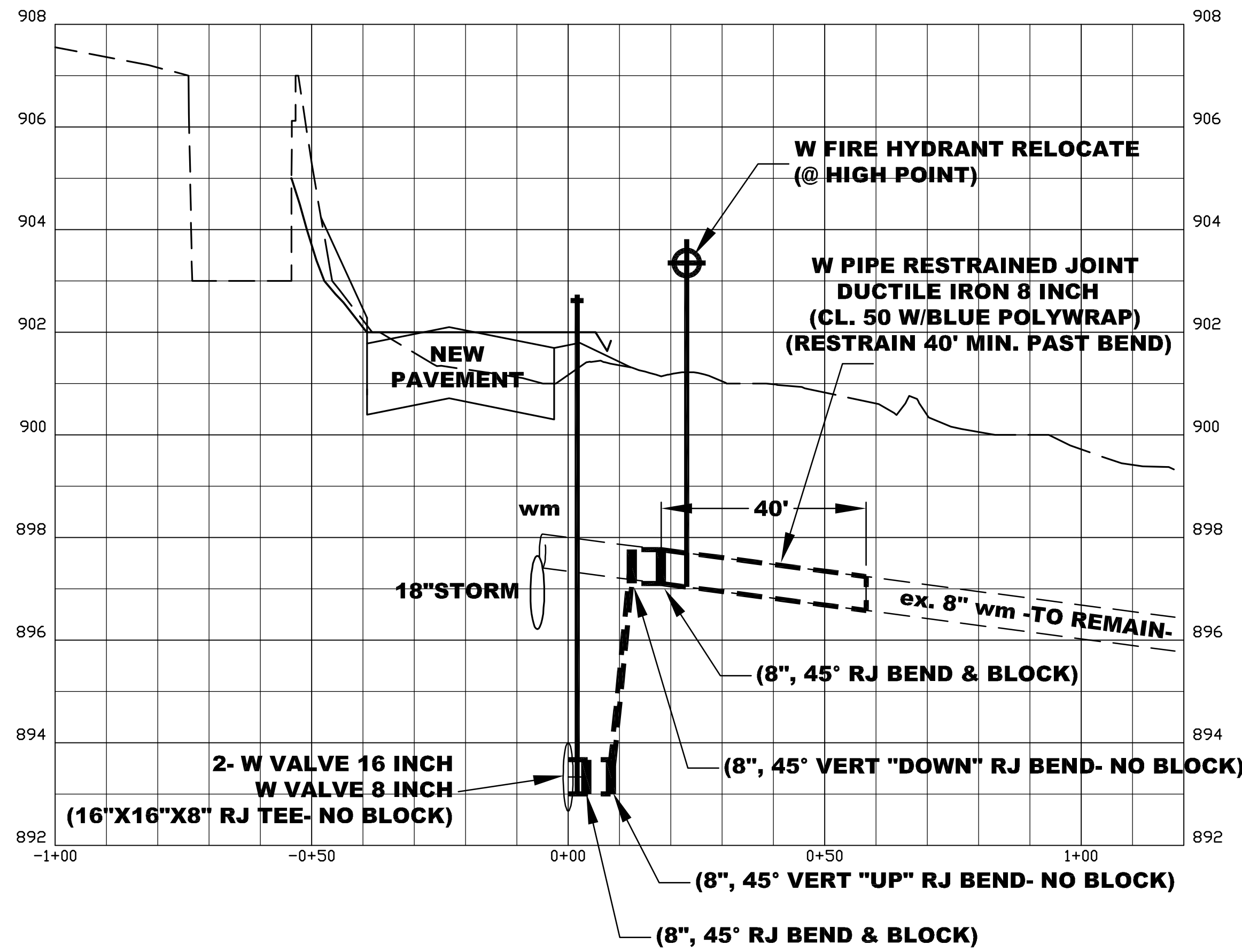
W PIPE RESTRAINED JOINT  
 DUCTILE IRON 16 INCH  
 (CL. 50 W/BLUE POLYWRAP)  
 (102 LF)

W STRUCTURE REMOVAL  
 (OLD VAULT)

PREPARED BY  
 CHECKED BY  
 APPROVED BY

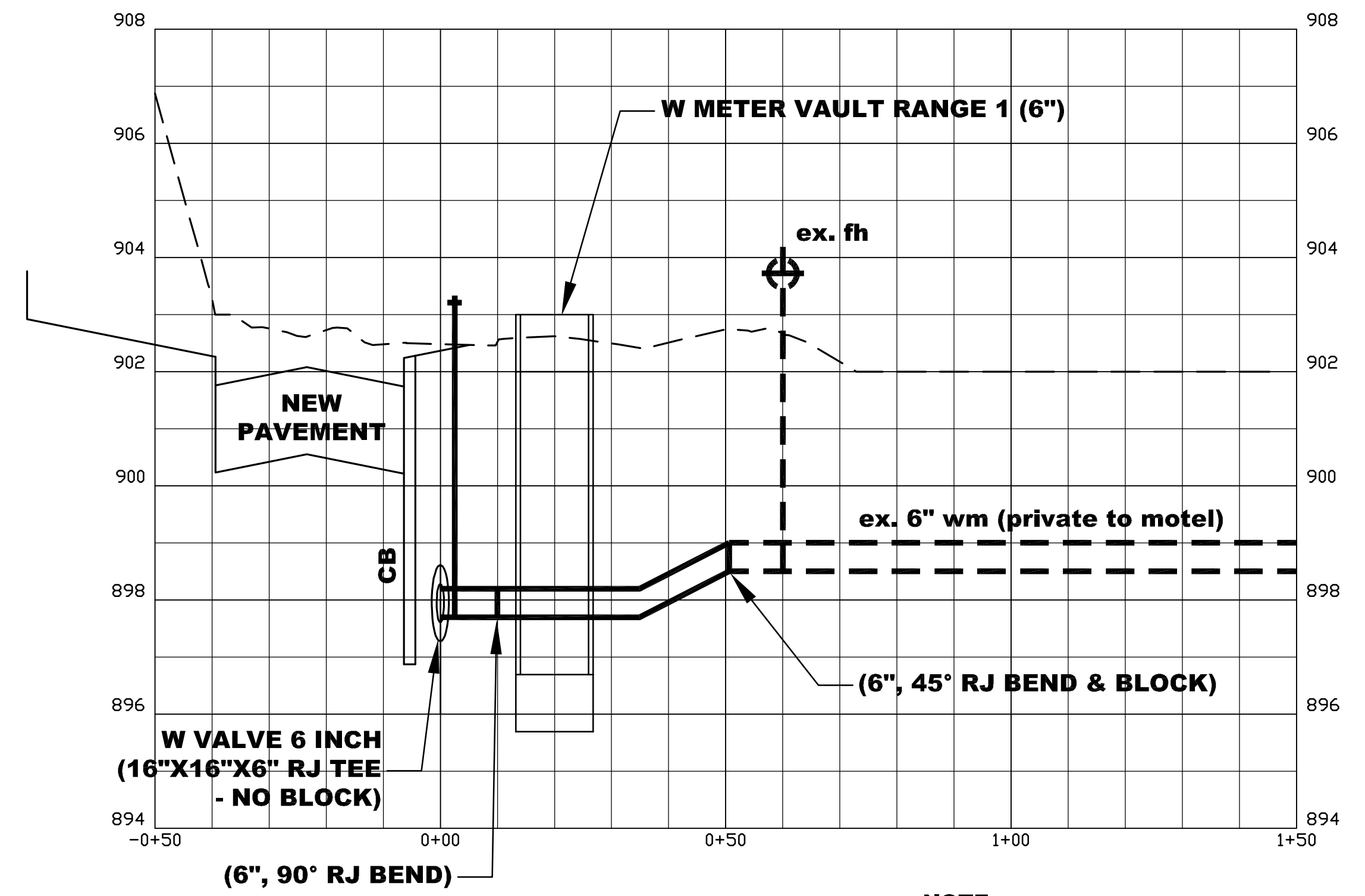
- WATER MAIN CONSTRUCTION ONLY -

### CONNECTION TO WINNING COLORS DRIVE

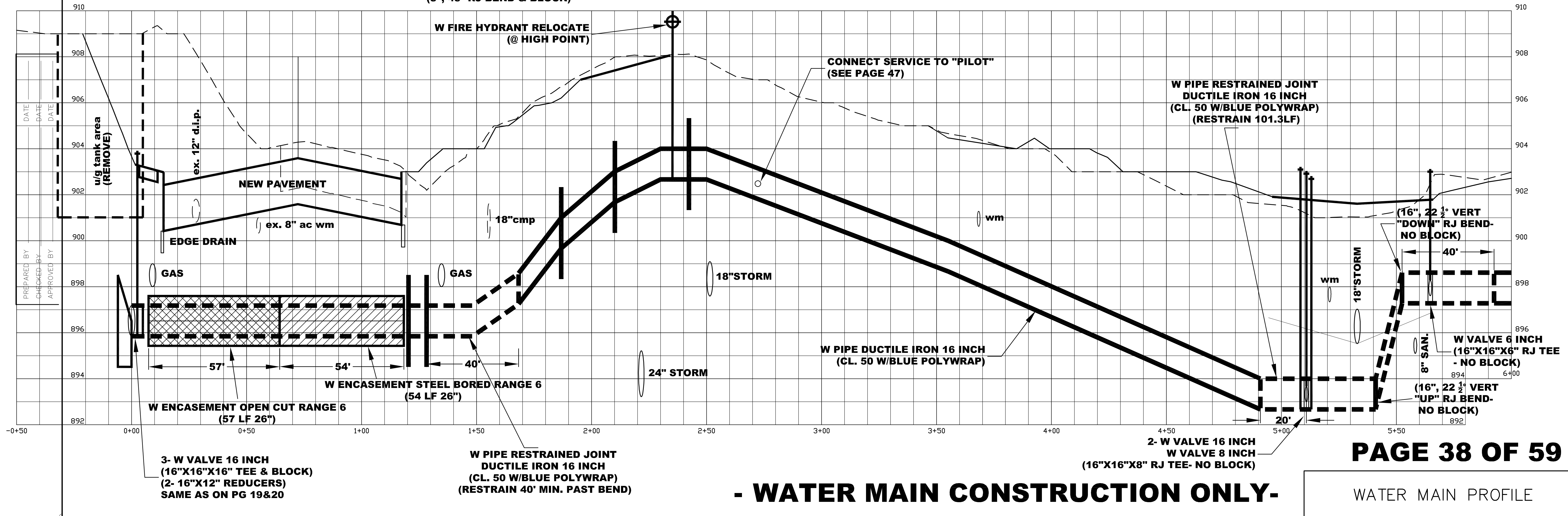


HORIZONTAL: 1"=20'  
VERTICAL: 1"=2'

### CONNECTION TO METER PIT P-321

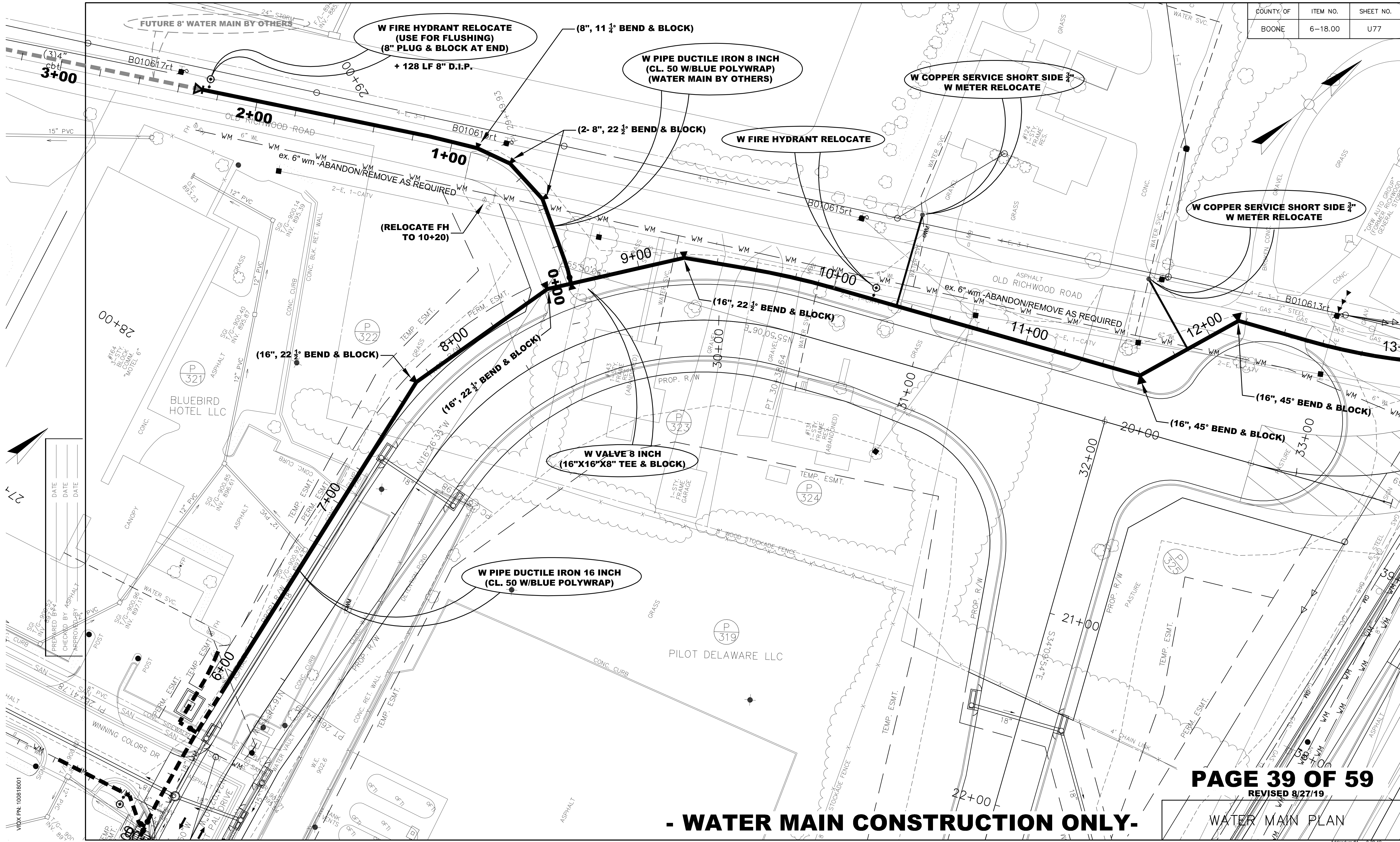


**NOTE:**  
ROTATE BENDS VERTICAL WHERE REQUIRED.  
DEFLECT PIPE WHERE POSSIBLE: MAX. DEFLECTION- 6"-8"-12" = 5"  
16"= 4"



**- WATER MAIN CONSTRUCTION ONLY -**

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-18.00	U77



DATE	DATE	DATE
PREPARED BY	CHECKED BY	APPROVED BY
DATE	DATE	DATE

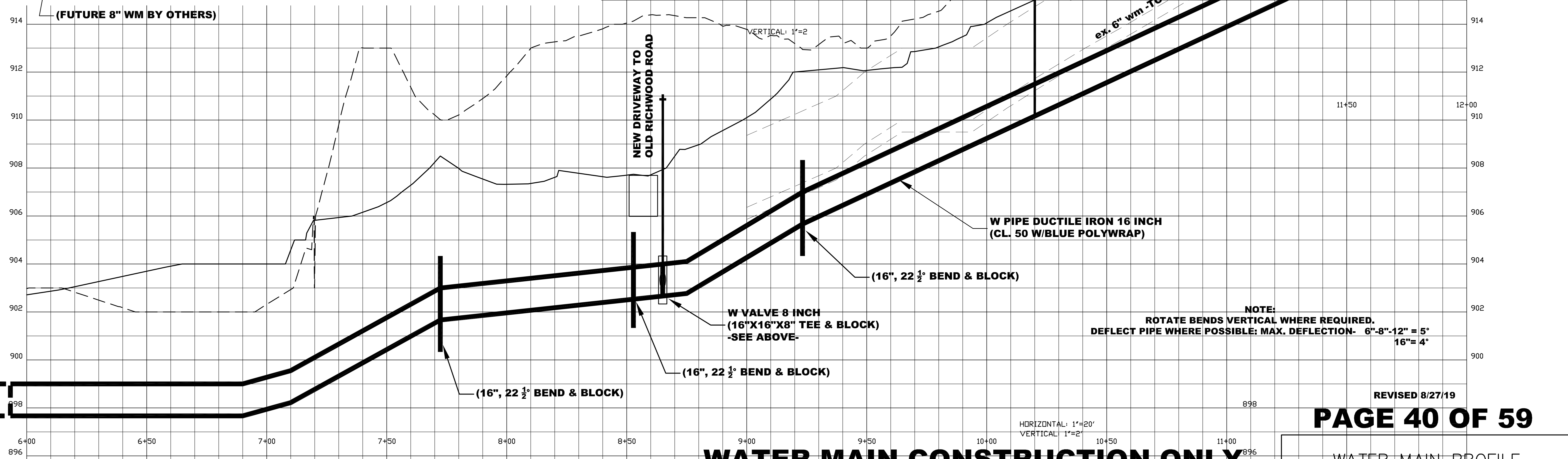
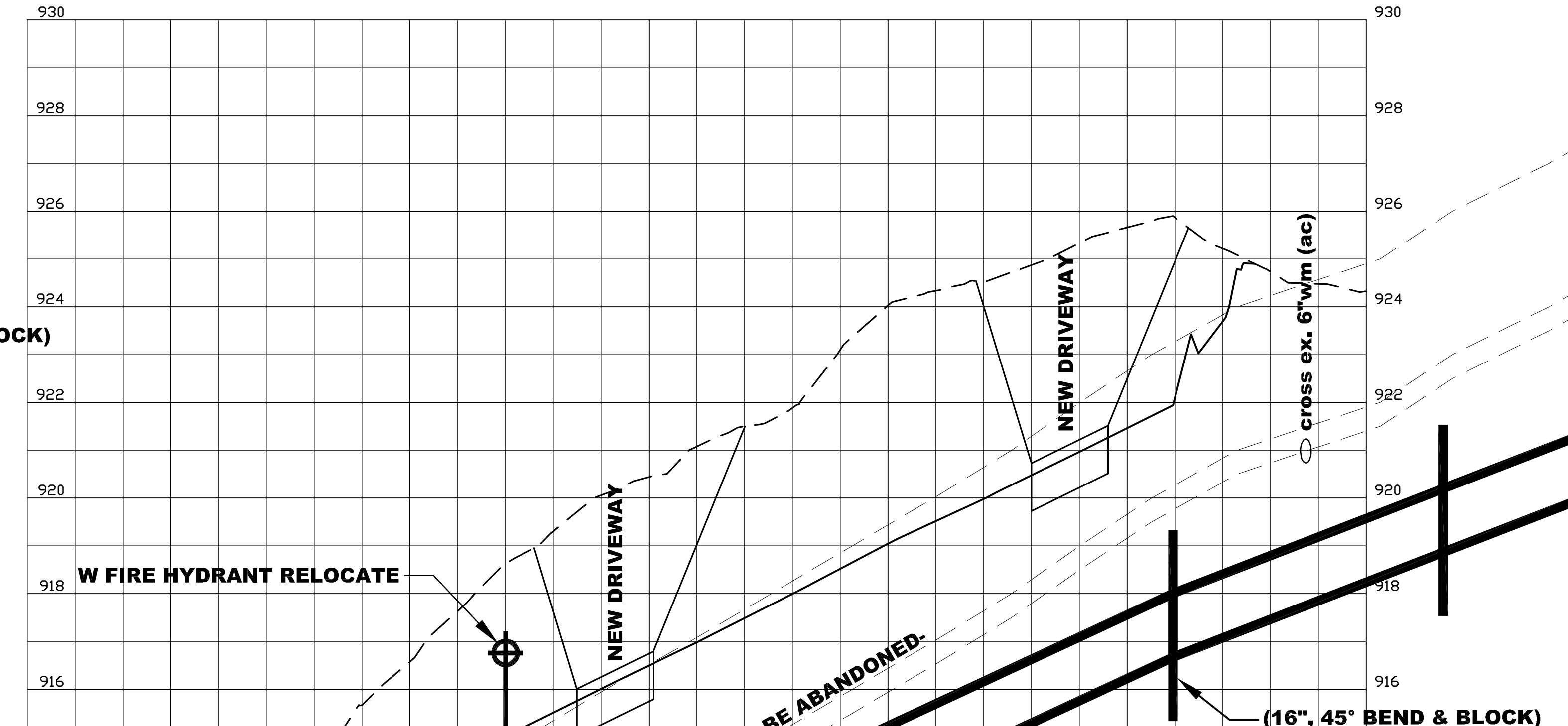
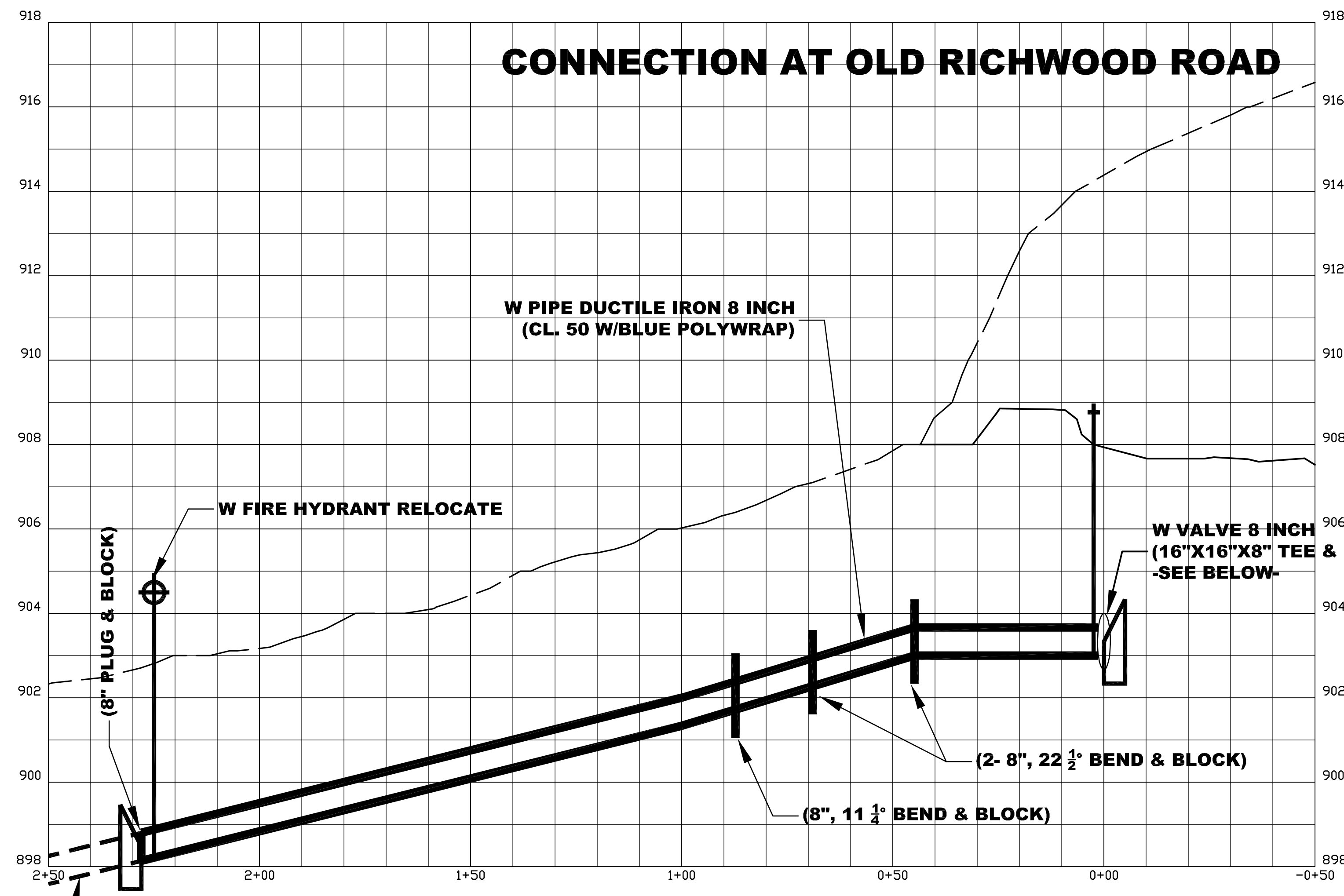
**- WATER MAIN CONSTRUCTION ONLY -**

WATER MAIN PLAN

ADDENDUM #4 - 8-30-19

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-18.00	U78

### CONNECTION AT OLD RICHWOOD ROAD



PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

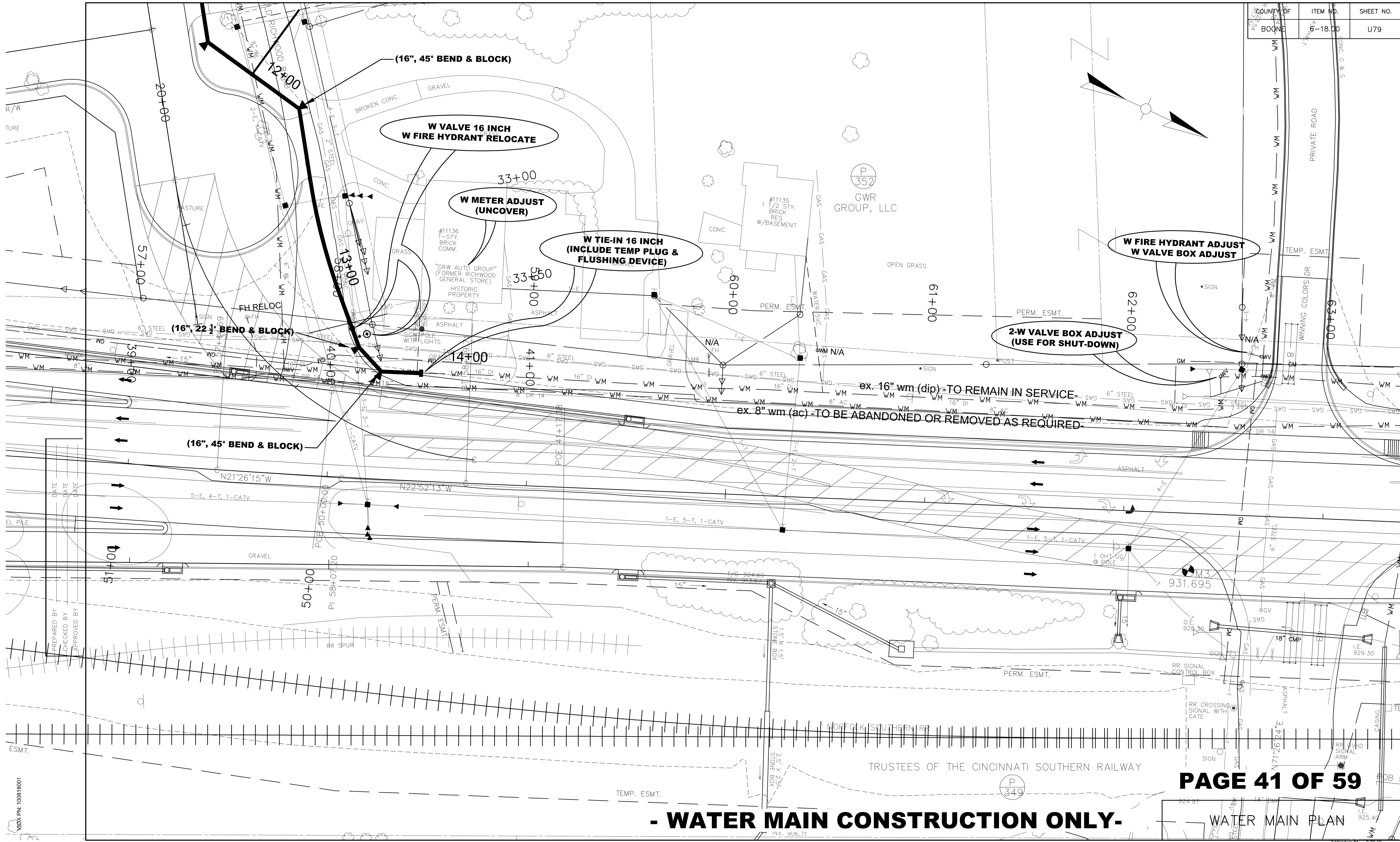
REVISED 8/27/19  
**PAGE 40 OF 59**

**- WATER MAIN CONSTRUCTION ONLY -**

WATER MAIN PROFILE

P:\BCWD (08)\KY 338-75 INTERCHANGE TO U.S. 25, KYTC ITEM NO. 6-18.00 WM RELOC (18001)\Engineering\DWG\PLAN SET\PG-40-WM-6-18-00-REV.dwg, 8/27/2019 2:17:25 PM

V:\DC\PN\181800



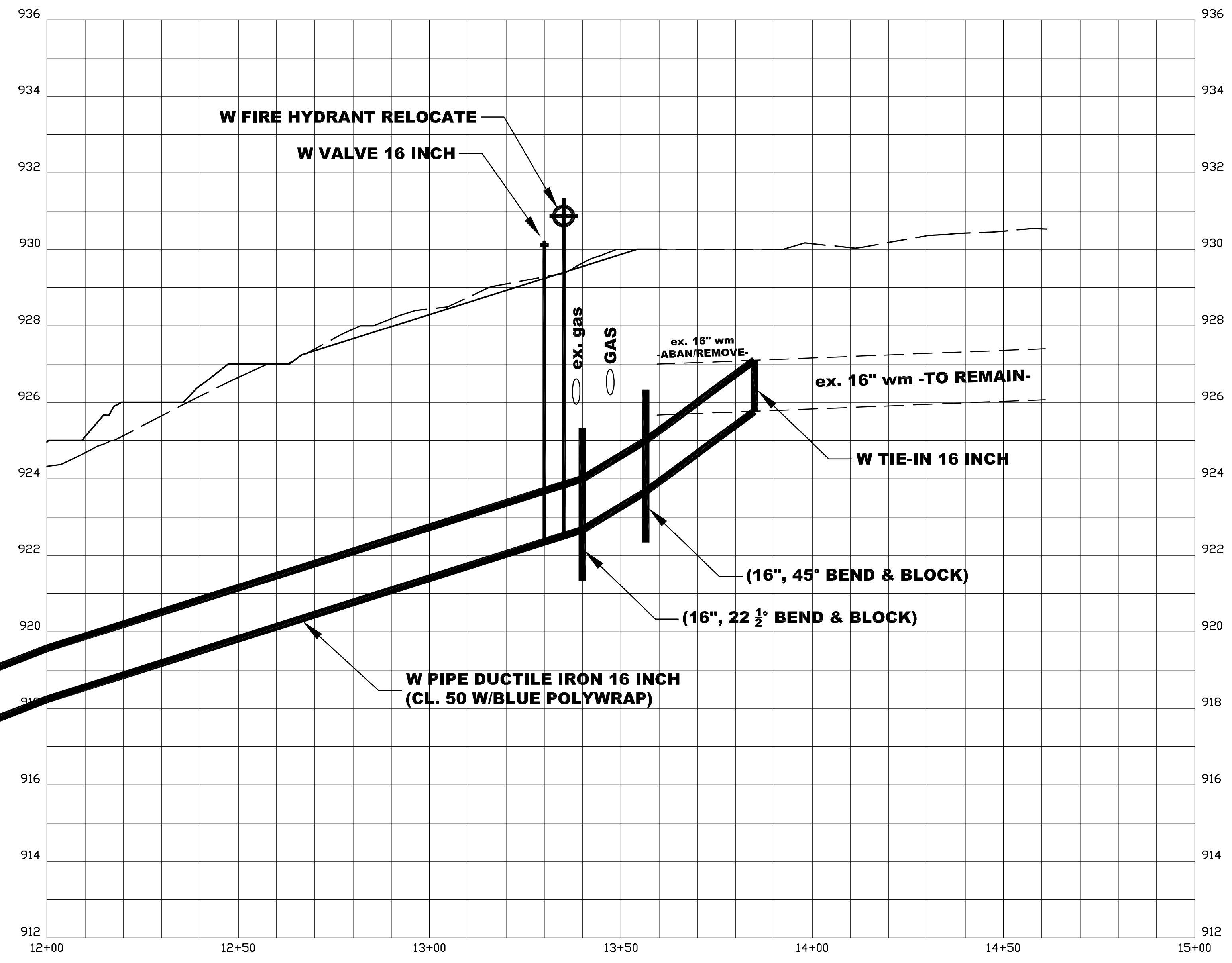
DATE  
PREPARED BY  
DATE  
CHECKED BY  
DATE  
APPROVED BY

**- WATER MAIN CONSTRUCTION ONLY -**

P:\BOWD (08)\KY 338-75 INTERCHANGE TO I-25 KYTC ITEM NO. 6-18.00 WM RELOC (18001)\Engineering\DWG\PLAN SET\PG-41-WM-6-18-00.dwg, 7/19/2019 2:38:46 PM

ADDENDUM #4 - 8-30-19

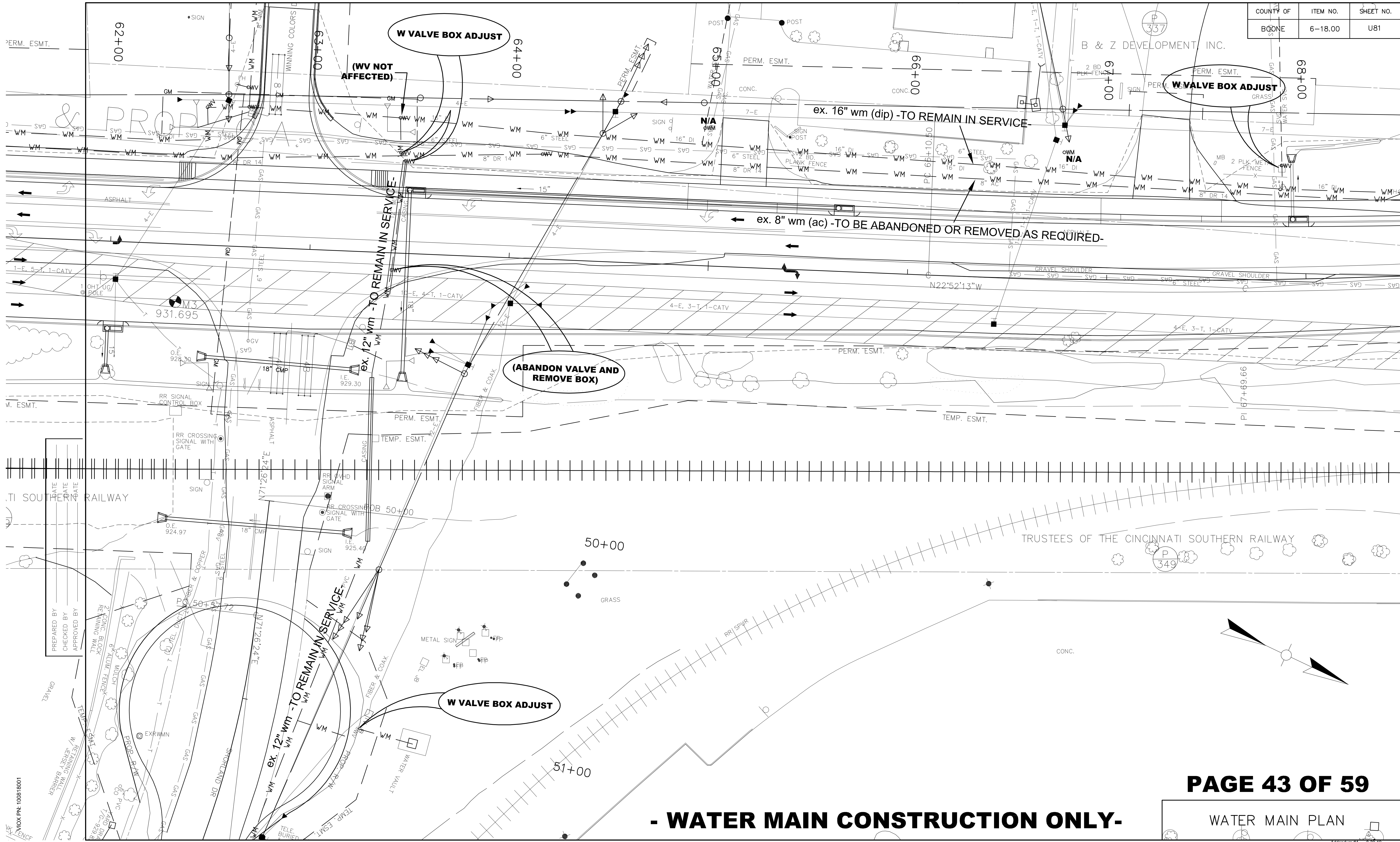




HORIZONTAL: 1"=20  
 VERTICAL: 1"=2

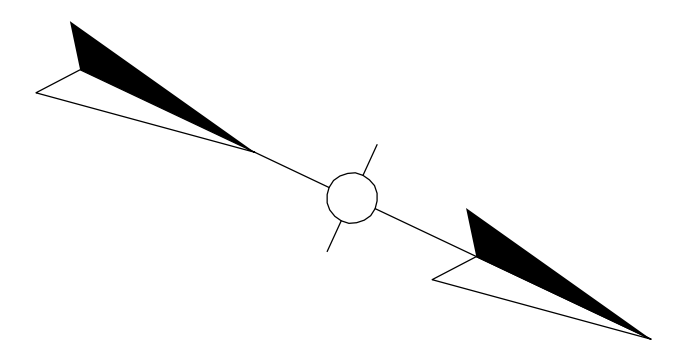
PREPARED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 APPROVED BY \_\_\_\_\_ DATE \_\_\_\_\_

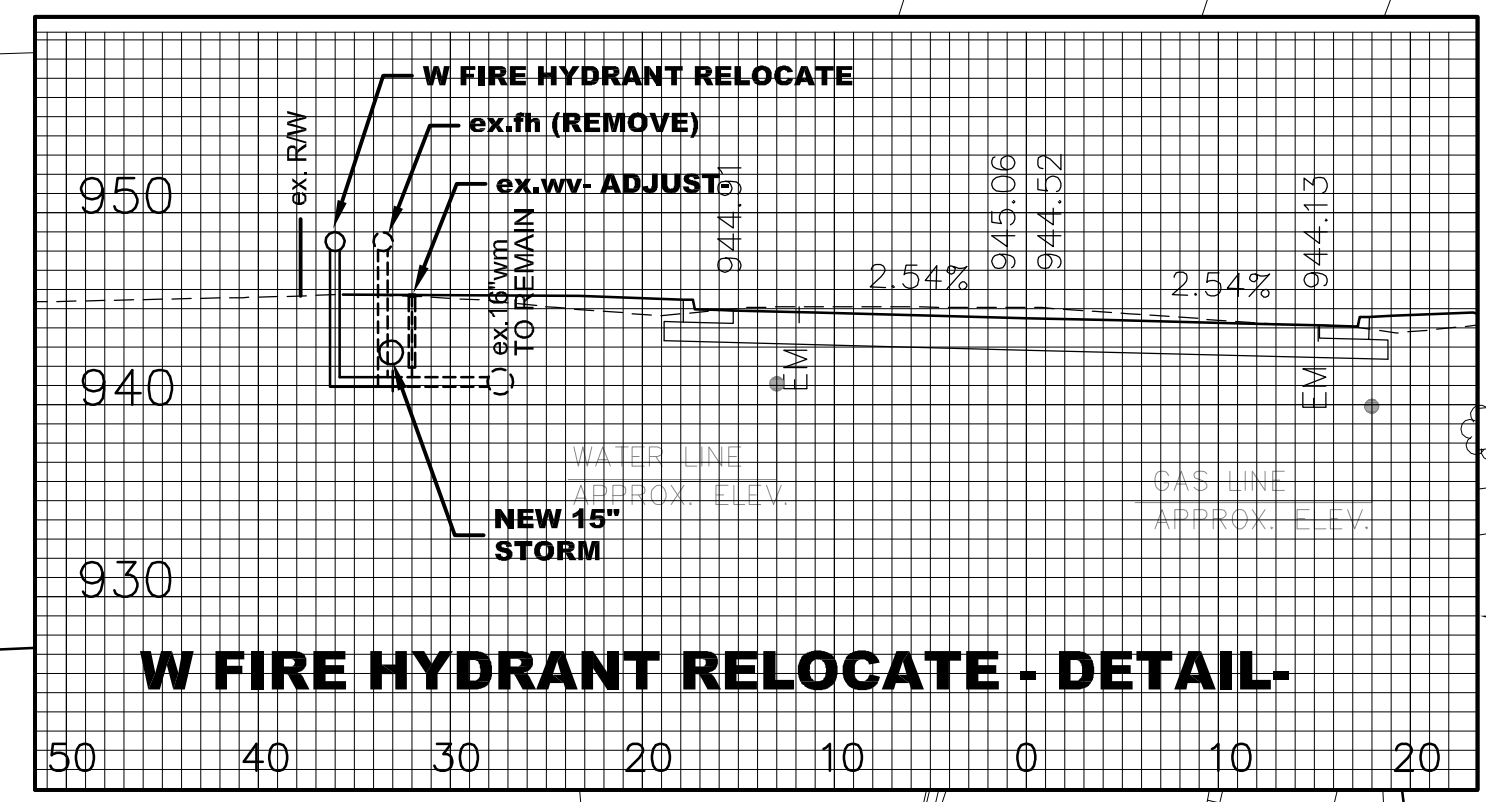
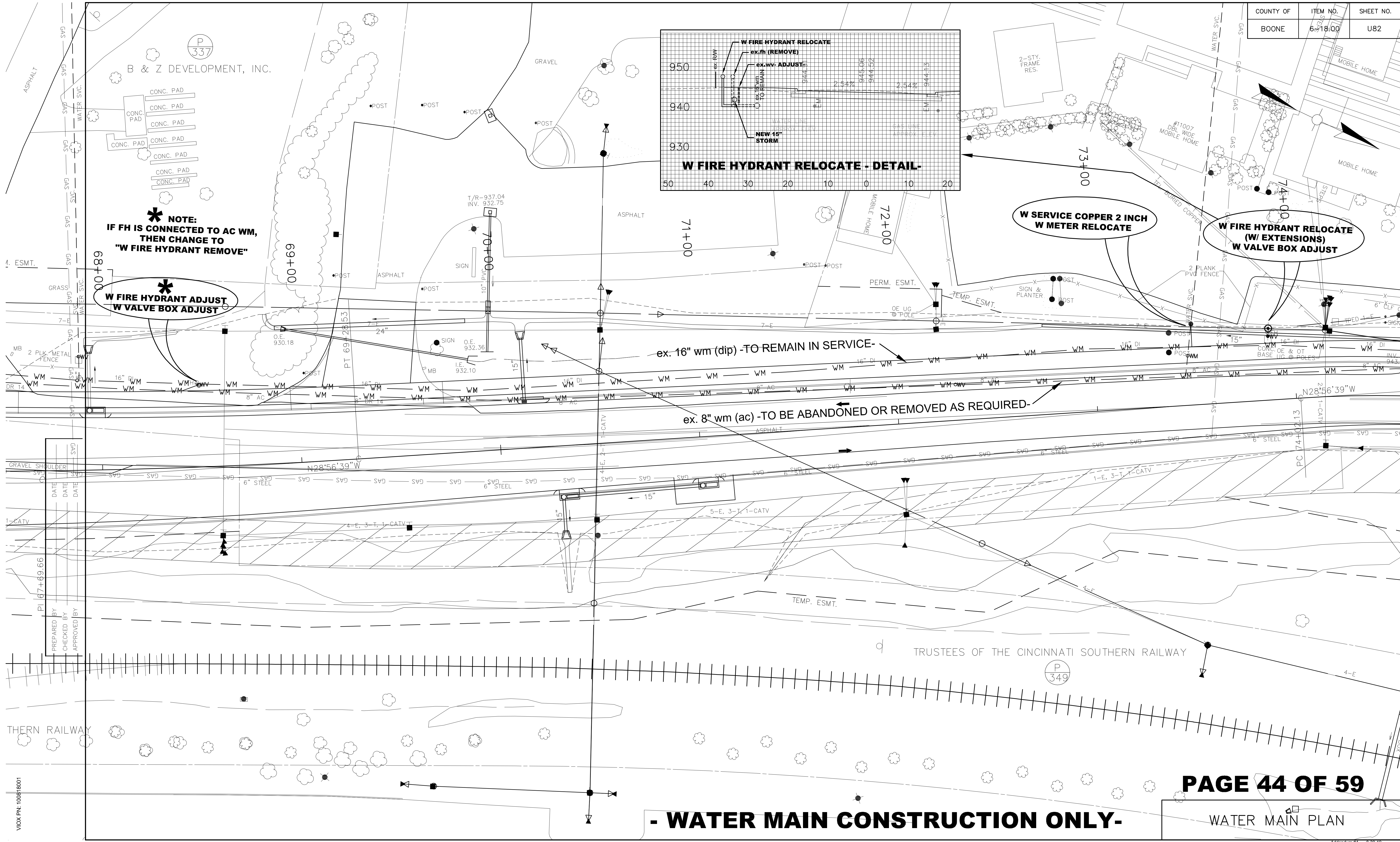
COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-18.00	U81



DATE  
 CHECKED BY  
 APPROVED BY

P:\BOWD (008) KY 338-75 INTERCHANGE TO I-25 KYTC ITEM NO. 6-18.00 WM RELOC (18001) Engineering\DWG TO DGN\FG45-6-14-00-WM-TO DGN.dwg, 7/16/2019 9:50:32 AM  
 V:\X\FENCE  
 V:\X\100818001





**\* NOTE:**  
**IF FH IS CONNECTED TO AC WM,**  
**THEN CHANGE TO**  
**\"/>**

**\* W FIRE HYDRANT ADJUST**  
**W VALVE BOX ADJUST**

**W SERVICE COPPER 2 INCH**  
**W METER RELOCATE**

**W FIRE HYDRANT RELOCATE**  
**(W/ EXTENSIONS)**  
**W VALVE BOX ADJUST**

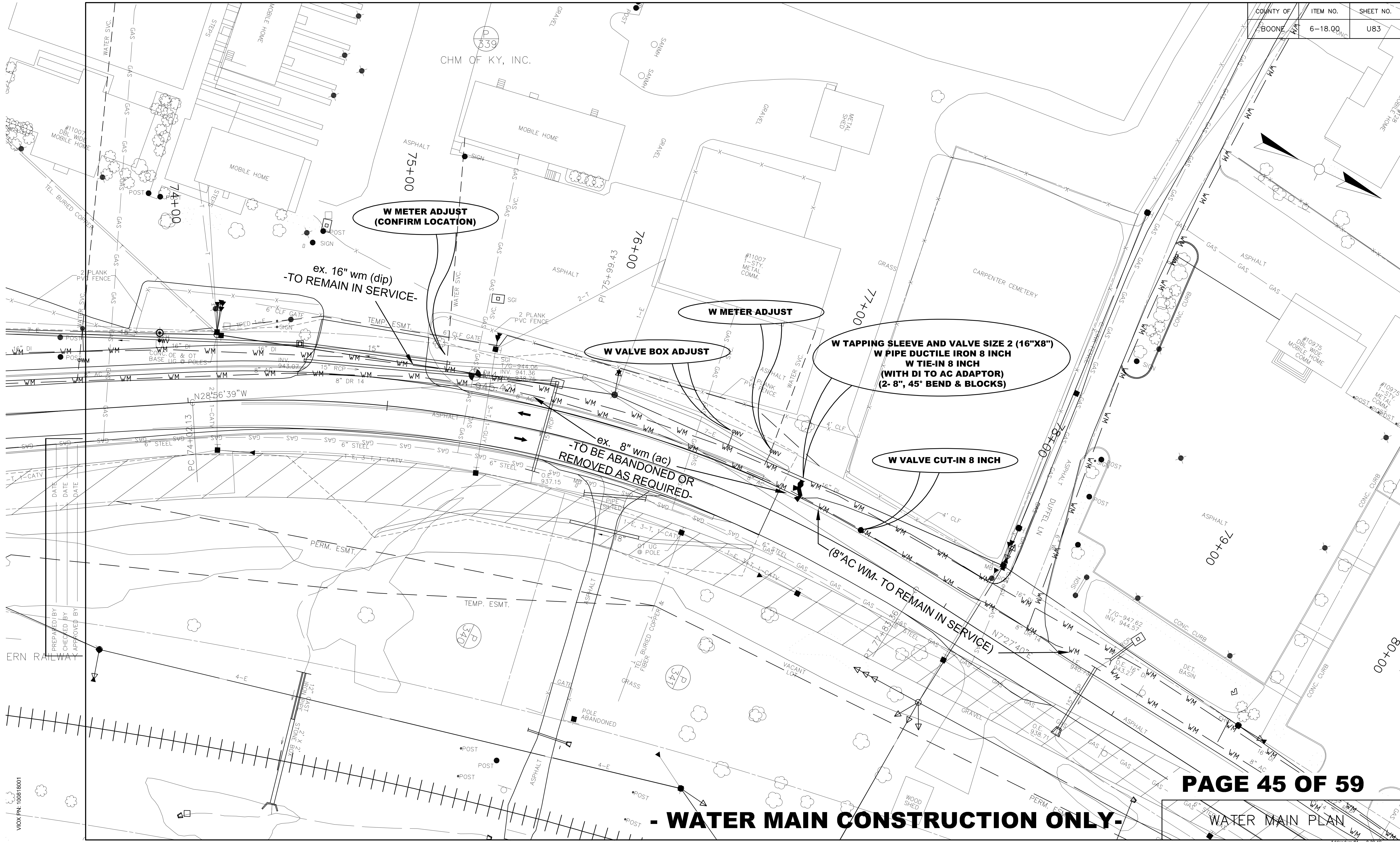
ex. 16\"/>

ex. 8\"/>

**- WATER MAIN CONSTRUCTION ONLY -**

P:\BOVD (08)\KY 338-75 INTERCHANGE TO U.S. 25 KYTC ITEM NO. 6-18-00 WM RELOC (18001)\Engineering\DWG TO DGN\FG44-6-14-00-WM-TO DGN.dwg, 7/16/2019 10:04:02 AM  
 VBOX PN: 100818001

Addendum #4 - 8-30-19



**- WATER MAIN CONSTRUCTION ONLY -**

P:\BOWD (08)\KY 338-75 INTERCHANGE TO U.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC (18001)\Engineering\DWG TO DGN\FG6-5-18-00-WM-TO-DGN.dwg, 7/19/2019 3:32:35 PM  
 VIOX PN: 100818001

ADDENDUM #4 - 8-30-19

**SEE PAGE 37**

**(CONFIRM EXACT LOCATION AND SIZE OF WATER SERVICE AT CONNECTION POINT PRIOR TO CONSTRUCTION)**

**W SERVICE COPPER LONG SIDE 1 INCH W METER RELOCATE (FROM PAGE 37) (SEE NOTE NO. 14: PAGE 1 OF 59)**

**(SET WS BETWEEN CURB AND POSTS)**

**(SET WATER METER IN SIDEWALK)**

**(CONTRACTOR TO COORDINATE WITH DUKE TO PROVIDE TEMPORARY RESTRAINT FOR THE POLE ANCHORS CROSSING THE PROPOSED WATER SERVICE)**

ex. 8" wm (ac) -TO BE REMOVED AS REQUIRED-

ex. 12" wm (dip) -TO BE REMOVED AS REQUIRED-

**W FIRE HYDRANT REMOVE**

**W FIRE HYDRANT REMOVE**

**NOTE: ITEMS "W FIRE HYDRANT REMOVE" AND ADJOINING WATER MAINS TO BE TAKEN OUT OF SERVICE AFTER CONSTRUCTION AND RECONNECTION OF NEW WATER MAIN ALONG U.S. 25 CORRIDOR, BUT BEFORE EXCAVATION FOR NEW UNDERPASS. THESE ITEMS MAY BE USED FOR "W FIRE HYDRANT ASSEMBLY" IN OTHER AREAS OF PROJECT WHERE POSSIBLE.**

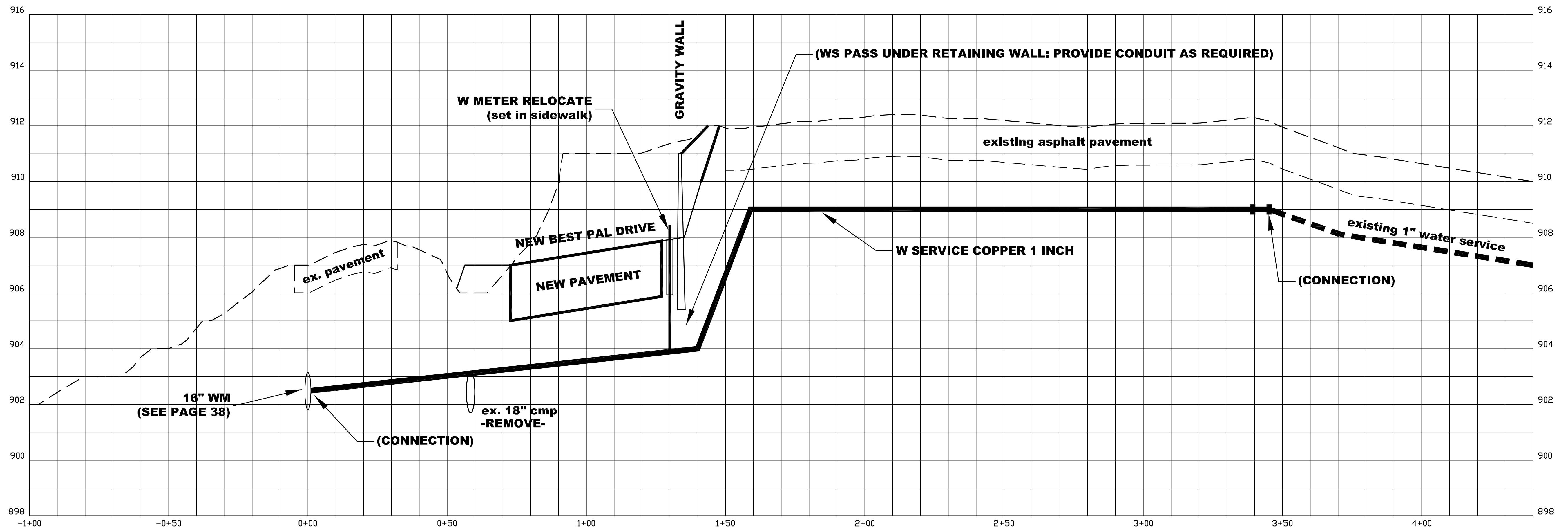
**- WATER MAIN CONSTRUCTION ONLY -**

WATER MAIN PLAN

P:\BOWD (08)\KY 338-75 INTERCHANGE TO U.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC (18001)\Engineering\DWG\PLAN SET\PG-46-WM-6-18-00.dwg, 7/20/2019 3:41:24 PM

Addendum #4 - 8-30-19

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-18.00	U85



HORIZONTAL: 1"=20  
 VERTICAL: 1"=2

## WATER SERVICE TO "PILOT"

**- WATER MAIN CONSTRUCTION ONLY -**

**PAGE 47 OF 59**

PIPE PROFILE  
 WATER SERVICE TO "PILOT"

PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

P:\BC\WD (08)\KY 338-75 INTERCHANGE TO I.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC (18001)\Engineering\DWG\PLAN SET\PG-47-WM-6-18-00.dwg, 7/28/2019 3:42:41 PM

VICX PN: 100818001

#110  
1-STY.  
METAL  
COMM.  
"FLORENCE WINNELSON  
PLUMBING SUPPLY COMPANY"

J.O.  
PROPERTIES, LLC

#100  
1-STY.  
METAL  
COMM.  
K & S REALTY, L.L.C.

WALTON FIRE  
PROTECTION DISTRICT

NOTE: TEE & WATER VALVES  
AT SHORLAND DRIVE  
POSSIBLE SHUT-DOWN-

W FIRE HYDRANT RELOCATE  
(8" PLUG & BLOCK @ END)

W VALVE 6 INCH  
(8"X8"X6" TEE & BLOCK)  
W PIPE DI 6 INCH  
(2- 6", 45° BEND & BLOCKS)  
W TIE-IN 6 INCH

W PIPE DUCTILE IRON 8 INCH  
(CL. 50 W/BLUE POLYWRAP)

3-W VALVE 12 INCH  
(12"X12"X12" TEE & BLOCK)

(8", 45° BEND & BLOCK)

(8", 11 1/2° BEND & BLOCK)

(12", 22 1/2° VERT. DOWN BEND & BLOCK)

(12", 22 1/2° VERT. UP BEND- NO BLOCK)

(12", 22 1/2° BEND & BLOCK)

W REMOVE STRUCTURE  
(OLD METER PIT)

W TIE-IN 12 INCH  
(12", 45° BEND & BLOCK)  
(INCLUDE TEMP. PLUG &  
FLUSHING DEVICE)

W PIPE DUCTILE IRON 12 INCH  
(CL. 50 W/BLUE POLYWRAP)

SEE PAGE 50

STAG INDUSTRIAL HOLDINGS, LLC

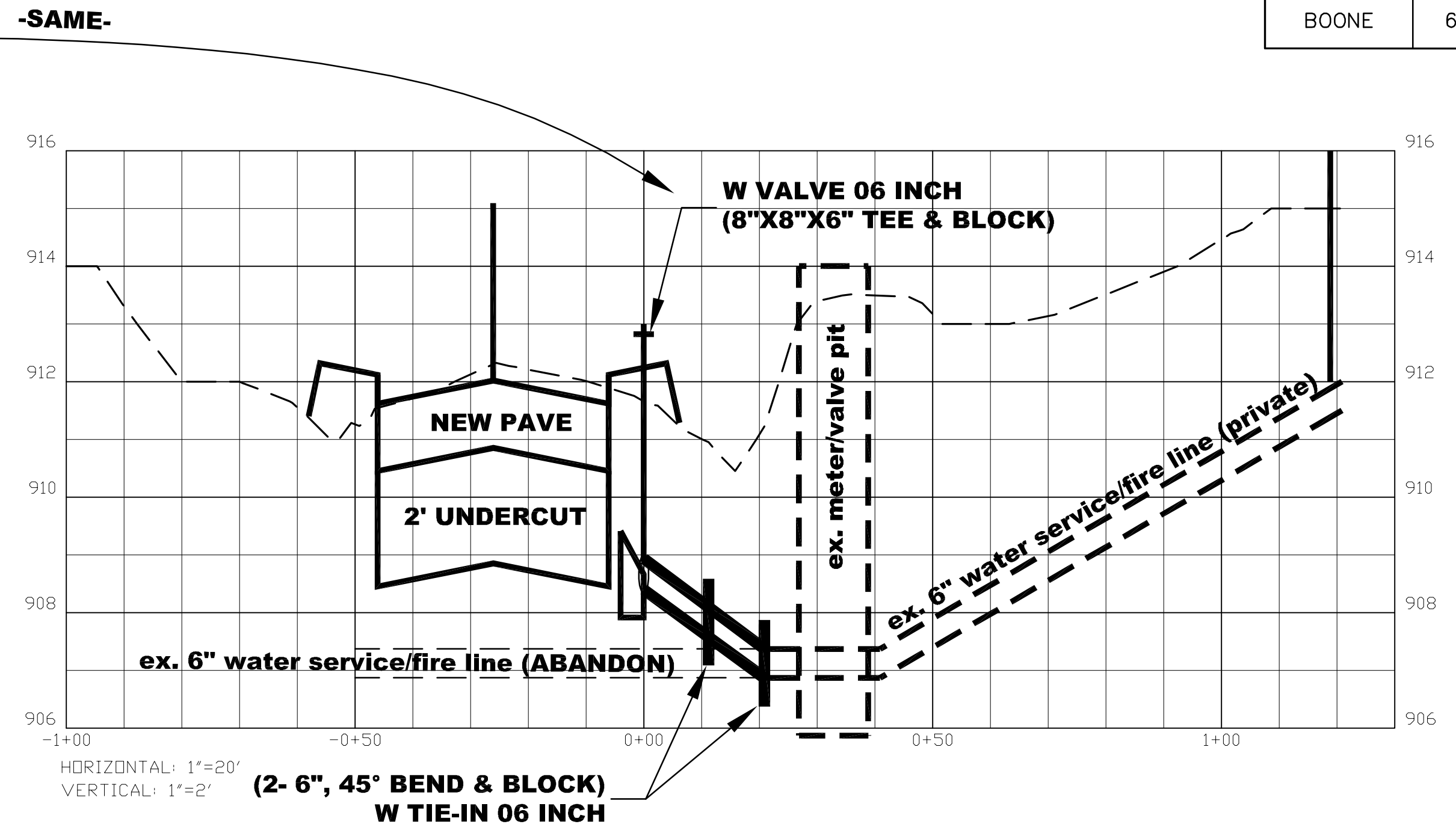
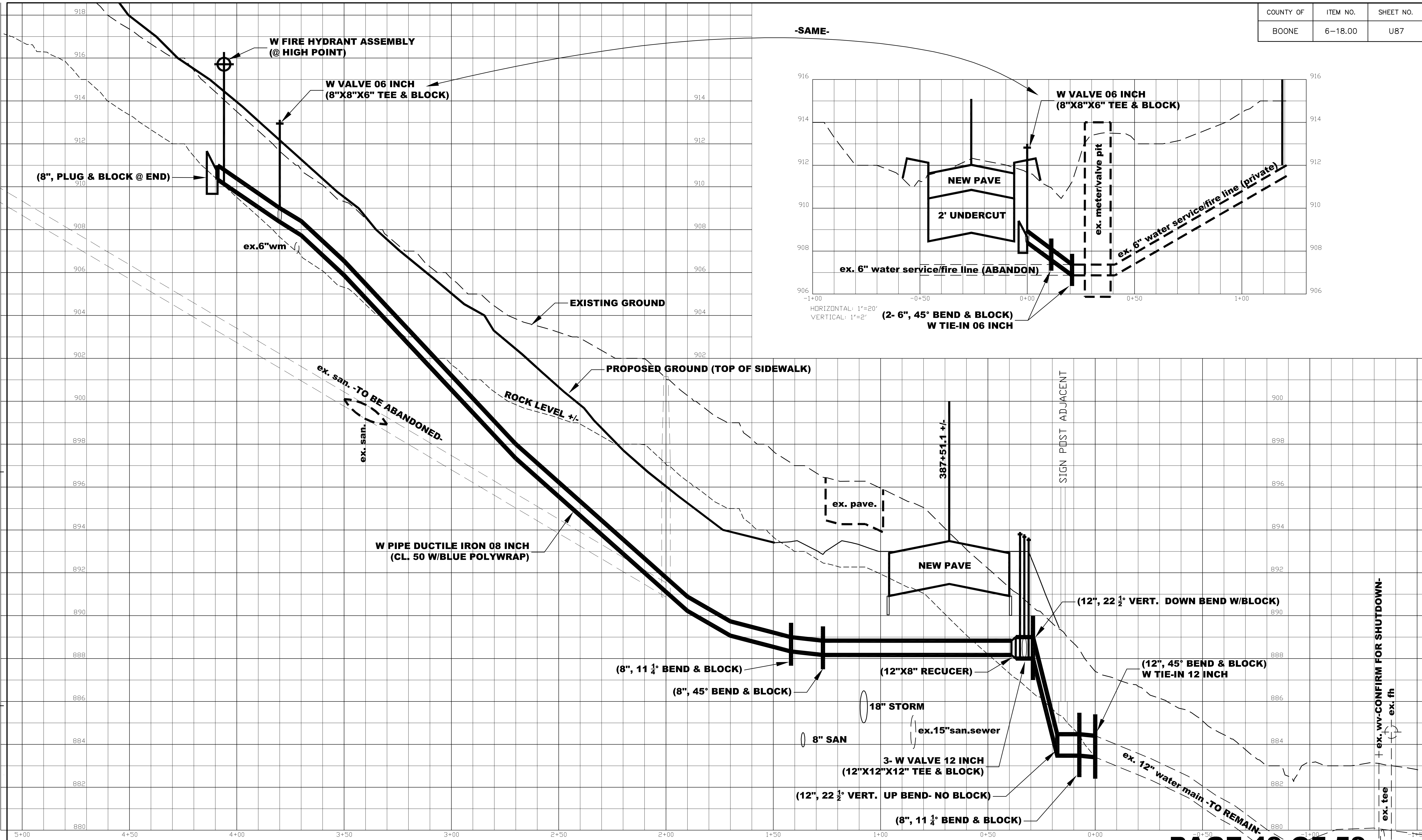
**- WATER MAIN CONSTRUCTION ONLY -**

WATER MAIN PLAN

DATE DATE DATE  
PREPARED BY  
CHECKED BY  
APPROVED BY

VICX PN: 100818001

Addendum #4 - 8-30-19



PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

HORIZONTAL: 1"=20'  
VERTICAL: 1"=2'

**NOTE:**  
ROTATE BENDS VERTICAL WHERE REQUIRED.  
DEFLECT PIPE WHERE POSSIBLE: MAX. DEFLECTION- 6"-8"-12" = 5"

**- WATER MAIN CONSTRUCTION ONLY -**

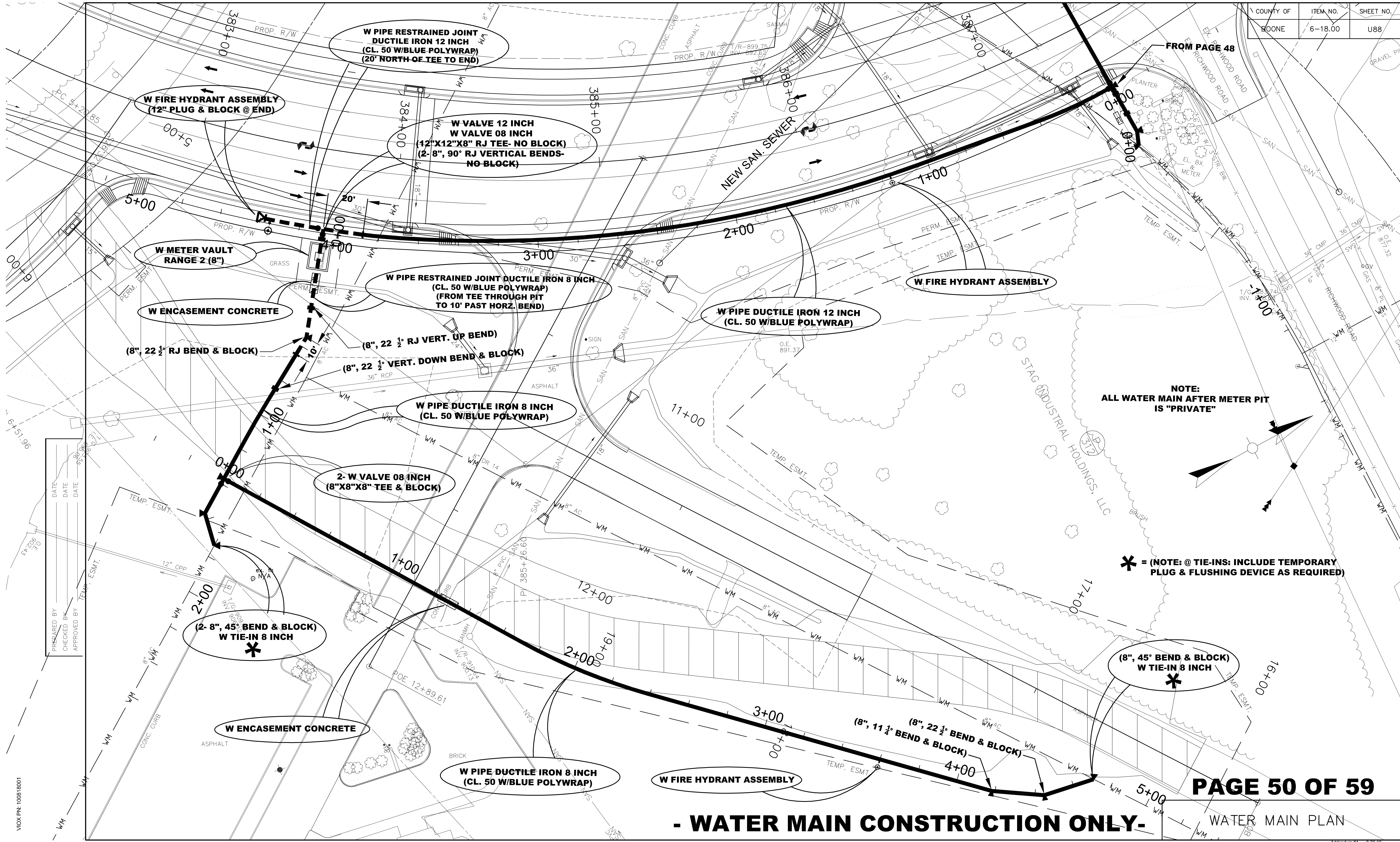
Addendum #4 - 8-30-19

P:\BC\WD (08)KY 338-75 INTERCHANGE TO ILS 25 KYTC ITEM NO. 6-18.00 WM RELOC (18001)\Engineering\DWG\PLAN SET\PG-49-WM-6-18-00.dwg, 7/31/2019 10:28:13 AM

V10X PN: 100818001



FROM PAGE 48



W FIRE HYDRANT ASSEMBLY  
(12" PLUG & BLOCK @ END)

W PIPE RESTRAINED JOINT  
DUCTILE IRON 12 INCH  
(CL. 50 W/BLUE POLYWRAP)  
(20' NORTH OF TEE TO END)

W VALVE 12 INCH  
W VALVE 08 INCH  
(12"X12"X8" RJ TEE- NO BLOCK)  
(2-8", 90° RJ VERTICAL BENDS-  
NO-BLOCK)

W-METER VAULT  
RANGE 2 (8")

W ENCASEMENT CONCRETE

W PIPE RESTRAINED JOINT DUCTILE IRON 8 INCH  
(CL. 50 W/BLUE POLYWRAP)  
(FROM TEE THROUGH PIT  
TO 10' PAST HORIZ. BEND)

W PIPE DUCTILE IRON 12 INCH  
(CL. 50 W/BLUE POLYWRAP)

W FIRE HYDRANT ASSEMBLY

(8", 22 1/2° RJ BEND & BLOCK)

(8", 22 1/2° RJ VERT. UP BEND)  
(8", 22 1/2° VERT. DOWN BEND & BLOCK)

W PIPE DUCTILE IRON 8 INCH  
(CL. 50 W/BLUE POLYWRAP)

2- W VALVE 08 INCH  
(8"X8"X8" TEE & BLOCK)

NOTE:  
ALL WATER MAIN AFTER METER PIT  
IS "PRIVATE"

\* = (NOTE: @ TIE-INS: INCLUDE TEMPORARY  
PLUG & FLUSHING DEVICE AS REQUIRED)

(2- 8", 45° BEND & BLOCK)  
W TIE-IN 8 INCH \*

W ENCASEMENT CONCRETE

W PIPE DUCTILE IRON 8 INCH  
(CL. 50 W/BLUE POLYWRAP)

W FIRE HYDRANT ASSEMBLY

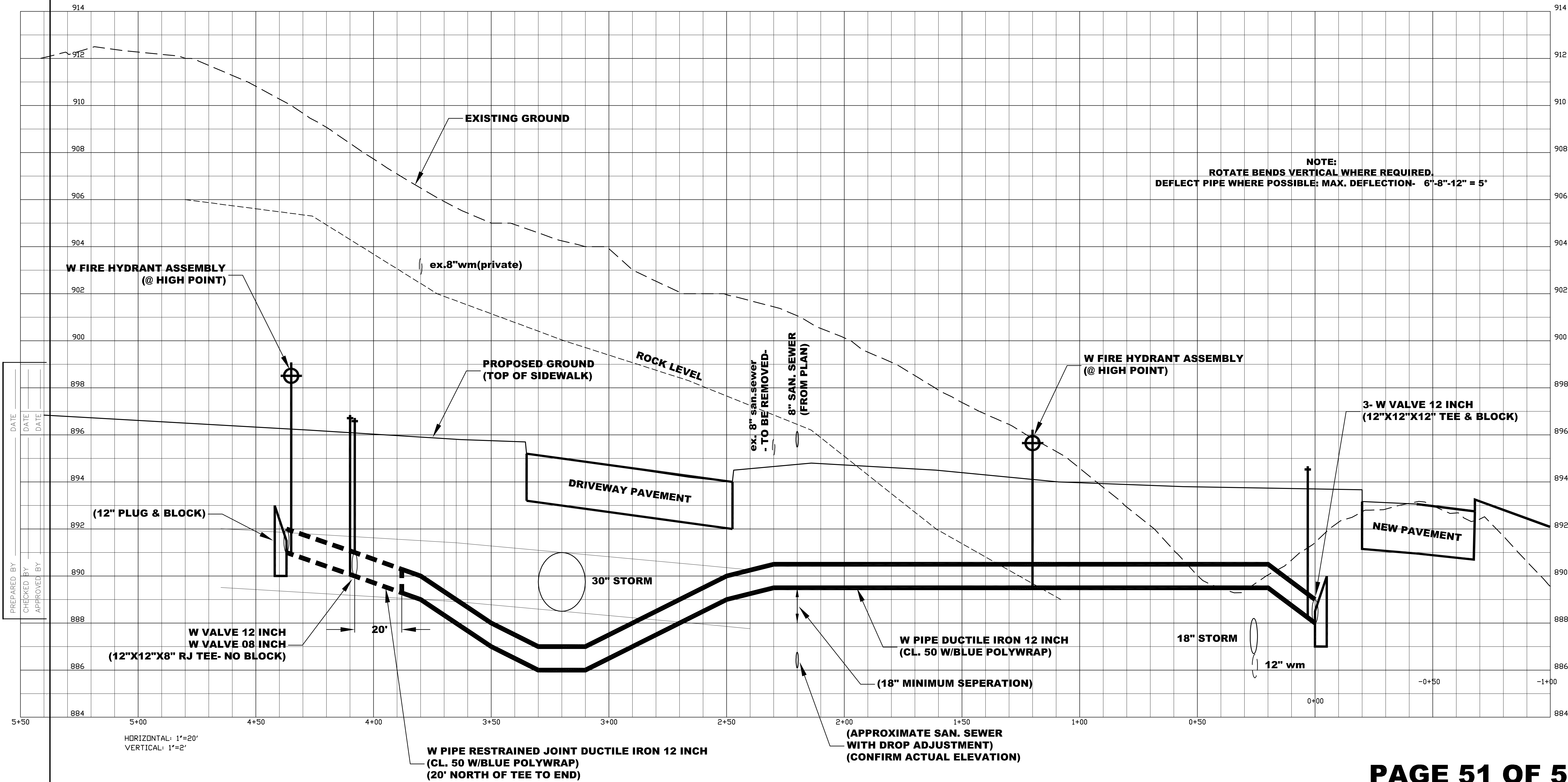
(8", 45° BEND & BLOCK)  
W TIE-IN 8 INCH \*

(8", 11 1/4° BEND & BLOCK)  
(8", 22 1/2° BEND & BLOCK)

DATE	DATE	DATE
PREPARED BY	CHECKED BY	APPROVED BY

VI0X PN: 100818001

Addendum #4 - 8-30-19

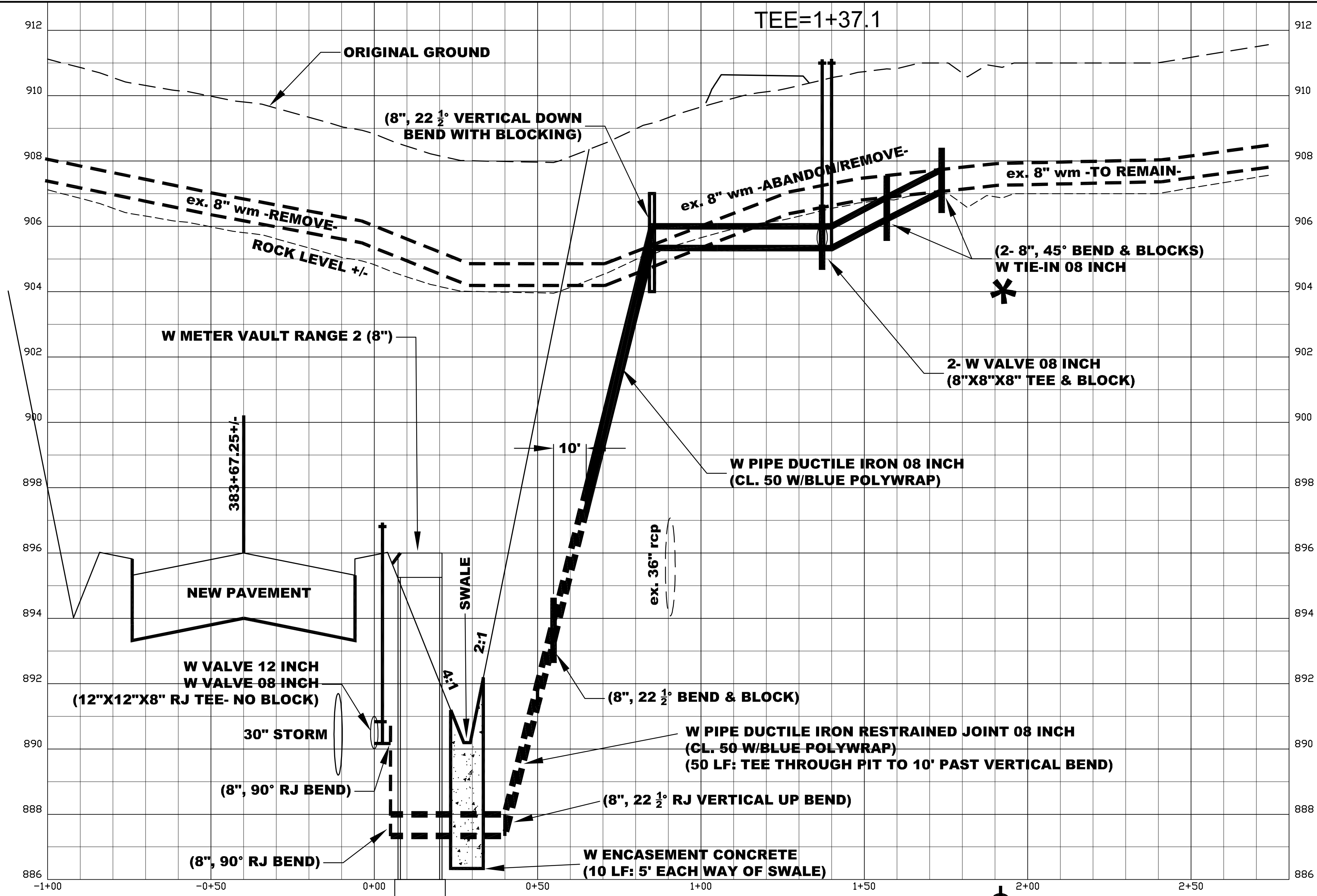


**- WATER MAIN CONSTRUCTION ONLY-**

P:\BCWD (08)\KY 338-75 INTERCHANGE TO I.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC (18001)\Engineering\DWG\PLAN SET\PG-51-WM-6-18-00.dwg, 7/31/2019 11:22:39 AM  
 VIOX PN: 100818001

Addendum #4 - 8-30-19

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-18.00	U89A



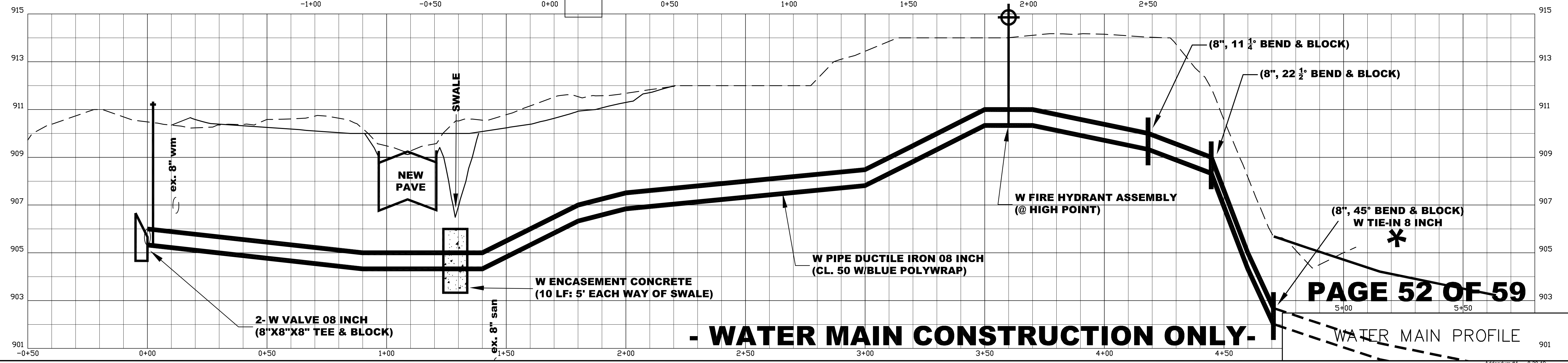
\* = (NOTE: @ TIE-INS: INCLUDE TEMPORARY PLUG & FLUSHING DEVICE AS REQUIRED)

NOTE:  
ROTATE BENDS VERTICAL WHERE REQUIRED.  
DEFLECT PIPE WHERE POSSIBLE:  
MAX. DEFLECTION- 6"-8"-12" = 5°

NOTE:  
ALL WATER MAIN AFTER METER PIT IS "PRIVATE"

HORIZONTAL: 1"=20'  
VERTICAL: 1"=2'

PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE



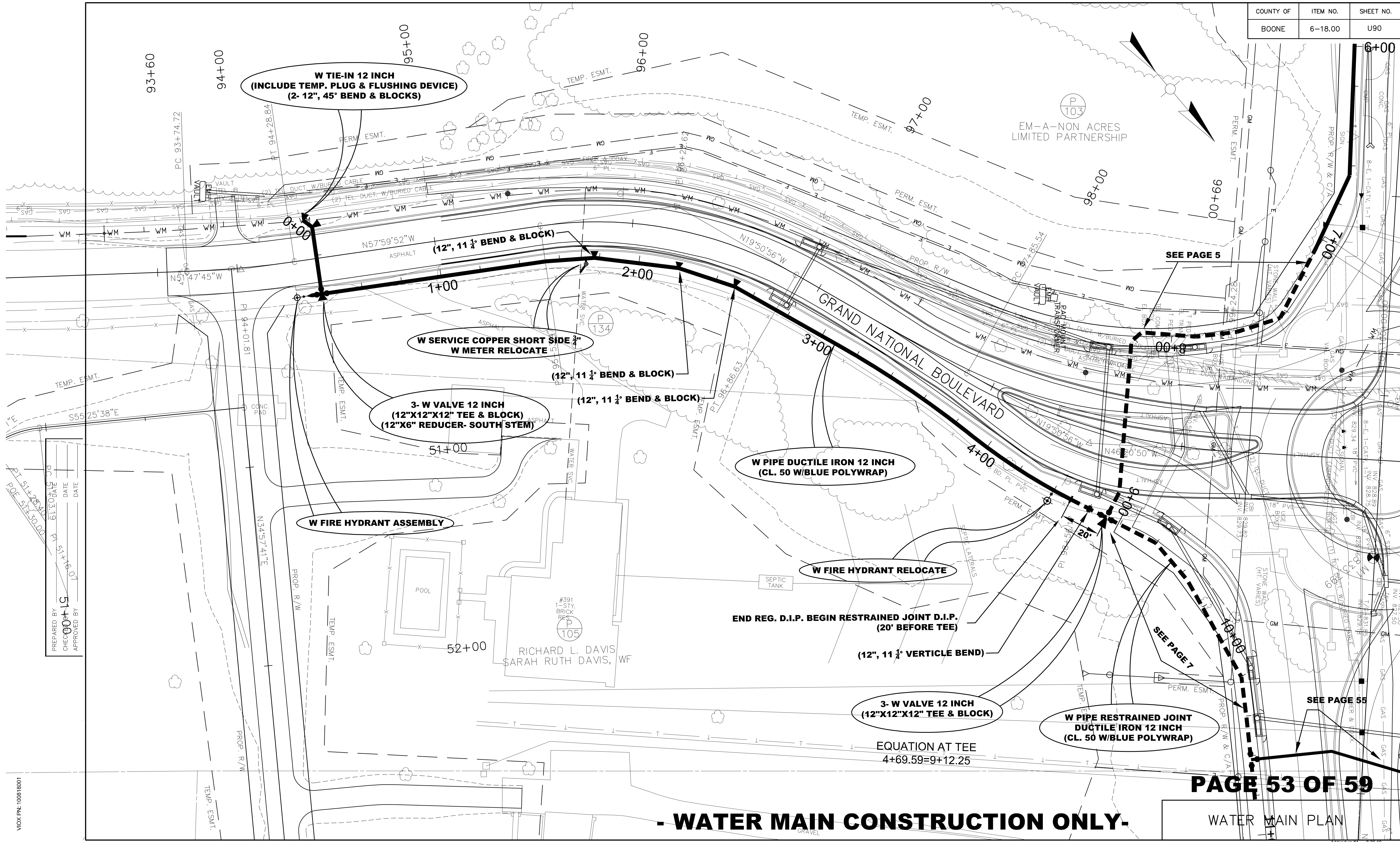
**- WATER MAIN CONSTRUCTION ONLY -**

**PAGE 52 OF 59**

WATER MAIN PROFILE

VIOX PN: 100818001

P:\BCMD (08)\KY 338-75 INTERCHANGE TO U.S. 25 KYTC ITEM NO. 6-18.00 WM RELOC (18001)\Engineering\DWG TO DGN\FG52-6-18-00-WM-TO DGN.dwg, 7/28/2019 5:11:05 PM



**W TIE-IN 12 INCH  
(INCLUDE TEMP. PLUG & FLUSHING DEVICE)  
(2- 12", 45° BEND & BLOCKS)**

**W SERVICE COPPER SHORT SIDE 3"  
W METER RELOCATE**

**3- W VALVE 12 INCH  
(12"X12"X12" TEE & BLOCK)  
(12"X6" REDUCER- SOUTH STEM)**

**W FIRE HYDRANT ASSEMBLY**

**W PIPE DUCTILE IRON 12 INCH  
(CL. 50 W/BLUE POLYWRAP)**

**W FIRE HYDRANT RELOCATE**

**END REG. D.I.P. BEGIN RESTRAINED JOINT D.I.P.  
(20' BEFORE TEE)**

**3- W VALVE 12 INCH  
(12"X12"X12" TEE & BLOCK)**

**W PIPE RESTRAINED JOINT  
DUCTILE IRON 12 INCH  
(CL. 50 W/BLUE POLYWRAP)**

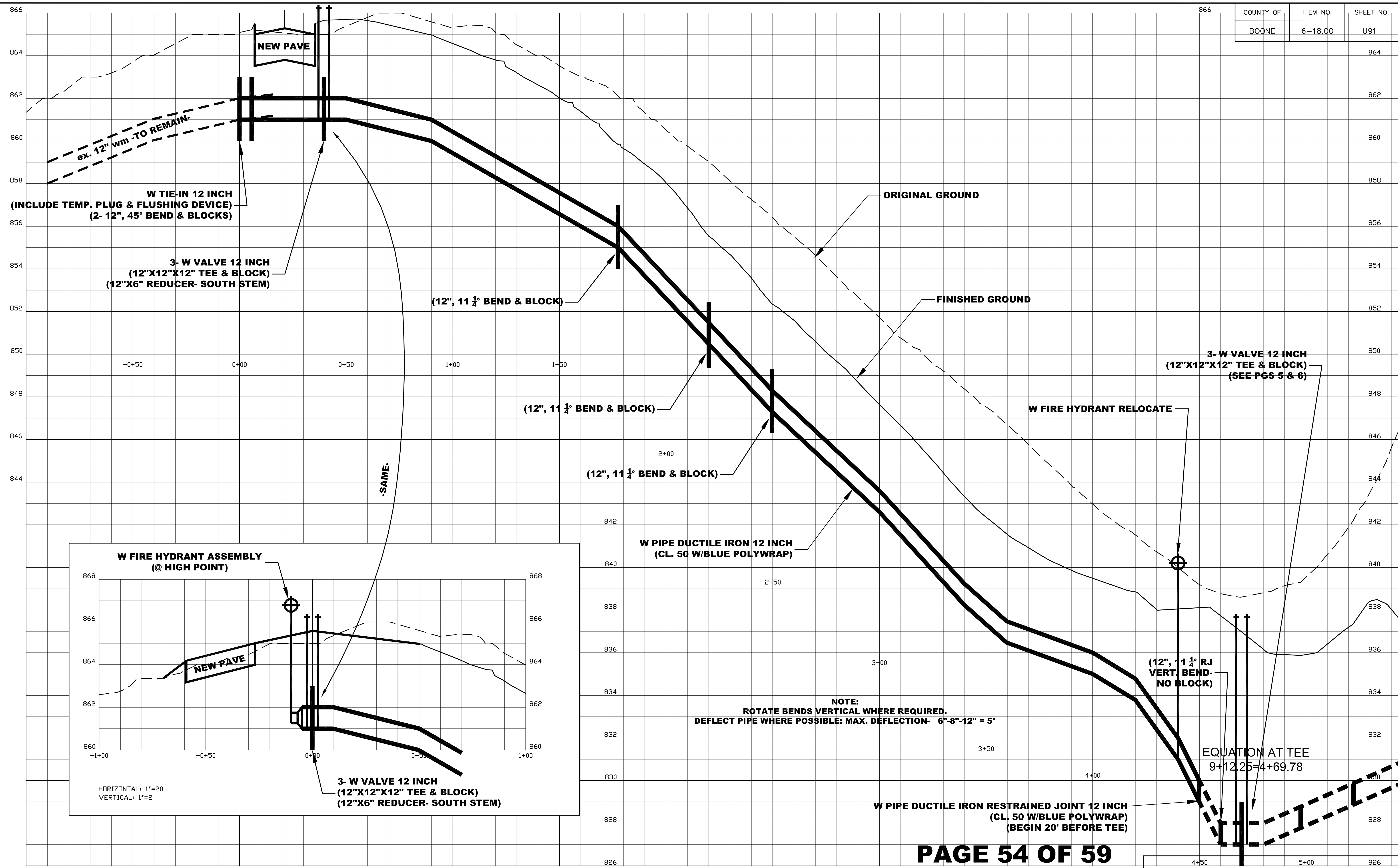
**EQUATION AT TEE  
4+69.59=9+12.25**

PREPARED BY: CHECKED BY: APPROVED BY:  
 DATE: DATE: DATE:  
 PI 51+28.34  
 PC 51+30.00  
 POE 51+50.00  
 PI 51+16.07  
 DATE: 5/1/07

V10X PN: 100818001

Addendum #4 - 8-30-19

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-18.00	U91



PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

VICX PN: 100818001

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	6-18.00	U92

P 101

TRIPLE CROWN DEVELOPERS, LLC

**(NEXT LINE VALVE @ SIR BARTON PLACE-  
USE FOR SHUT-DOWN)**

TRIPLE CROWN BOULEVARD

**W TIE-IN 12 INCH  
(40' PAST BEND)  
(INCLUDE RESTRAINT  
OR REMOVE OLD MAIN)  
(INCLUDE TEMP. PLUG AND  
FLUSHING DEVICE)**

**(2- 12", 45° RJ BENDS- NO BLOCK)**

**W FIRE HYDRANT ASSEMBLY**

**BEGIN: W PIPE DUCTILE IRON  
RESTRAINED JOINT 12 INCH  
(CL. 50 W/BLUE PIPYWRAP)  
(40' BEFORE BEND)**

P 104

THE TRIPLE CROWN  
DEVELOPERS, LLC

**W PIPE DUCTILE IRON 12 INCH  
(CL. 50 W/BLUE POLYWRAP)**

**(2- 12", 22 1/2° BEND & BLOCKS)**

**(12", 22 1/2° BEND & BLOCK)**

**(2- 12", 45° BEND & BLOCKS)**

**(12", 22 1/2° BEND & BLOCK)**

**3- W VALVE 12 INCH  
(12"X12"X12" RJ TEE- NO BLOCK)**

TEE=10+62.00  
=0+00 TRIPLE CROWN

TEE @ 9+12.25

**- WATER MAIN CONSTRUCTION ONLY -**

**PAGE 55 OF 59**

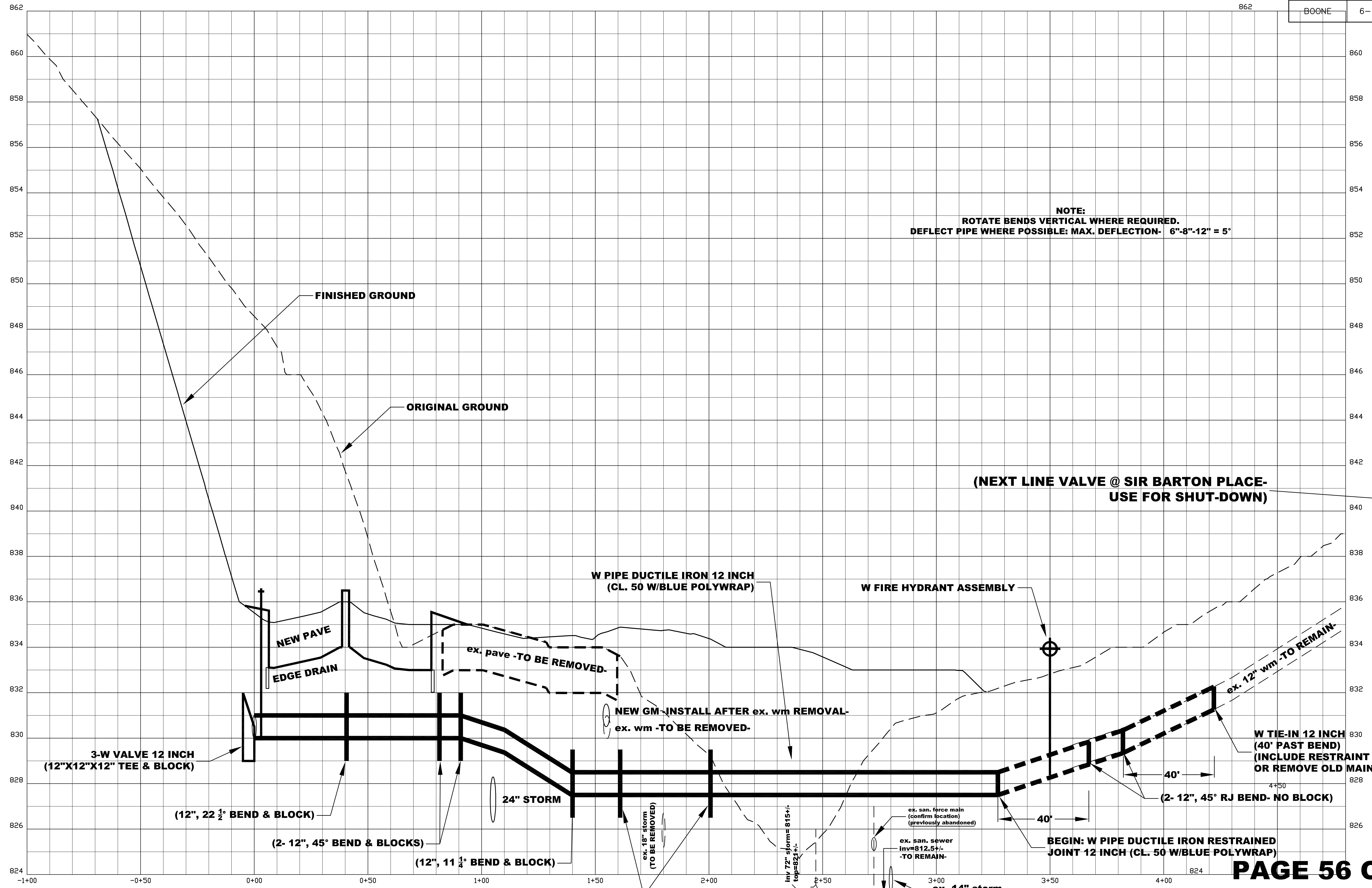
WATER MAIN PLAN

DATE	DATE	DATE
PREPARED BY	CHECKED BY	APPROVED BY

APPROXIMATE LOCATION OF SEPTIC AND LATERAL FIELD IN FRONT OF HOMES

VICX PN: 100818001

DONALD A. DAVIS, W.F.  
RITA S. DAVIS, W.F.  
P 106



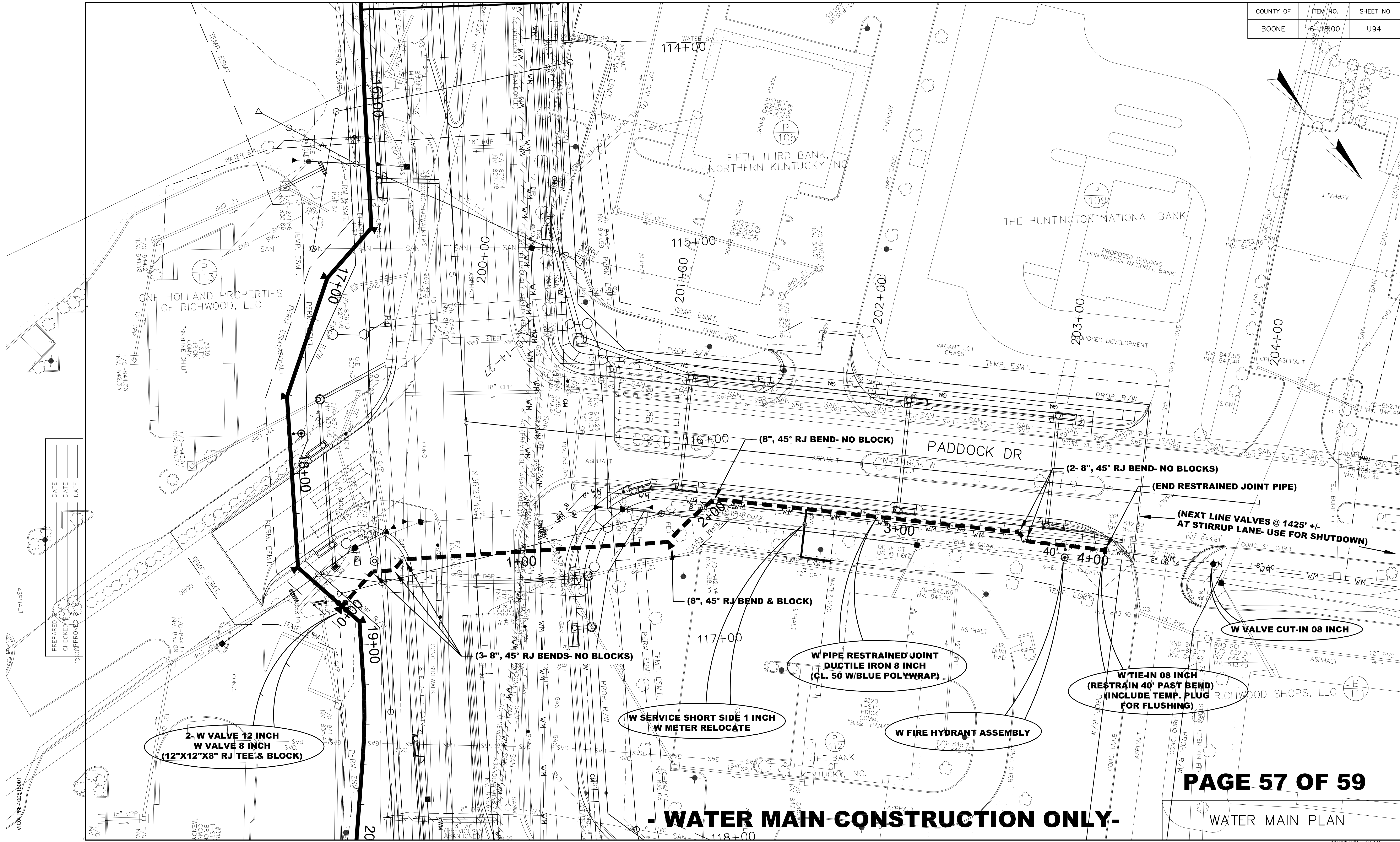
PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

VICX PIN: 100818001

**- WATER MAIN CONSTRUCTION ONLY -**

WATER MAIN PROFILE

Addendum #4 - 8-30-19



DATE	DATE	DATE

PREPARED BY: \_\_\_\_\_  
 CHECKED BY: \_\_\_\_\_  
 APPROVED BY: \_\_\_\_\_

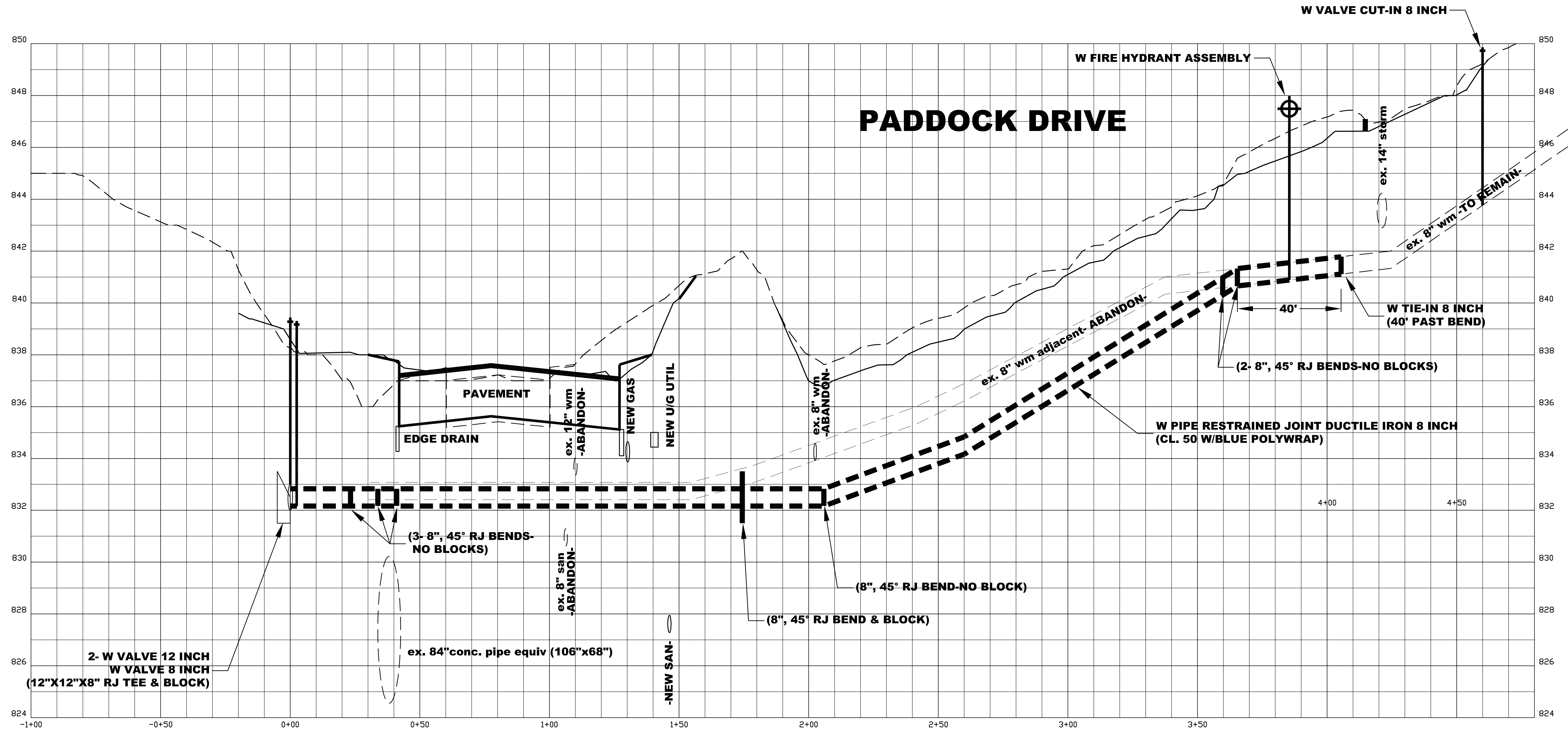
P:\BOMD (009)\KY 338-75 INTERCHANGE TO U.S. 25 KYTC ITEM NO. 6-18-00 WMI RELOC (18001)\Engineering\DWG\PLAN SET\PG-57-WMI-6-18-00.dwg, 7/20/2019 4:38:17 PM  
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**- WATER MAIN CONSTRUCTION ONLY -**

WATER MAIN PLAN

Addendum #4 - 8-30-19





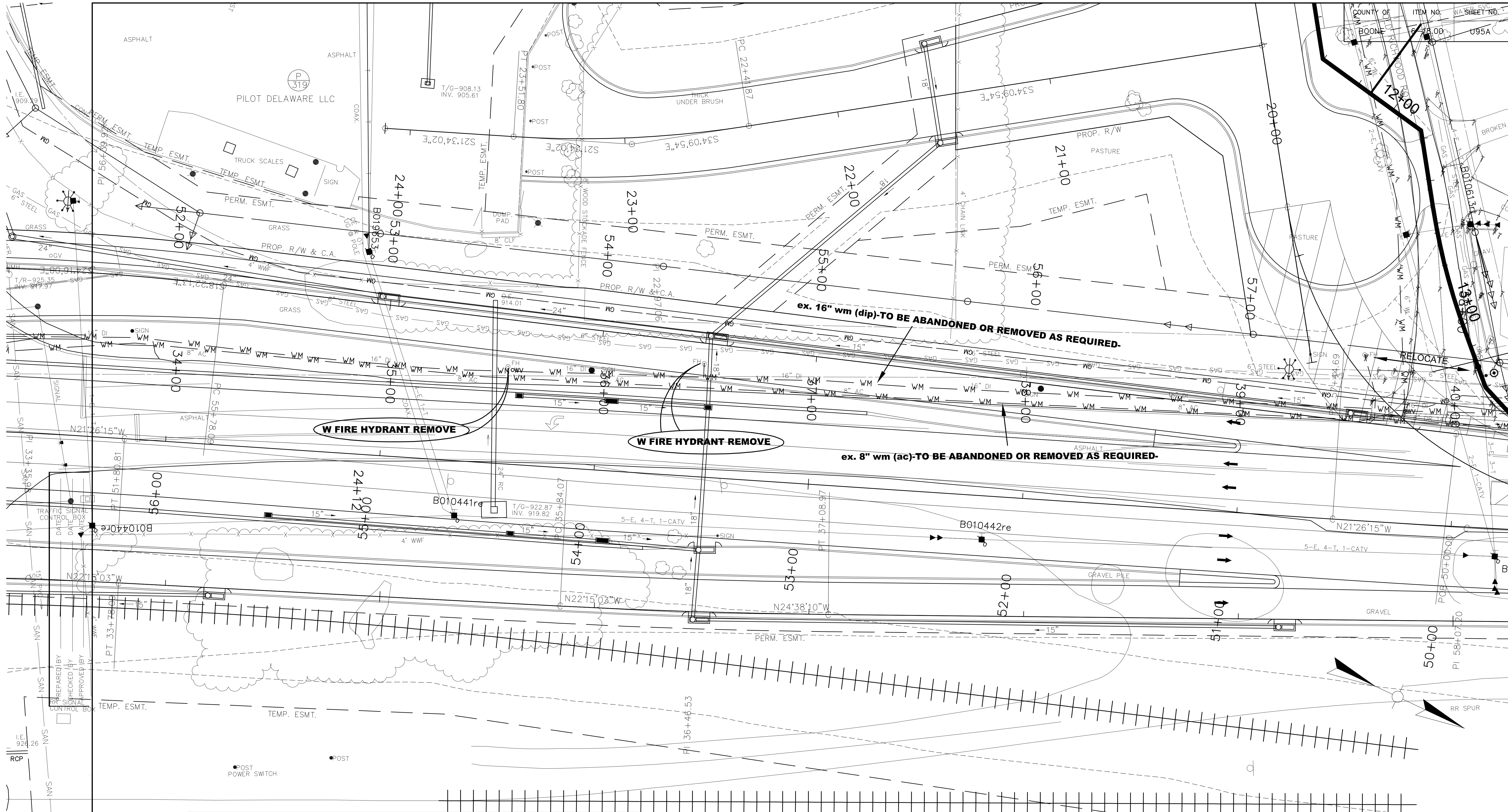
HORIZONTAL: 1"=20'  
 VERTICAL: 1"=2'

**NOTE:**  
 ROTATE BENDS VERTICAL WHERE REQUIRED.  
 DEFLECT PIPE WHERE POSSIBLE: MAX. DEFLECTION- 6"-8"-12" = 5°

**- WATER MAIN CONSTRUCTION ONLY -**

PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

VICX PN: 100818001



**NOTE: ITEMS "W FIRE HYDRANT REMOVE" AND ADJOINING WATER MAINS TO BE TAKEN OUT OF SERVICE AFTER CONSTRUCTION AND RECONNECTION OF NEW WATER MAIN ALONG U.S. 25 CORRIDOR, BUT BEFORE EXCAVATION FOR NEW UNDERPASS. THESE ITEMS MAY BE USED FOR "W FIRE HYDRANT ASSEMBLY" IN OTHER AREAS OF PROJECT WHERE POSSIBLE.**

P 349

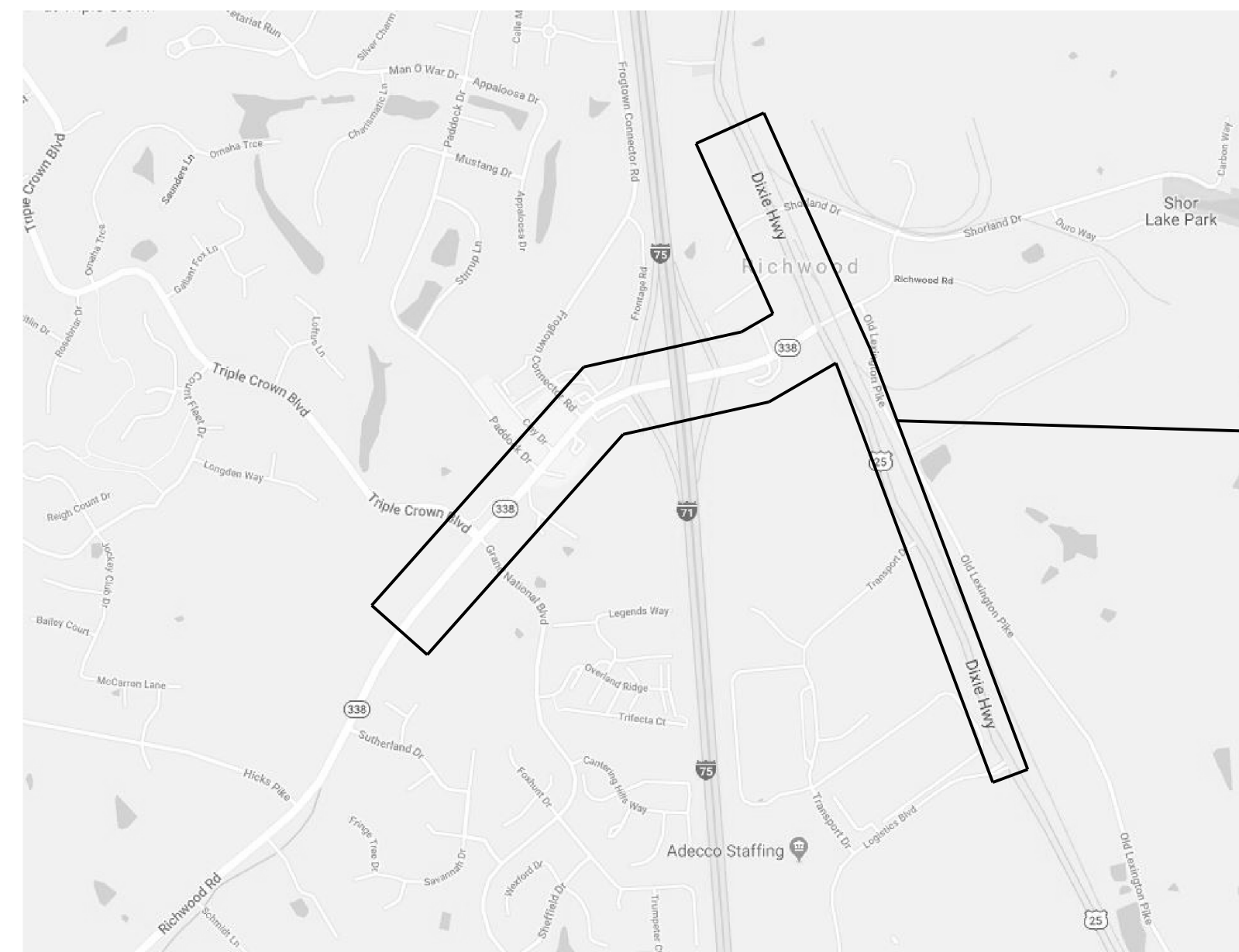
TRUSTEES OF THE CINCINNATI SOUTHERN RAILWAY

# - WATER MAIN CONSTRUCTION ONLY -

MATERIAL LIST

ITEM	DESCRIPTION	STOCK NO.	EST	ACTUAL
CA30	CAP. BUTT FUSION, 6" IPS	0050088404	9	
CA68	CAP. WELD, 6" IPS, Gr Y52, STD/SCH 40 WALL	1526432	7	
C034	COUPL. BOLTED COMPRESSION, NON-INS. RESTRAINING, 6" IPS, W/ 1" - SDR 13.5 STIFFENER	0050057436	1	
C039	COUPL. E-F, 2" IPS	0050057409	9	
EL43	ELL. BF, 45 DEG., 6" IPS	0050088405	39	
EL44	ELL. BF, 90 DEG., 6" IPS	0050088406	12	
F06	LINE STOPPER, STEEL, WELD, SCARFED BOTTOM, 6IN, ANSI 150 FLANGE, 285psig RATED ALL CLASS LOCATIONS, INCLUDES PLUG AND FLANGE KIT	0050057584	1	
P27	PIPE, MDPE, 6IN IPS, SDR 13.5, 40FT STICK	0050088398	12037	
RE11	REDUCER, BF, MDPE, MOLDED, 4IN (SDR 11) x 2IN (SDR 11)	0050057758	1	
RE15	REDUCER, BF, MDPE, MOLDED, 6IN (SDR 13.5) x 4IN (SDR 11.5)	0050088410	2	
SA13	SADDLE, EF x BF BRANCH, SDR 13.5 HDPE, 6" IPS RUN x 6" IPS OUT	50122076	2	
TE10	TEE, TAP, WELD, SPHERICAL 3-WAY, 6IN IPS, ANSI 150 FLANGE, 285psig RATED ALL CLASS LOCATIONS, INCLUDES COMPLETION PLUG, O-RING, GASKET, BLIND FLANGE, STUDS & NUTS	0050057873	7	
TE42	TEE, PIPE, BF, MDPE, 6IN IPS, SDR 13.5 ENDS	0050088411	9	
TF09	TRANSITION FITTING, BF x FL, 6IN PE2708 SDR 11 x 6IN STEEL FLANGE ANSI 150	0050092950	7	
TW1	WIRE/CABLE, ELECTRICAL, TRACER, 1 CONDUCTOR, 19 AWG, TIN COATED CU, SOL., 300V, YELLOW, 32 MIL HDPE JACKET, WOVE	1479146	12037	
TWTEST	LID, SHAFT, 5-1/4" DIA. CAST IRON, WITH A 3/8IN HOLE DRILLED IN LID, MARKED GAS BOX, VALVE, 15-1/2IN LG, CAST IRON TOP SECTION (UPPER CENTER), F/ 5-1/4" SHAFT X	50057324	62	
		50057322	62	
	ANODE, 5LB ZINC, w/ 10FT OF RED PE INSULATED 12AWG CU WIRE	1456747	62	
	CONNECTOR, ELECTRICAL, WIRE NUT, WING GRIP, BLUE, HOLDS 3-6 (12AWG) WIRES	1458186	62	
	MARKER BALL FOR 3M LOCATING TOOL	1458304	62	
	CONNECTOR, SPLICE, MAINLINE END TO END, POLYCARBONATE FILLED W/ WATER BLOCKING GEL, SELF PIERCING, FOR USE W/ NEPTCO TRACE-SAFE WIRE	1479149	62	

# DUKE ENERGY



VICINITY MAP  
N.T.S.

AREA OF WORK

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

**GAS DEPARTMENT**  
DUKE ENERGY

1  
62

ERLANGER DISTRICT

CONTACT GAS SYSTEMS OPERATIONS SUPERVISOR PRIOR TO STARTING JOB TO VERIFY GAS FLOW

CALL K.U.P.I.  
2 BUSINESS DAY BEFORE YOU DIG  
\*811

DESIGN REVIEW OF COMPLETED CONSTRUCTION JOB  SPONSOR _____ DATE _____	<table border="1"> <tr> <th>SIZE</th> <th>KIND</th> <th>WALL THICKNESS</th> <th>EST. PIPE LENGTH</th> <th>ACTUAL PIPE LENGTH</th> <th>ACTUAL FITTING &amp; VALVE LENGTH</th> </tr> <tr> <td>6"</td> <td>PL</td> <td></td> <td>12,037'</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td>TOTAL</td> <td>12,037'</td> <td></td> </tr> </table>	SIZE	KIND	WALL THICKNESS	EST. PIPE LENGTH	ACTUAL PIPE LENGTH	ACTUAL FITTING & VALVE LENGTH	6"	PL		12,037'																								TOTAL	12,037'		PERMIT(S) REQUIRED ----- TRACEABILITY OF PLASTIC MAIN AND SERVICES TESTED UPON COMPLETION
	SIZE	KIND	WALL THICKNESS	EST. PIPE LENGTH	ACTUAL PIPE LENGTH	ACTUAL FITTING & VALVE LENGTH																																
	6"	PL		12,037'																																		
			TOTAL	12,037'																																		
SYSTEM OPERATION SUPERVISOR VALVES AND NUMBERS REVIEWED  REVIEWED BY _____ DATE _____  VALVES THAT HAVE BEEN ABANDONED AND BOX REMOVED * _____ * * _____ * * _____ * * _____ * * _____ * * _____ *	CORROSION ENGINEERING CONDITION OF PIPE COATING WHEN DELIVERED TO JOB: <u>  </u> TEST CONN. PER STD. 7.7.1 APPR. BY: _____ NO. PROPOSED _____ COATING TYPE _____ GOOD <input type="checkbox"/> FAIR <input type="checkbox"/> POOR <input type="checkbox"/> NO. INSTALLED _____ INSPECTION: VISUAL <input type="checkbox"/> JEEP <input type="checkbox"/> INSULATION CHECKED <input type="checkbox"/> NO. TESTED OK _____ TYPE PATCH MATERIAL _____ NO. CHECKED _____ PLASTIC SEPARATIONS INSTALLED <input type="checkbox"/> CONTINUITY OF COUPLINGS CHECKED <input type="checkbox"/> CASING CHECKED FOR SHORT <input type="checkbox"/>	COMPLETION CONTRACTOR _____  VERIFICATION INSPECTOR _____																																				
	FIELD PRESSURE LEAK TEST ALL PIPELINES REQUIRE LEAK TESTING BEFORE PLACING INTO SERVICE. PRESSURE CHARTS AND FORMS SHOULD BE FORWARDED TO GAS ENGINEERING. REQUIRED TEST PRESSURE RANGE: MIN. <u>90</u> PSIG TO MAX <u>100</u> PSIG HOURS <u>24</u> MEDIUM <u>AIR</u> TESTED BY _____ DATE _____	SUPERVISOR BLOCK SUPERVISOR OR CONTRACTOR _____ RECORDED BY _____  DATE STARTED _____ DATE PLACED IN SERVICE _____ DATE COMPLETED _____ PERMIT NO. _____	PROJECT CONTACTS CONSTRUCTION: MELISSA VAUGHAN GREG MENETREY (W) 513-287-2325 (W) 513-979-5405 (C) 513-312-9744 (C) 513-659-0066  JOB SPONSOR: GERRY HELM (W) 859-534-4357 (C) 859-912-0820																																			
<table border="1"> <tr> <th>INSTALLATION</th> <th>WO#</th> <th>PROJECT</th> <th>ACTIVITY</th> </tr> <tr> <td>ABANDONMENT</td> <td></td> <td>MX954566</td> <td>I</td> </tr> <tr> <td>RENEW SERVICE M-C</td> <td></td> <td>MCRP70</td> <td>I</td> </tr> <tr> <td>RENEW SERVICE C-M</td> <td></td> <td>CMRP70</td> <td>I</td> </tr> <tr> <td>RELOCATE METER</td> <td></td> <td>GMSMOVE</td> <td>X</td> </tr> </table>	INSTALLATION	WO#	PROJECT	ACTIVITY	ABANDONMENT		MX954566	I	RENEW SERVICE M-C		MCRP70	I	RENEW SERVICE C-M		CMRP70	I	RELOCATE METER		GMSMOVE	X	RICHWOOD RD REPLACEMENT  MAIN REPLACEMENT  WALTON, BOONE CO., KY		DRAWN _____ MER _____ 7-15-19 CHECKED _____ APPROVED _____ CLOSED BY _____ EST. FOOTAGE <b>12,037'</b>															
INSTALLATION	WO#	PROJECT	ACTIVITY																																			
ABANDONMENT		MX954566	I																																			
RENEW SERVICE M-C		MCRP70	I																																			
RENEW SERVICE C-M		CMRP70	I																																			
RELOCATE METER		GMSMOVE	X																																			
MAP NO. S 0 5 W 0 2 - 1 8				DOCUMENT NO. 0 2 9 5 4 5 5 6 6																																		

REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

<i>Service Tag Number</i>	<i>Service Address</i>	<i>Date Installed</i>	<i>Actual Length (')</i>	<i>Nominal Diameter</i>	<i>Material</i>	<i>Near House Line Distance (')</i>	<i>Near House Direction</i>	<i>JCF Filled Out</i>	<i>Comments</i>
374404	Multiple - 281 RICHWOOD RD, WALTON, KY, 41094	1/1/1982	62	1	Plastic	6	EE		
605969	13005 FROGTOWN CONNECTOR RD, WALTON, KY, 41094	2/12/2004	77	1	Plastic	5	SS		
404600	186 RICHWOOD RD, WALTON, KY, 41094	11/24/1987	3	1.25	Plastic	7	EE		
411964	11139 US RT 25, WALTON, KY, 41094	10/13/1988	5	1	Plastic	2	NN		
484492	160 RICHWOOD RD, WALTON, KY, 41094	6/6/1995	1	1.25	Plastic	2	EW		
607502	461 RICHWOOD RD, WALTON, KY, 41094	12/14/2010	8	1	Plastic	10	EE		
423545	311 RICHWOOD RD, WALTON, KY, 41094	4/26/1996	120	1.25	Plastic	1	EW		
512779	169 WINNING COLORS, WALTON, KY, 41094	7/13/1998	8	1.25	Plastic	9	WE		
312837	145 RICHWOOD RD, WALTON, KY, 41094	1/1/1969	76	3	Coated Steel	175	WW		
434923	11213 FRONTAGE RD, WALTON, KY, 41094	10/17/1991	70	1.25	Plastic	5	WW		
515937	340 RICHWOOD RD, WALTON, KY, 41094	10/3/2002	2	1	Plastic	1	SN		
528495	339 RICHWOOD RD, WALTON, KY, 41094	4/24/2003	3	1	Plastic	8	WW		
406961	287 RICHWOOD RD, WALTON, KY, 41094	4/26/1988	87	1.25	Plastic	7	WE		
426121	306 RICHWOOD RD, WALTON, KY, 41094	4/26/1996	3	1.25	Plastic	47	WW		
592635	None	1/23/2008	2	1	Plastic	61	WW		
528509	286 RICHWOOD RD, WALTON, KY, 41094	12/20/2001	1	1	Plastic	7	EW		
423546	319 RICHWOOD RD, WALTON, KY, 41094	4/26/1996	102	1.25	Plastic	14	EW		
515514	11263 PADDOCK DR, WALTON, KY, 41094	8/30/2001	11	1	Plastic	19	EW		
466239	11135 US RT 25, WALTON, KY, 41094	2/25/1994	4	1	Plastic	3	SN		

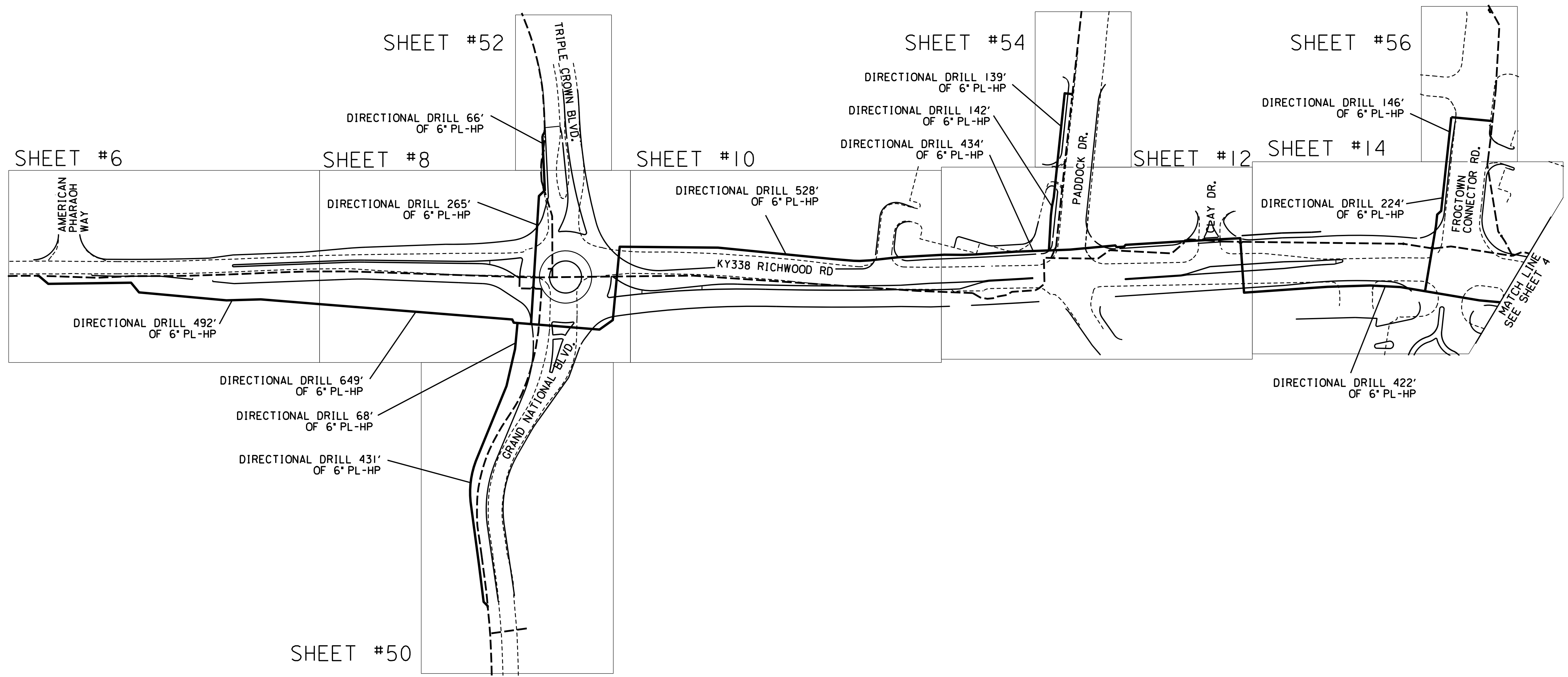
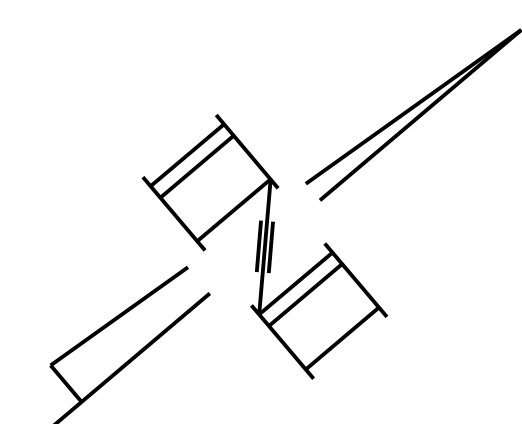
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

GAS DEPARTMENT  
DUKE ENERGY

3  
62

ERLANGER DISTRICT 0 50 100



REVISIONS

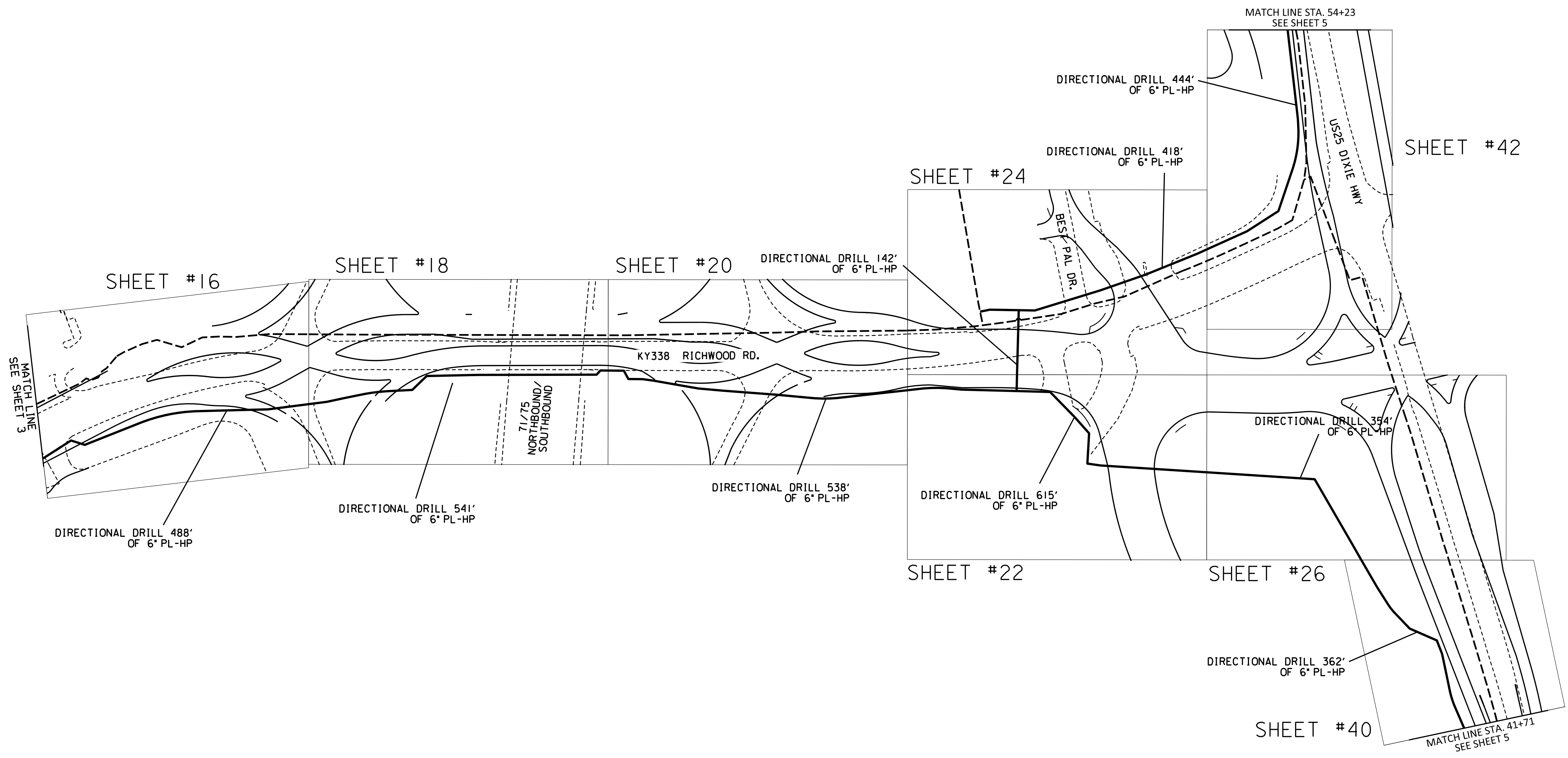
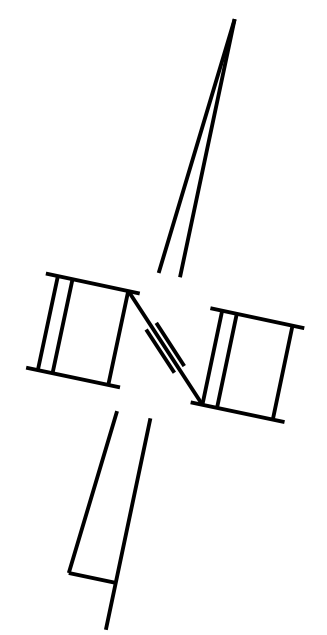
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COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

**GAS DEPARTMENT**  
DUKE ENERGY

4  
62

ERLANGER DISTRICT 0 50 100



REVISIONS

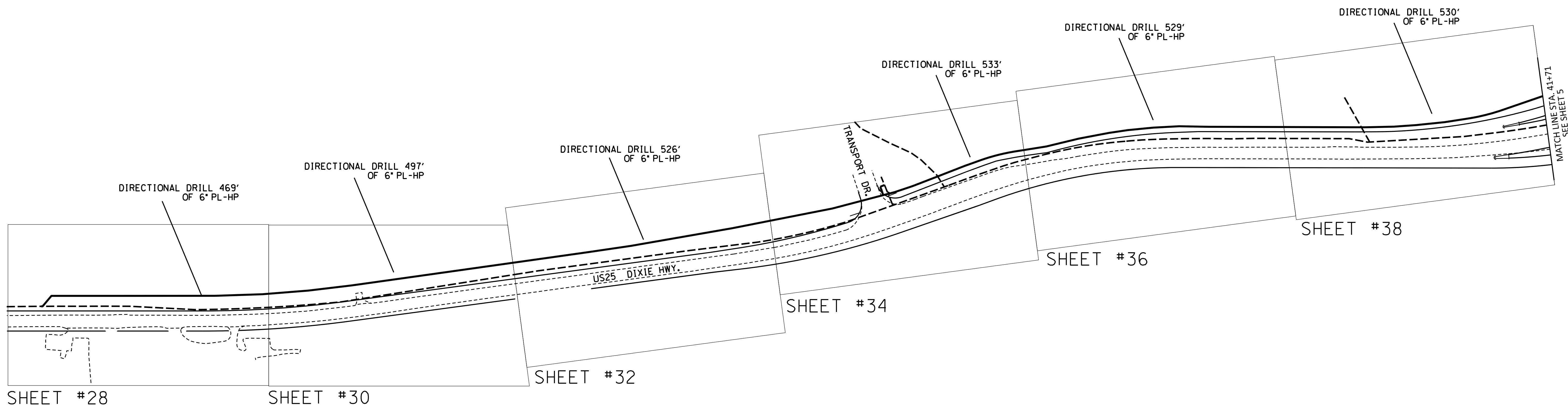
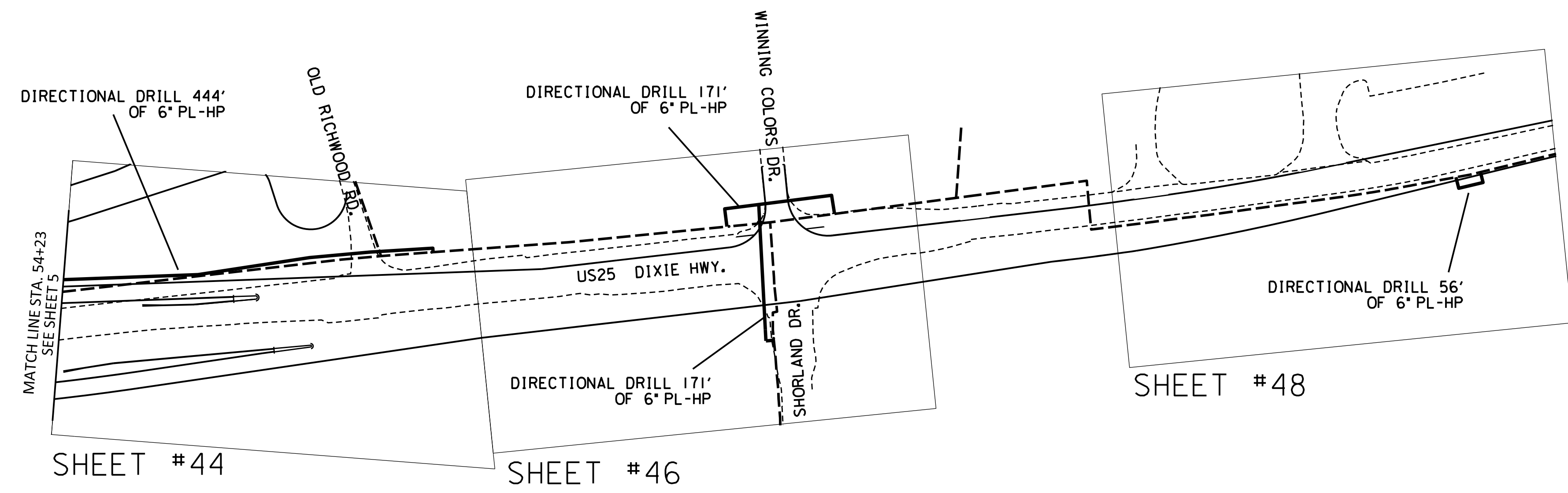
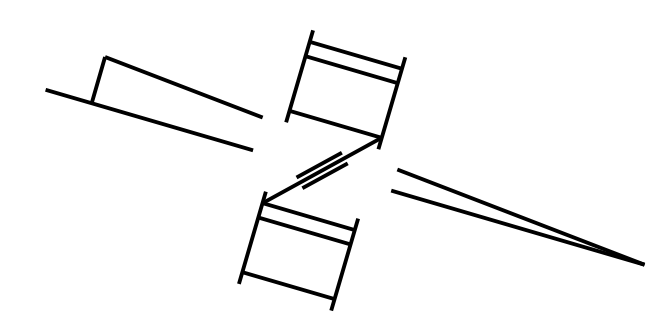
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COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

GAS DEPARTMENT  
DUKE ENERGY

5  
62

ERLANGER DISTRICT 0 50 100



REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

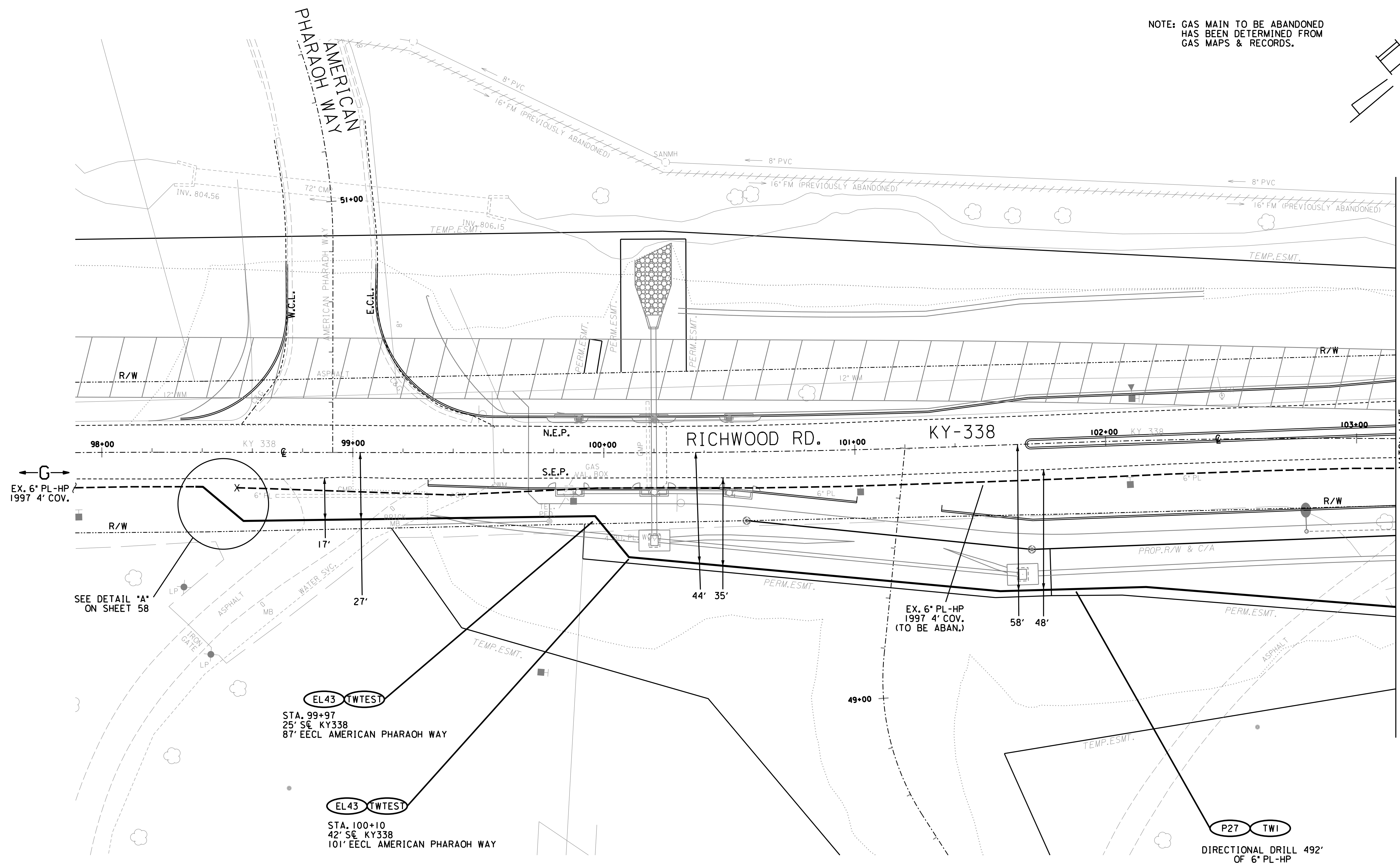
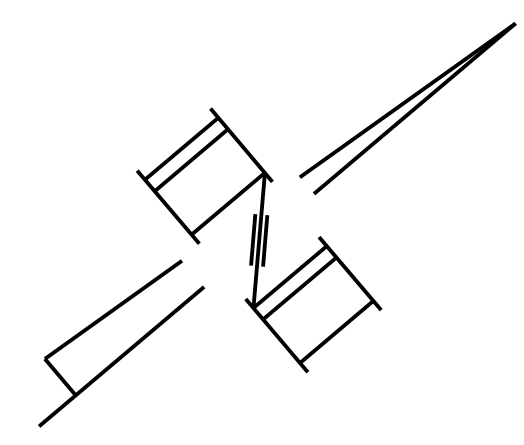
**GAS DEPARTMENT**  
DUKE ENERGY

6  
62

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED  
HAS BEEN DETERMINED FROM  
GAS MAPS & RECORDS.



← G  
EX. 6" PL-HP  
1997 4' COV.

SEE DETAIL 'A'  
ON SHEET 58

EL43 TWTEST  
STA. 99+97  
25' S.C. KY338  
87' EECL AMERICAN PHARAOH WAY

EL43 TWTEST  
STA. 100+10  
42' S.C. KY338  
101' EECL AMERICAN PHARAOH WAY

EX. 6" PL-HP  
1997 4' COV.  
(TO BE ABAN.)

P27 TWI  
DIRECTIONAL DRILL 492'  
OF 6" PL-HP

MATCH LINE  
SEE SHEET 8

REVISIONS

0 2 9 5 4 5 5 6 6

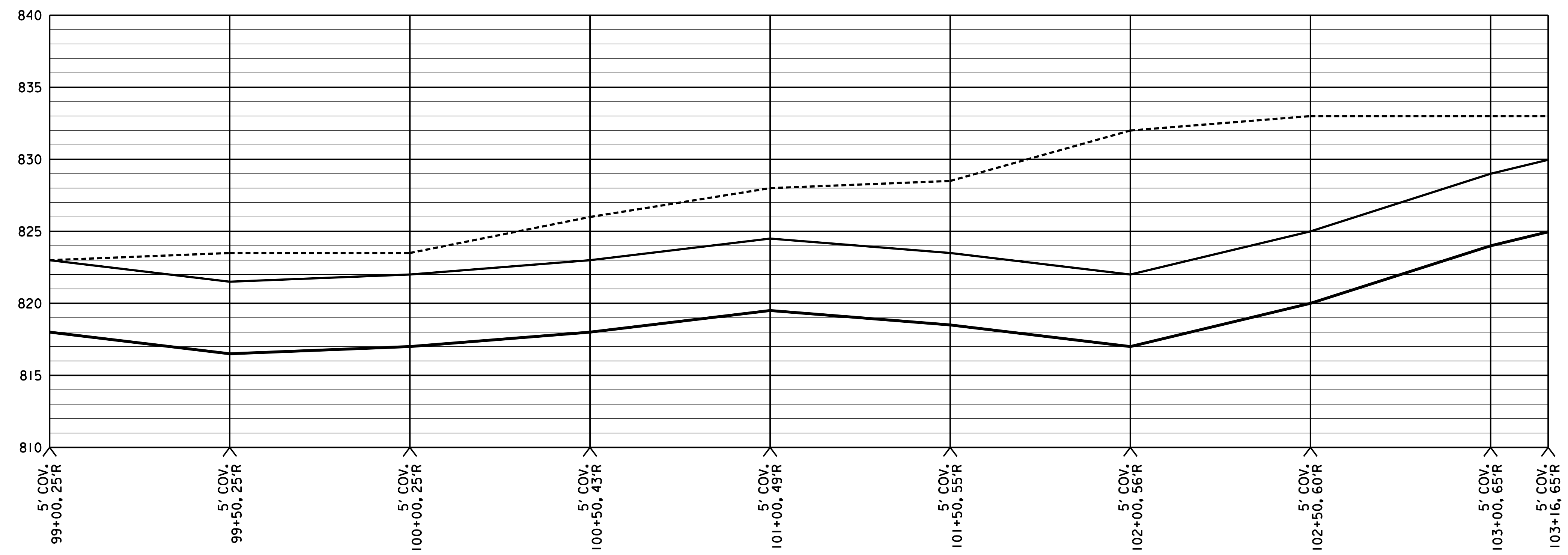


COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

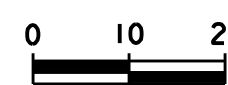
**GAS DEPARTMENT**  
DUKE ENERGY


7  
62


ERLANGER DISTRICT  NTS





**PROFILE "A"**  
FROM SHEET 6

HORIZ. SCALE 

VERT. SCALE 

PROP. GAS MAIN 

PROP. GRADE 

EX. GRADE 

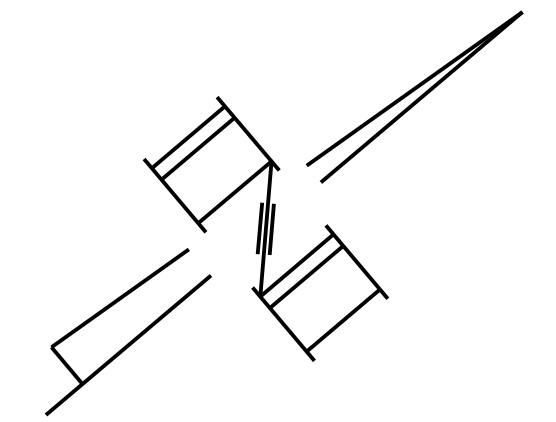
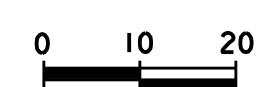
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

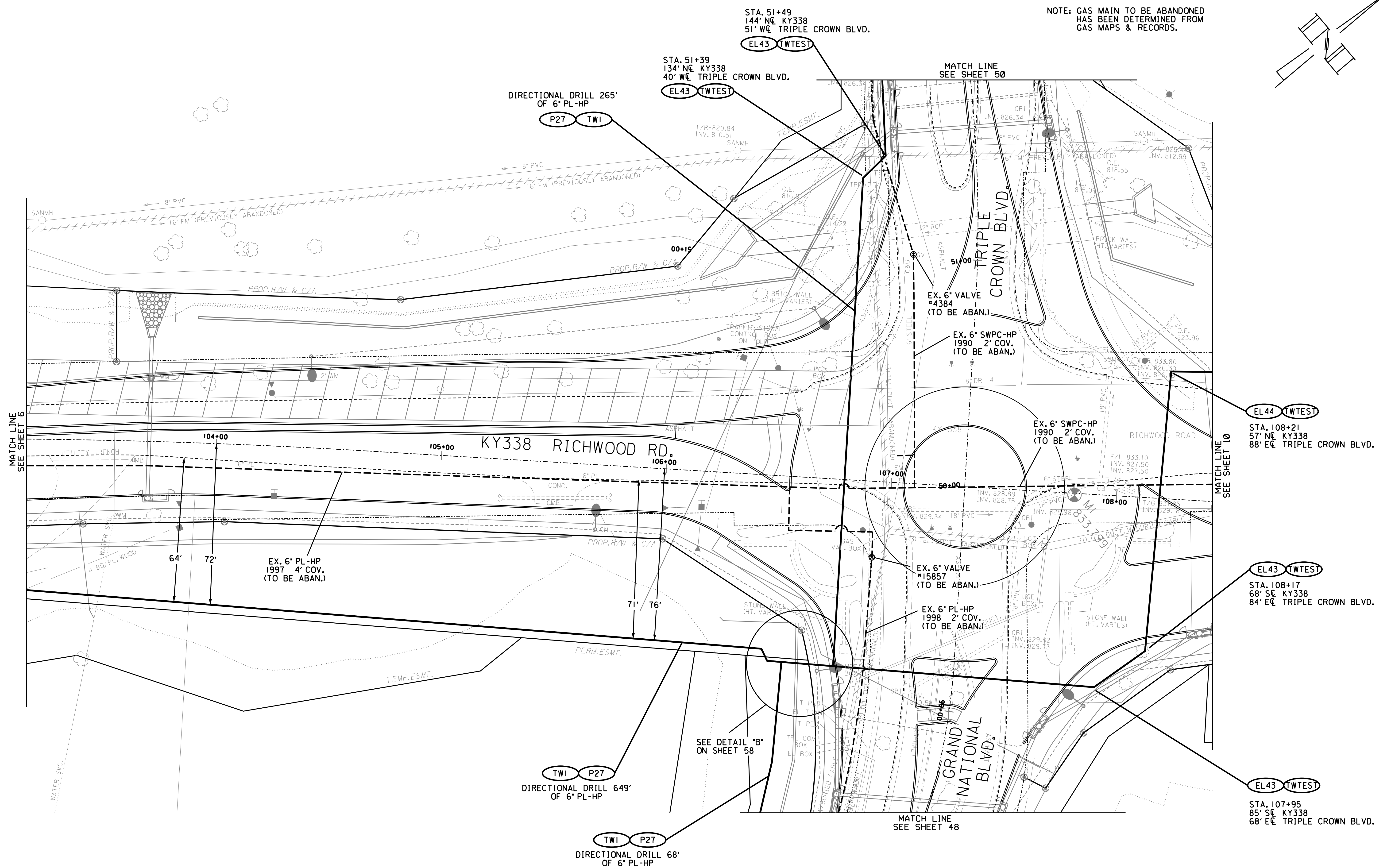
**GAS DEPARTMENT**  
DUKE ENERGY

8  
62

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED HAS BEEN DETERMINED FROM GAS MAPS & RECORDS.



MATCH LINE  
SEE SHEET 6

MATCH LINE  
SEE SHEET 10

MATCH LINE  
SEE SHEET 48

REVISIONS

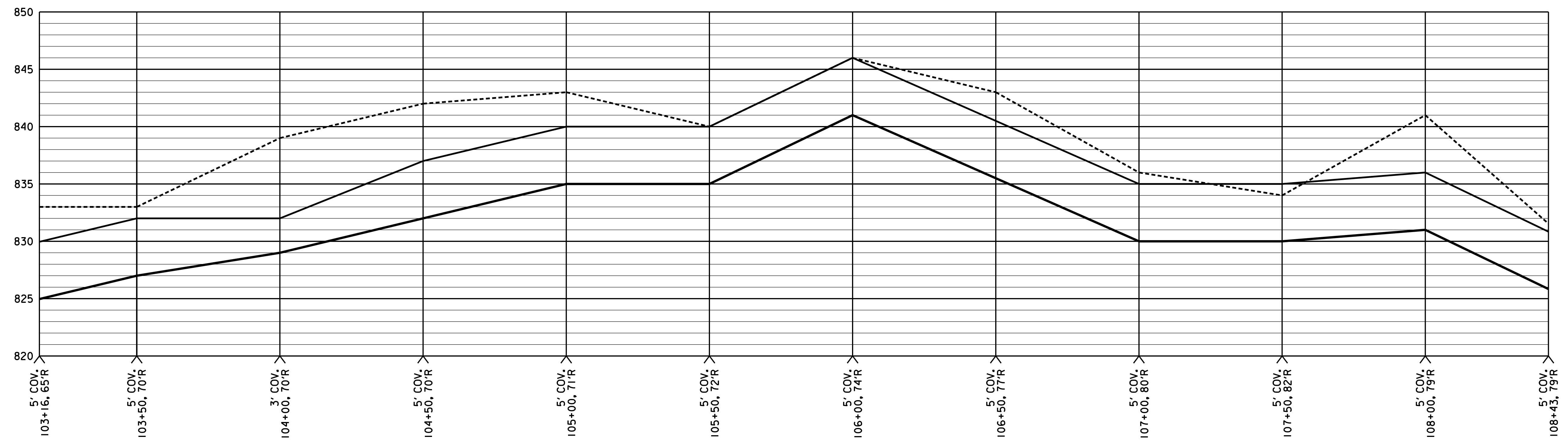
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COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

**GAS DEPARTMENT**  
DUKE ENERGY

9  
62

ERLANGER DISTRICT **NTS**



**PROFILE "B"**  
FROM SHEET 8

HORIZ. SCALE 0 10 20  
VERT. SCALE 0 2.5 5

PROP. GAS MAIN ———  
PROP. GRADE ———  
EX. GRADE - - - - -

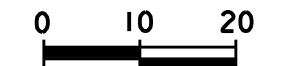
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

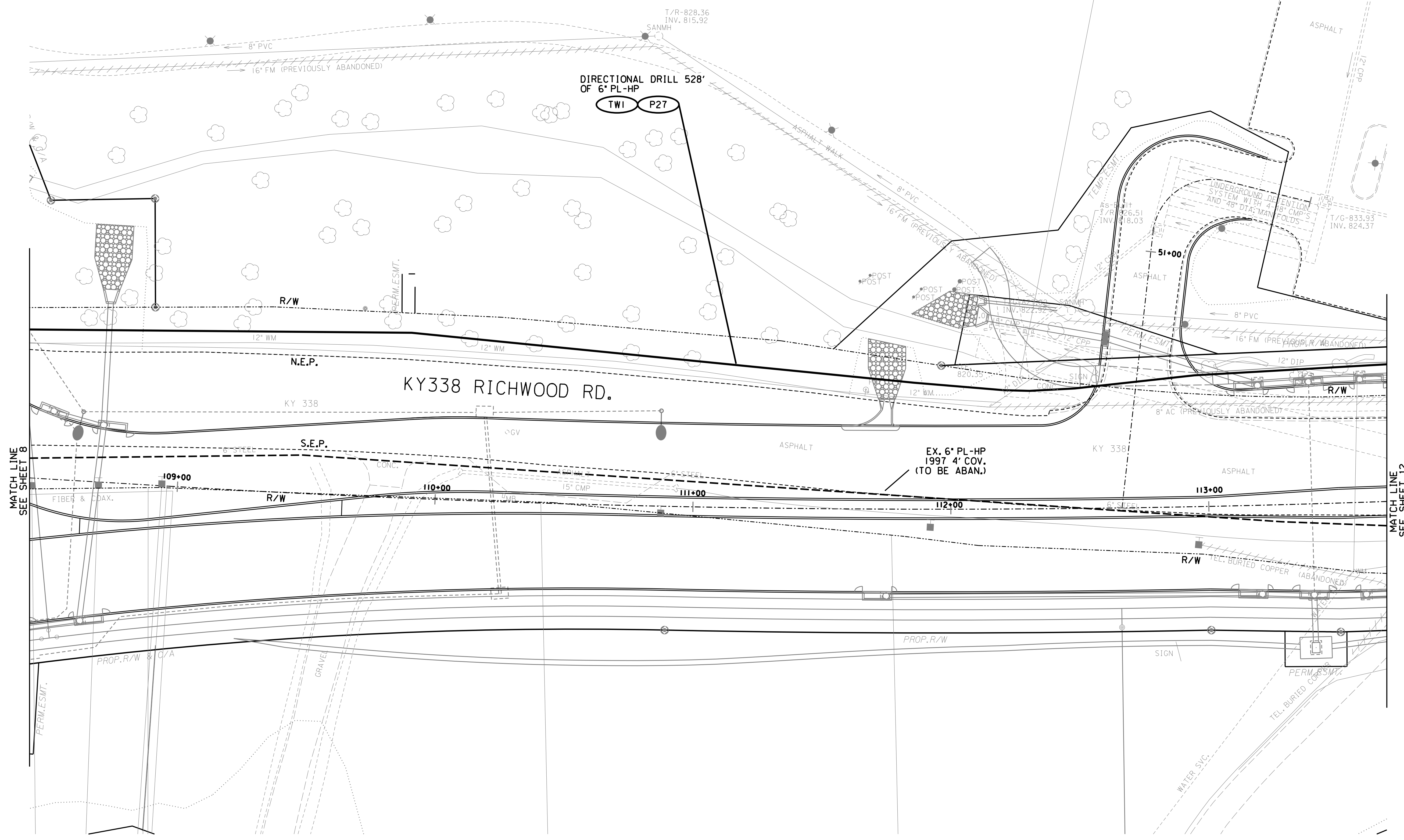
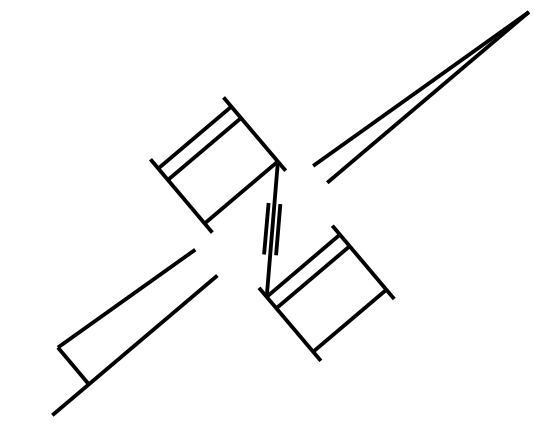
**GAS DEPARTMENT**  
DUKE ENERGY

10  
62

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED HAS BEEN DETERMINED FROM GAS MAPS & RECORDS.



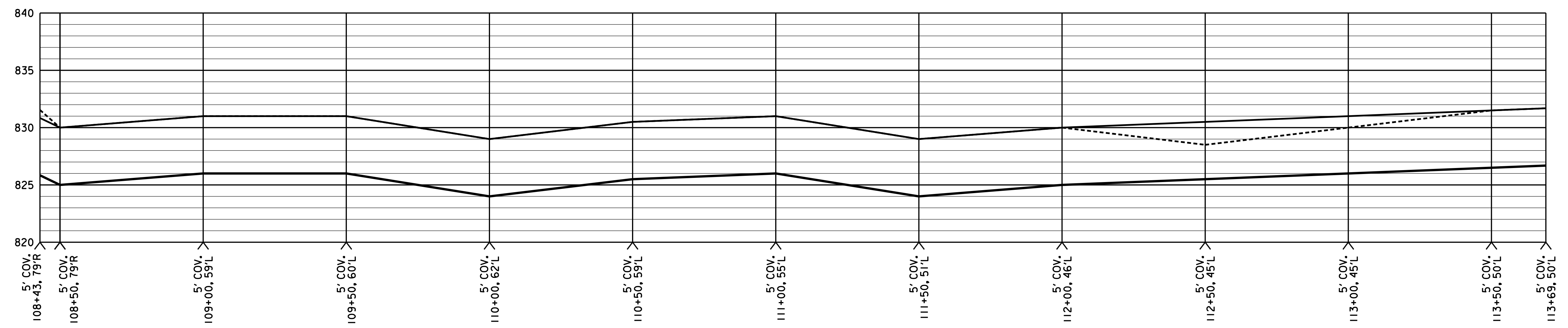
MATCH LINE  
SEE SHEET 8

MATCH LINE  
SEE SHEET 12

REVISIONS

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COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	



**PROFILE "C"**

FROM SHEET 9



- PROP. GAS MAIN
- PROP. GRADE
- EX. GRADE

REVISIONS

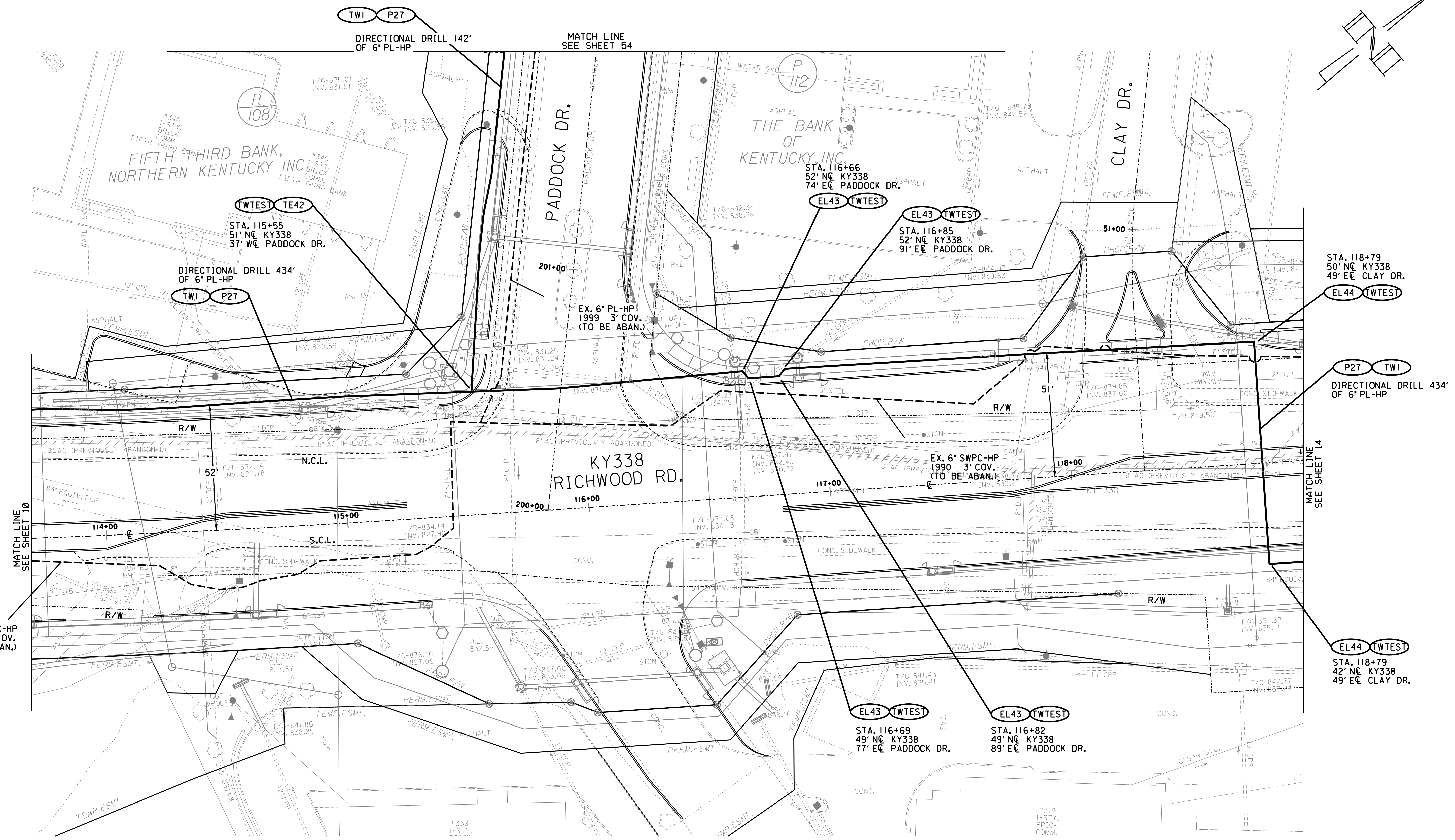
COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

**GAS DEPARTMENT**  
DUKE ENERGY

12  
62

ERLANGER DISTRICT

NOTE: GAS MAIN TO BE ABANDONED  
HAS BEEN DETERMINED FROM  
GAS MAPS & RECORDS.



REVISIONS

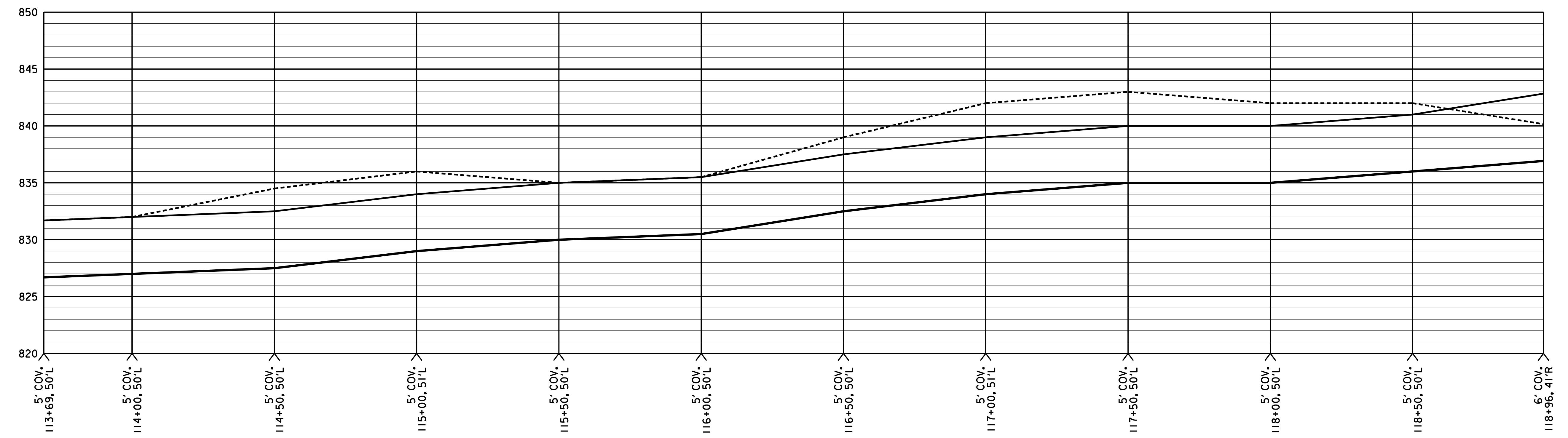
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COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

**GAS DEPARTMENT**  
DUKE ENERGY

13  
62

ERLANGER DISTRICT  NTS




**PROFILE "D"**  
FROM SHEET 12

HORIZ. SCALE 

VERT. SCALE 

PROP. GAS MAIN 

PROP. GRADE 

EX. GRADE 

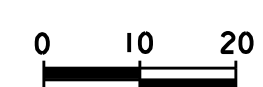
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

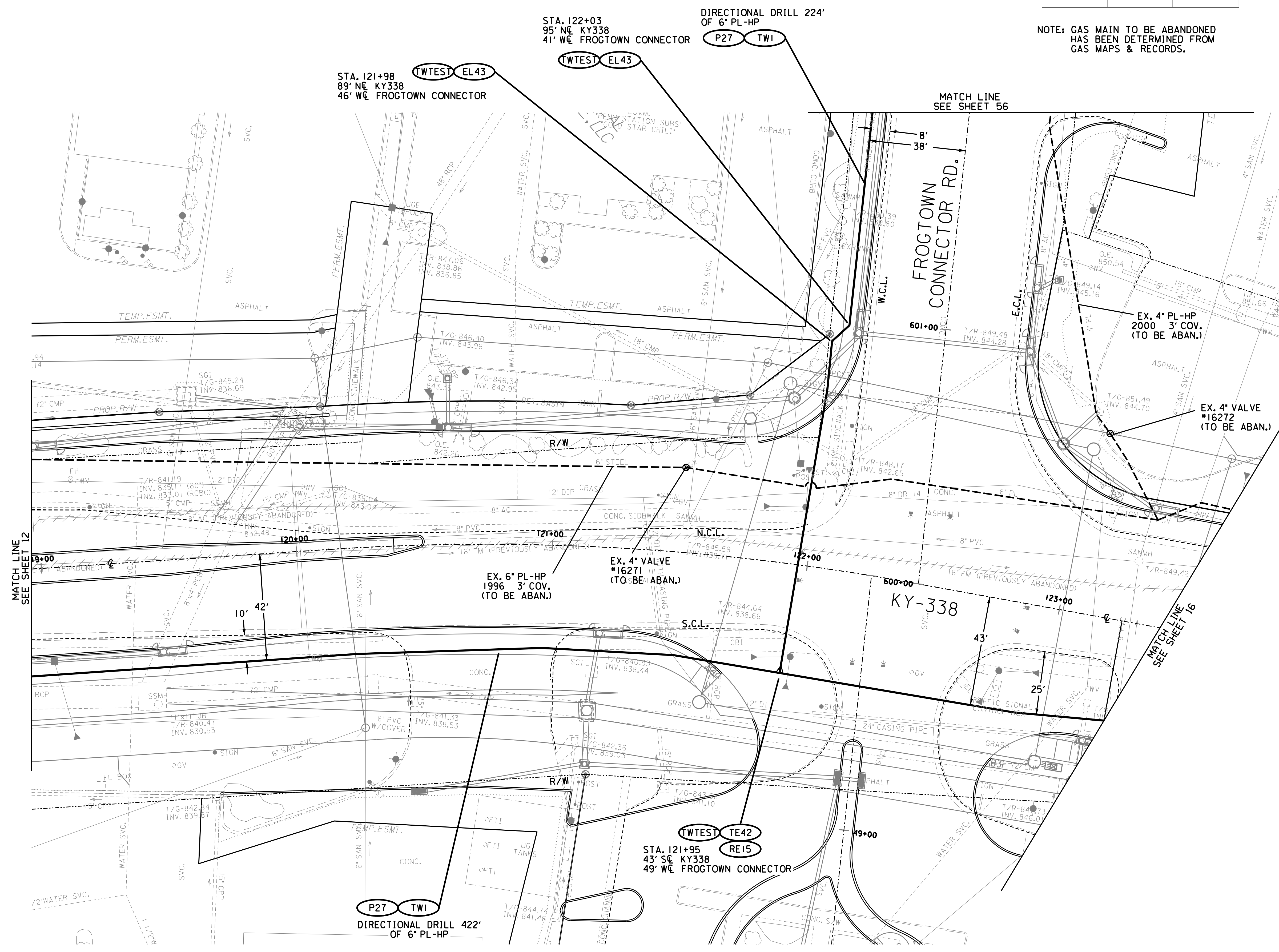
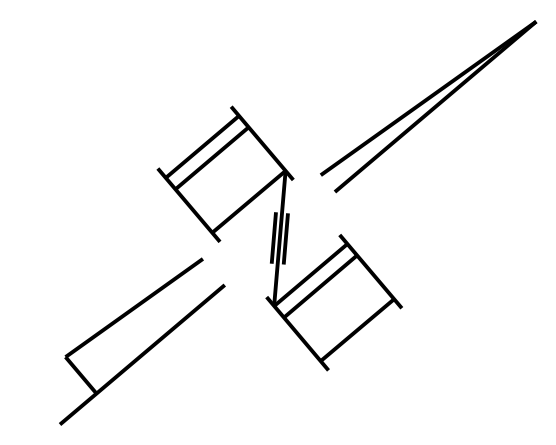
**GAS DEPARTMENT**  
DUKE ENERGY

14  
62

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED  
HAS BEEN DETERMINED FROM  
GAS MAPS & RECORDS.



MATCH LINE  
SEE SHEET 12

MATCH LINE  
SEE SHEET 16

REVISIONS

0	2	9	5	4	5	5	6	6
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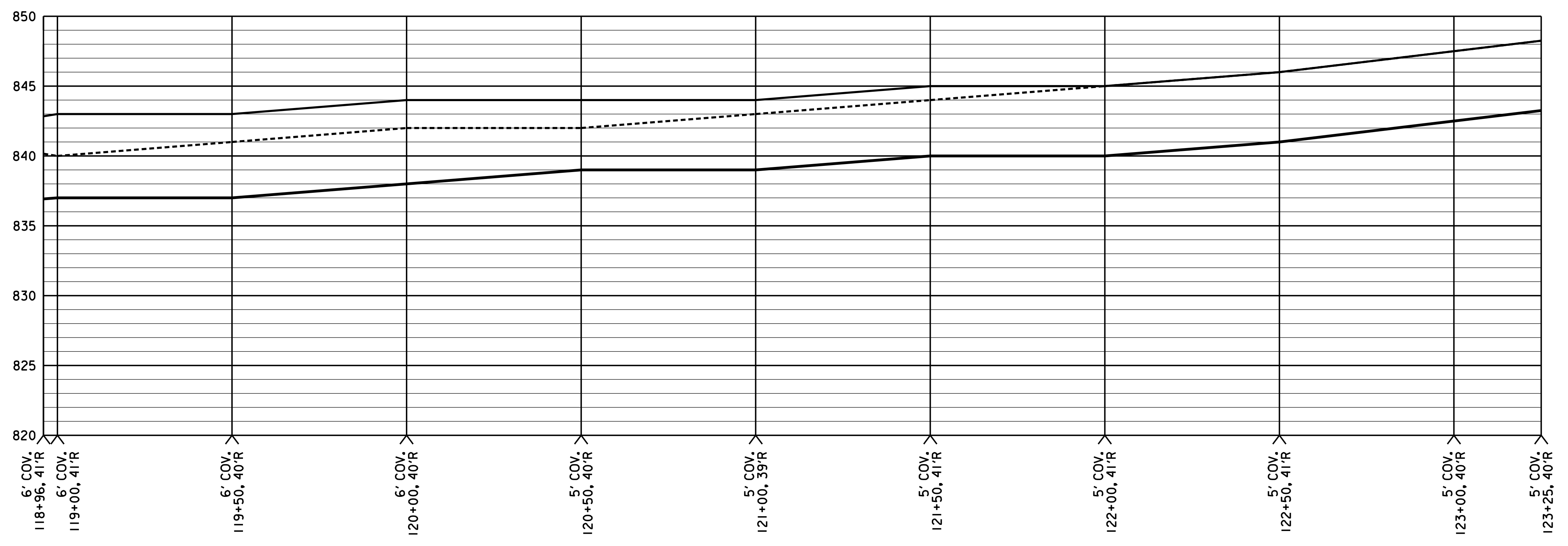


COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

**GAS DEPARTMENT**  
DUKE ENERGY

15  
62

ERLANGER DISTRICT  NTS



**PROFILE "E"**

FROM SHEET 14

HORIZ. SCALE 

VERT. SCALE 

PROP. GAS MAIN 

PROP. GRADE 

EX. GRADE 

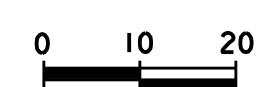
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

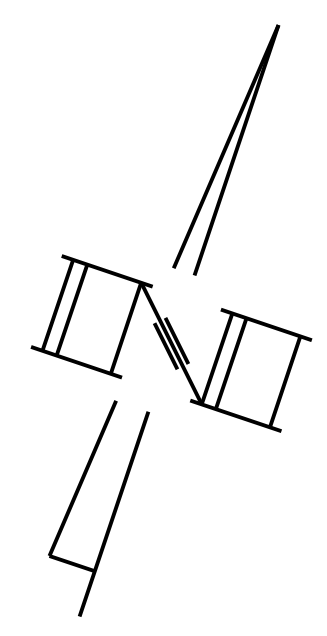
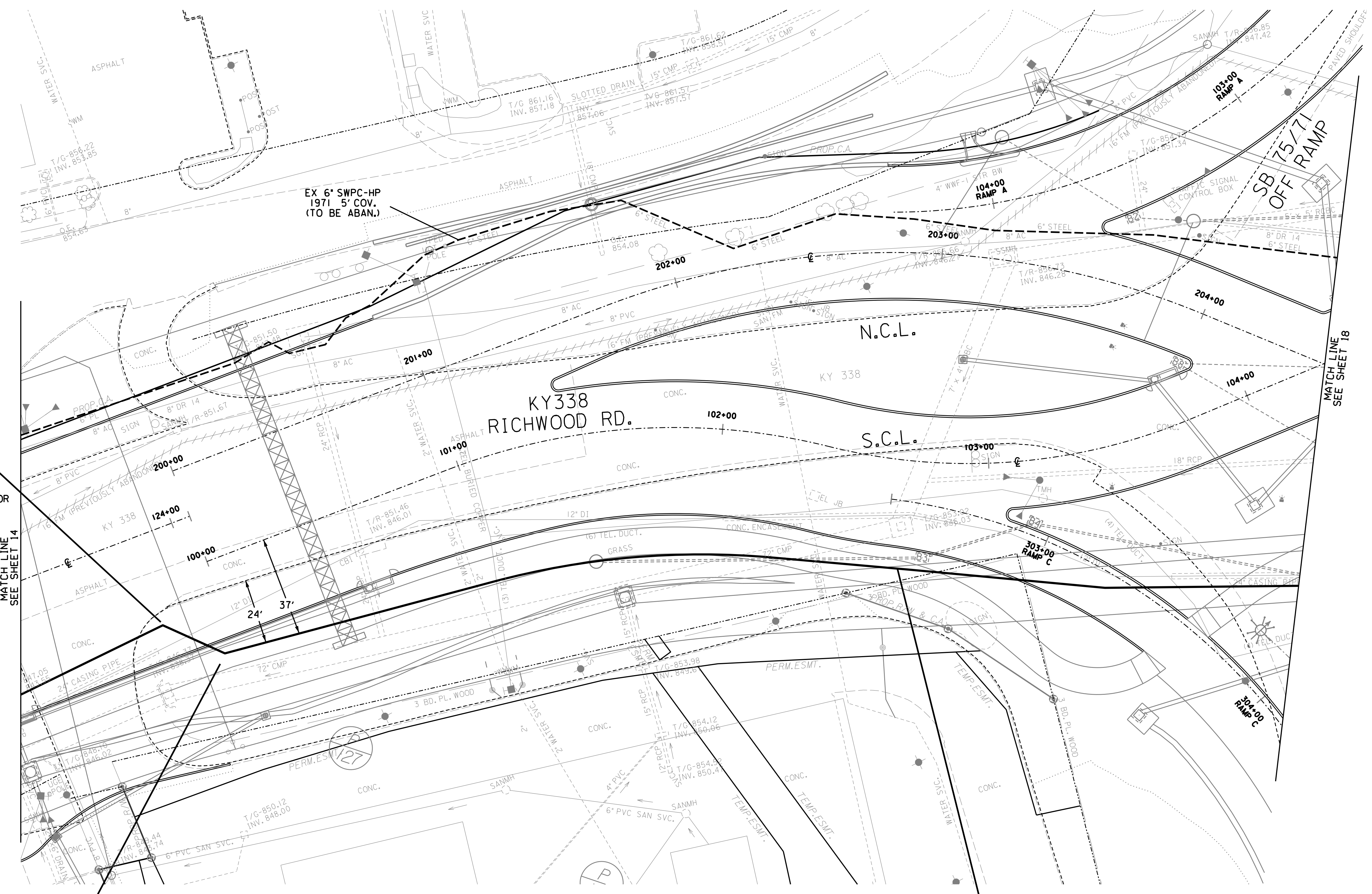
**GAS DEPARTMENT**  
DUKE ENERGY

16  
62

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED  
HAS BEEN DETERMINED FROM  
GAS MAPS & RECORDS.



EL43 TWTEST  
STA. 123+83  
34' S of KY338  
139' E of FROGTOWN CONNECTOR

MATCH LINE  
SEE SHEET 14

EL43 TWTEST  
STA. 124+01  
52' S of KY338  
157' E of FROGTOWN CONNECTOR

P27 TWI  
DIRECTIONAL DRILL 488'  
OF 6\"/>

REVISIONS

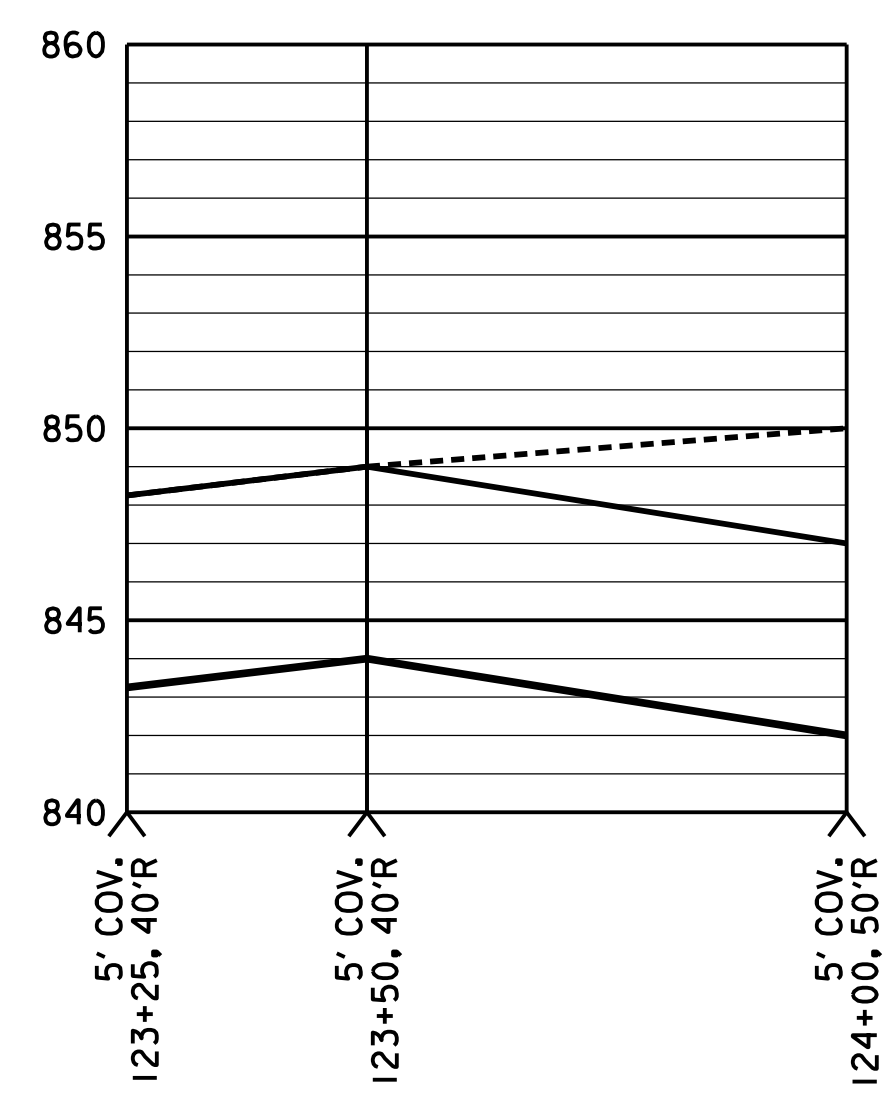
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COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

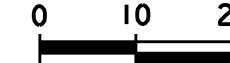
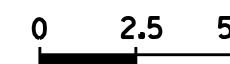



**GAS DEPARTMENT**  
DUKE ENERGY

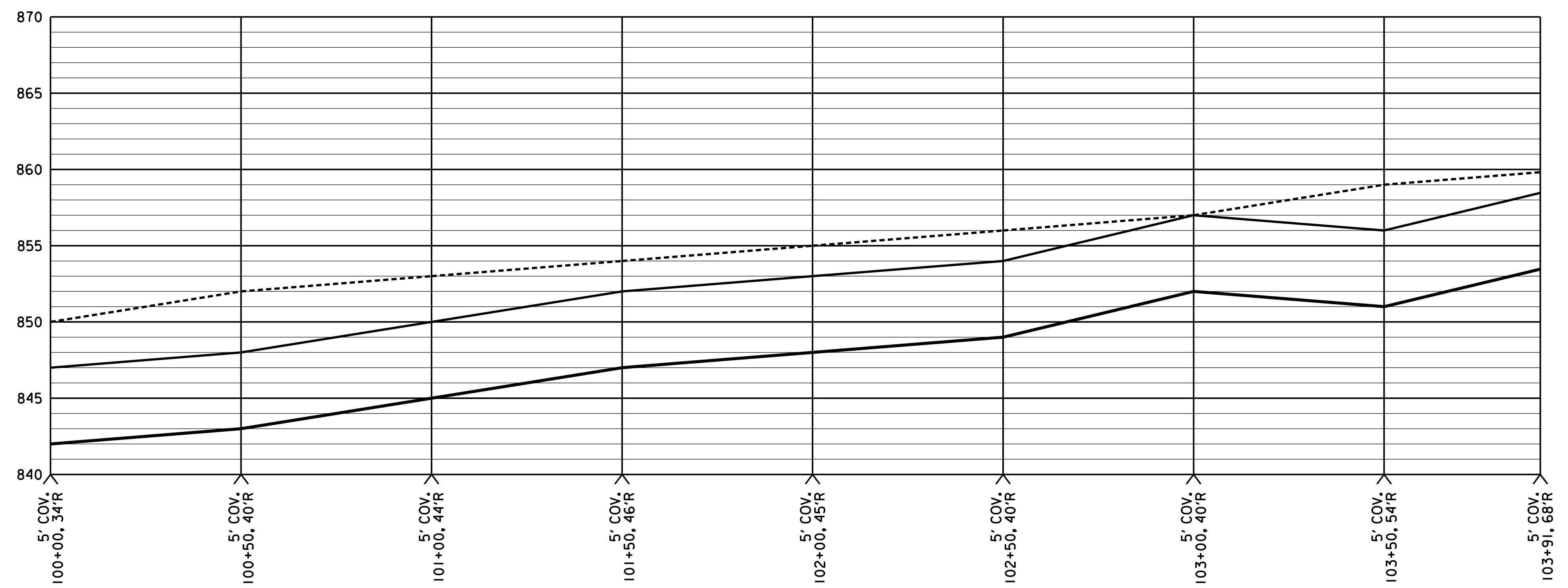
17  
62

ERLANGER DISTRICT  NTS

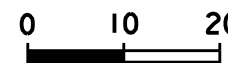
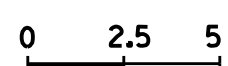





**PROFILE "F"**  
FROM SHEET 16

HORIZ. SCALE   
 VERT. SCALE   
 PROP. GAS MAIN   
 PROP. GRADE   
 EX. GRADE 



**PROFILE "G"**  
FROM SHEET 16

HORIZ. SCALE   
 VERT. SCALE   
 PROP. GAS MAIN   
 PROP. GRADE   
 EX. GRADE 

REVISIONS

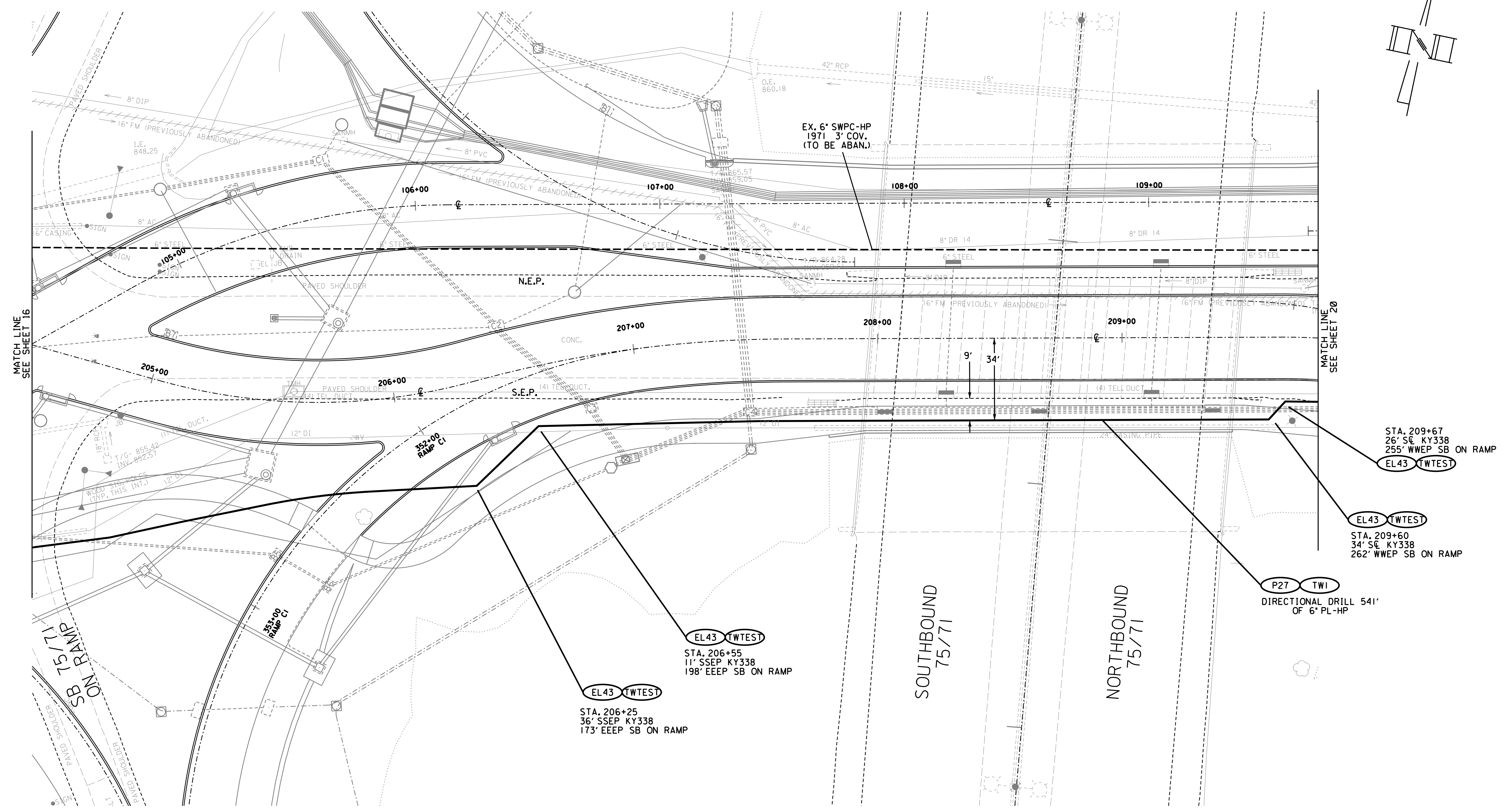
COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

**GAS DEPARTMENT**  
DUKE ENERGY

18  
62

ERLANGER DISTRICT

NOTE: GAS MAIN TO BE ABANDONED  
HAS BEEN DETERMINED FROM  
GAS MAPS & RECORDS.



MATCH LINE  
SEE SHEET 16

MATCH LINE  
SEE SHEET 20

STA. 209+67  
26' SE KY338  
255' WWEP SB ON RAMP  
EL43 TWTEST

EL43 TWTEST  
STA. 209+60  
34' SE KY338  
262' WWEP SB ON RAMP

P27 TWI  
DIRECTIONAL DRILL 541'  
OF 6" PL-HP

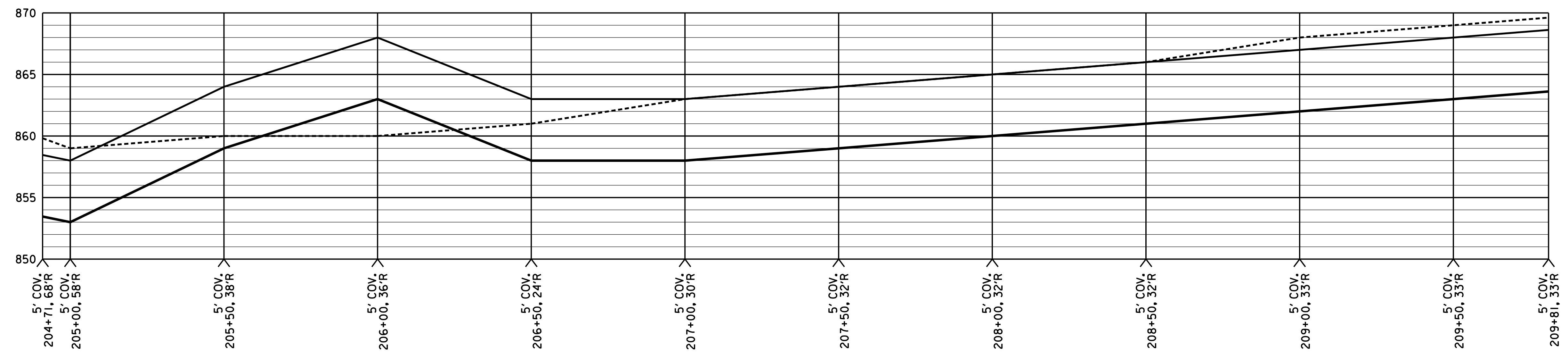
EL43 TWTEST  
STA. 206+55  
11' SSEP KY338  
198' EEEP SB ON RAMP

EL43 TWTEST  
STA. 206+25  
36' SSEP KY338  
173' EEEP SB ON RAMP

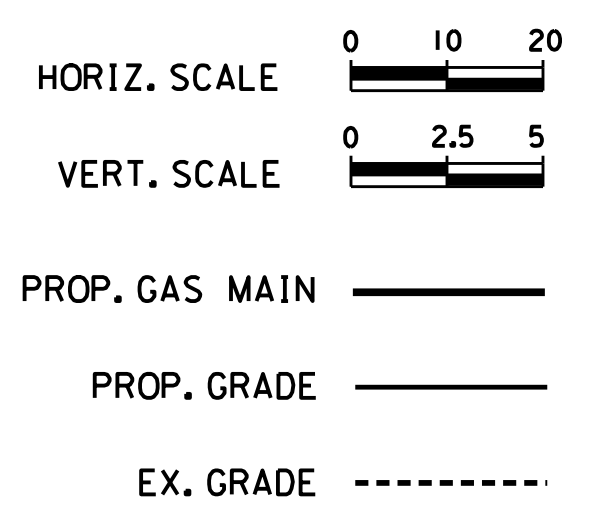
REVISIONS

0 2 9 5 4 5 5 6 6

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	



**PROFILE "H"**  
FROM SHEET 18



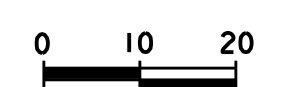
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

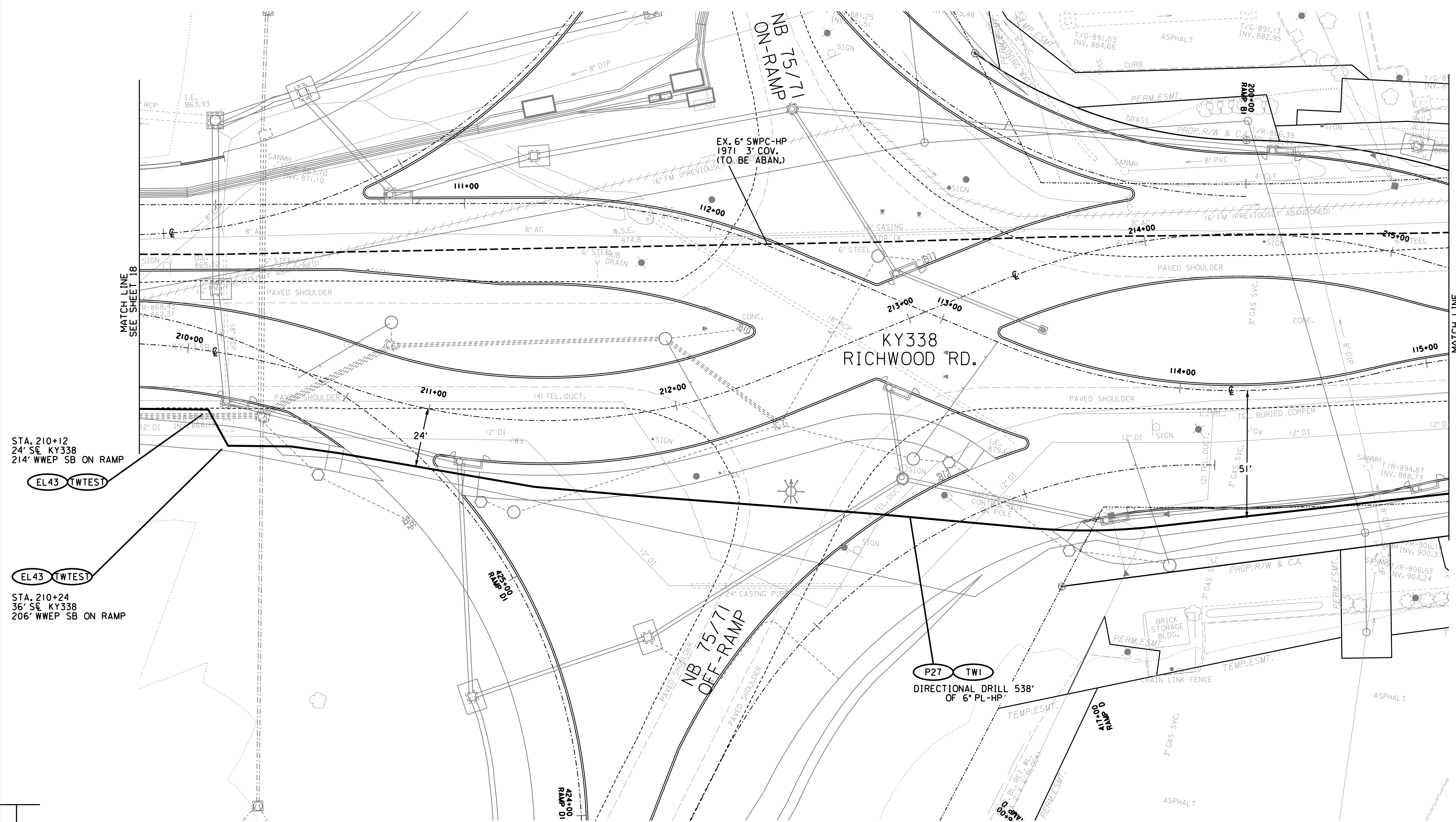
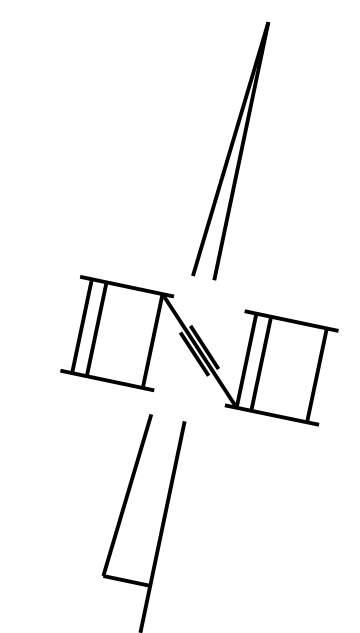
**GAS DEPARTMENT**  
DUKE ENERGY

20  
62

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED  
HAS BEEN DETERMINED FROM  
GAS MAPS & RECORDS.



STA. 210+12  
24' SE KY338  
214' WWEP SB ON RAMP  
EL43 TWTEST

STA. 210+24  
36' SE KY338  
206' WWEP SB ON RAMP  
EL43 TWTEST

P27 TWI  
DIRECTIONAL DRILL 538'  
OF 6\"/>

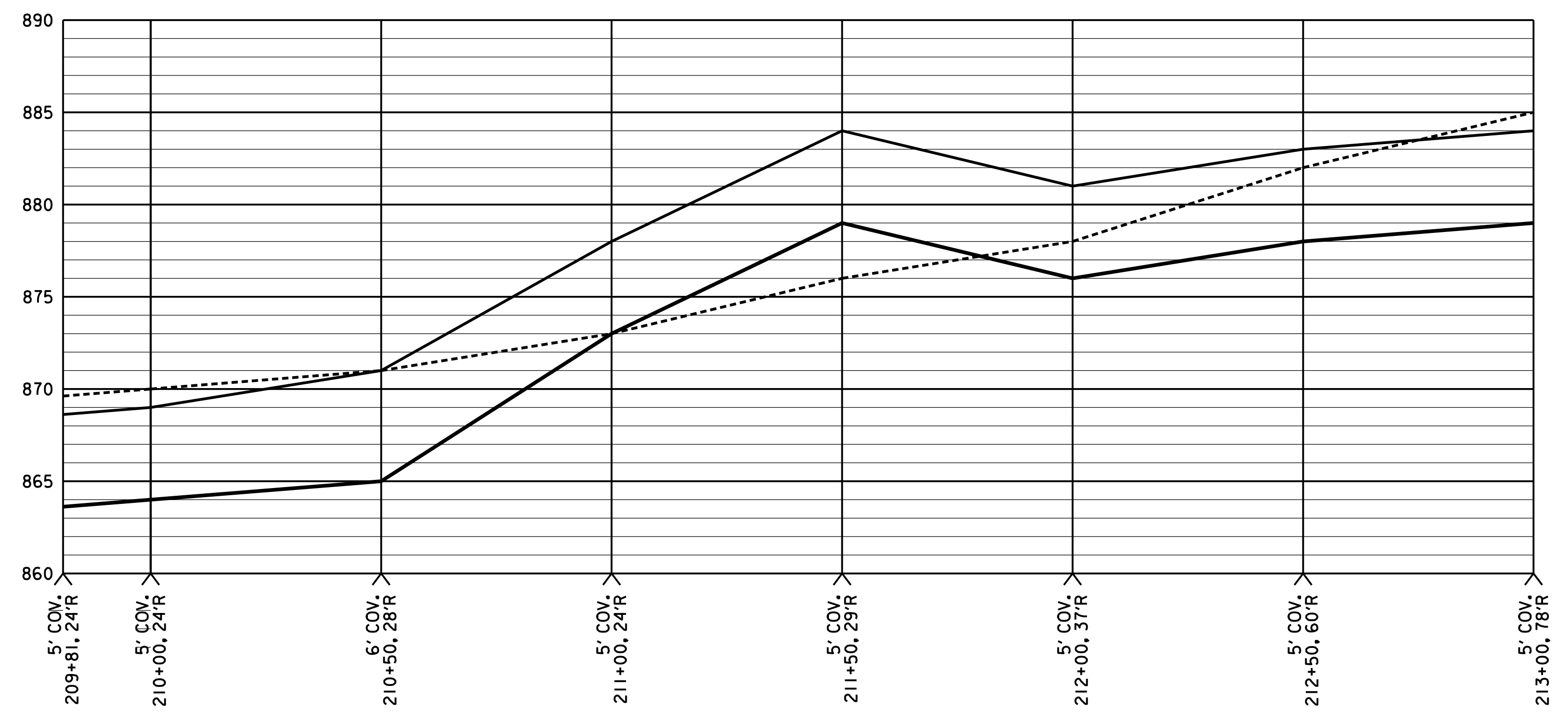
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

**GAS DEPARTMENT**  
DUKE ENERGY

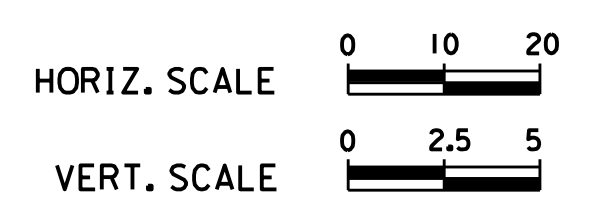
21  
62


ERLANGER DISTRICT  NTS





**PROFILE "I"**

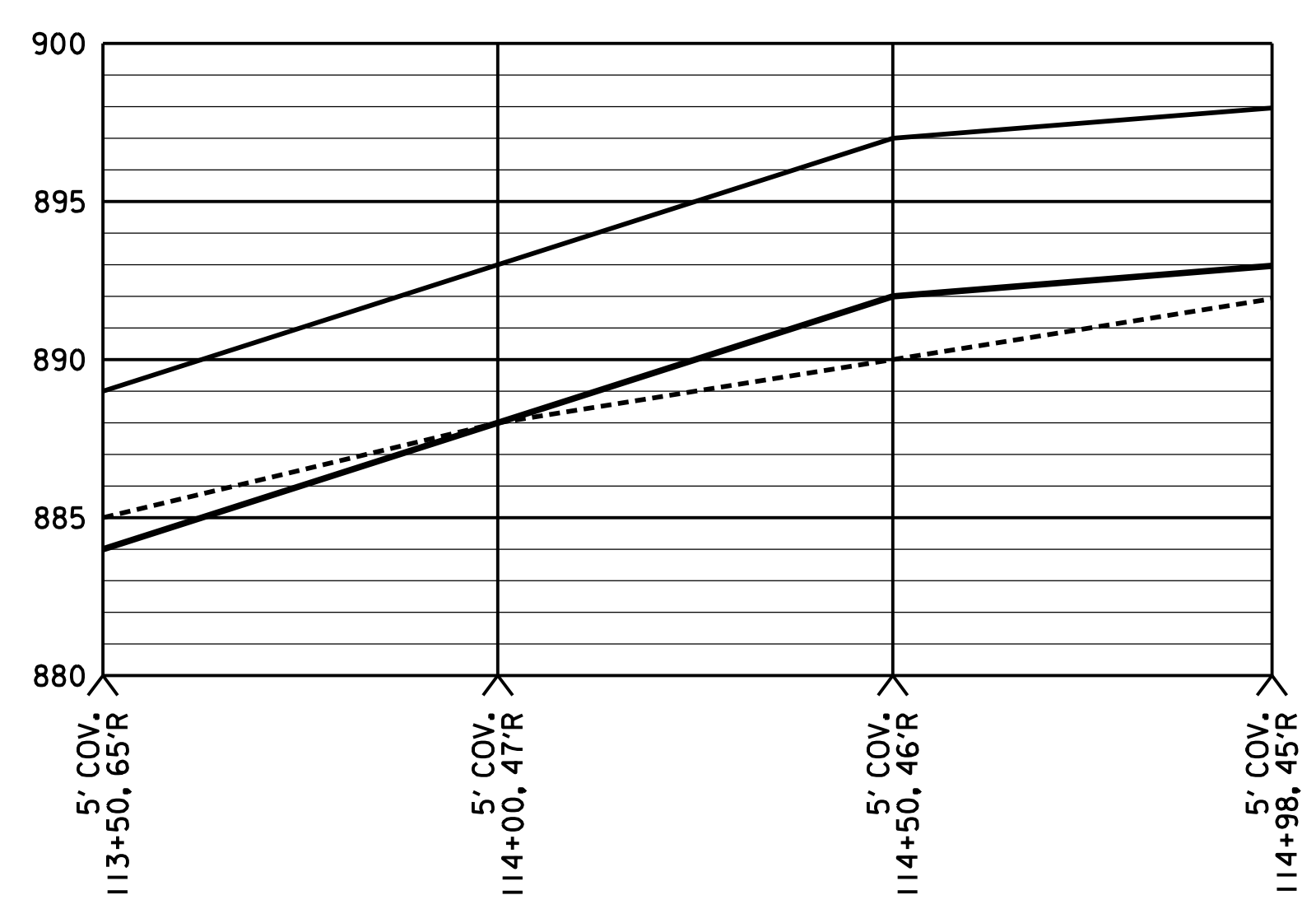
FROM SHEET 20



PROP. GAS MAIN 

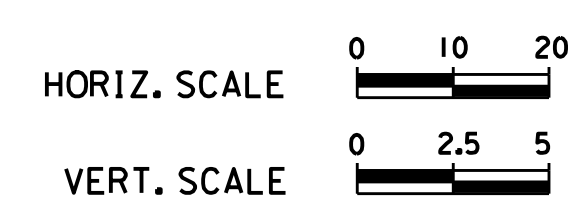
PROP. GRADE 


EX. GRADE 





**PROFILE "J"**

FROM SHEET 20



PROP. GAS MAIN 

PROP. GRADE 

EX. GRADE 

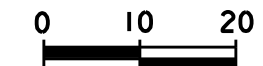
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

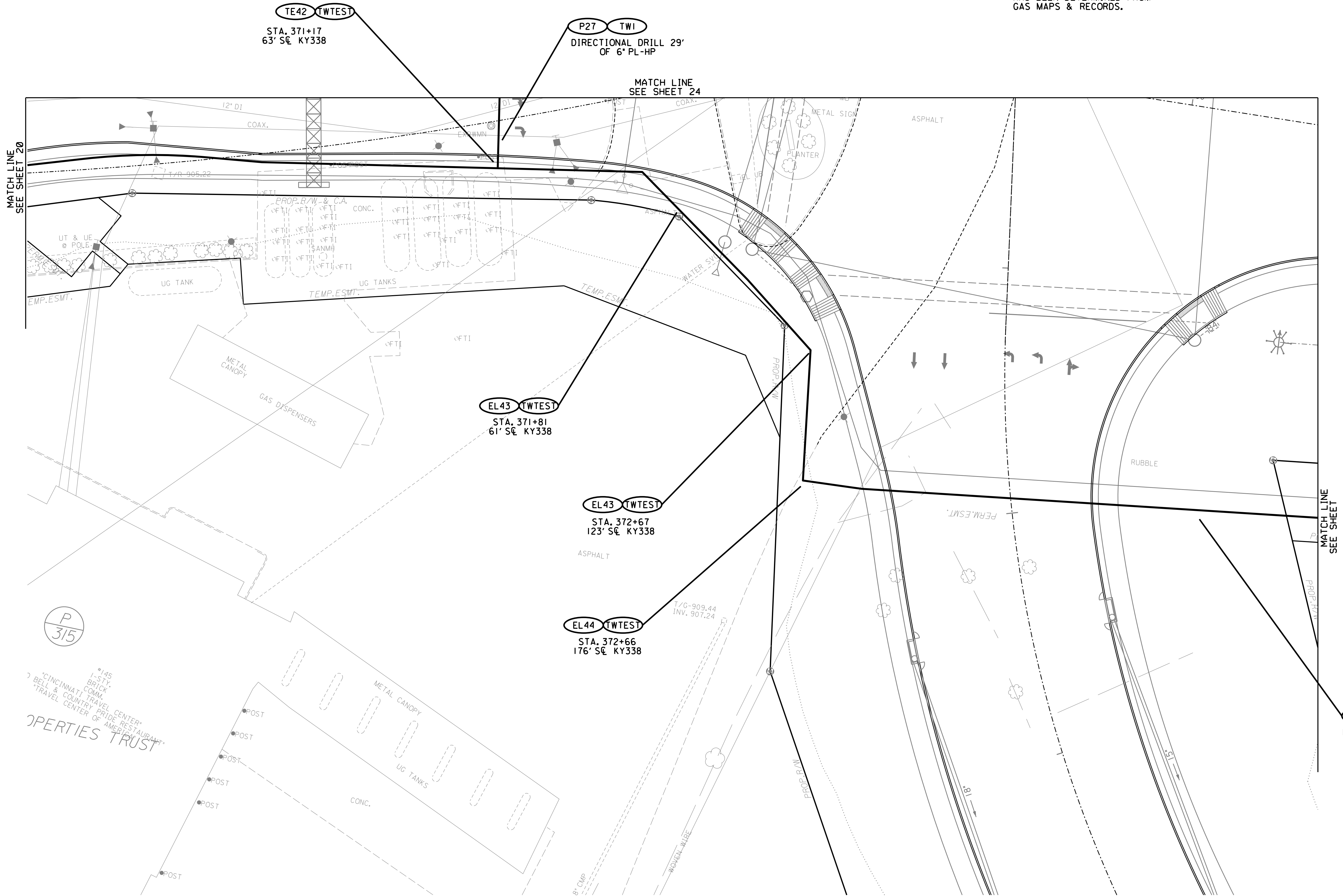
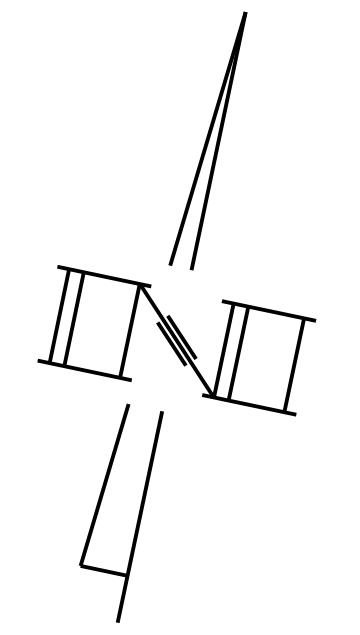
**GAS DEPARTMENT**  
DUKE ENERGY

22  
62

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED  
HAS BEEN DETERMINED FROM  
GAS MAPS & RECORDS.



P  
315

#145  
1-1/2 STY.  
BRICK  
COMM.  
"CINCINNATI TRAVEL CENTER"  
"BELL & COUNTRY PRIDE RESTAURANT"  
"TRAVEL CENTER OF AMERICA"  
PROPERTIES TRUST

REVISIONS

0 2 9 5 4 5 5 6 6

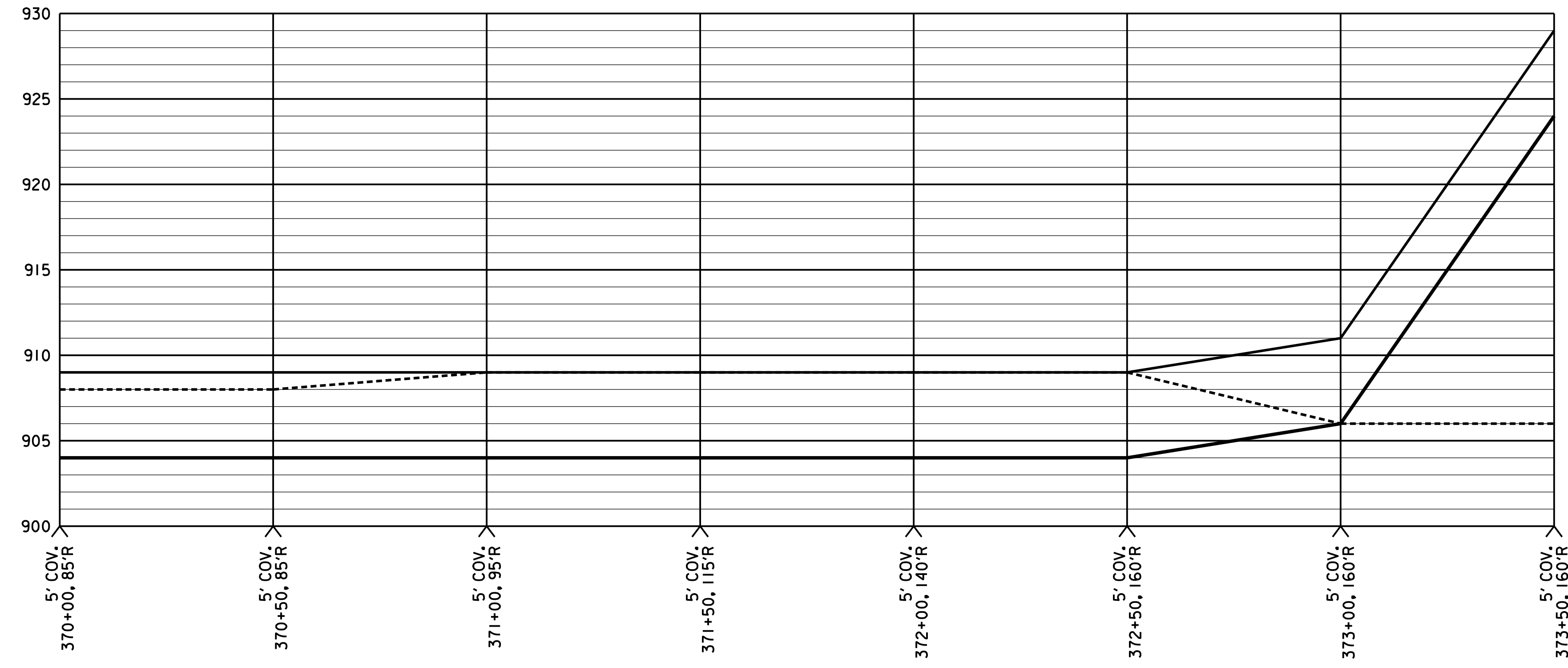


COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

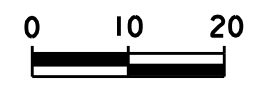


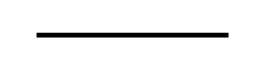

**GAS DEPARTMENT**  
DUKE ENERGY

23  
62

ERLANGER DISTRICT  NTS



**PROFILE "K"**  
FROM SHEET 22

HORIZ. SCALE   
 VERT. SCALE   
 PROP. GAS MAIN   
 PROP. GRADE   
 EX. GRADE 

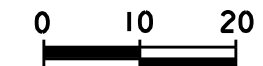
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

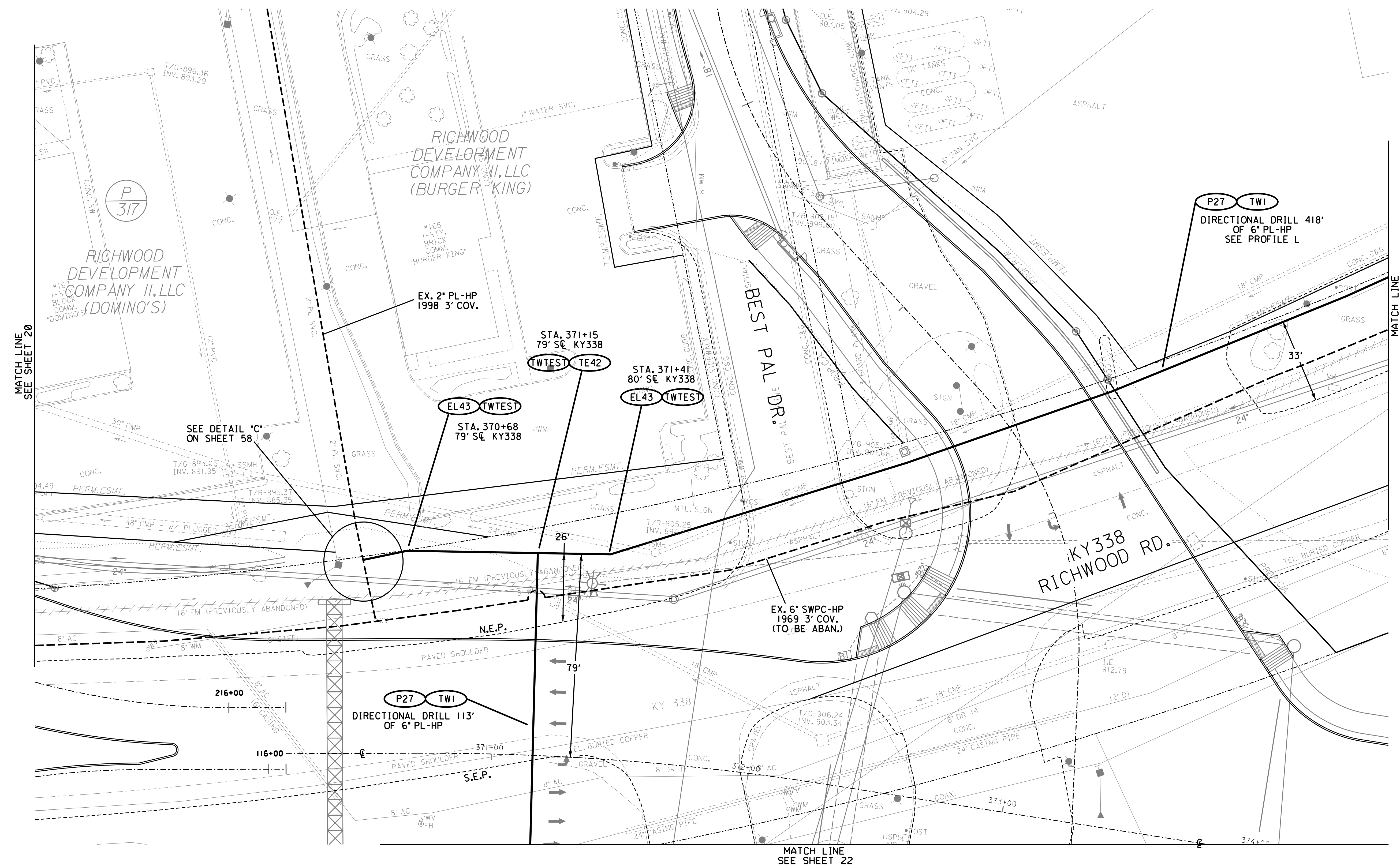
**GAS DEPARTMENT**  
DUKE ENERGY

24  
62

ERLANGER DISTRICT



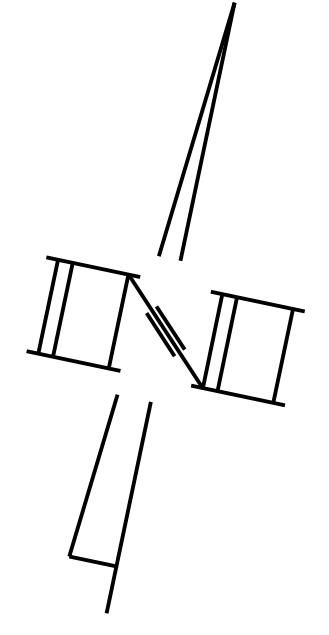
NOTE: GAS MAIN TO BE ABANDONED  
HAS BEEN DETERMINED FROM  
GAS MAPS & RECORDS.



MATCH LINE  
SEE SHEET 20

MATCH LINE  
SEE SHEET

MATCH LINE  
SEE SHEET 22



REVISIONS

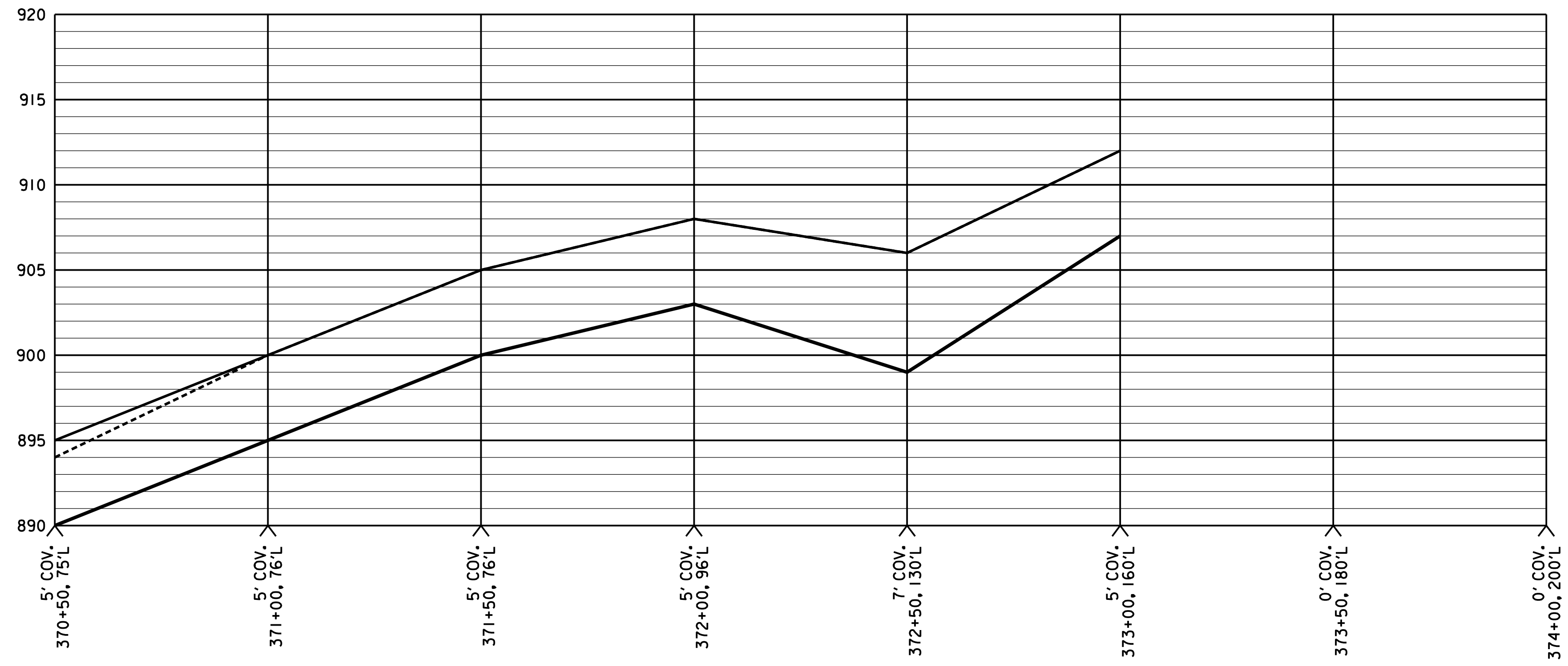
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COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

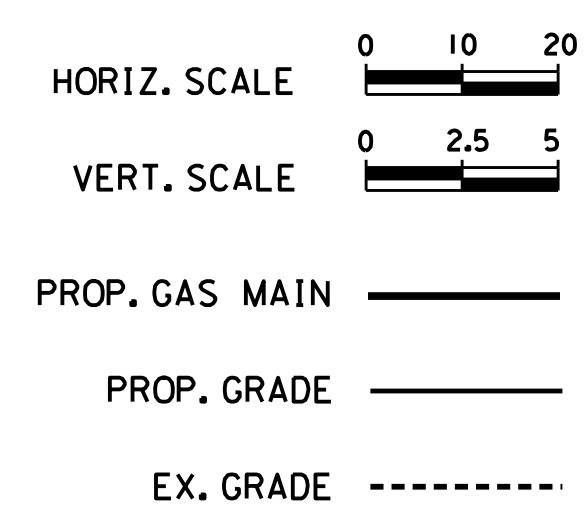
GAS DEPARTMENT  
DUKE ENERGY

25  
62

ERLANGER DISTRICT NTS



PROFILE "L"  
FROM SHEET 24



REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

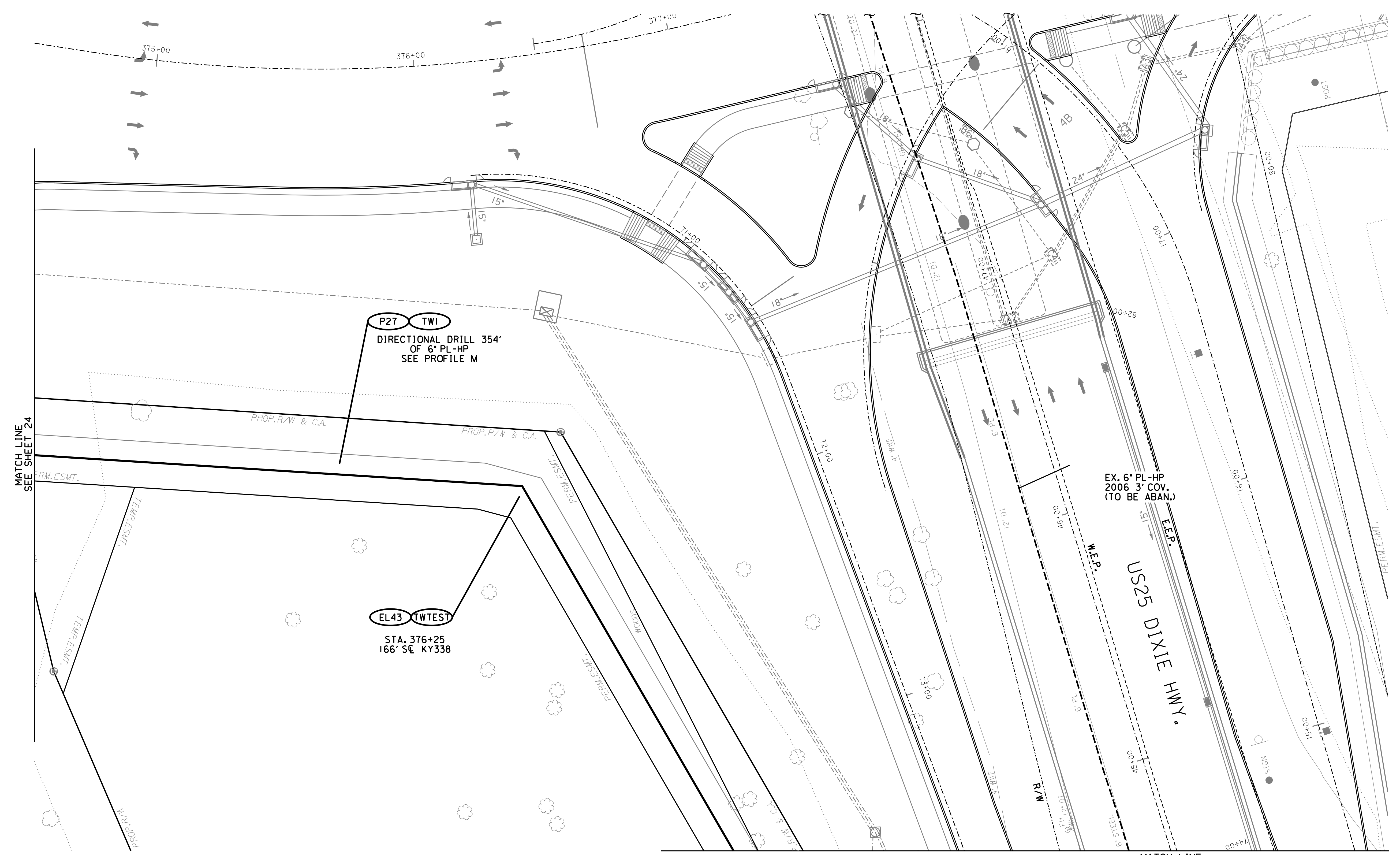
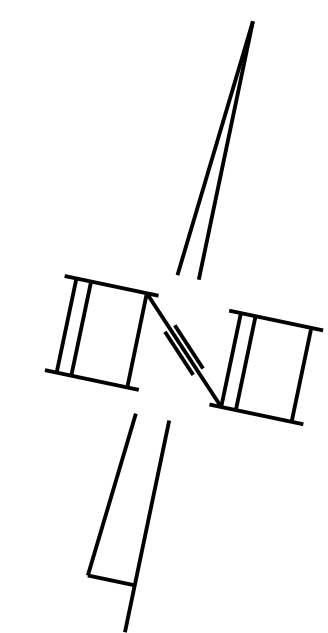
**GAS DEPARTMENT**  
DUKE ENERGY

26  
62

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED  
HAS BEEN DETERMINED FROM  
GAS MAPS & RECORDS.



MATCH LINE  
SEE SHEET 24

MATCH LINE  
SEE SHEET 40

REVISIONS

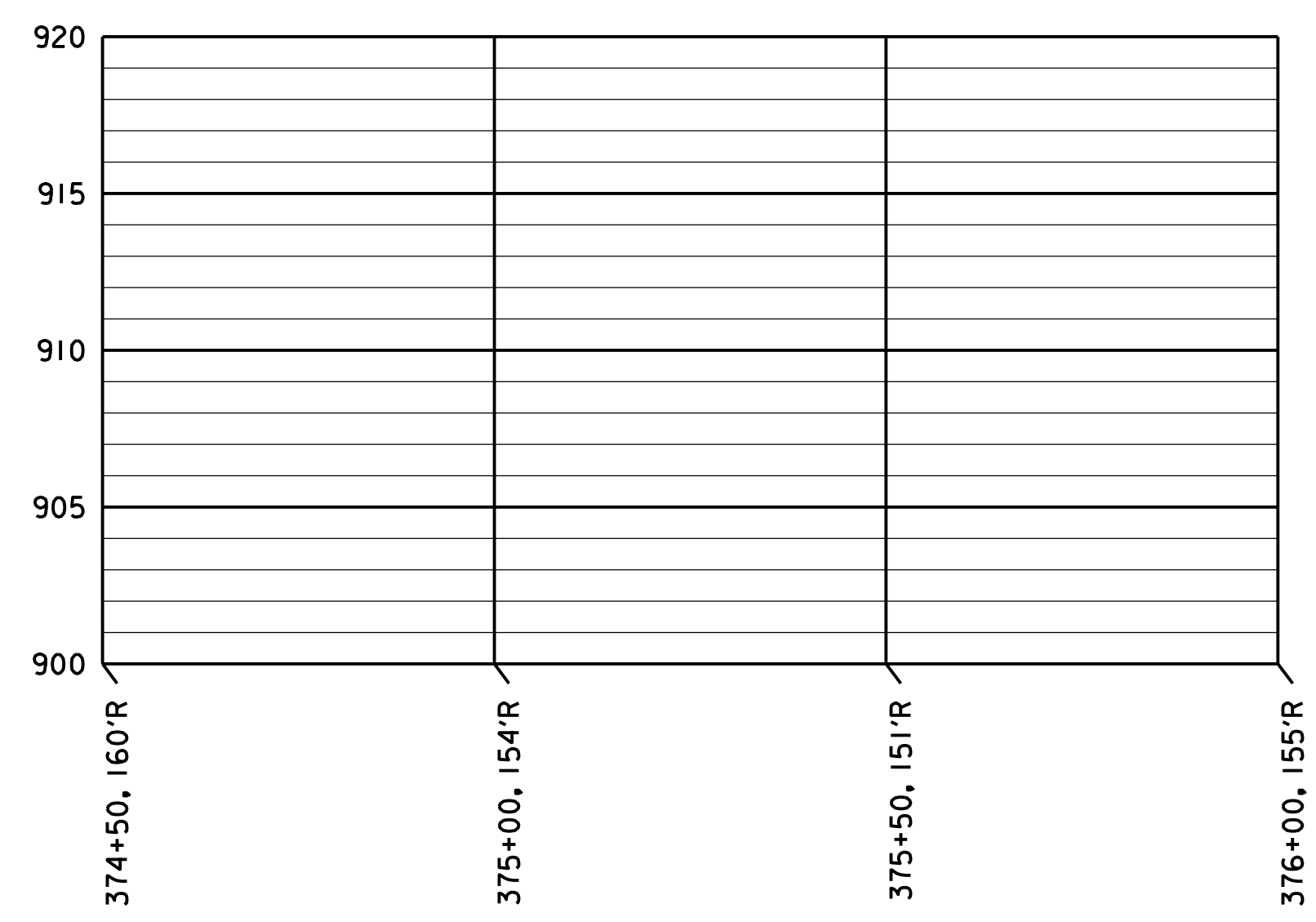
0	2	9	5	4	5	5	6	6
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COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

**GAS DEPARTMENT**  
DUKE ENERGY

27  
62

ERLANGER DISTRICT NTS



**PROFILE "M"**

FROM SHEET 26

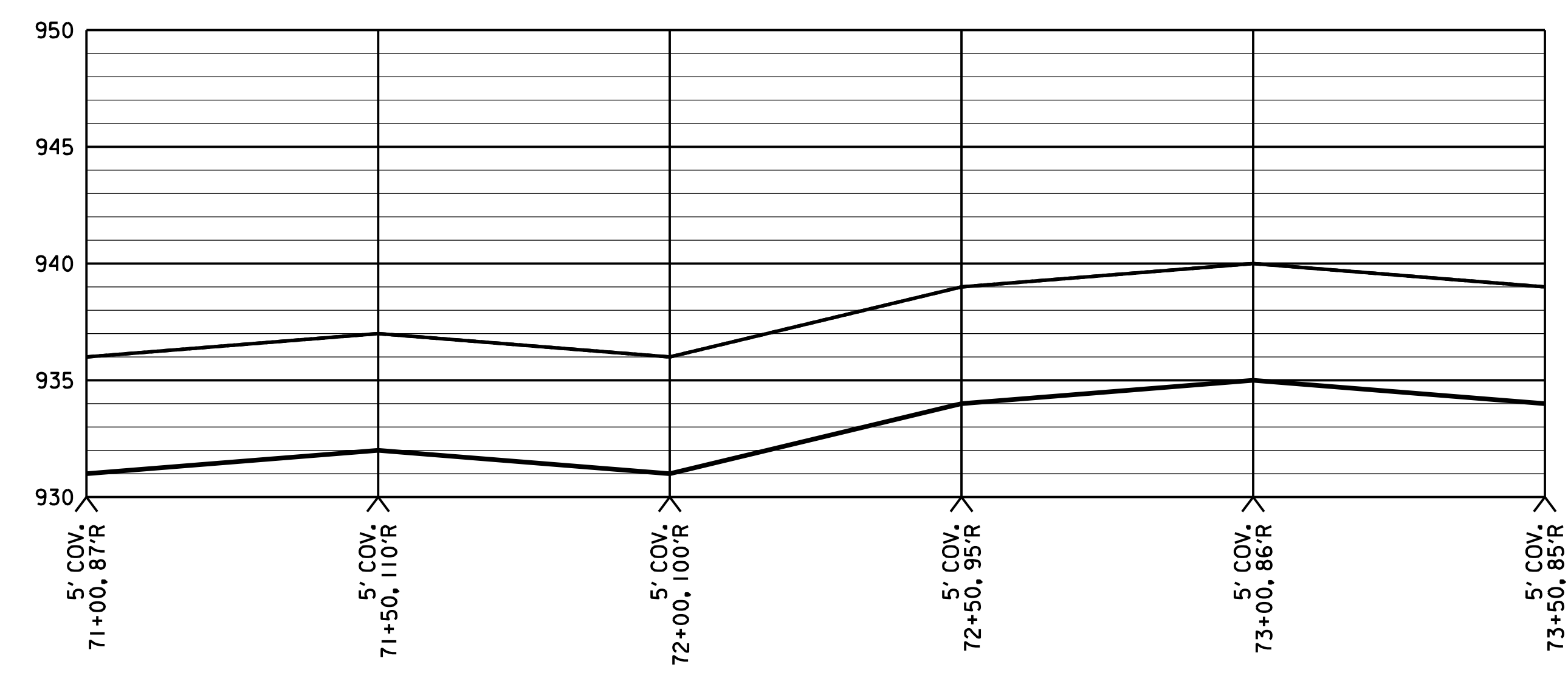
HORIZ. SCALE

VERT. SCALE

PROP. GAS MAIN

PROP. GRADE

EX. GRADE



**PROFILE "N"**

FROM SHEET 26

HORIZ. SCALE

VERT. SCALE

PROP. GAS MAIN

PROP. GRADE

EX. GRADE

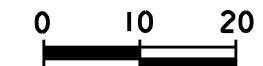
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

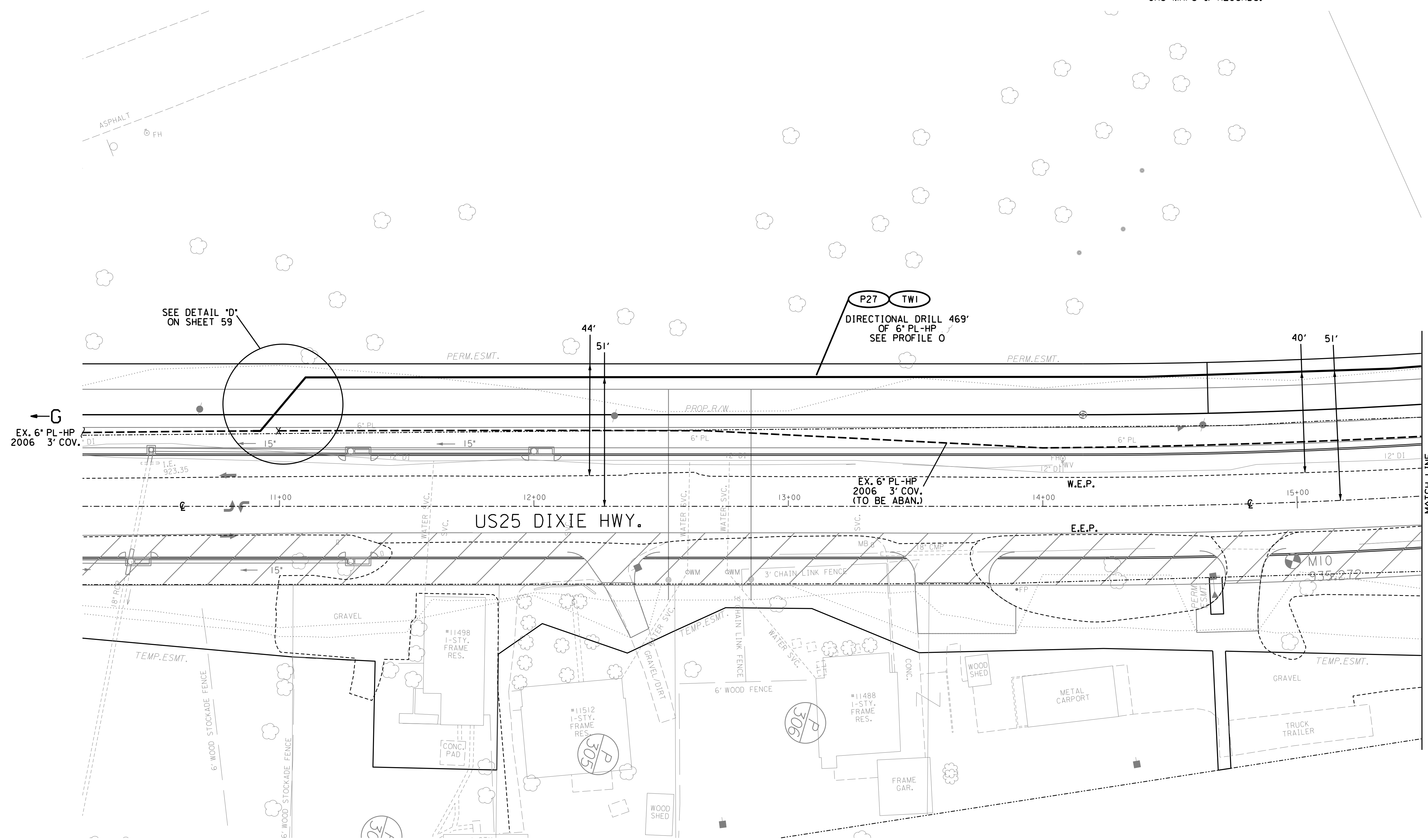
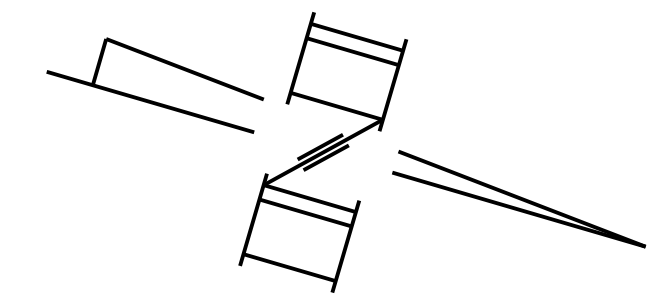
**GAS DEPARTMENT**  
DUKE ENERGY

28  
62

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED  
HAS BEEN DETERMINED FROM  
GAS MAPS & RECORDS.



SEE DETAIL 'D'  
ON SHEET 59

P27 TWI  
DIRECTIONAL DRILL 469'  
OF 6" PL-HP  
SEE PROFILE O

EX. 6" PL-HP  
2006 3' COV.  
(TO BE ABAN.)

MATCH LINE  
SEE SHEET 30

REVISIONS

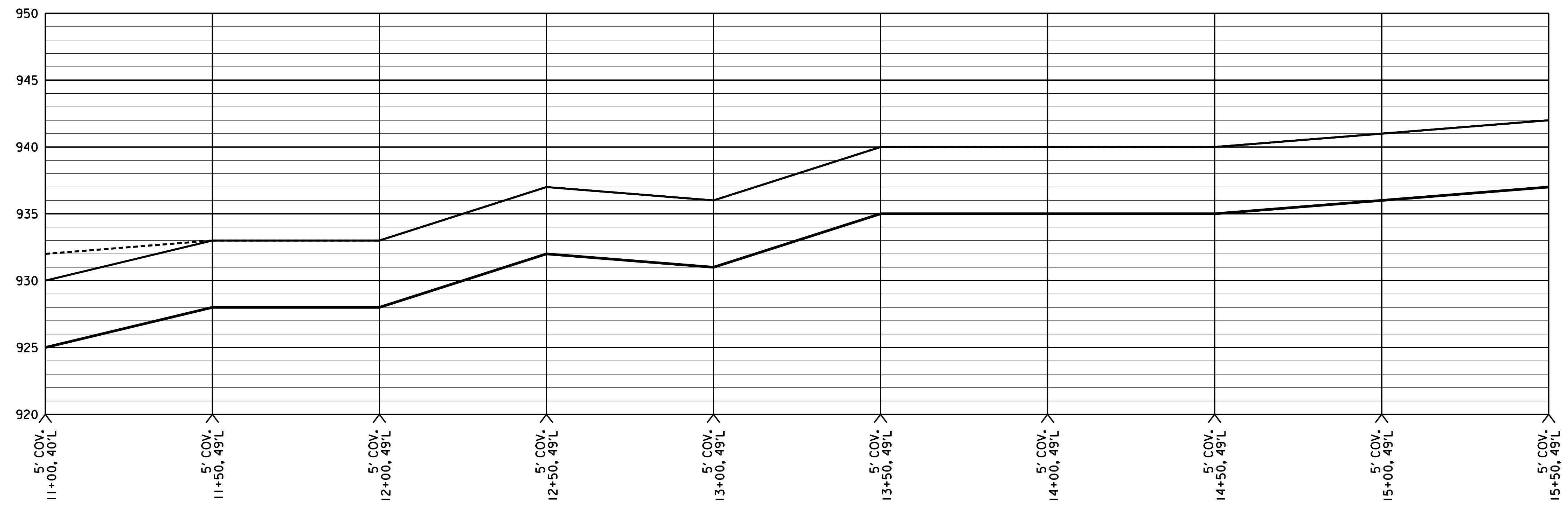
0	2	9	5	4	5	5	6	6
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COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

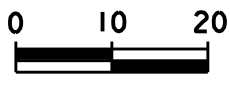




**GAS DEPARTMENT**  
DUKE ENERGY

29  
62

ERLANGER DISTRICT  NTS



PROFILE "O"  
FROM SHEET 28

HORIZ. SCALE   
 VERT. SCALE   
 PROP. GAS MAIN   
 PROP. GRADE   
 EX. GRADE 

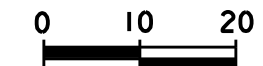
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

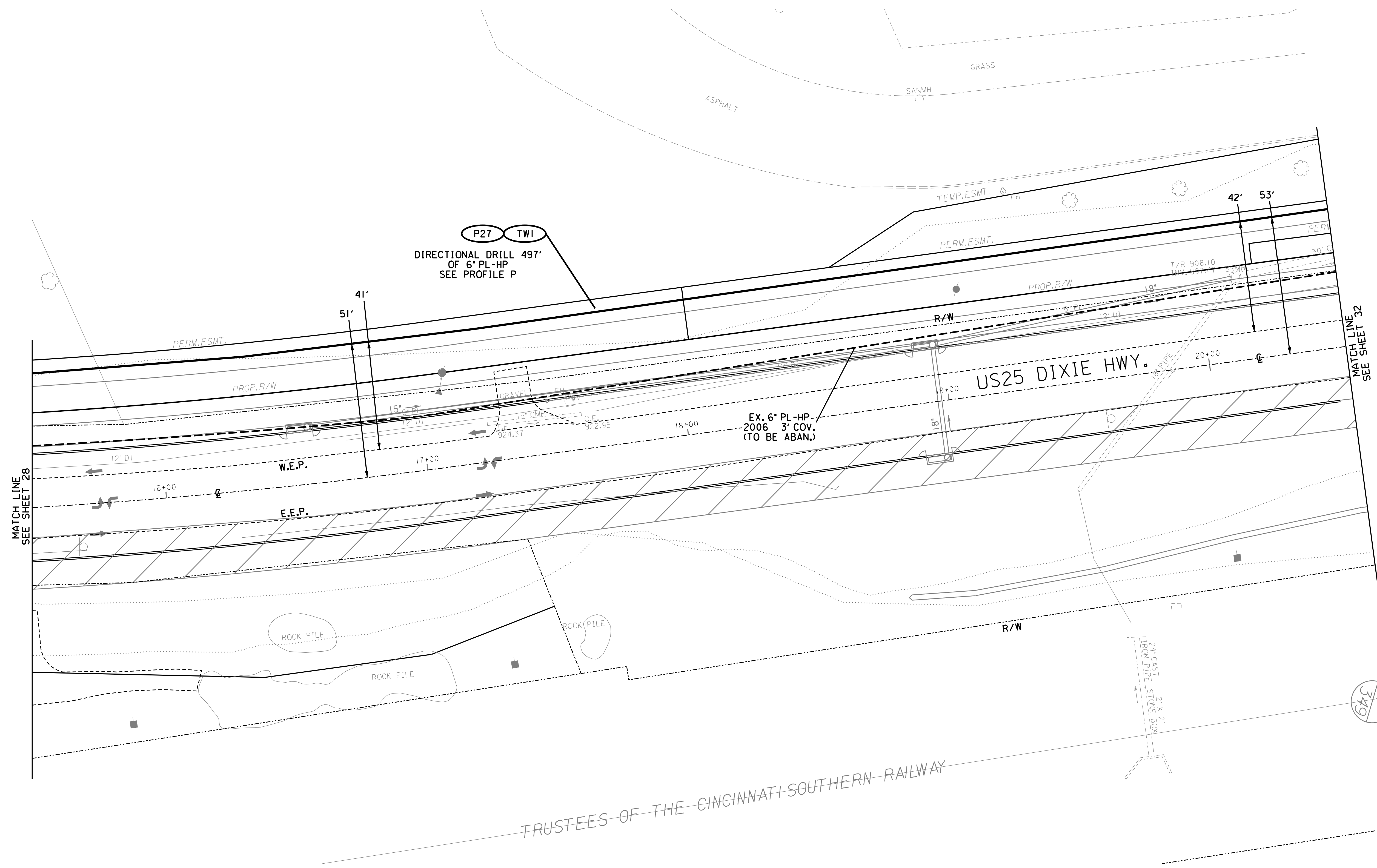
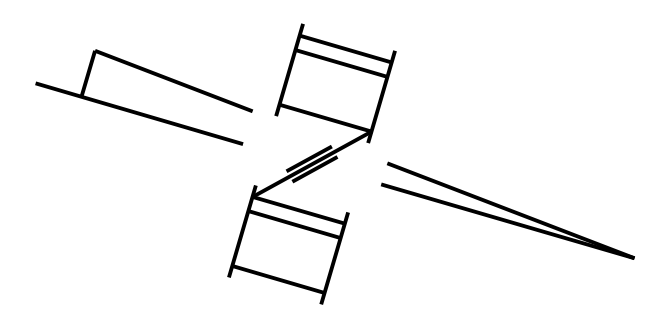
**GAS DEPARTMENT**  
DUKE ENERGY

30  
62

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED  
HAS BEEN DETERMINED FROM  
GAS MAPS & RECORDS.



REVISIONS

0	2	9	5	4	5	5	6	6
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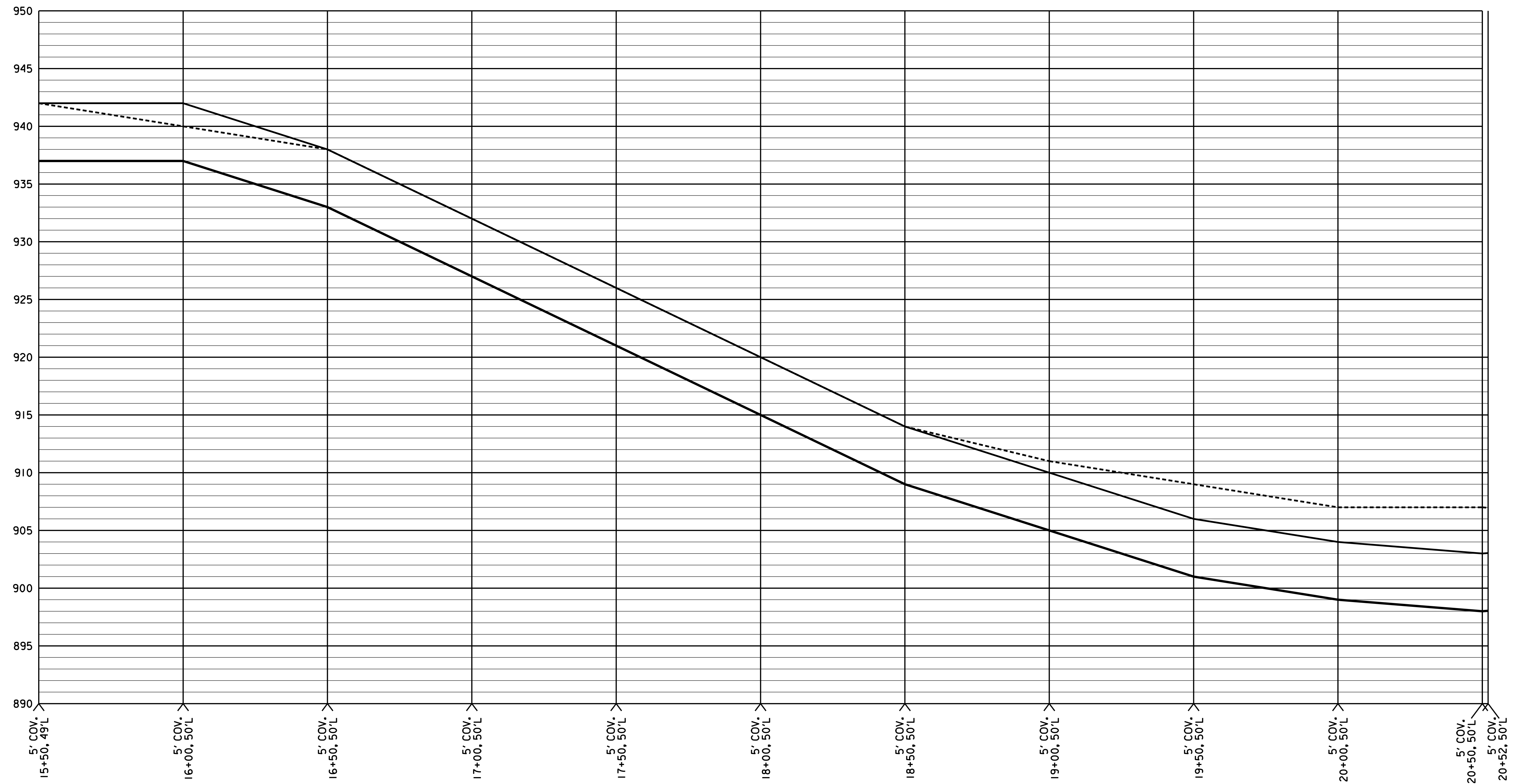


COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

**GAS DEPARTMENT**  
DUKE ENERGY

31  
62

ERLANGER DISTRICT  NTS




**PROFILE "P"**  
FROM SHEET 30

HORIZ. SCALE 

VERT. SCALE 

PROP. GAS MAIN 

PROP. GRADE 

EX. GRADE 

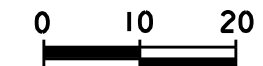
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

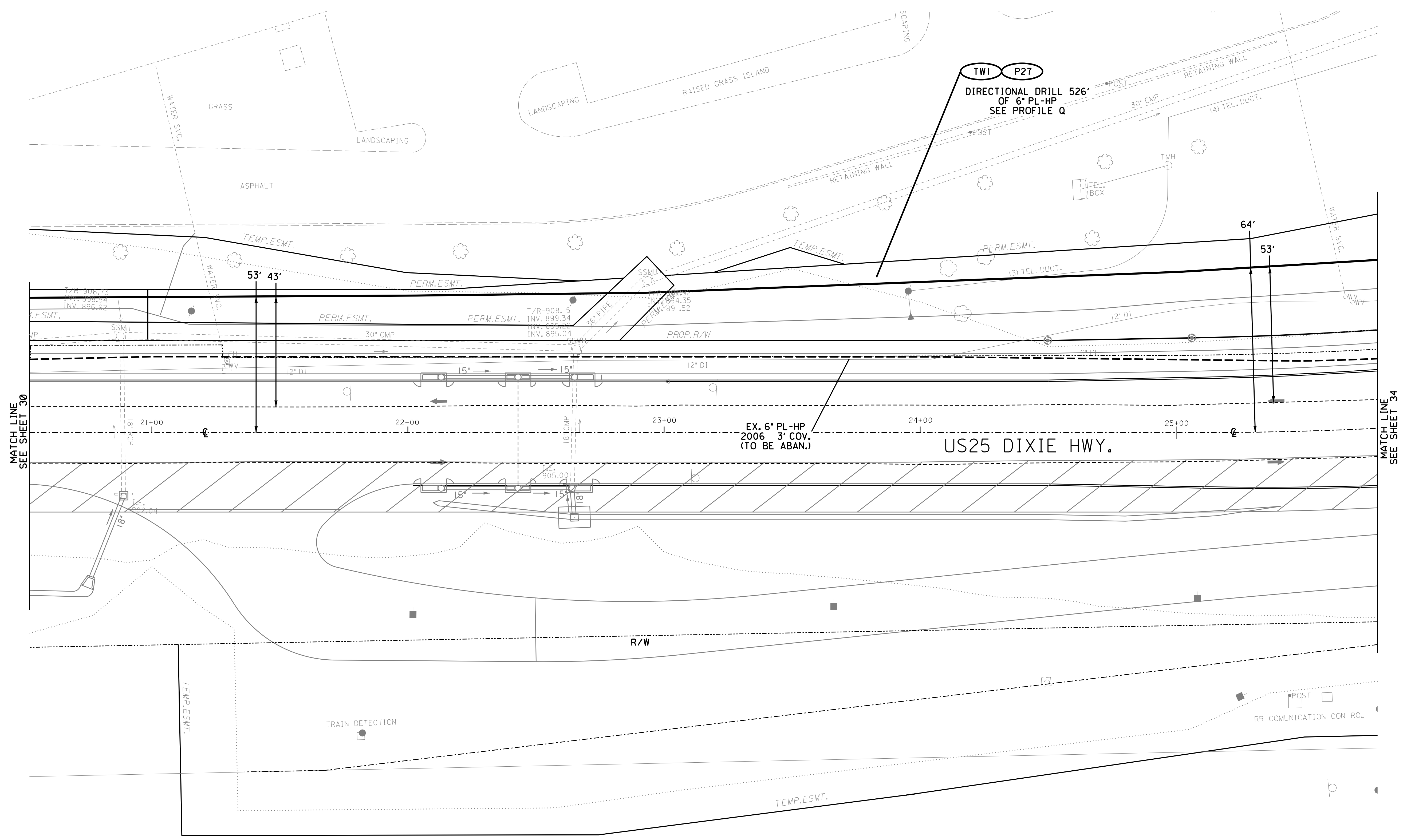
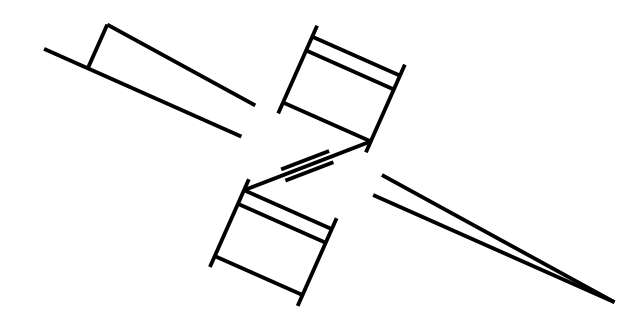
**GAS DEPARTMENT**  
DUKE ENERGY

32  
62

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED  
HAS BEEN DETERMINED FROM  
GAS MAPS & RECORDS.



MATCH LINE  
SEE SHEET 30

MATCH LINE  
SEE SHEET 34

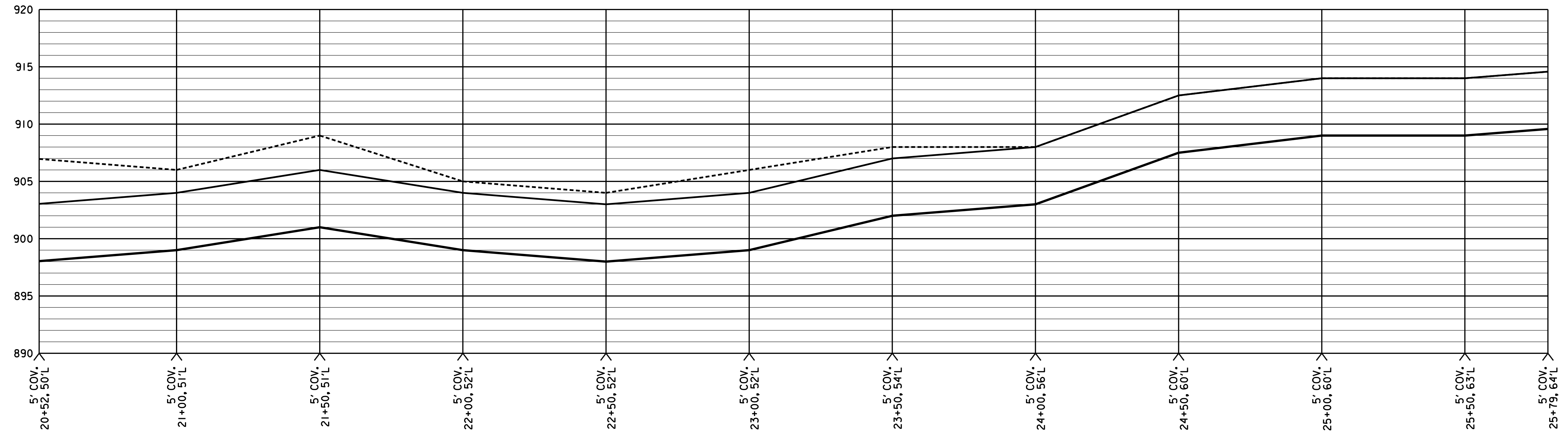
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

**GAS DEPARTMENT**  
DUKE ENERGY

33  
62

ERLANGER DISTRICT  NTS



**PROFILE "Q"**

FROM SHEET 32



PROP. GAS MAIN

PROP. GRADE

EX. GRADE

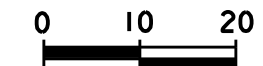
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

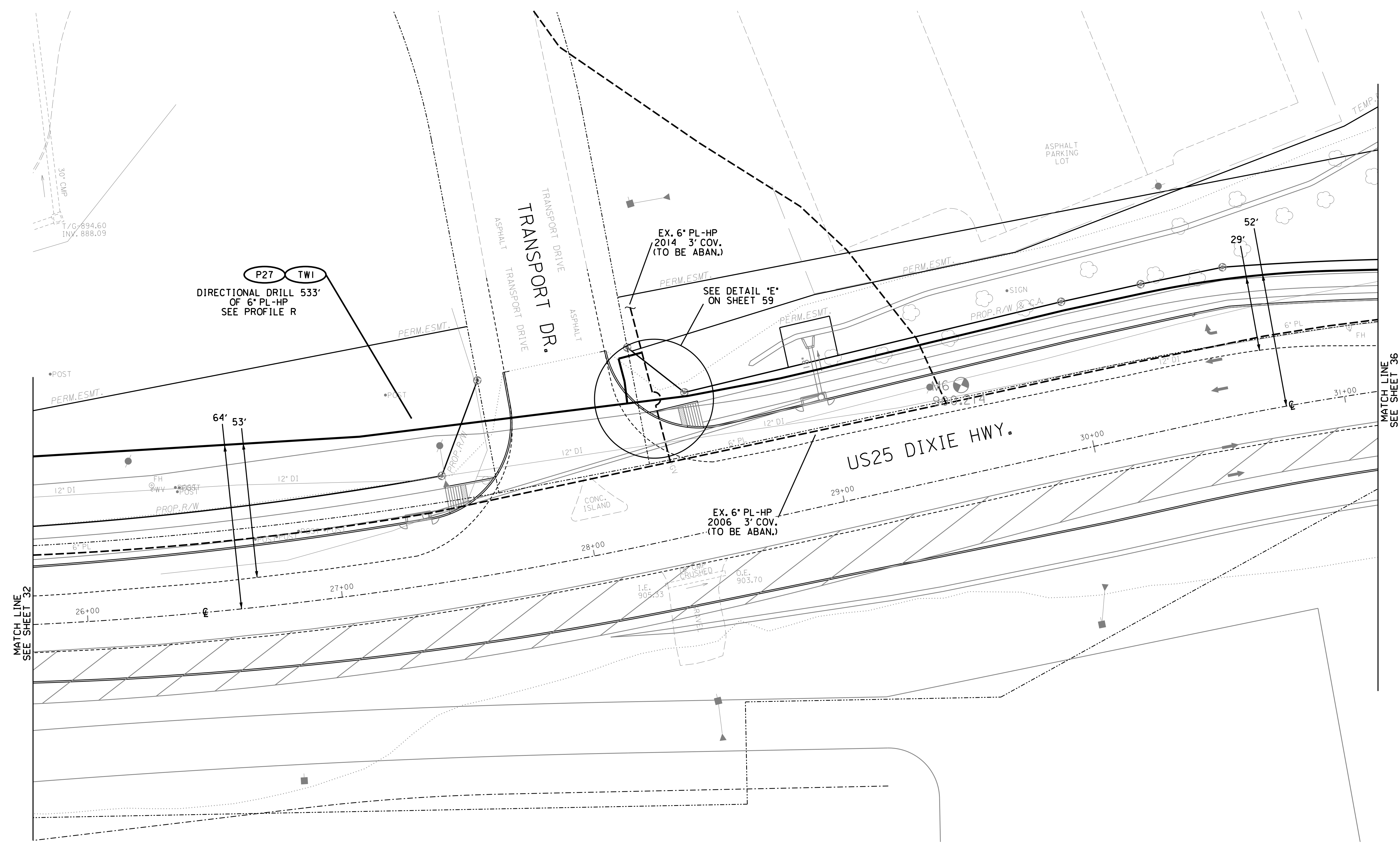
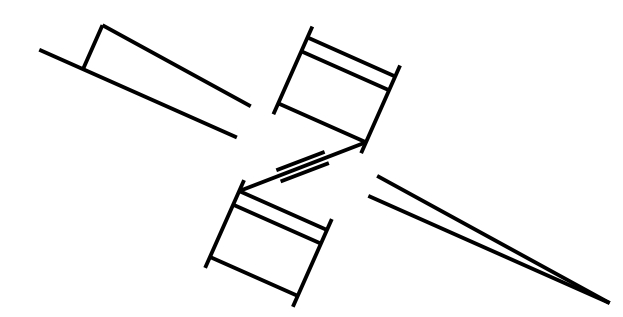
**GAS DEPARTMENT**  
DUKE ENERGY

34  
62

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED  
HAS BEEN DETERMINED FROM  
GAS MAPS & RECORDS.



MATCH LINE  
SEE SHEET 32

MATCH LINE  
SEE SHEET 36

REVISIONS

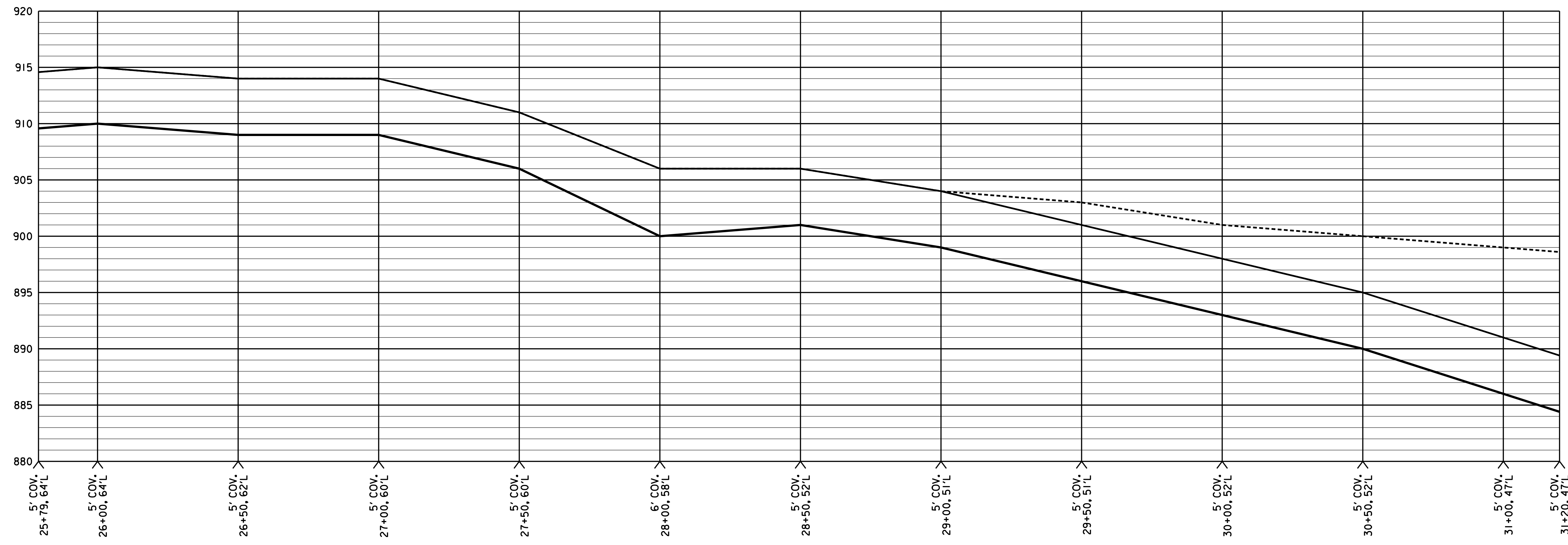
0	2	9	5	4	5	5	6	6
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COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

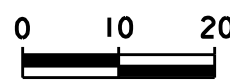
**GAS DEPARTMENT**  
DUKE ENERGY


35  
62


ERLANGER DISTRICT  NTS





**PROFILE "R"**  
FROM SHEET 34

HORIZ. SCALE 

VERT. SCALE 

PROP. GAS MAIN 

PROP. GRADE 

EX. GRADE 

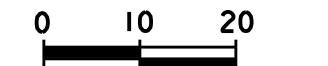
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

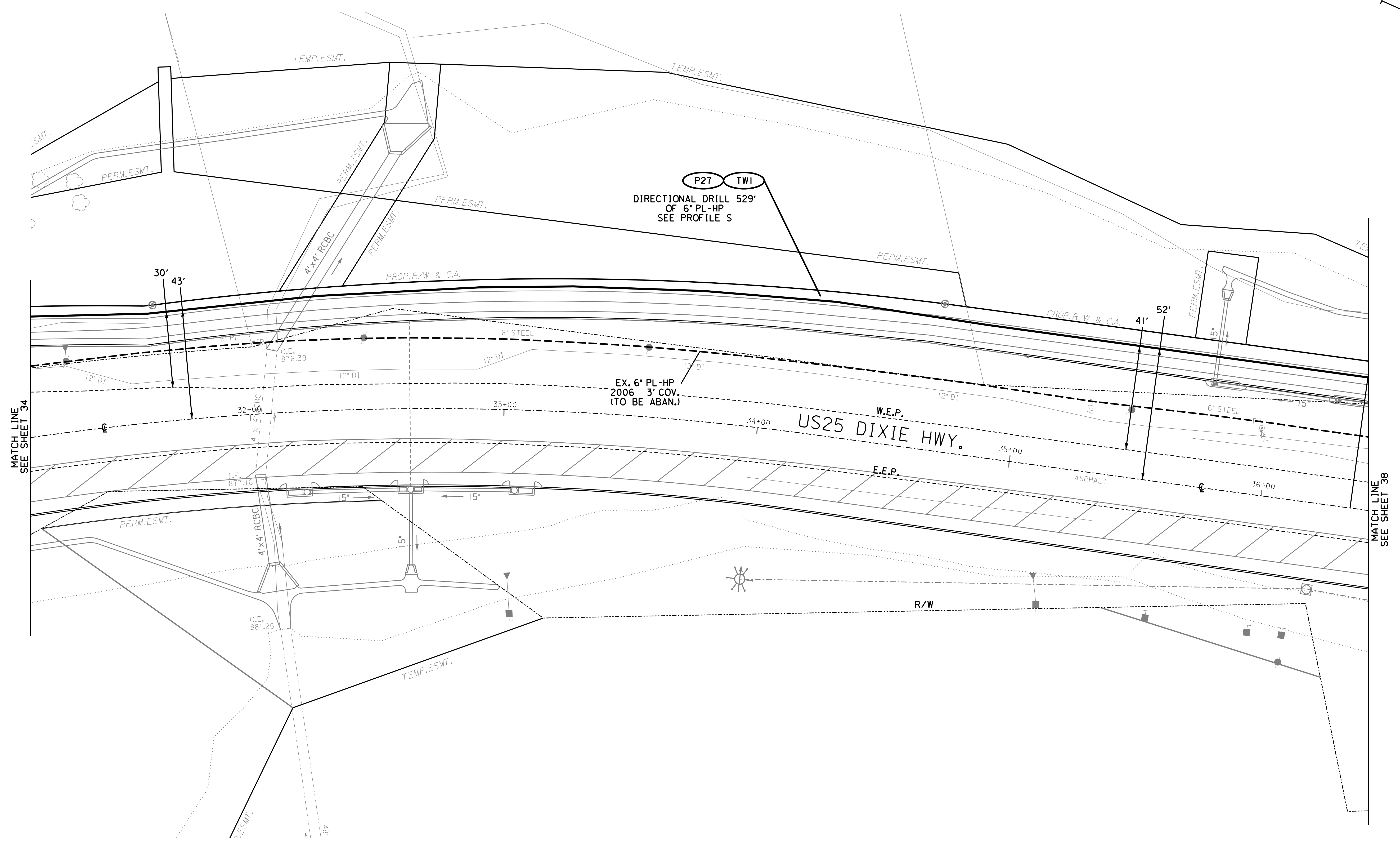
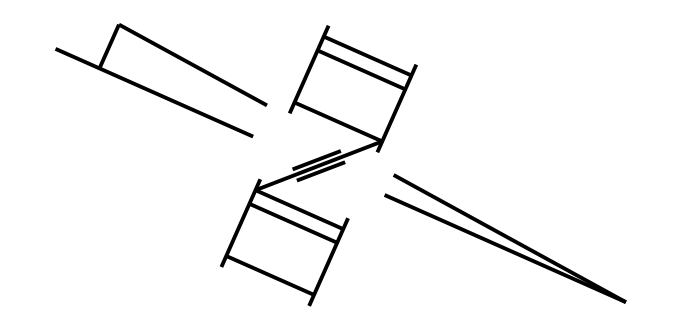
**GAS DEPARTMENT**  
DUKE ENERGY

36  
62

ERLANGER DISTRICT



**NOTE: GAS MAIN TO BE ABANDONED  
HAS BEEN DETERMINED FROM  
GAS MAPS & RECORDS.**



MATCH LINE  
SEE SHEET 34

MATCH LINE  
SEE SHEET 38

REVISIONS

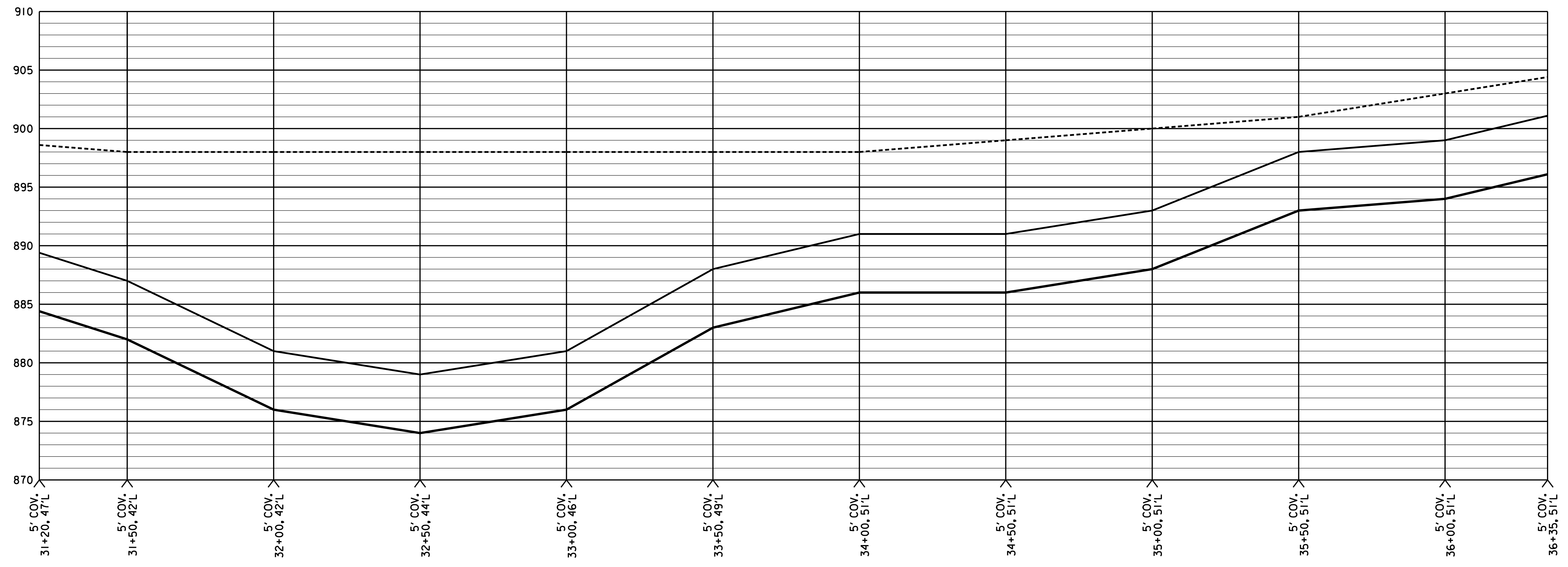
0 2 9 5 4 5 5 6 6

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

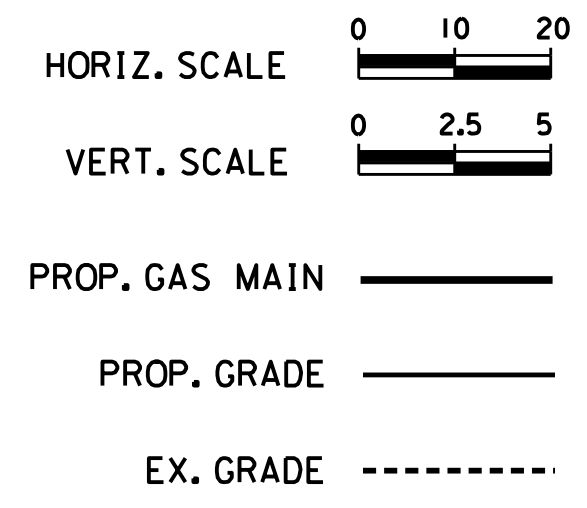
**GAS DEPARTMENT**  
DUKE ENERGY

37  
62

ERLANGER DISTRICT  NTS



**PROFILE "S"**  
FROM SHEET 36



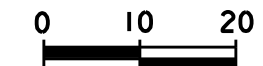
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

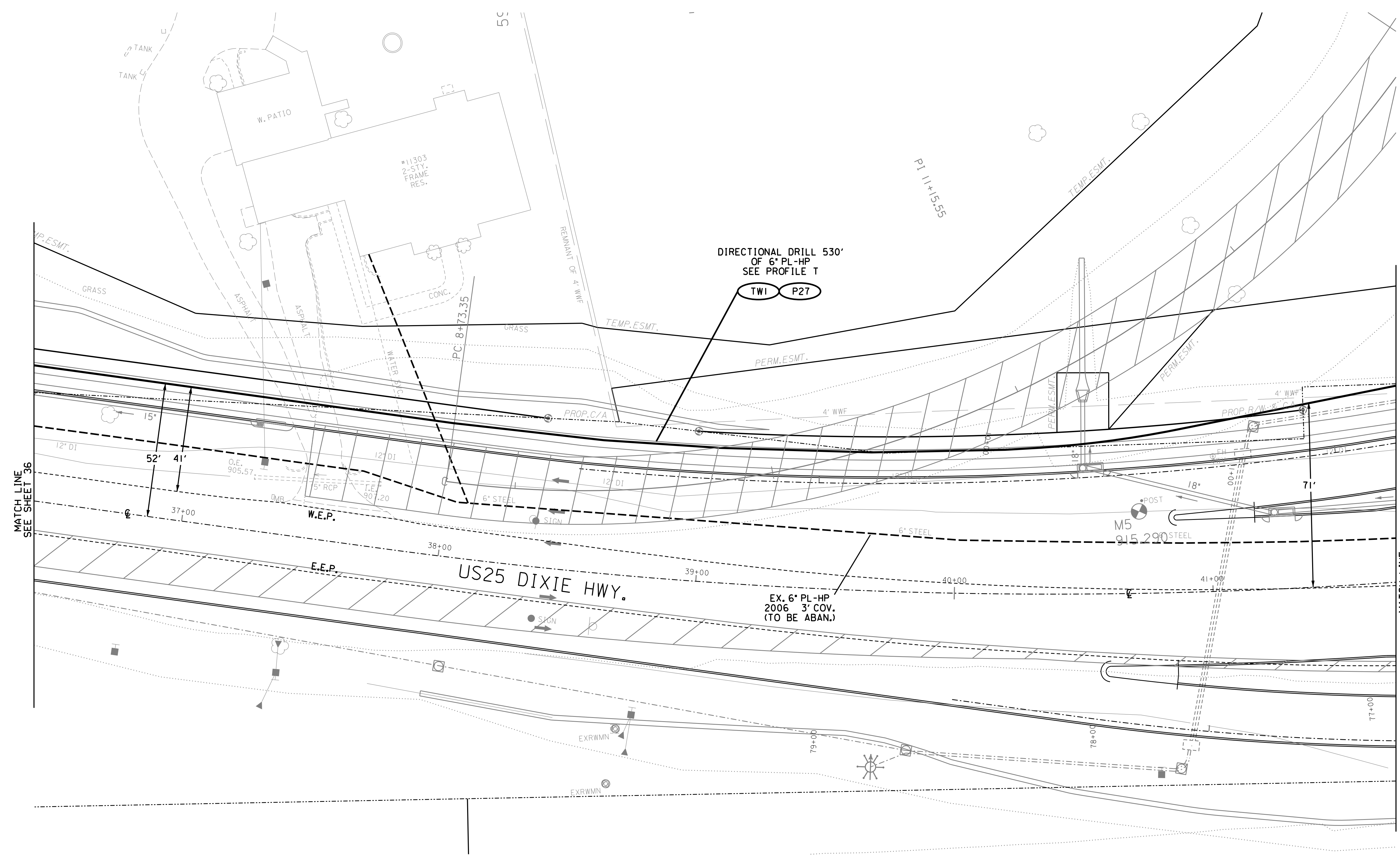
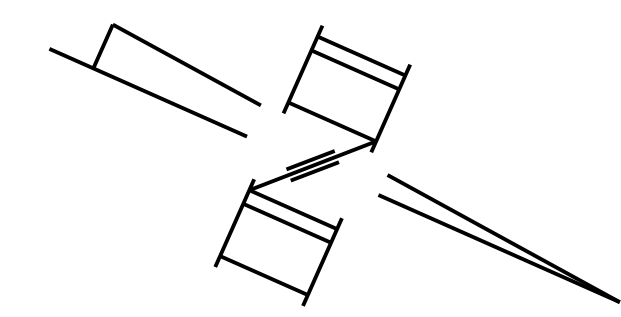
**GAS DEPARTMENT**  
DUKE ENERGY

38  
62

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED  
HAS BEEN DETERMINED FROM  
GAS MAPS & RECORDS.



MATCH LINE  
SEE SHEET 36

MATCH LINE  
SEE SHEET 40

REVISIONS

0 2 9 5 4 5 5 6 6

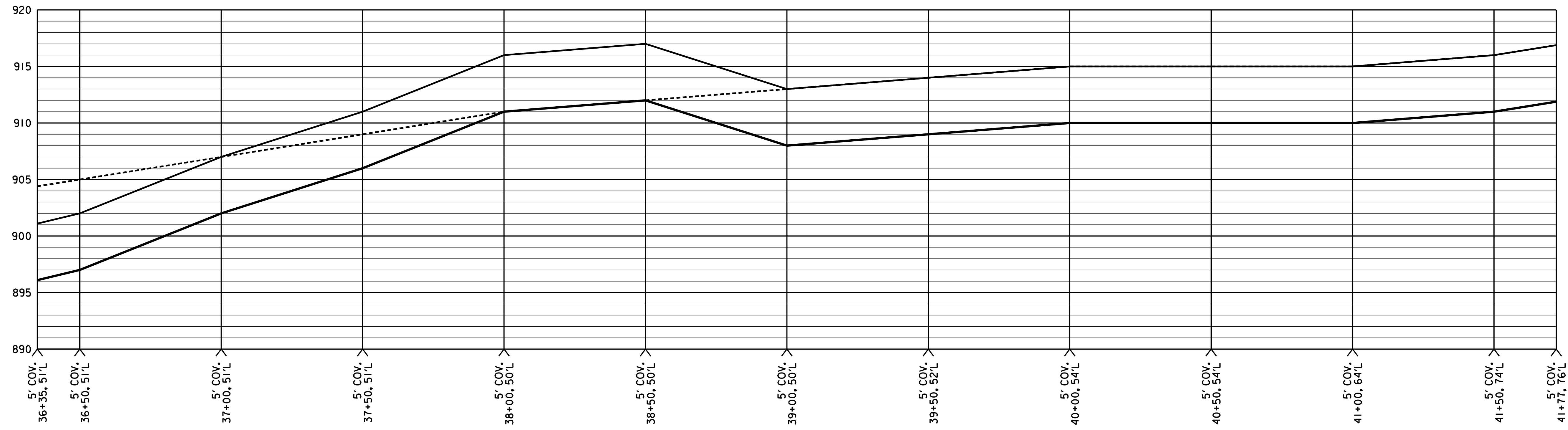


COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

**GAS DEPARTMENT**  
DUKE ENERGY

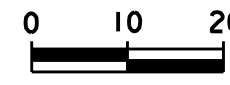
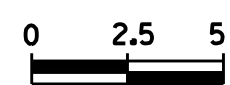

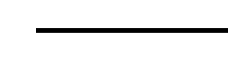
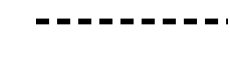
39  
62

ERLANGER DISTRICT  NTS



**PROFILE "T"**

FROM SHEET 38

- HORIZ. SCALE 
- VERT. SCALE 
- PROP. GAS MAIN 
- PROP. GRADE 
- EX. GRADE 

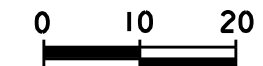
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

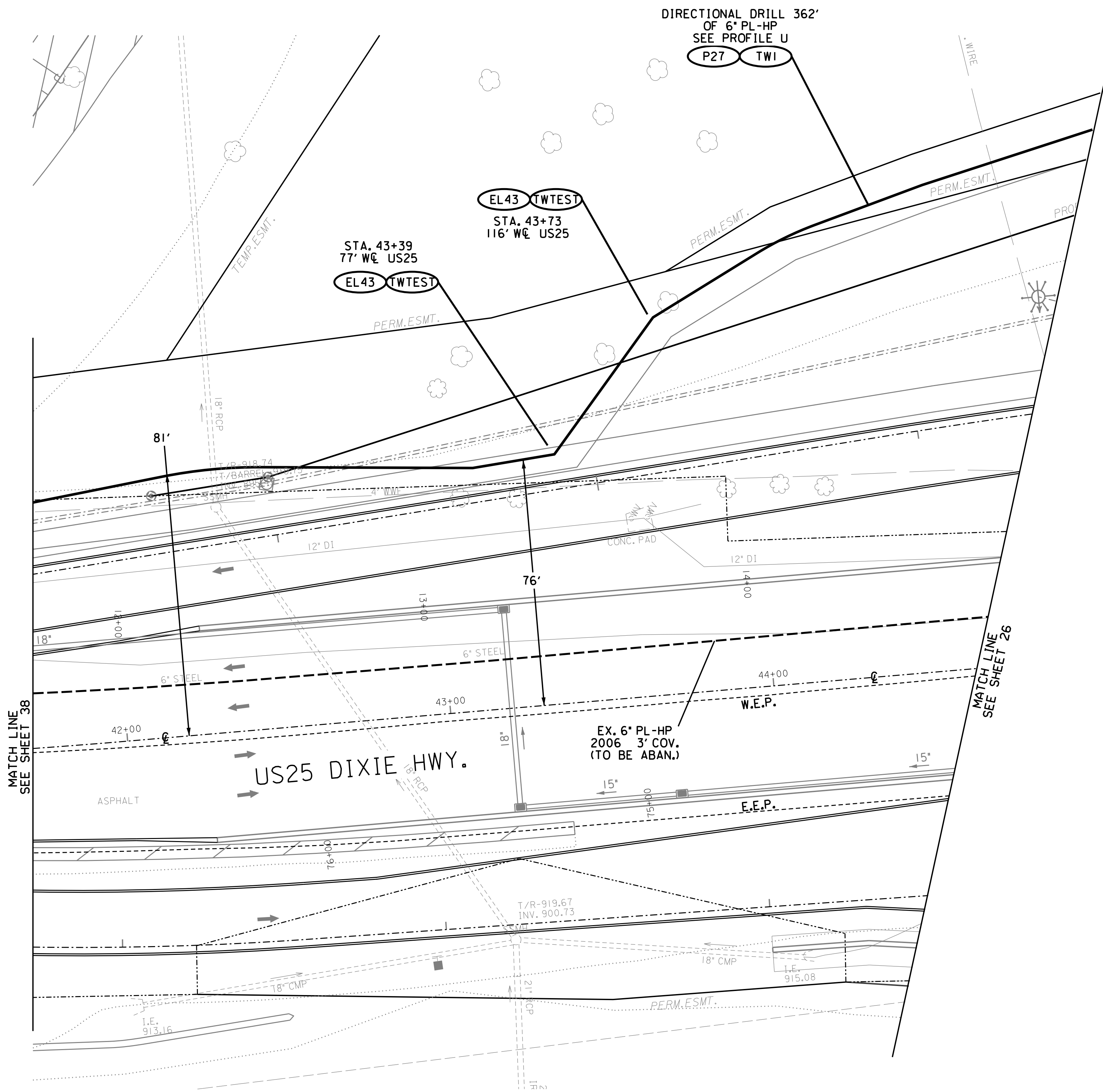
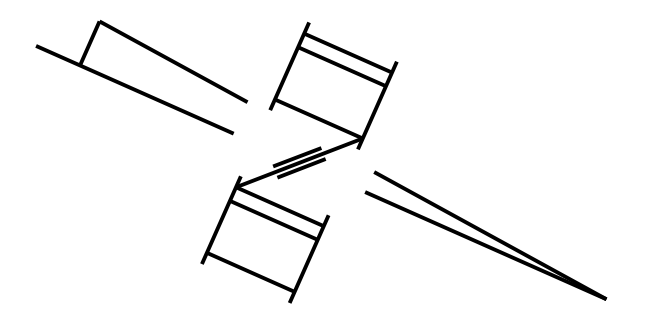
**GAS DEPARTMENT**  
DUKE ENERGY

40  
62

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED  
HAS BEEN DETERMINED FROM  
GAS MAPS & RECORDS.



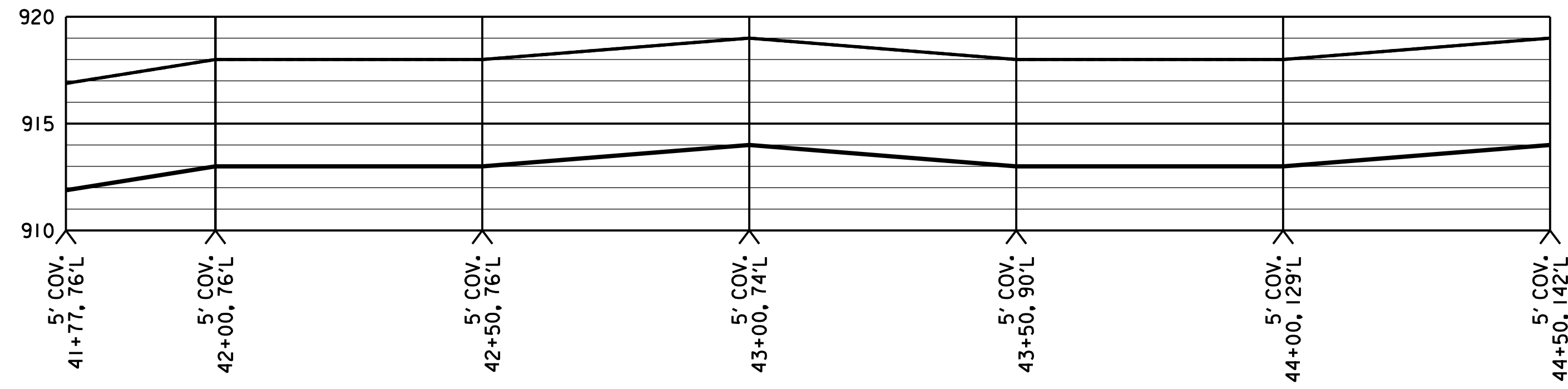
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

**GAS DEPARTMENT**  
DUKE ENERGY

41  
62

ERLANGER DISTRICT  NTS



**PROFILE "U"**

FROM SHEET 40



PROP. GAS MAIN

PROP. GRADE

EX. GRADE

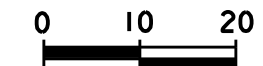
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

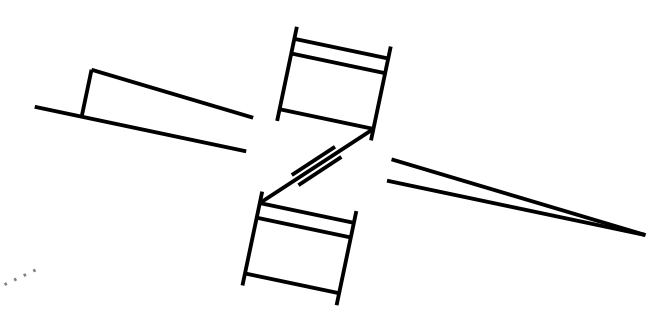
**GAS DEPARTMENT**  
DUKE ENERGY

42  
62

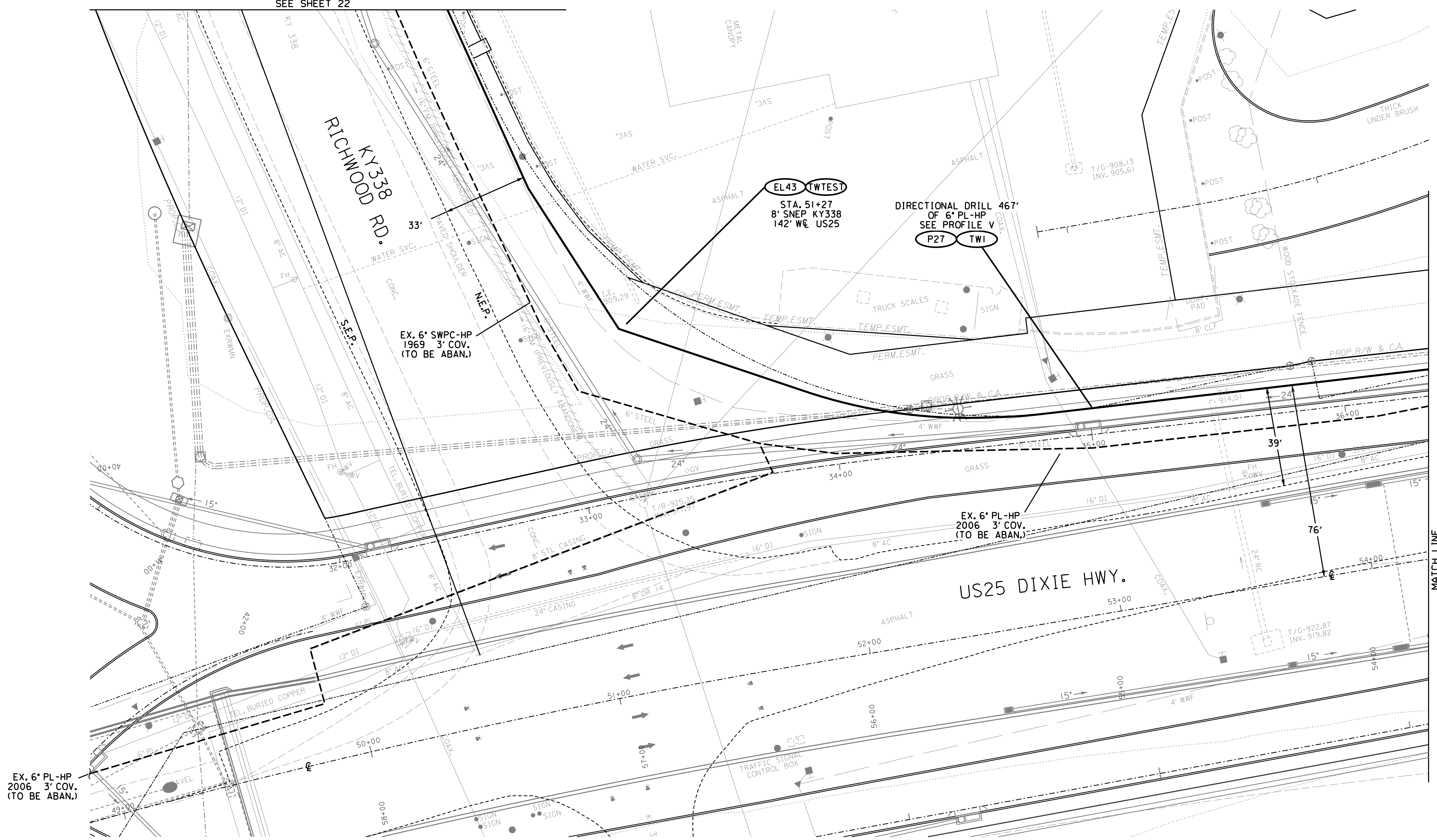
ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED  
HAS BEEN DETERMINED FROM  
GAS MAPS & RECORDS.



MATCH LINE  
SEE SHEET 22



MATCH LINE  
SEE SHEET 44

REVISIONS

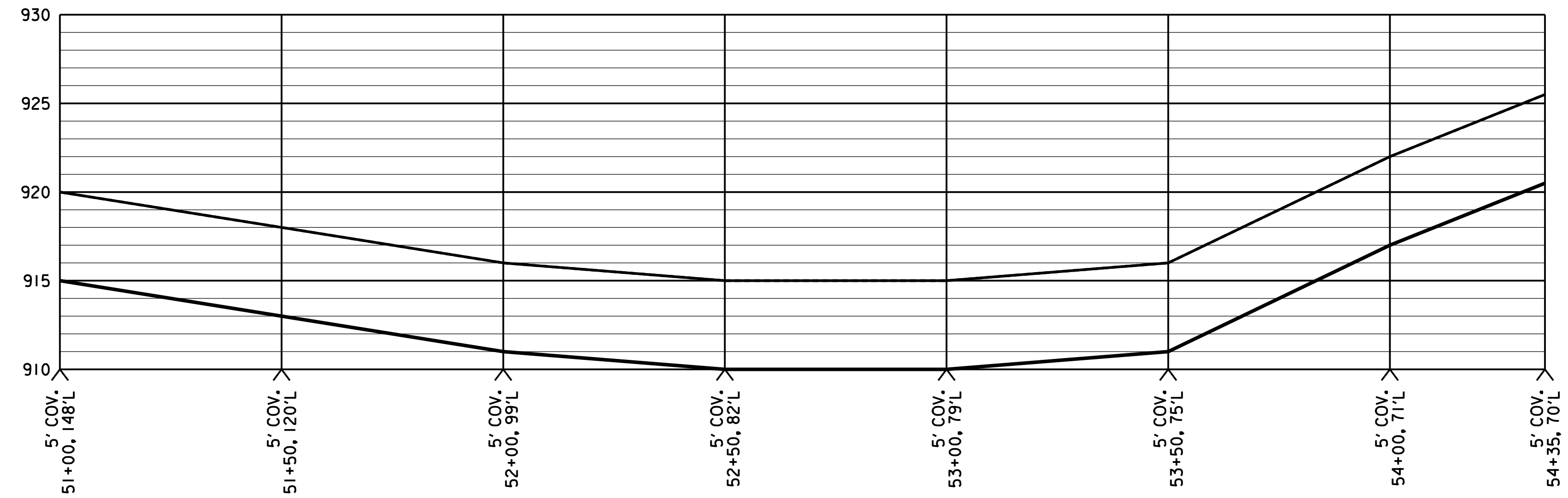
0 2 9 5 4 5 5 6 6

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

**GAS DEPARTMENT**  
DUKE ENERGY

43  
62

ERLANGER DISTRICT  NTS



**PROFILE "V"**


FROM SHEET 42

HORIZ. SCALE 

VERT. SCALE 

PROP. GAS MAIN 

PROP. GRADE 

EX. GRADE 

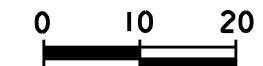
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

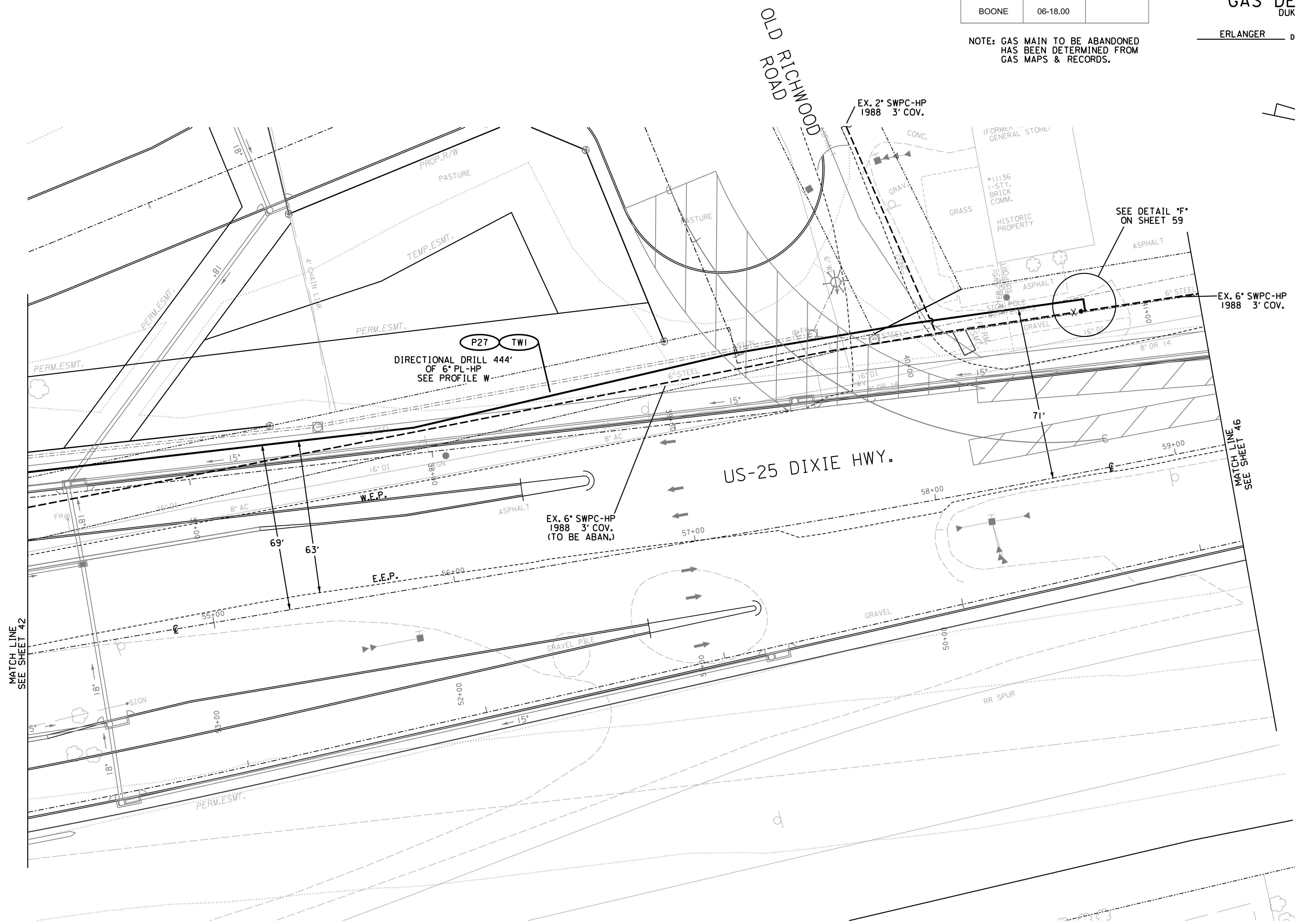
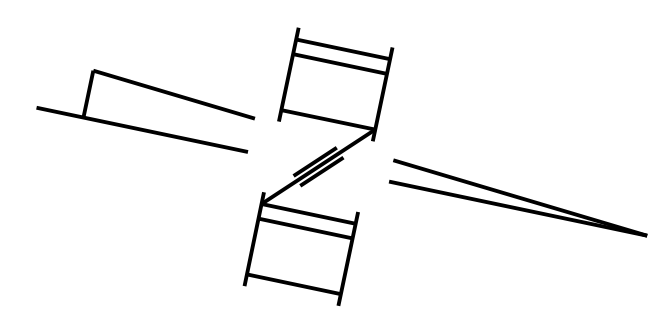
**GAS DEPARTMENT**  
DUKE ENERGY

44  
62

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED HAS BEEN DETERMINED FROM GAS MAPS & RECORDS.



MATCH LINE  
SEE SHEET 42

MATCH LINE  
SEE SHEET 46

REVISIONS

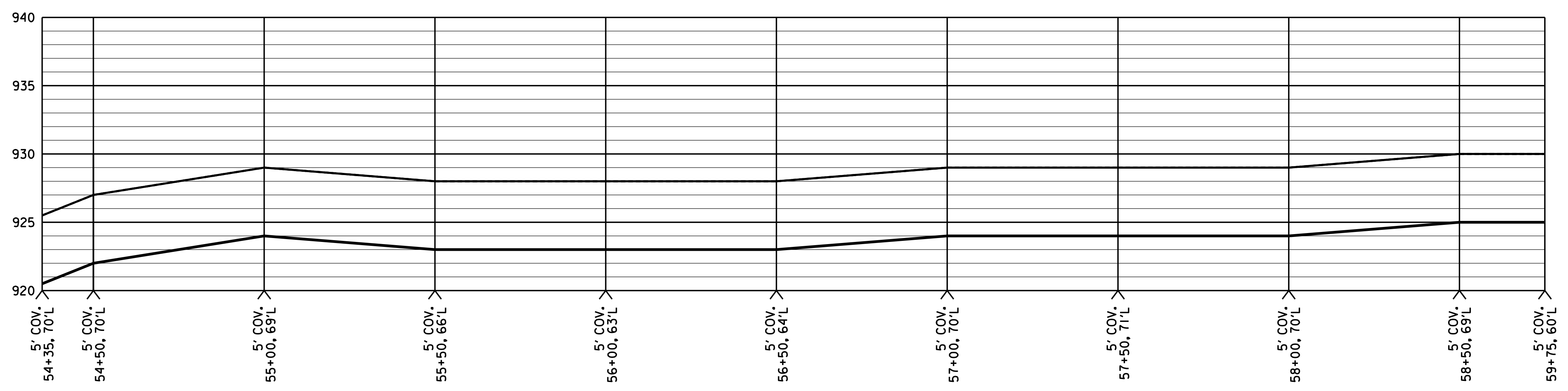
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COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

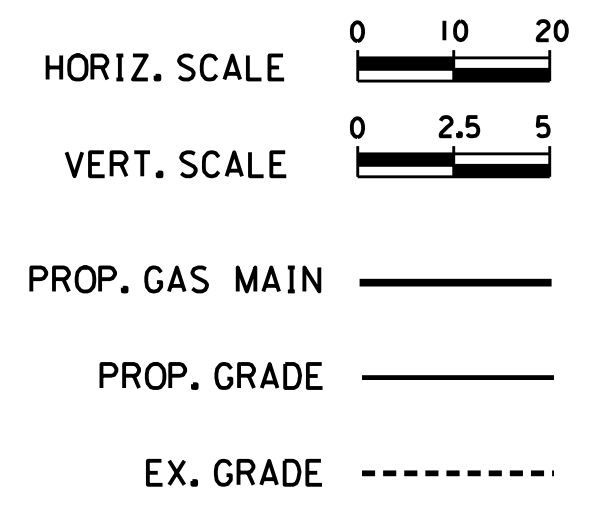
**GAS DEPARTMENT**  
DUKE ENERGY

45  
62

ERLANGER DISTRICT  NTS



PROFILE "W"  
FROM SHEET 44



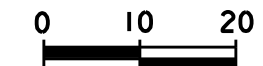
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

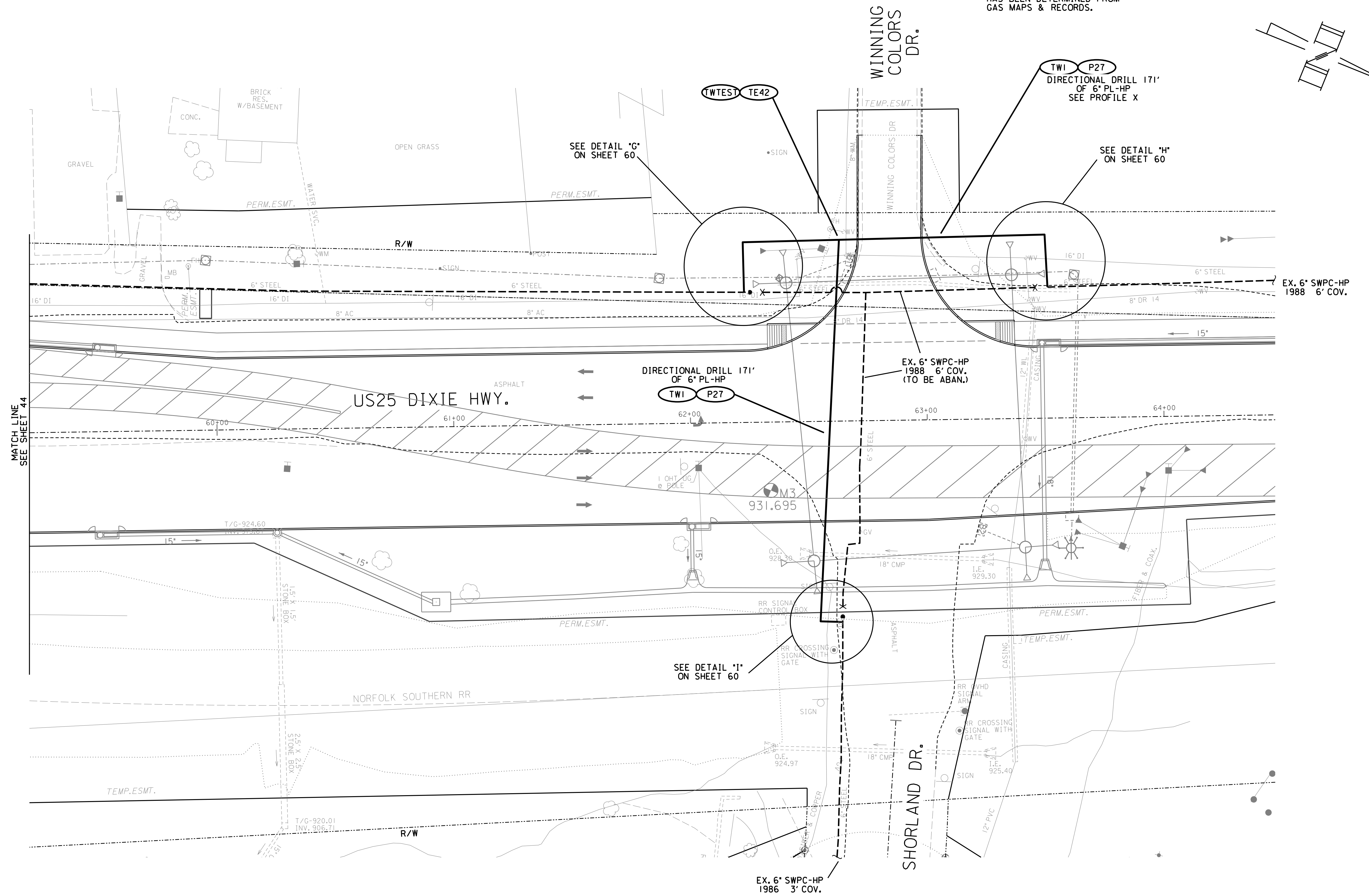
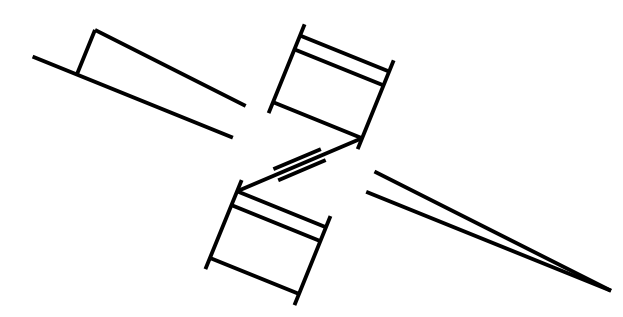
**GAS DEPARTMENT**  
DUKE ENERGY

46  
62

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED HAS BEEN DETERMINED FROM GAS MAPS & RECORDS.



REVISIONS

0 2 9 5 4 5 5 6 6

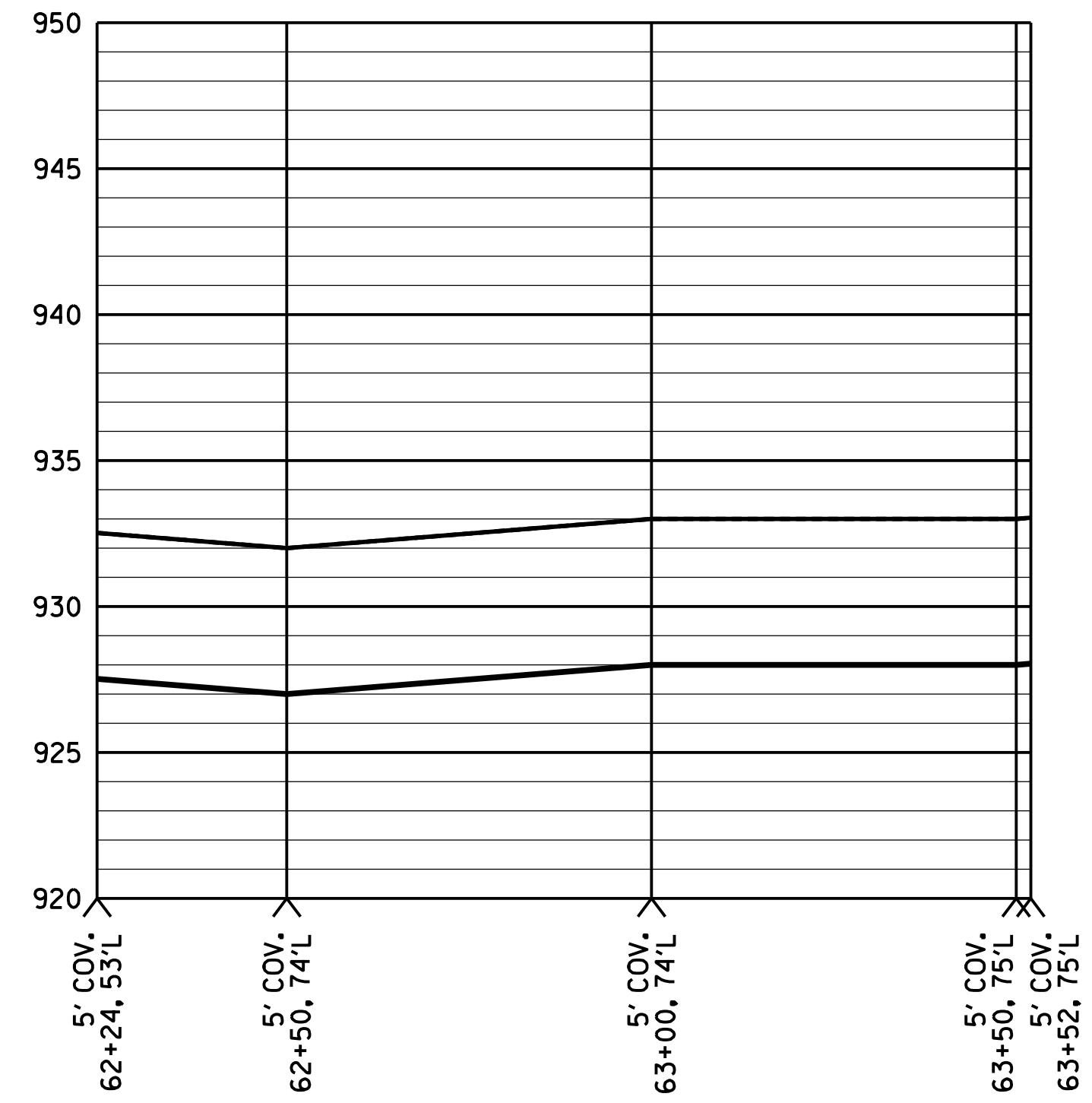


COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

**GAS DEPARTMENT**  
DUKE ENERGY

47  
62

ERLANGER DISTRICT  NTS




PROFILE "X"  
FROM SHEET 46

HORIZ. SCALE 

VERT. SCALE 

PROP. GAS MAIN 

PROP. GRADE 

EX. GRADE 

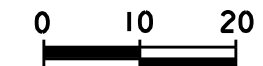
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

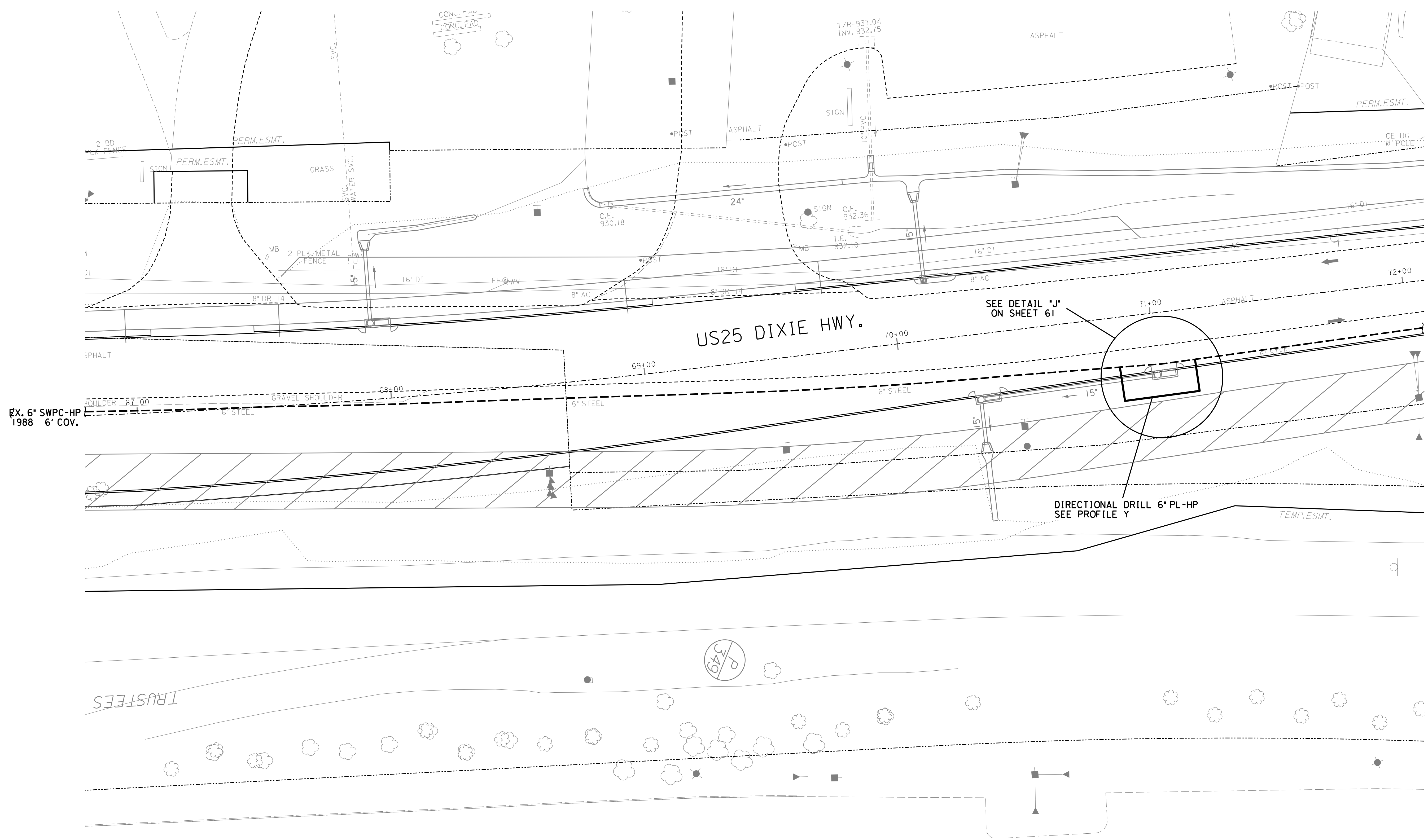
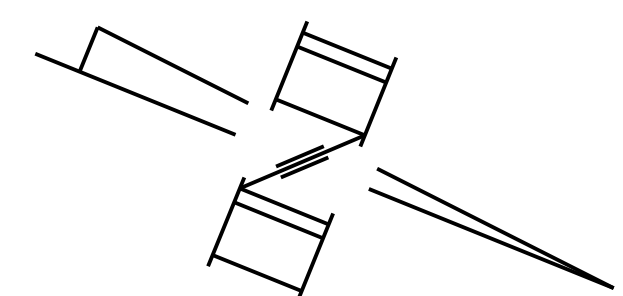
**GAS DEPARTMENT**  
DUKE ENERGY

48  
62

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED  
HAS BEEN DETERMINED FROM  
GAS MAPS & RECORDS.



SEE DETAIL 'J'  
ON SHEET 61

DIRECTIONAL DRILL 6" PL-HP  
SEE PROFILE Y

EX. 6" SWPC-HP  
1988 6' COV.

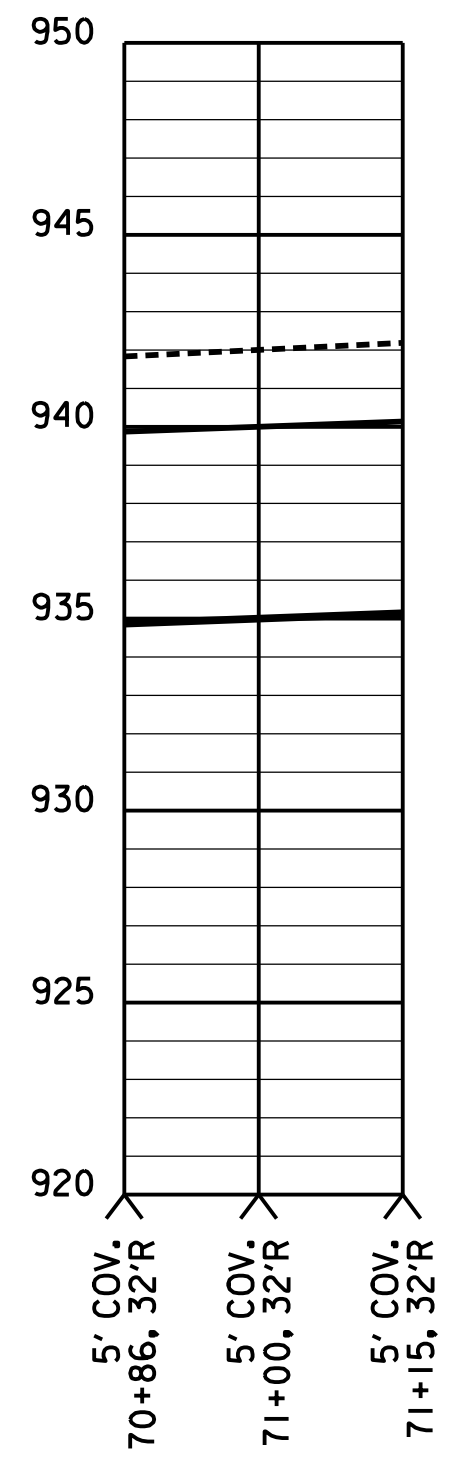
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

**GAS DEPARTMENT**  
DUKE ENERGY

49  
62

ERLANGER DISTRICT  NTS




**PROFILE "Y"**  
FROM SHEET 48

HORIZ. SCALE 

VERT. SCALE 

PROP. GAS MAIN 

PROP. GRADE 

EX. GRADE 

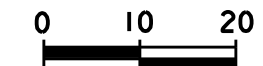
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

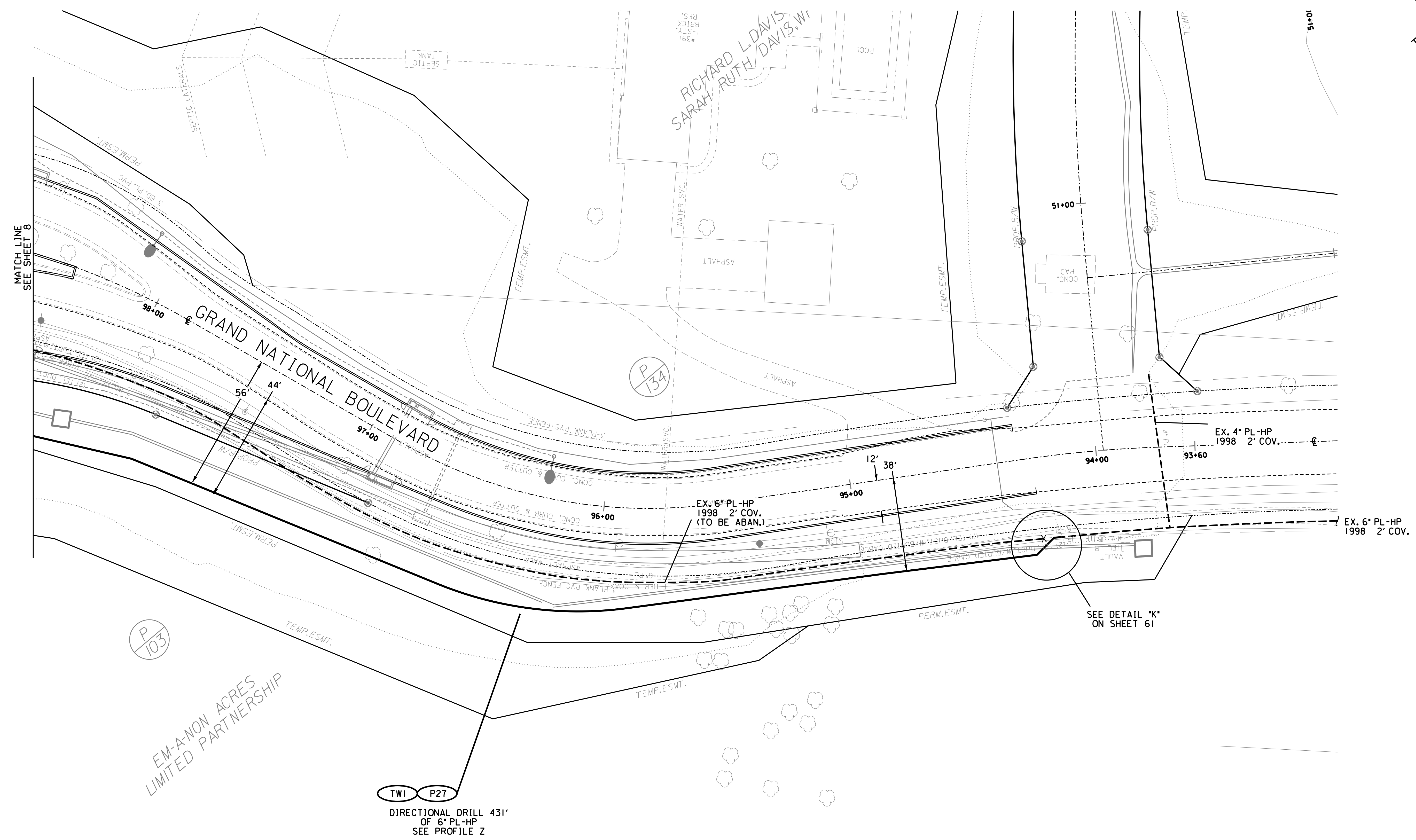
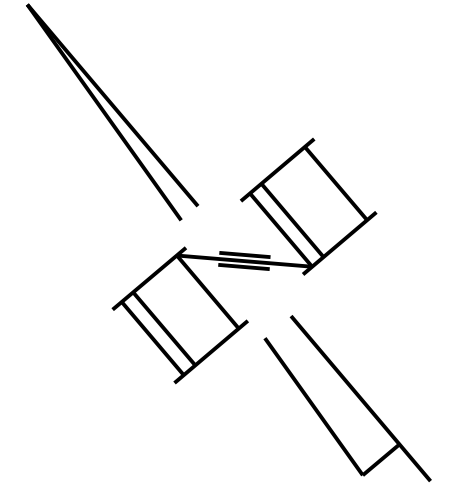
**GAS DEPARTMENT**  
DUKE ENERGY

50  
62

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED  
HAS BEEN DETERMINED FROM  
GAS MAPS & RECORDS.



REVISIONS

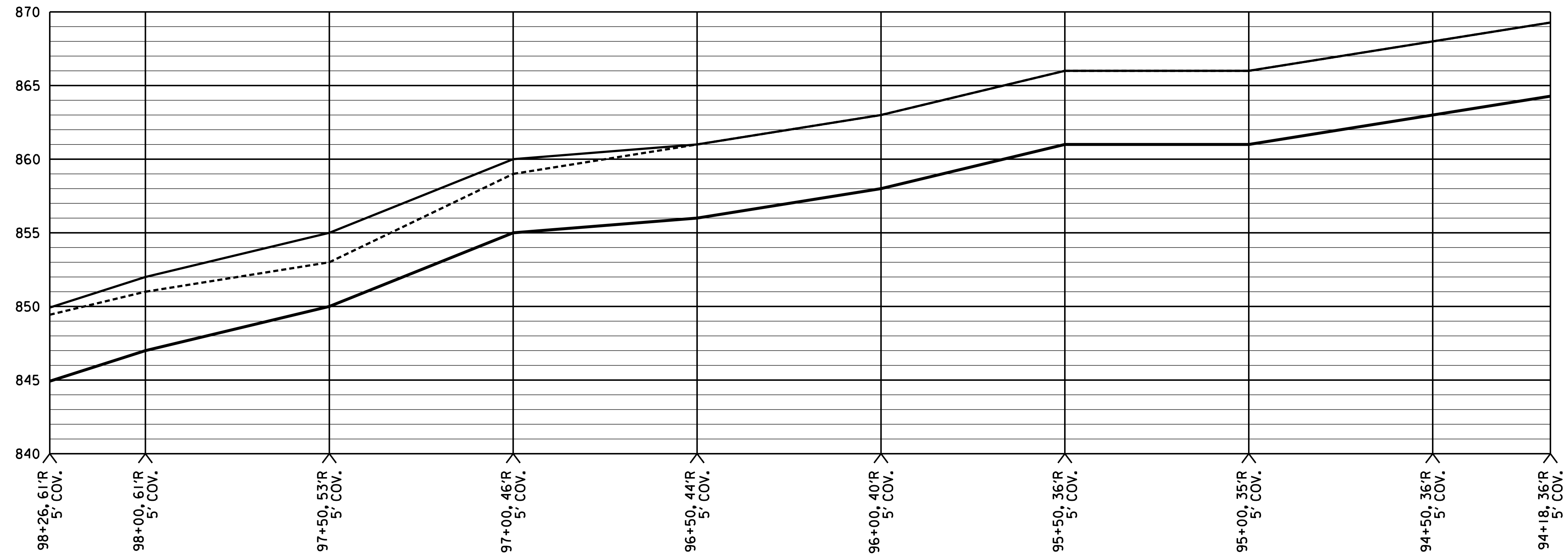
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COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

GAS DEPARTMENT  
DUKE ENERGY

51  
62

ERLANGER DISTRICT  NTS



PROFILE "Z"

FROM SHEET 50

HORIZ. SCALE 

VERT. SCALE 

PROP. GAS MAIN 

PROP. GRADE 

EX. GRADE 

REVISIONS

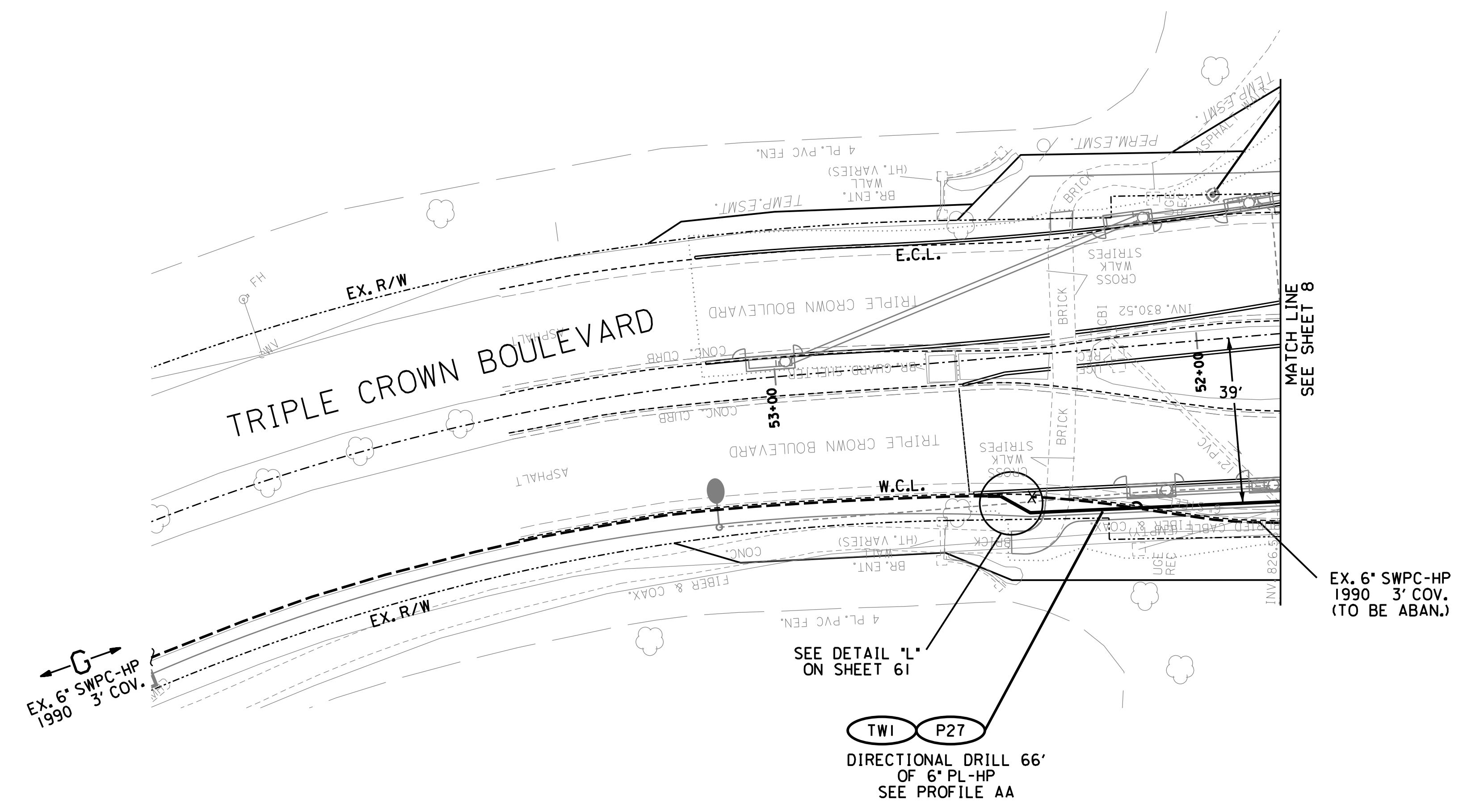
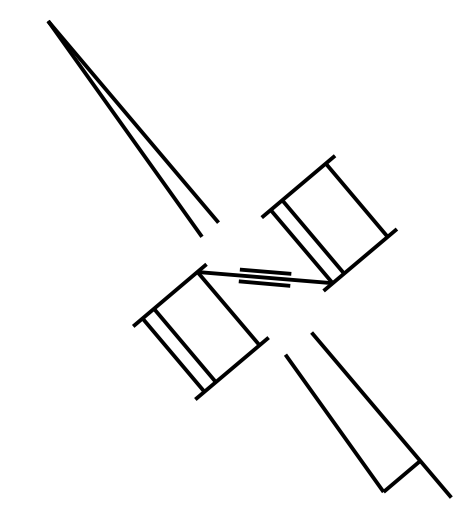
COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

**GAS DEPARTMENT**  
DUKE ENERGY

52  
62

ERLANGER DISTRICT 0 10 20

NOTE: GAS MAIN TO BE ABANDONED  
HAS BEEN DETERMINED FROM  
GAS MAPS & RECORDS.



REVISIONS

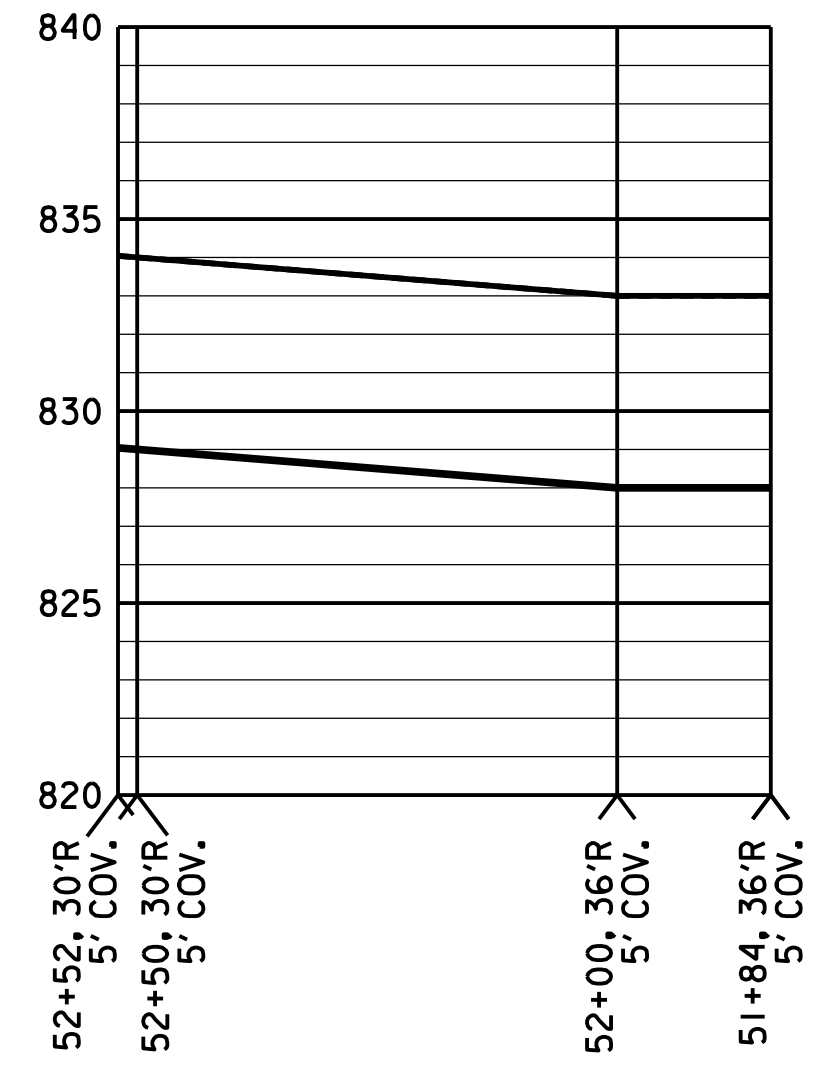
0 2 9 5 4 5 5 6 6

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

**GAS DEPARTMENT**  
DUKE ENERGY

53  
62

ERLANGER DISTRICT  NTS



**PROFILE "AA"**  
FROM SHEET 52

HORIZ. SCALE 

VERT. SCALE 

PROP. GAS MAIN 

PROP. GRADE 

EX. GRADE 

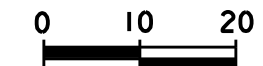
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

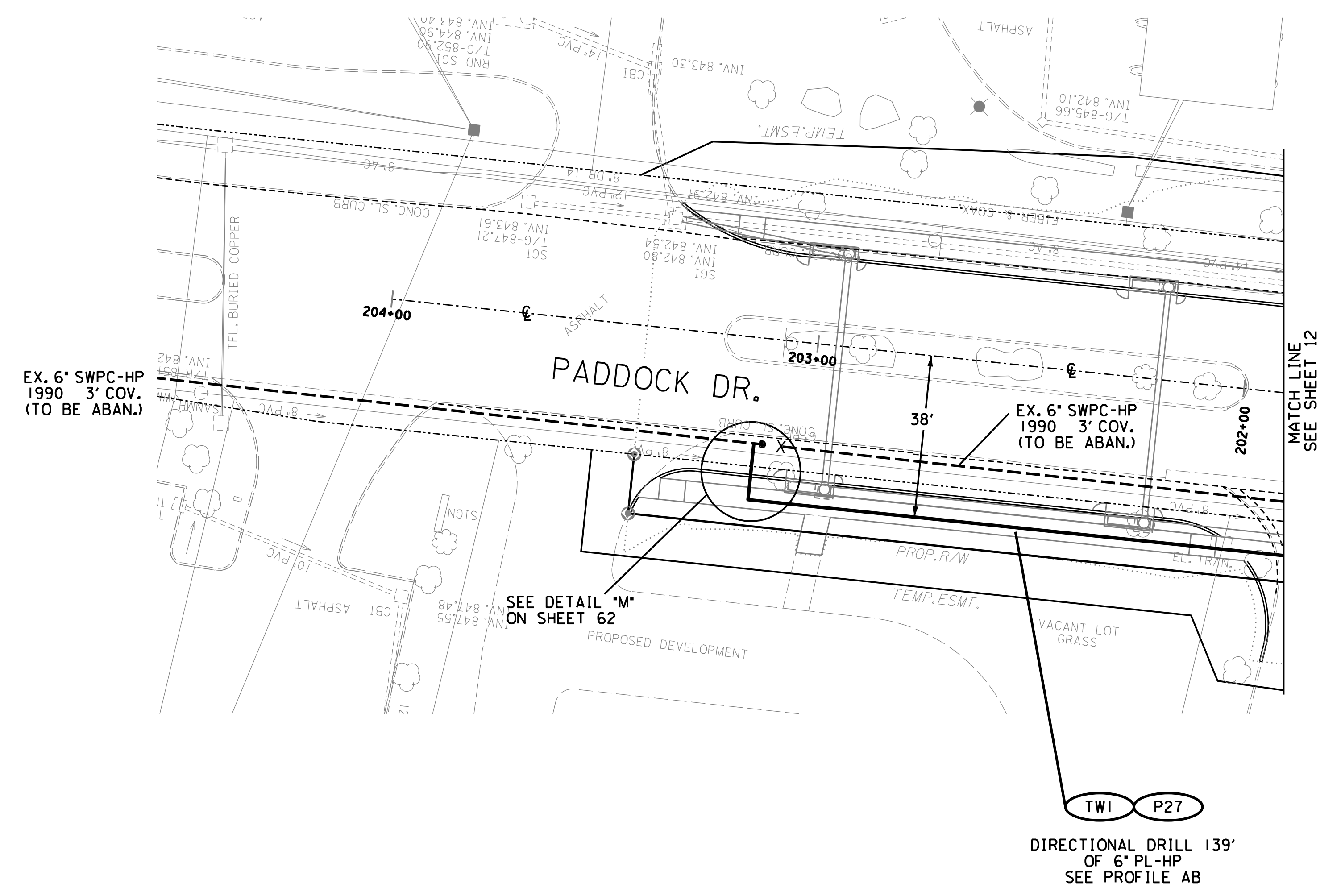
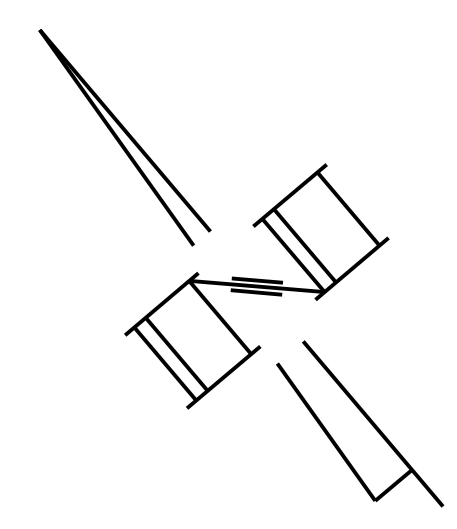
**GAS DEPARTMENT**  
DUKE ENERGY

54  
62

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED  
HAS BEEN DETERMINED FROM  
GAS MAPS & RECORDS.



REVISIONS

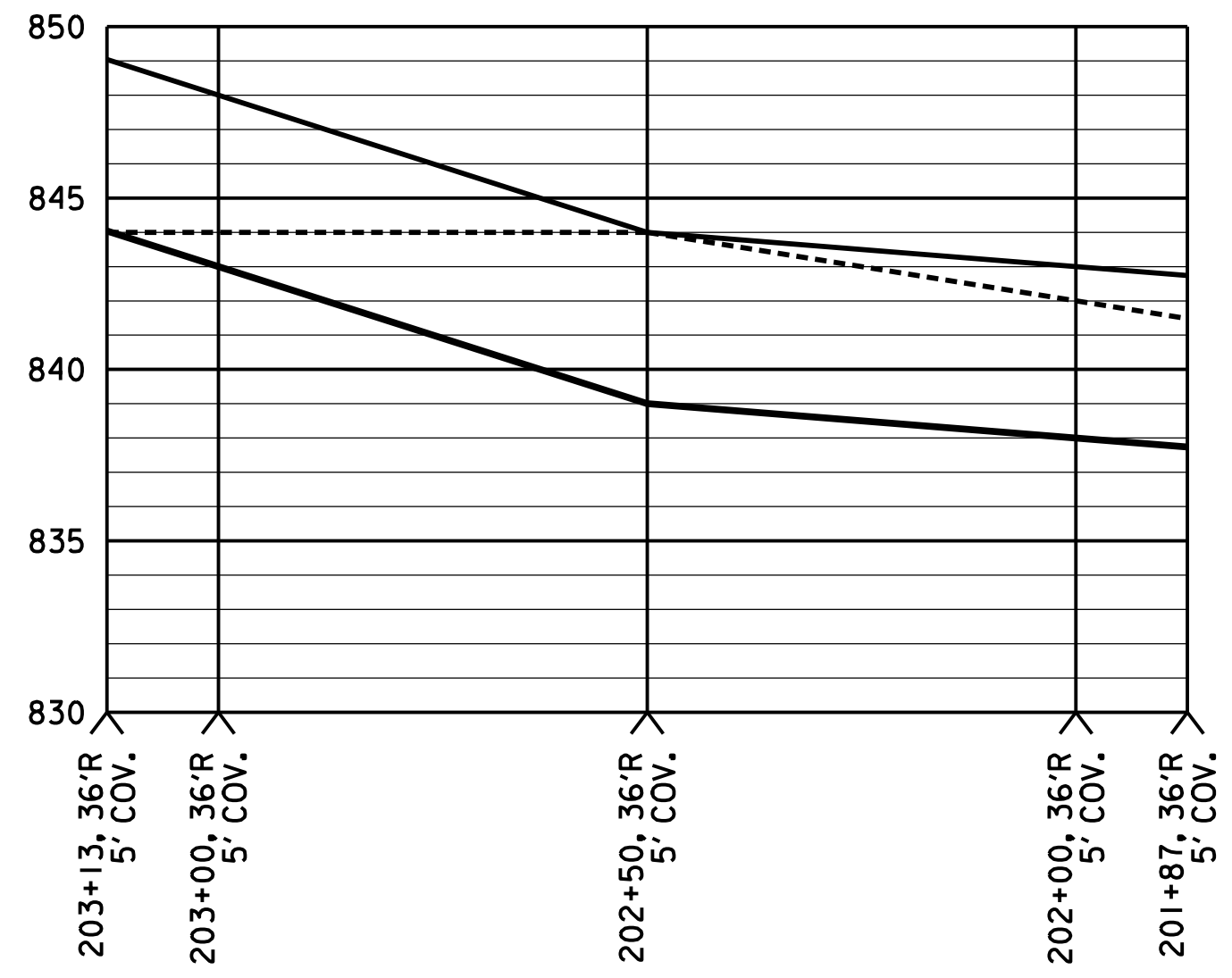


COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

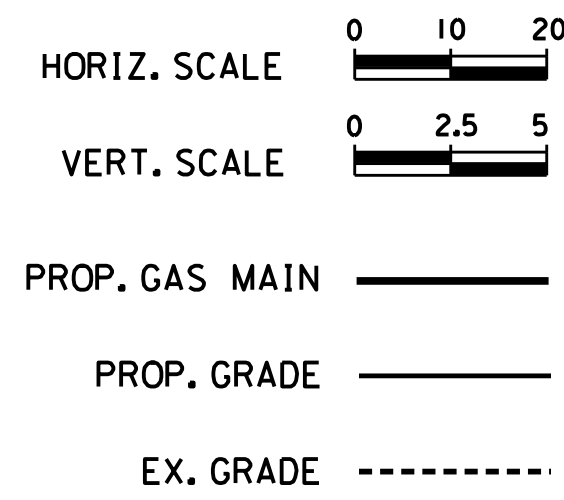
**GAS DEPARTMENT**  
DUKE ENERGY

55  
62

ERLANGER DISTRICT  NTS



**PROFILE "AB"**  
FROM SHEET 54



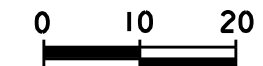
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

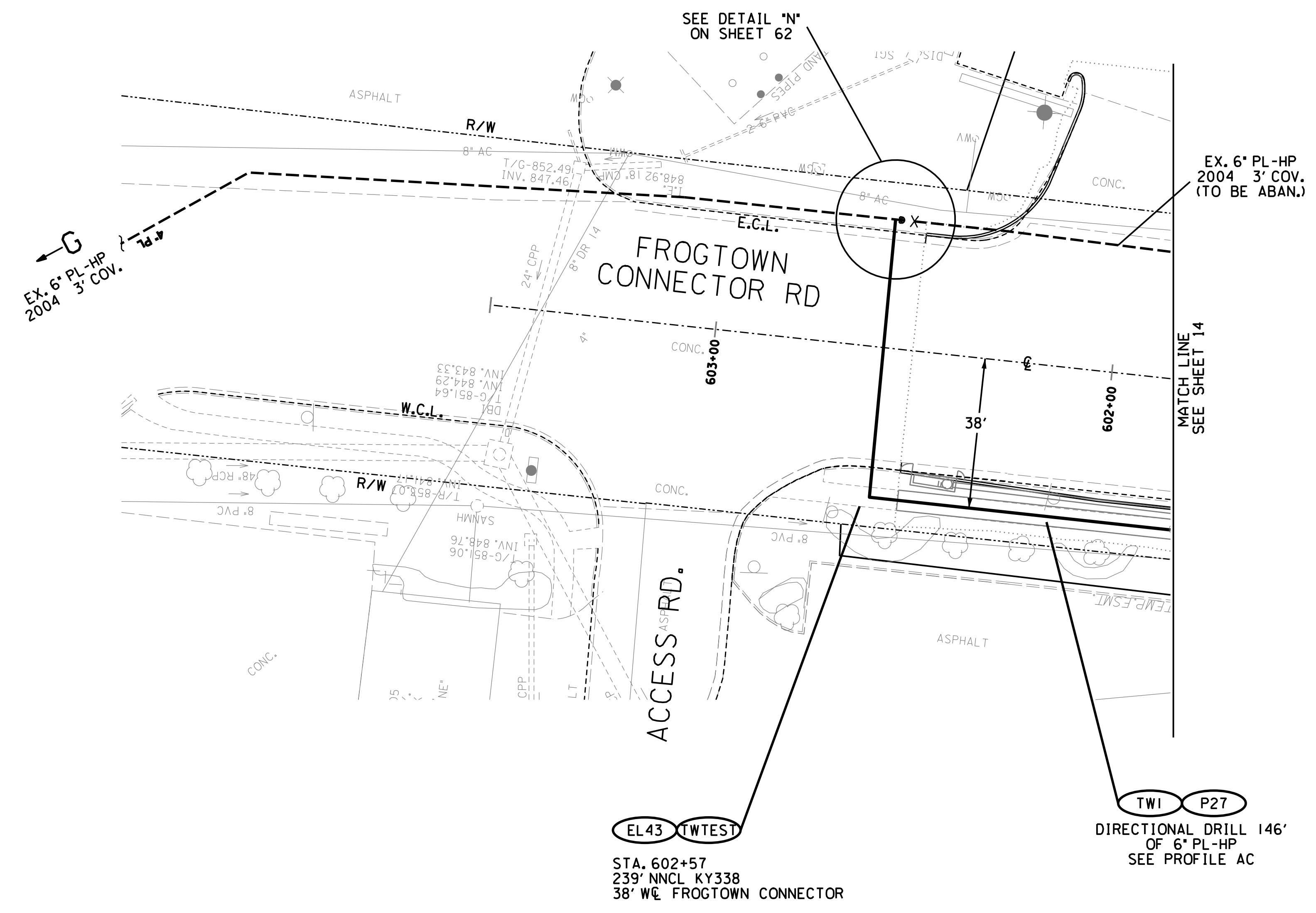
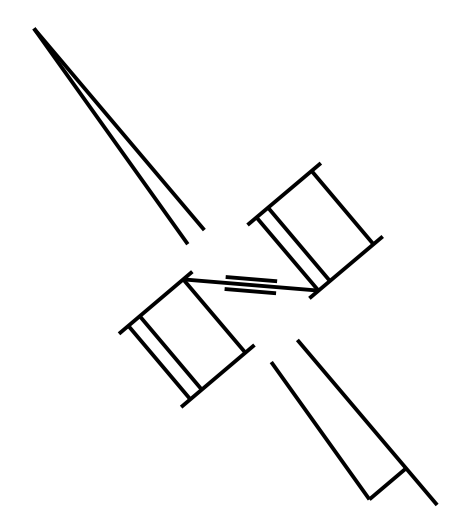
**GAS DEPARTMENT**  
DUKE ENERGY

56  
62

ERLANGER DISTRICT



NOTE: GAS MAIN TO BE ABANDONED  
HAS BEEN DETERMINED FROM  
GAS MAPS & RECORDS.



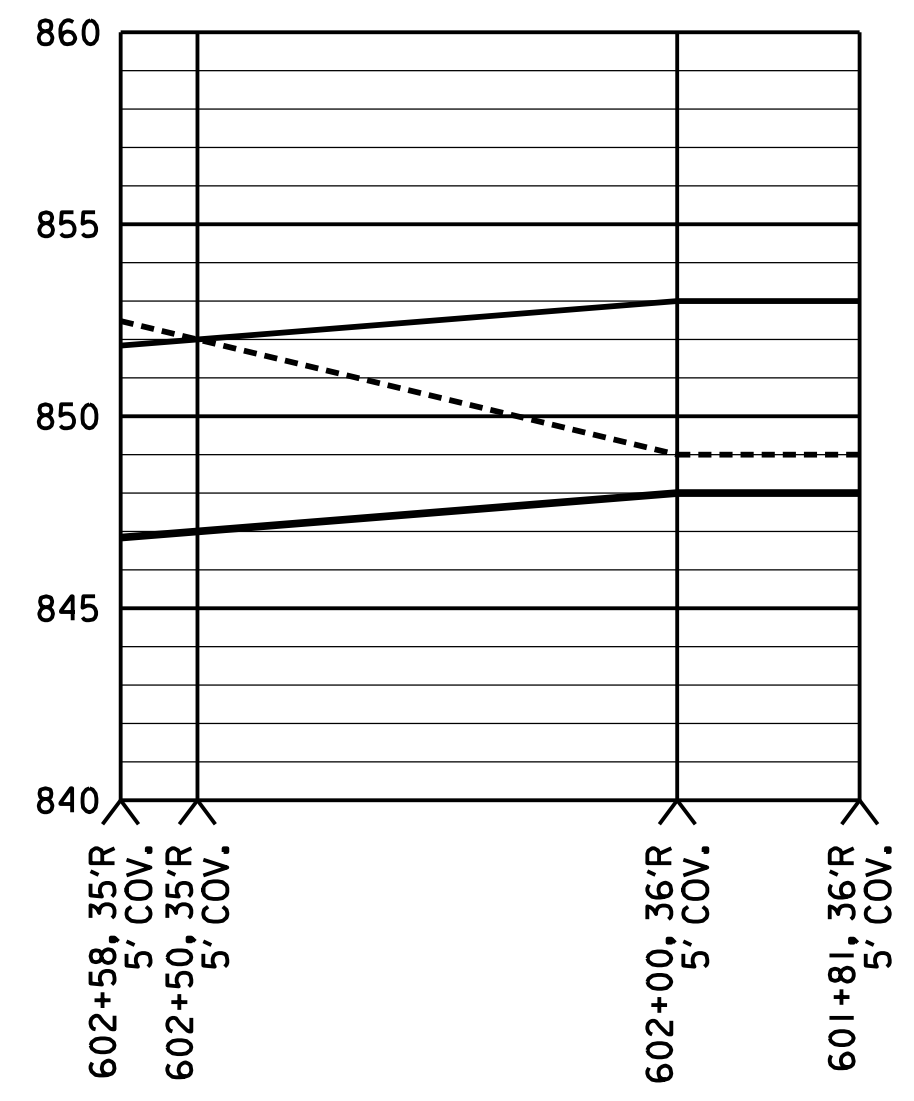
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

**GAS DEPARTMENT**  
DUKE ENERGY

57  
62

ERLANGER DISTRICT  NTS




**PROFILE "AC"**

FROM SHEET 56



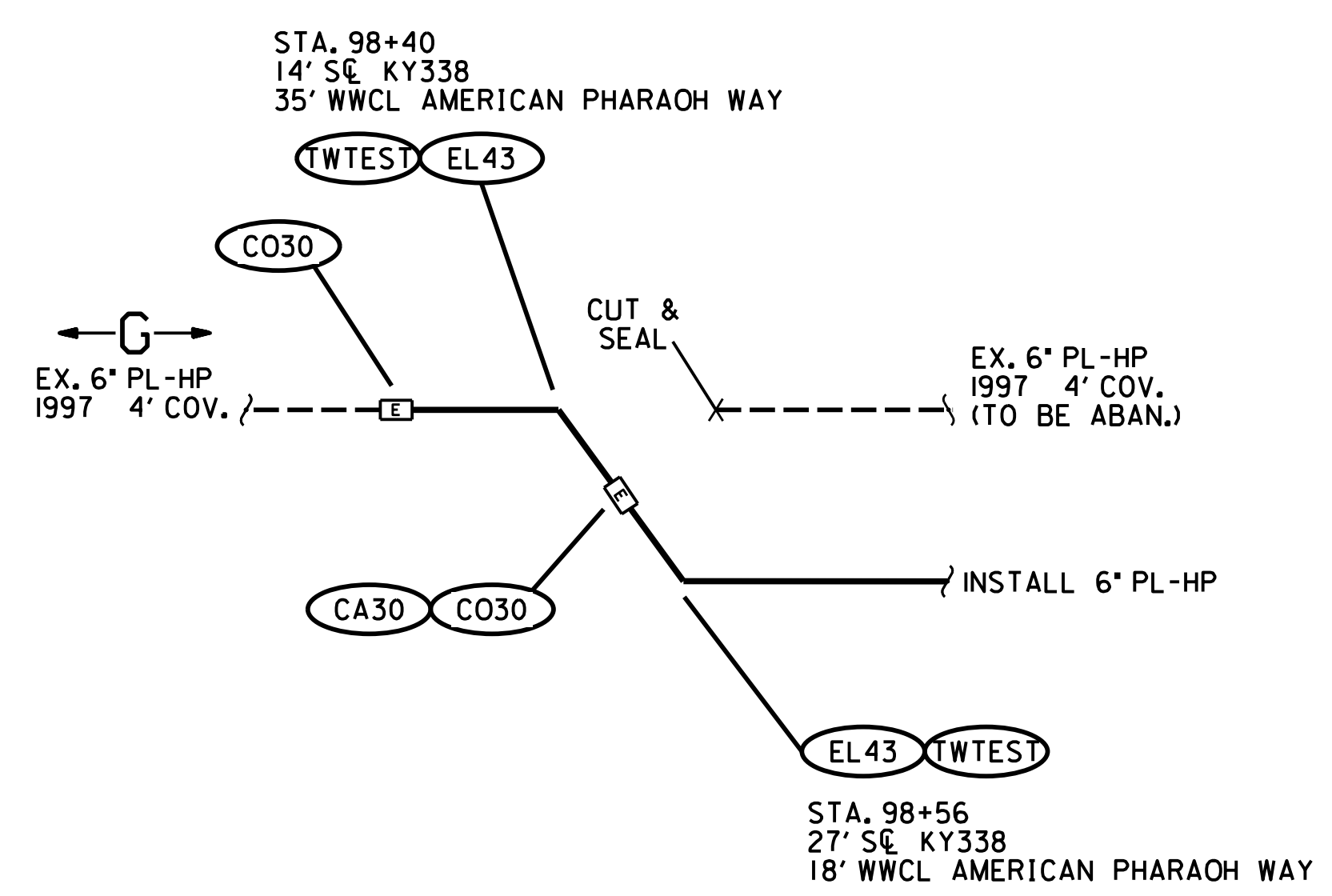
PROP. GAS MAIN 

PROP. GRADE 

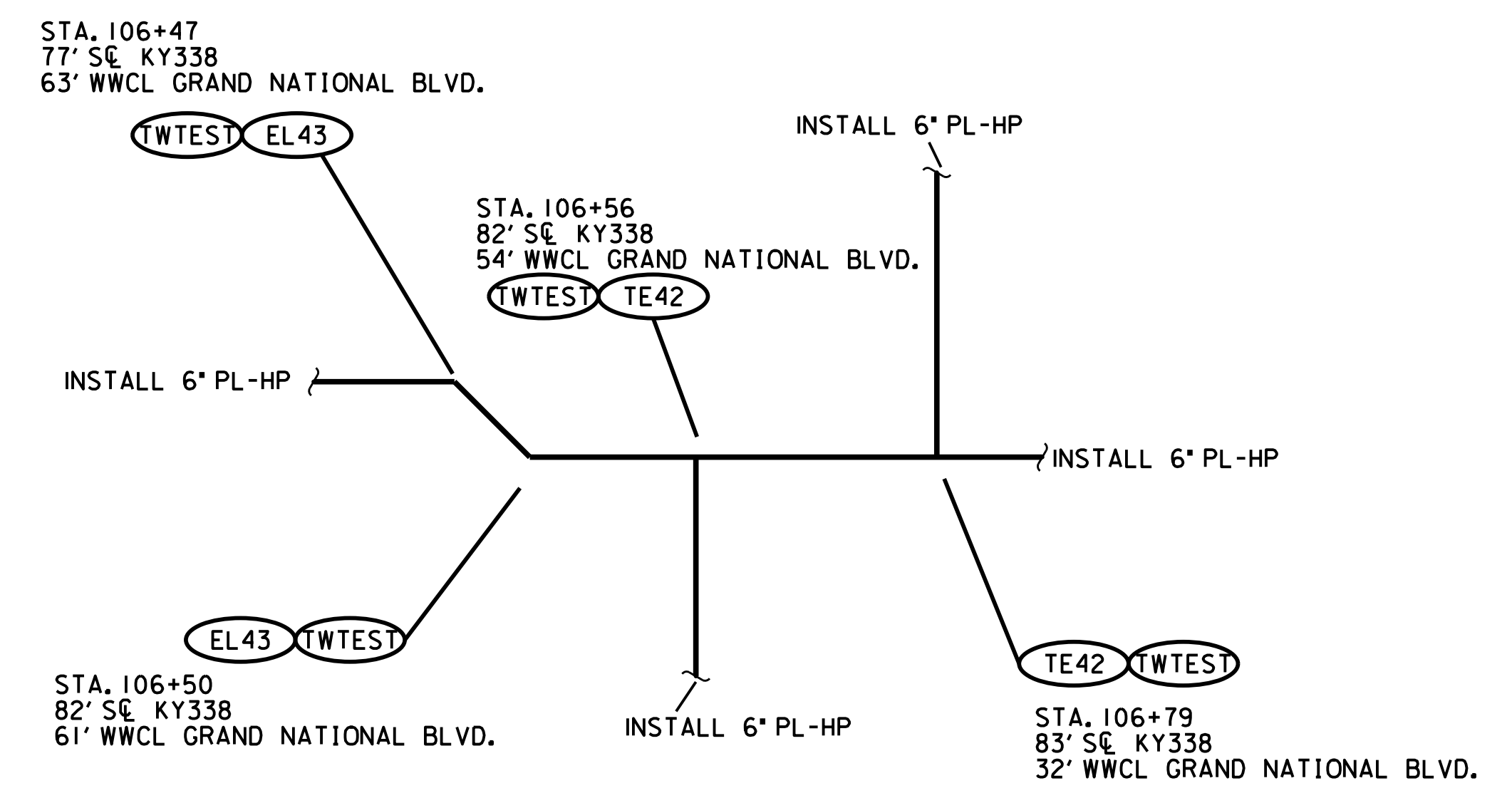
EX. GRADE 

REVISIONS

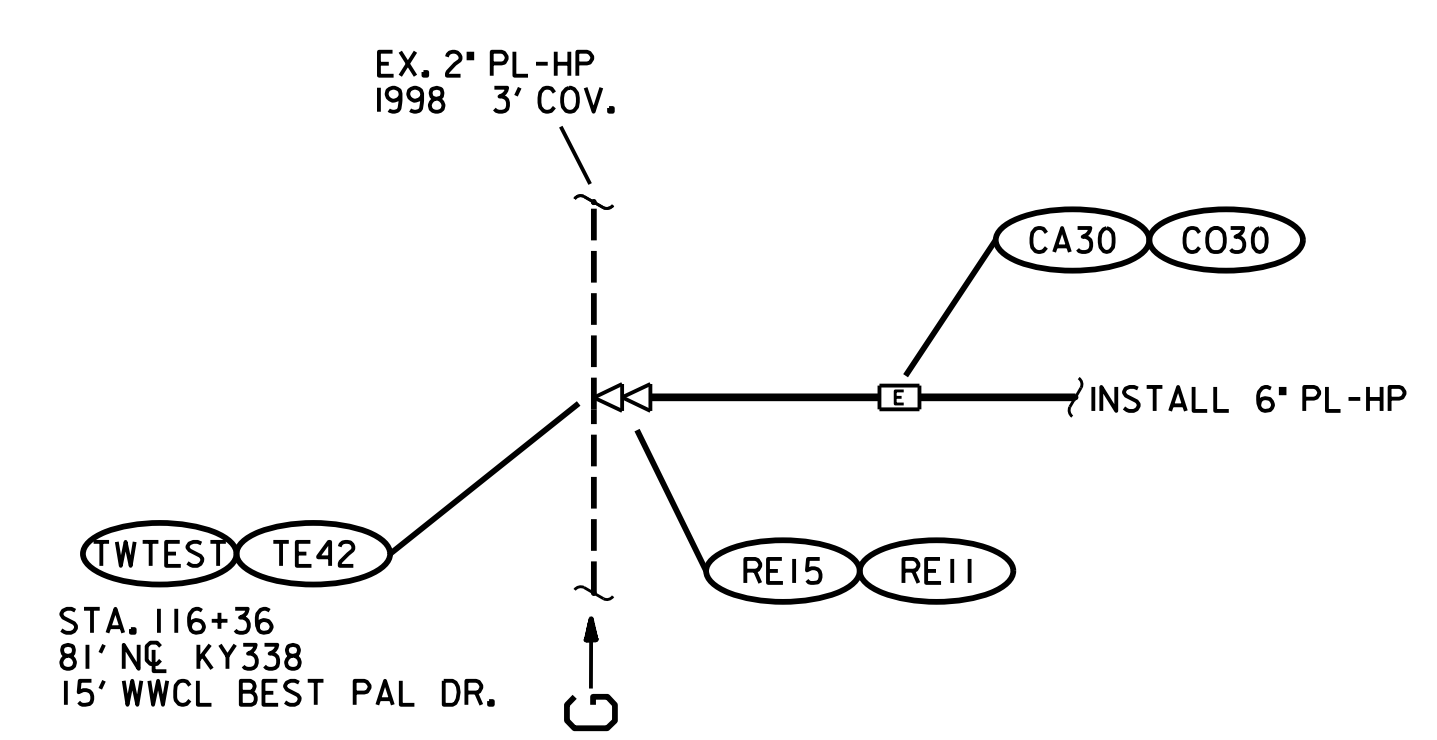
COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	



DETAIL "A"  
N.T.S.  
FROM SHEET 6



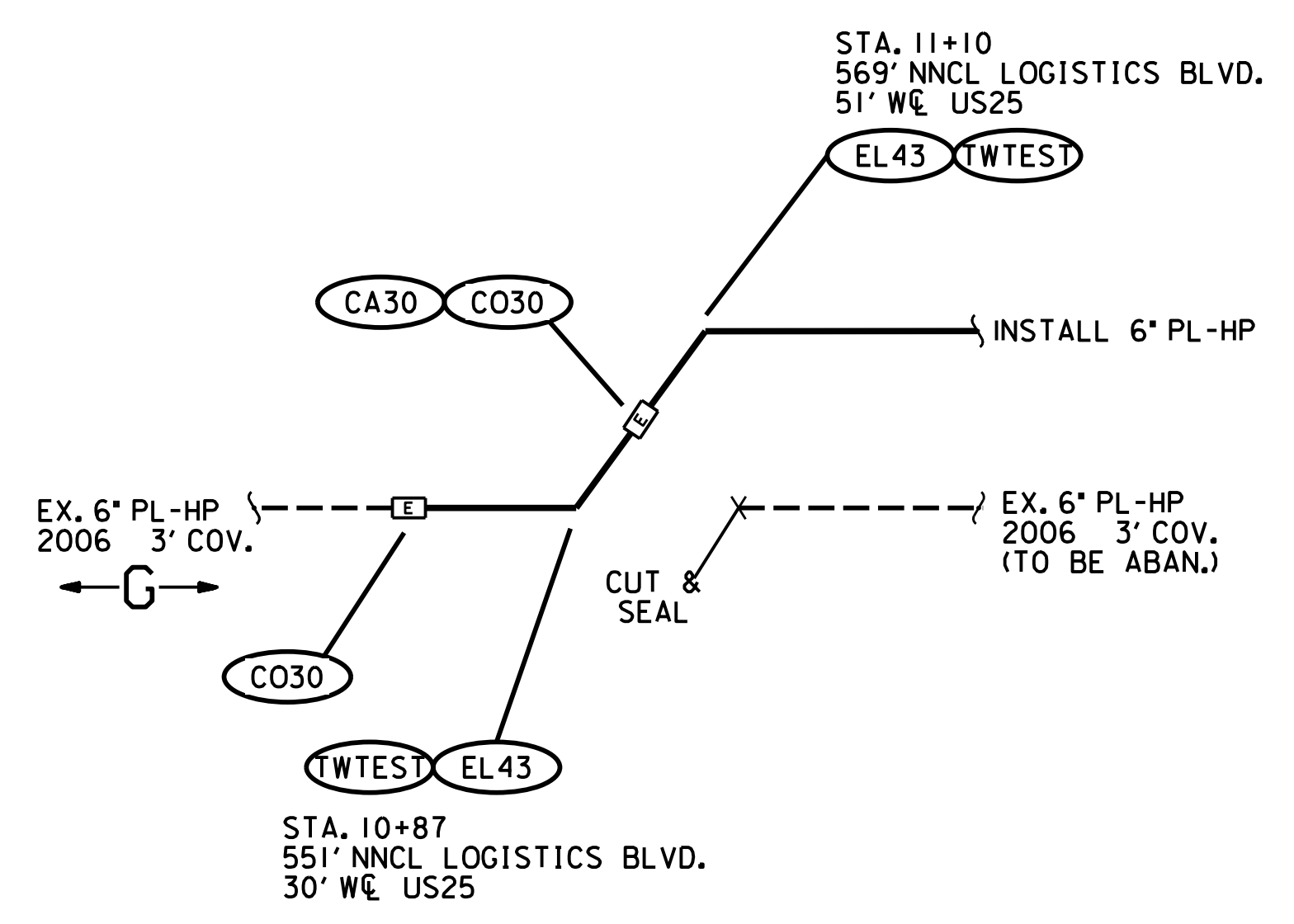
DETAIL "B"  
N.T.S.  
FROM SHEET 8



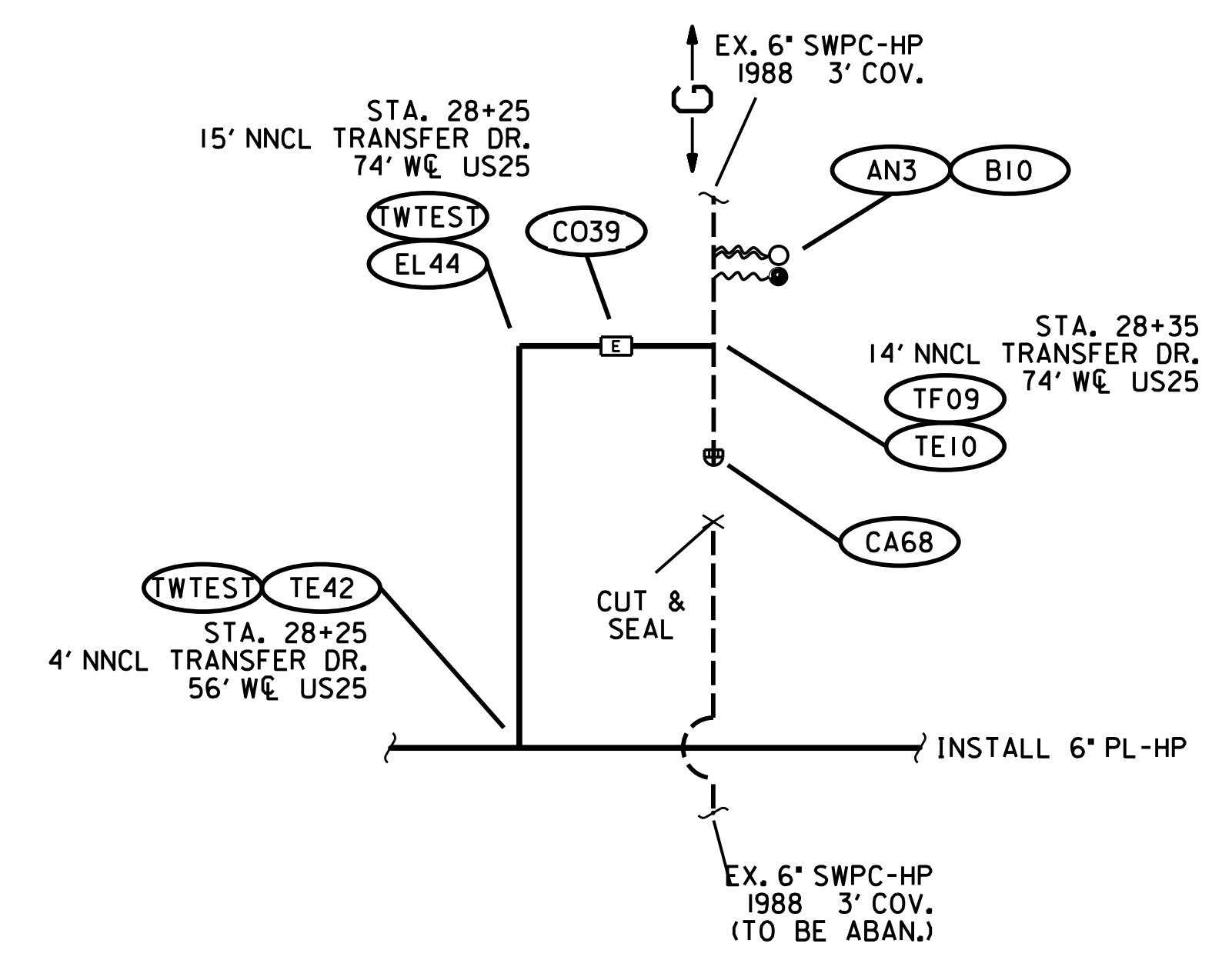
DETAIL "C"  
N.T.S.  
FROM SHEET 24

REVISIONS

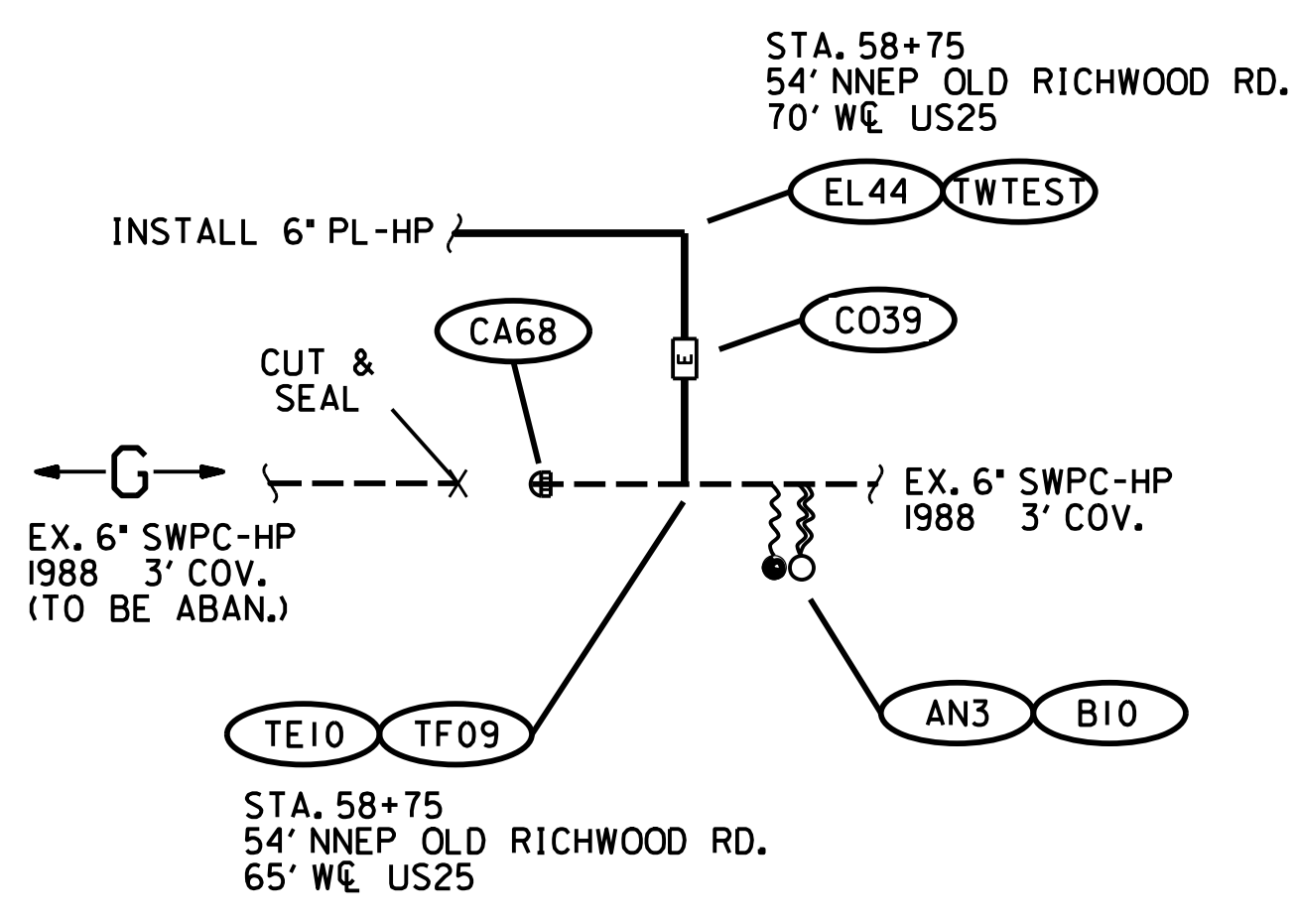
COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	



DETAIL "D"  
N.T.S.  
FROM SHEET 28



DETAIL "E"  
N.T.S.  
FROM SHEET 34



DETAIL "F"  
N.T.S.  
FROM SHEET 44

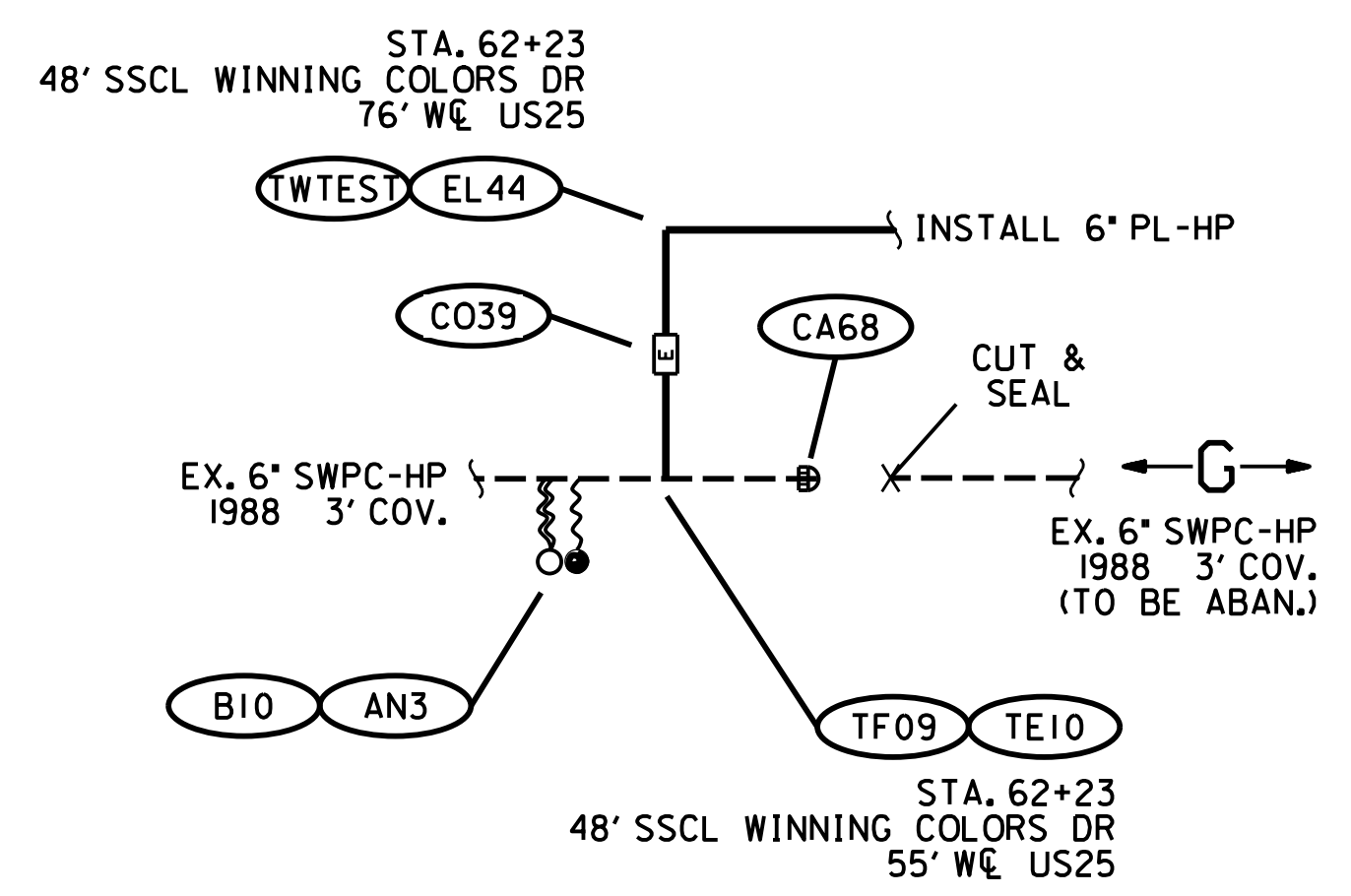
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

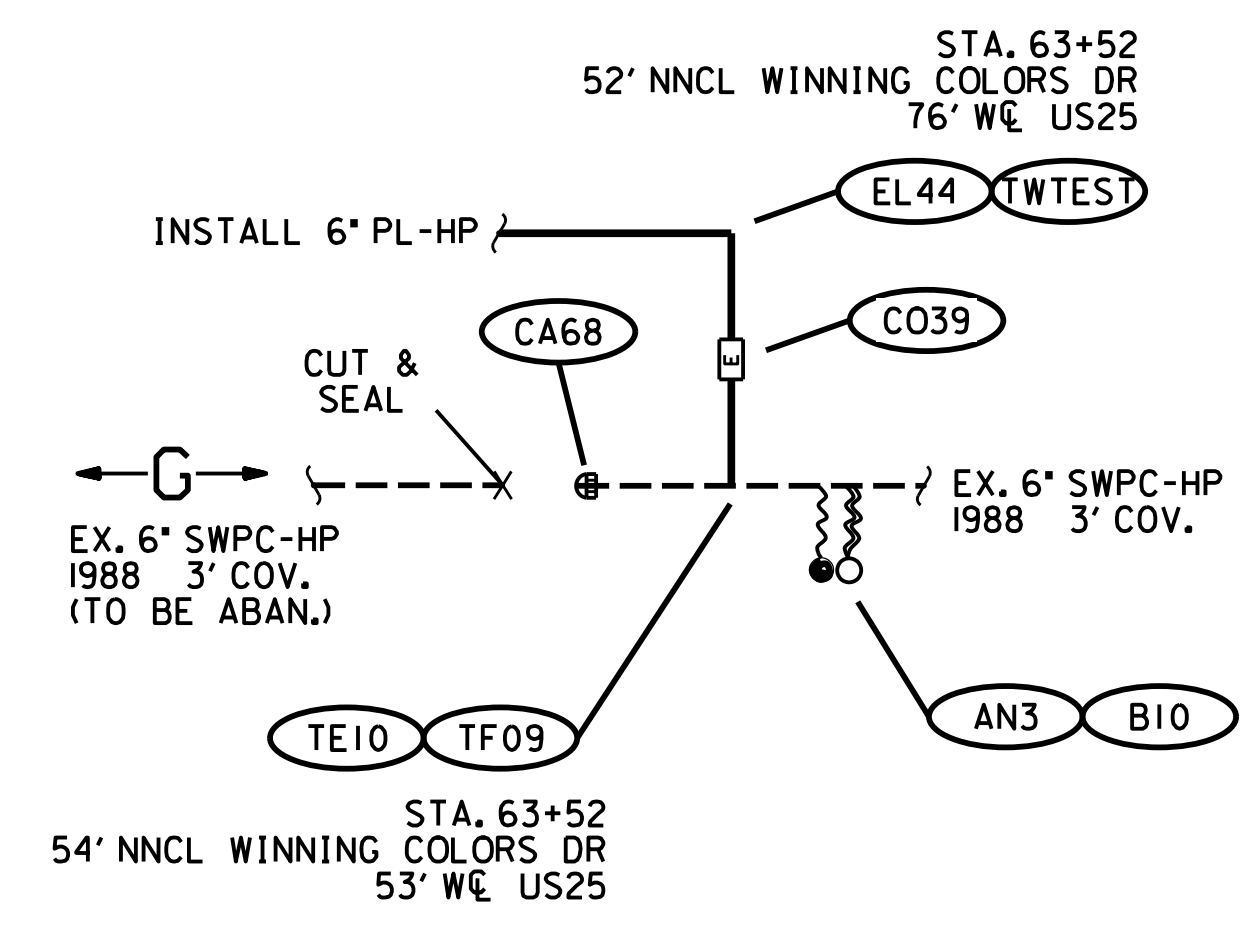
GAS DEPARTMENT  
DUKE ENERGY

60  
62

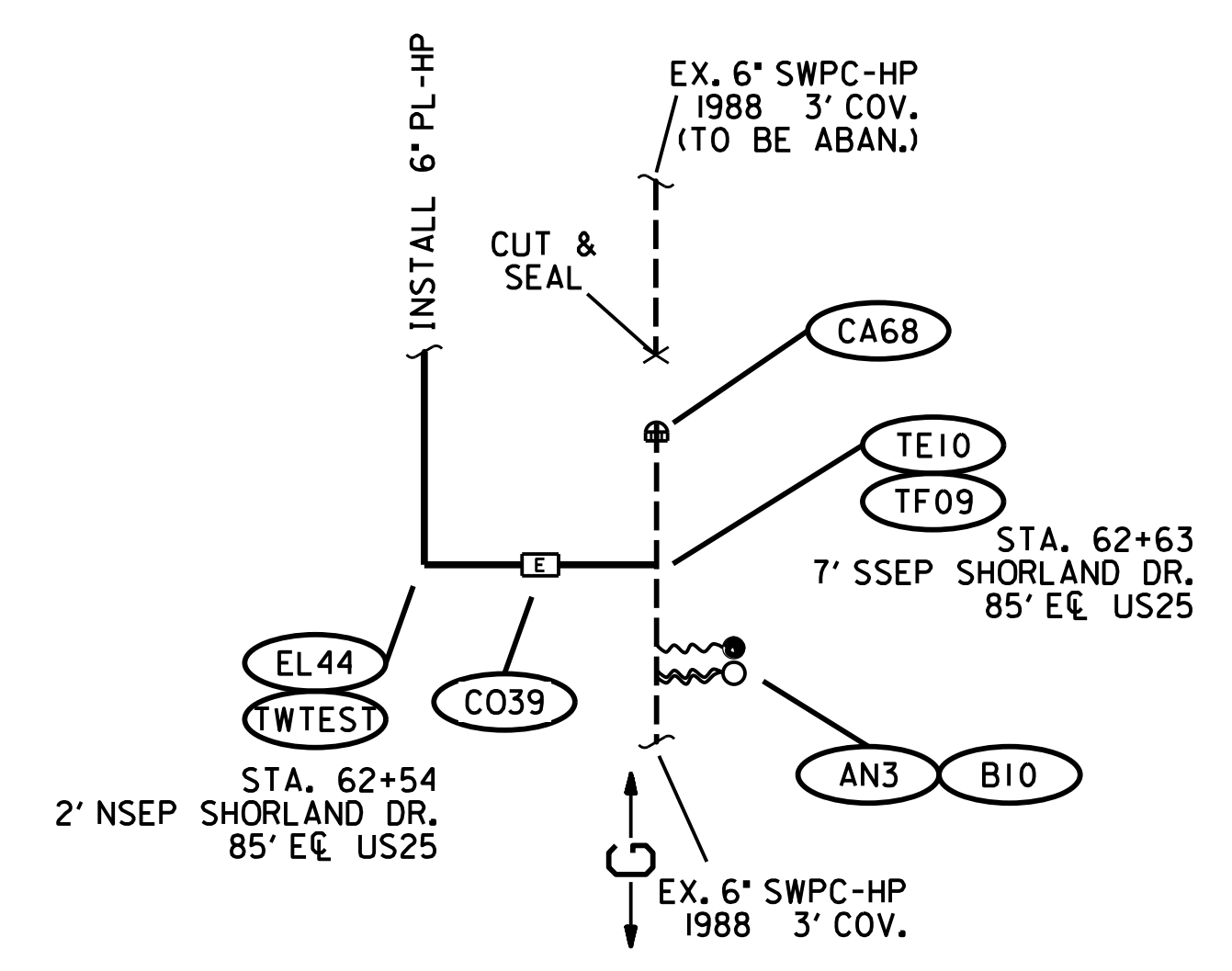
ERLANGER DISTRICT NTS



DETAIL "G"  
N.T.S.  
FROM SHEET 46



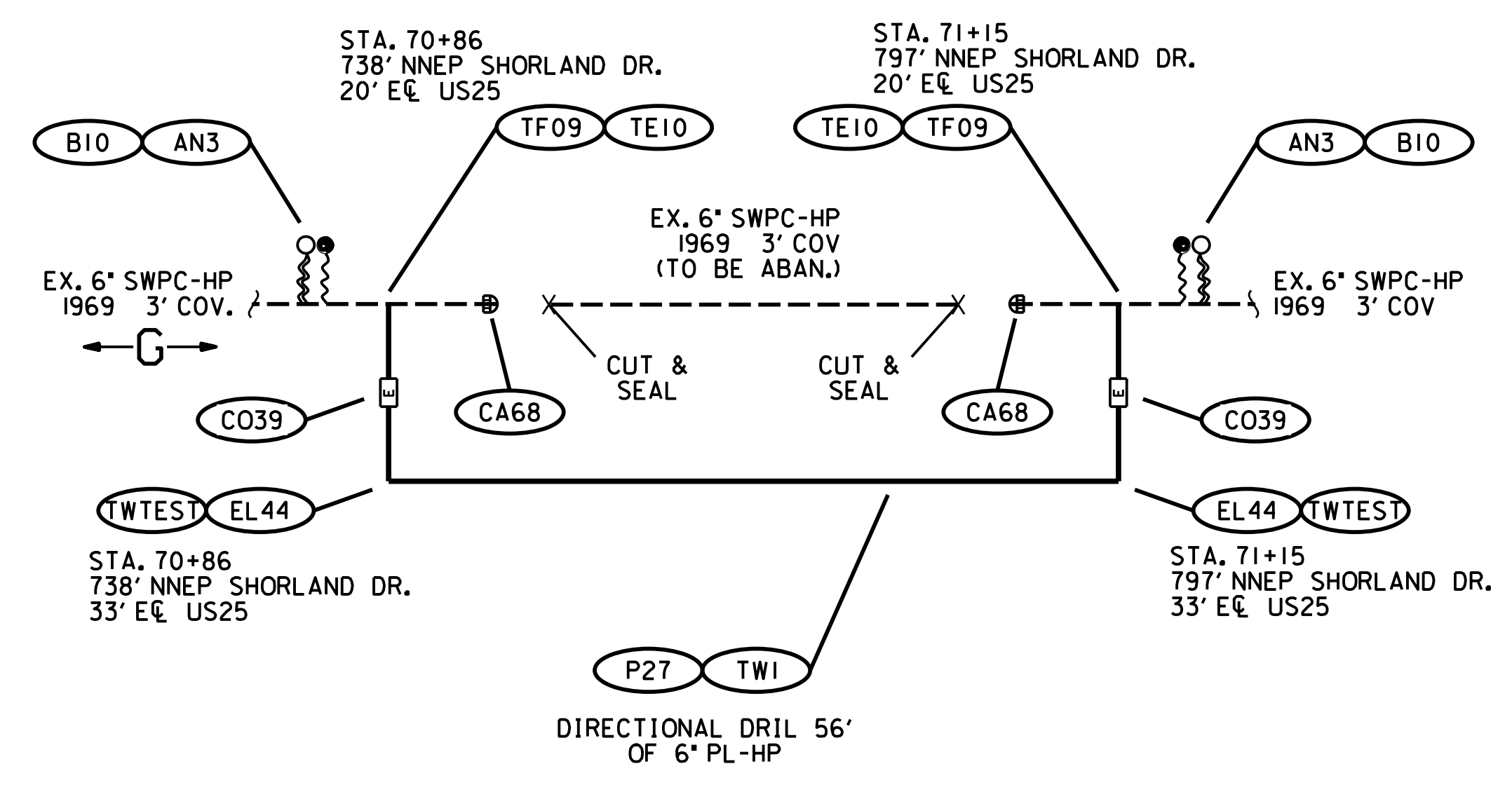
DETAIL "H"  
N.T.S.  
FROM SHEET 46



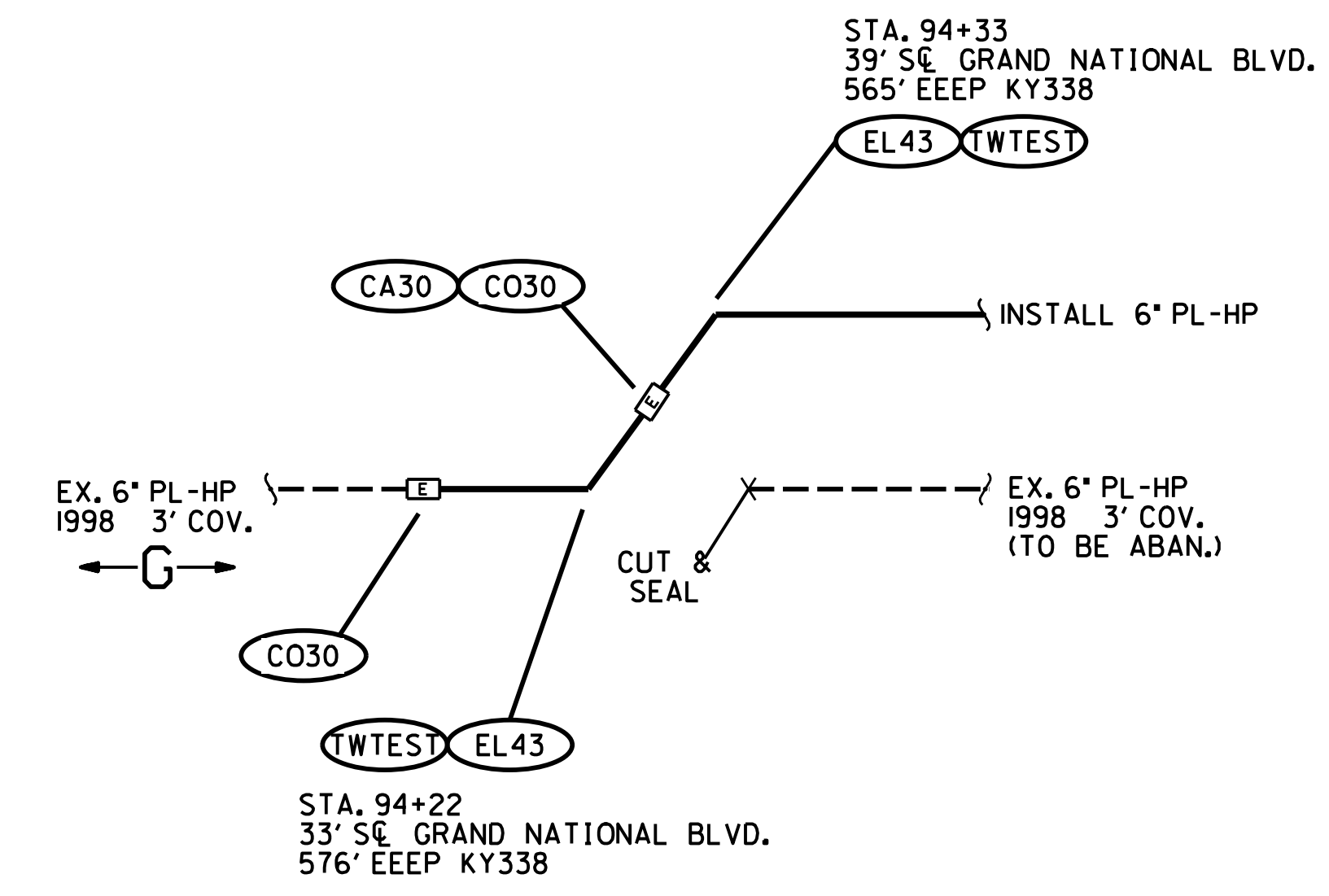
DETAIL "I"  
N.T.S.  
FROM SHEET 46

REVISIONS

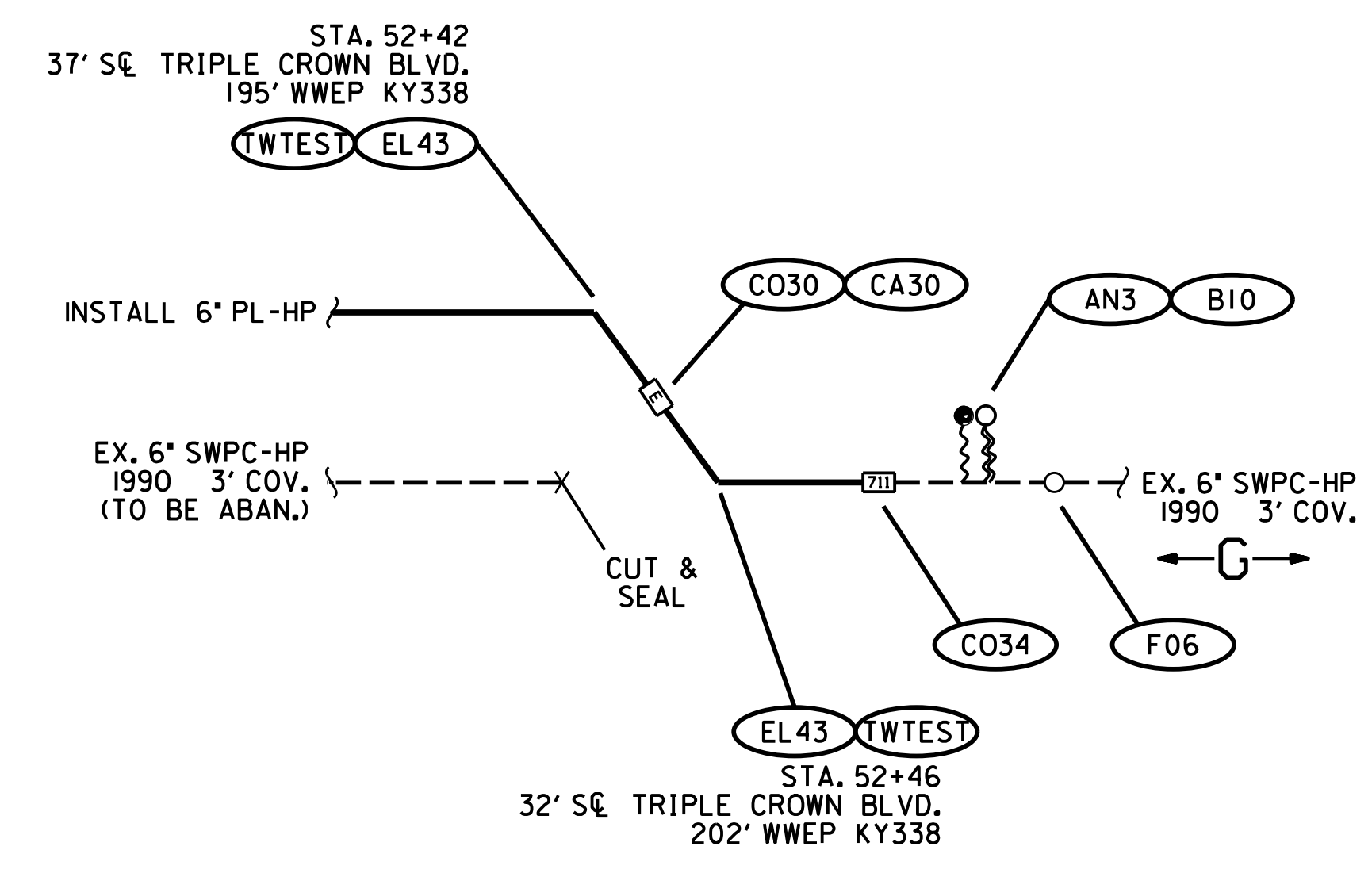
COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	



DETAIL "J"  
N.T.S.  
FROM SHEET 48



DETAIL "K"  
N.T.S.  
FROM SHEET 50



DETAIL "L"  
N.T.S.  
FROM SHEET 52

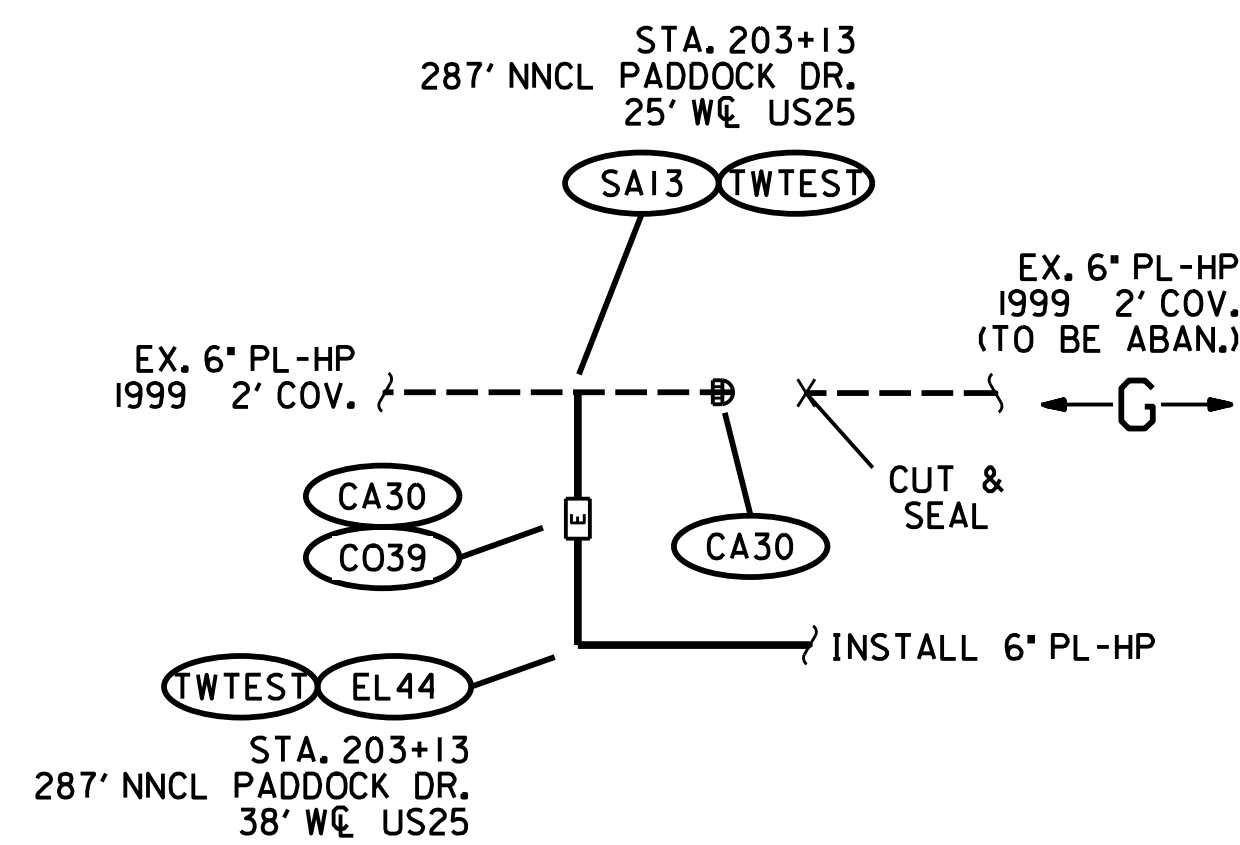
REVISIONS

COUNTY OF	ITEM NO.	SHEET NO.
BOONE	06-18.00	

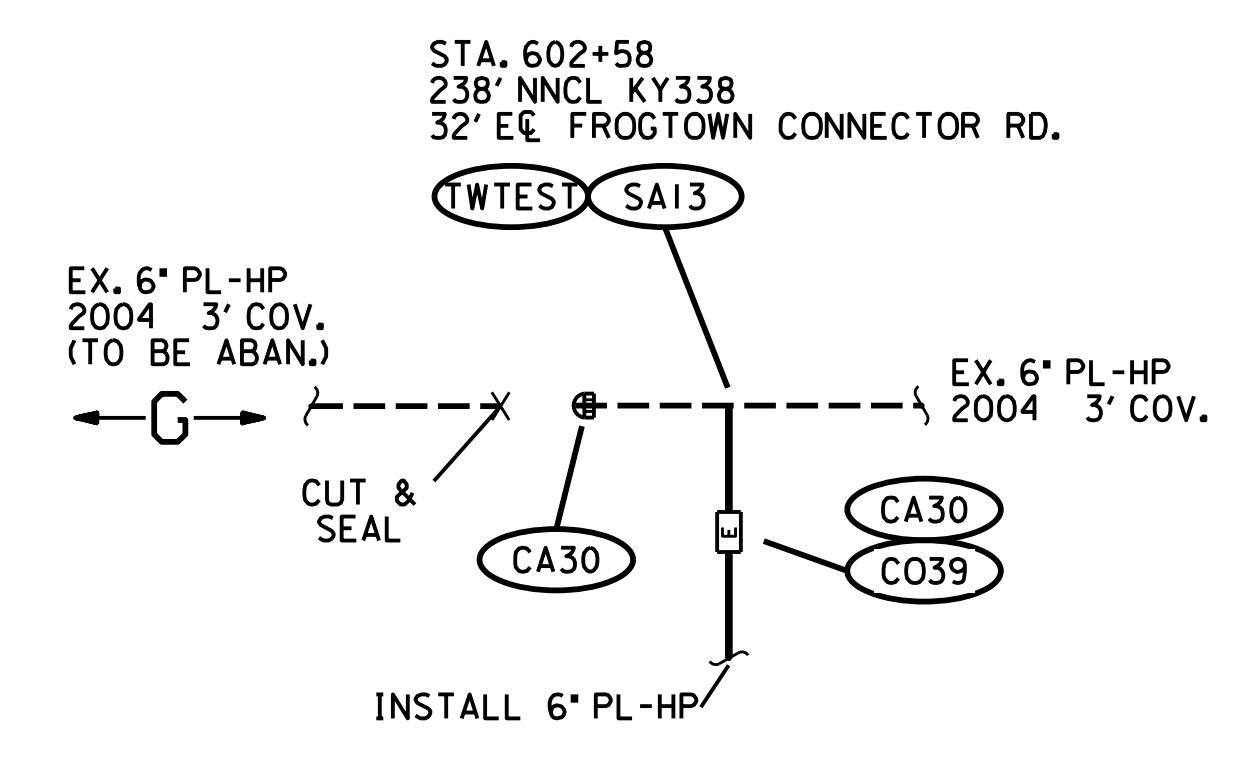
GAS DEPARTMENT  
DUKE ENERGY

62  
62

ERLANGER DISTRICT NTS



DETAIL "M"  
N.T.S.  
FROM SHEET 54

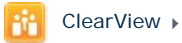


DETAIL "N"  
N.T.S.  
FROM SHEET 56

REVISIONS



## **Appendix C3 -- CAP**



**Item Number:** 06-0014.00    **Contract ID:** Unavailable    **County:** BOONE  
**Letting Date:**    **Project Manager:** kytc\Carol.Callan-Ramler  
**Description:**  
 IMPROVE THE KY-536 (MT. ZION ROAD) INTERCHANGE. (14CCR)(16CCR)(18CCR) (DESIGN BUILD)

**Info:** Welcome to the Clear View Production site. All changes here will affect Production SYP.

Search    Project    Reports

Milestones

Funding

CAP

Evaluations

Details

Open CAP Report							
#	Requestor	Location	Request Date	CAP Description	Modified By	Modified	
1	Carol Callan-Ramler / Tim Flynn	D6	05/30/2018	State agrees to sod all disturbed areas.	ky\carol.callan-ramler	06/13/2019	
2	Carol Callan-Ramler / Tim Flynn	D6	05/30/2018	Clarification to #1: Parcel 118: State agrees to sod all disturbed areas.	ky\carol.callan-ramler	06/13/2019	
3	Carol Callan-Ramler / Tim Flynn	D6	02/07/2019	Parcel 123: State agrees to sod all disturbed areas.	ky\carol.callan-ramler	06/13/2019	
4	Carol Callan-Ramler / Tim Flynn	D6	12/18/2018	Parcel 126: State agrees to repair any disturbed area of subject parking lot with "in kind" materials. State agrees to sod all disturbed areas. Property Owners have retained Business Sign for salvage value and said sign is to be removed by owners from the easement area. If the sign is not removed by 3-31-19 the State shall obtain possession of and raze said sign.	ky\carol.callan-ramler	06/13/2019	
5	Carol Callan-Ramler / Tim Flynn	D6	02/23/2018	Parcel 127: State agrees to sod all disturbed areas.	ky\carol.callan-ramler	06/13/2019	
6	Carol Callan-Ramler / Tim Flynn	D6	02/09/2018	Parcel 131: State agrees to remove the "pork chop" median located within the proposed entrance way located right of Station 212+00. State agrees to sod all disturbed areas.	ky\carol.callan-ramler	06/13/2019	
7	Carol Callan-Ramler / Tim Flynn	D6	03/26/2018	Parcel 205: State agrees to sod all disturbed areas. Subject's 6 ft. security fencing is not to be disturbed.	ky\carol.callan-ramler	06/13/2019	
8	Carol Callan-Ramler / Tim Flynn	D6	12/19/2018	Parcel 310: State agrees to install a 24' Right In-Right Out commercial grade entrance way compliant with all local and state requirements for commercial grade entrances, left of Station 213+10 to T/E identified as "building removal / entrance way" construction.	ky\carol.callan-ramler	06/13/2019	

New

**Item Number:** 06-0018.00    **Contract ID:** Unavailable    **County:** BOONE  
**Letting Date:**    **Project Manager:** KYTC\CAROL.CALLAN-RAMLER  
**Description:**  
 RECONSTRUCT THE KY-338 (RICHWOOD ROAD) INTERCHANGE. (FUNDING FOR IMR SHOWN UNDER 6-14.01) (10CCR) (12CCR)(14CCR)(16CCR) (DESIGN BUILD)

**Info:** Welcome to the Clear View Production site. All changes here will affect Production SYP.

Search    Project    Reports

		Open CAP Report					
Milestones	#	Requestor	Location	Request Date	CAP Description	Modified By	Modified
Funding	1	Carol Callan-Ramler / Mary Beth Johnson	D6	05/29/2019	Parcel 102: The proposed driveway located at STA 101+20 RT (413 Richwood Road - KY 338) will be 12 feet in width. A Consent and Release is being signed for the removal of the existing drive and restoration of the area located outside the temporary easement area. The brick mailbox located at 461 Richwood Road (KY 338) is not to be disturbed during construction. The mailbox at 413 Richwood Road (KY 338) will be relocated to the newly constructed entrance.	ky\carol.callan-ramler	06/10/2019
CAP					Parcel 329: KYTC commits to the following:		
Evaluations	2	Carol Callan-Ramler / Mary Beth Johnson	D6	03/14/2019	<ul style="list-style-type: none"> <li>Construct a concrete entrance being approximately 15 feet in width and approximately 6 inches deep as per the attached plan sheet, R25 (rev. February 04, 2019)</li> <li>Install 112.5 L.F. of guardrail at RT St 390+00 to RT St 391+15.6 along Richwood Road (aka Paper Blvd.)</li> <li>Emergency response vehicles will have continuous access to Dixie Highway (US 25) from Shorland Drive during the entire duration of the project, until access is provided directly to Richwood Road.</li> </ul>	ky\carol.callan-ramler	06/10/2019
Details	3	Carol Callan-Ramler	D6	08/22/2019	Parcel 326: Property Owner has two drive entrances to be reconstructed. The east entrance provides access for tractor trailers. Tractor trailers cannot access via the west entrance. At all times, one entrance shall be open. When construction begins on one entrance, work shall be continuous until it is re-opened. The property owner requests an advance notice 5 business days prior to beginning work on an entrance. The east entrance shall be reopened 14 calendar days after work initiates.	ky\carol.callan-ramler	08/22/2019
	4	4	D6	08/30/2019	Parcel 113: Per the interlocutory judgment, the contract needs to provide two weeks notice of construction prior to commencing work on the property. This is to be interpreted as being potential multiple notifications should utility work occur in advance (weeks/months) to roadway work.	ky\carol.callan-ramler	08/30/2019

## **Appendix F - UTILITIES**

## **Appendix F1 -- Utility Impact Notes**

# **GENERAL UTILITY NOTES AND INSTRUCTIONS APPLICABLE TO ALL UTILITY WORK MADE A PART OF THE ROAD CONSTRUCTION CONTRACT**

The contractor should be aware the following utility notes and KYTC Utility Bid Item Descriptions shall supersede, replace and take precedence over any and all conflicting information that may be contained in utility owner supplied specifications contained in the contract, on plans supplied by the utility owner, or any utility owner specifications or information externally referenced in this contract.

Where information may have been omitted from these notes, bid item descriptions, utility owner supplied specifications or plans; the KYTC Standard Specifications for Road and Bridge Construction shall be referenced.

## **PROTECTION OF EXISTING UTILITIES**

The existing utilities shown on the plans are shown as best known at the time the plans were developed and are to be used as a guide only by the Contractor. The Contractor shall use all means at his disposal to accurately locate all existing utilities, whether shown on the plans or not, prior to excavation. The contractor shall protect these utilities during construction. Any damage to existing utilities during construction that are shown or not shown on the plans shall be repaired at the Contractor's expense.

## **PREQUALIFIED UTILITY CONTRACTORS**

Some utility owners may require contractors that perform relocation work on their respective facilities as a part of the road contract be prequalified or preapproved by the utility owner. Those utility owners with a prequalification or preapproval requirement are as follows:

### **DUKE ENERGY (GAS)**

The bidding contractor needs to review the above list and choose from the list of approved subcontractors contained in the respective utility specifications contained in the proposal before bidding. When the list of approved subcontractors is provided, only subcontractors shown on these list(s) will be allowed to perform work on that utility as a part of this contract.

When the list of approved subcontractors for the utility work is not provided in these general notes, the utility work can be completed by the prime contractor. If the prime contractor chooses to subcontract the work, the subcontractor shall be prequalified with the KYTC Division of Construction Procurement in the work type of "Utilities" (I33). Those who would like to become prequalified may contact the Division of

Construction Procurement at (502) 564-3500. Please note: it could take up to 30 calendar days for prequalification to be approved. The prequalification does not have to be approved prior to the bid, but must be approved before the subcontract will be approved by KYTC and the work can be performed.

#### CONTRACT ADMINISTRATION RELATIVE TO UTILITY WORK

All utility work is being performed as a part of a contract administered by KYTC; there is not a direct contract between the utility contractor and utility owner. The KYTC Section Engineer is ultimately responsible for the administration of the road contract and any utility work included in the contract.

#### SUBMITTALS AND CORRESPONDENCE

All submittals and correspondence of any kind relative to utility work included in the road contract shall be directed to the KYTC Section Engineer, a copy of which may also be supplied to the utility owner by the contractor to expedite handling of items like material approvals and shop drawings. All approvals and correspondence generated by the utility owner shall be directed to the KYTC Section Engineer. The KYTC Section Engineer will relay any approvals or correspondence to the utility contractor as appropriate. At no time shall any direct communication between the utility owner and utility contractor without the communication flowing through the KYTC Section Engineer be considered official and binding under the contract.

#### ENGINEER

Where the word “Engineer” appears in any utility owner specifications included in this proposal, utility owner specifications included as a part of this contract by reference or on the utility relocation plans, it shall be understood the “Engineer” is the Kentucky Transportation Cabinet (KYTC) Section Engineer or designated representative and the utility owner engineer or designated representative jointly. Both engineers must mutually agree upon all decisions made with regard to the utility construction. The Transportation Cabinet, Section Engineer shall make all final decisions in all disputes.

## INSPECTOR OR RESIDENT PROJECT REPRESENTATIVE

Where the word “Inspector” or “Resident Project Representative” appears in the utility specifications included in this proposal, utility owner specifications included as a part of this contract by reference or on the utility relocation plans, it shall be understood the “Inspector” or “Resident Project Representative” is the utility owner inspector and KYTC inspector jointly. The Transportation Cabinet, Section Engineer shall make all final decisions in all disputes.

## NOTICE TO UTILITY OWNERS OF THE START OF WORK

One month before construction is to start on a utility, the utility contractor shall make notice to the KYTC Section Engineer and the utility owner of when work on a utility is anticipated to start. The utility contractor shall again make confirmation notice to the KYTC Section Engineer and the utility owner one week before utility work is to actually start.

## UTILITY SHUTDOWNS

The Contractor shall not shut down any active and in-service mains, utility lines or services for any reason unless specifically given permission to do so by the utility owner. The opening and closing of valves and operating of other active utility facilities for main, utility line or utility service shut downs are to be performed by the utility owner unless specific permission is given to the contractor by the owner to make shutdowns. If and when the utility owner gives the contractor permission to shut down mains, utility lines or utility services, the contractor shall do so following the rules, procedures and regulations of the utility owner. Any permission given by the utility owner to the contractor to shutdown active and in-service mains, utility lines or services shall be communicated to the KYTC Section Engineer by the utility owner that such permission has been given.

Notice to customers of utility shut downs is sometimes required to be performed by the utility contractor. The contractor may be required; but, is not limited to, making notice to utility customers in a certain minimum amount of time in advance of the shut down and by whatever means of communication specified by the utility owner. The means of communication to the customer may be; but is not limited to, a door hanger, notice by newspaper ad, telephone contact, or any combination of communication methods deemed necessary, customary and appropriate by the utility owner. The contractor should refer to the utility owner specifications for requirements on customer notice.

Any procedure the utility owner may require the contractor to perform by specification or plan note and any expense the contractor may incur to comply with the utility owner’s shut down procedure and notice to customers shall be considered an incidental expense to the utility construction.

CUSTOMER SERVICE AND LATERAL ABANDONMENTS When temporary or permanent abandonment of customer water, gas, or sewer services or laterals are necessary during relocation of utilities included in the contract, the utility contractor shall perform these abandonments as part of the contract as incidental work. No separate payment will be made for service line and lateral abandonments. The contractor shall provide all labor, equipment and materials to accomplish the temporary or permanent abandonment in accordance with the plans, specifications and/or as directed by the engineer. Abandonment may include, but is not limited to, digging down on a water or gas main at the tap to turn off the tap valve



or corporation stop and/or capping or plugging the tap, digging down on a sewer tap at the main and plugging or capping the tap, digging down on a service line or lateral at a location shown on the plans or agreeable to the engineer and capping or plugging, or performing any other work necessary to abandon the service or lateral to satisfactorily accomplish the final utility relocation.

### STATIONS AND DISTANCES

All stations and distances, when indicated for utility placement in utility relocation plans or specifications, are approximate; therefore, some minor adjustment may have to be made during construction to fit actual field conditions. Any changes in excess of 6 inches of plan location shall be reviewed and approved jointly by the KYTC Section Engineer or designated representative and utility owner engineer or designated representative. Changes in location without prior approval shall be remedied by the contractor at his own expense if the unauthorized change creates an unacceptable conflict or condition.

### RESTORATION

Temporary and permanent restoration of paved or stone areas due to utility construction shall be considered incidental to the utility work. No separate payment will be made for this work. Temporary restoration shall be as directed by the KYTC Section Engineer. Permanent restoration shall be “in-kind” as existing.

Restoration of seed and sod areas will be measured and paid under the appropriate seeding and sodding bid items established in the contract for roadway work.

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BELOW ARE NOTES FOR WHEN “INST” ITEMS ARE IN THE CONTRACT MEANING THE UTILITY COMPANY IS PROVIDING CERTAIN MATERIALS FOR UTILITY RELOCATION

### MATERIAL

Contrary to Utility Bid Item Descriptions, those bid items that have the text “**Inst**” at the end of the bid item will have the major components of the bid item provided by the utility owner. No direct payment will be made for the major material component(s) supplied by the utility company. All remaining materials required to construct the bid item as detailed in utility bid item descriptions, in utility specifications and utility plans that are made a part of this contract will be supplied by the contractor. The contractor’s bid price should reflect the difference in cost due to the provided materials.

The following utility owners have elected to provide the following materials for work under this contract:

**DUKE ENERGY (GAS) will provide all pipe, fittings, valves and any other related material. The contractor will supply all bedding material and equipment.**

### SECURITY OF SUPPLIED MATERIALS

If any utility materials are to be supplied by the utility owner, it will be the responsibility of the utility contractor to secure all utility owner supplied materials after delivery to the project site. The utility

contractor shall coordinate directly with the utility owner and their suppliers for delivery and security of the supplied materials. Any materials supplied by the utility owner and delivered to the construction site that are subsequently stolen, damaged or vandalized and deemed unusable shall be replaced with like materials at the contractor's expense.

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## PROJECT SAFETY AND PROTECTION NOTES ON UTILITIES

Please Note: The information presented in this Utility Note is informational in nature and the information contained herein is not guaranteed.

### **SPECIAL WORKER PROTECTION NOTE**

**There is extensive high voltage electric transmission lines along with lesser voltage electric distribution lines throughout this project. The contractor is use extreme caution when operating equipment beneath these lines. Since these transmission lines are high voltage, there is a greater potential of arching if equipment gets too close. Transmission lines on this project are located parallel to Mt. Zion Road left of centerline from the interchange area to Norfolk Southern Railroad, and right of US-25 centerline the full length of the improvements along US-25. These transmission lines are currently located on wood poles; but, are to be relocated to new steel poles. Wherever transmission or distribution lines exist, whether on wood poles or steel, the contractor shall limit the height of equipment operating under these lines and within 25 feet of the center of transmission lines to 12 feet. No equipment shall be greater in height than 12 feet or shall extend to a height greater than 12 feet within 25 feet of any electric line.**

**There is also normal electric distribution lines located on the project in other areas. The contractor shall take normal cautionary measures when working under these lines.**

### **Protection of Underground Utilities**

The contractor will be responsible for contacting all utility facility owners on the subject project to coordinate his activities. The contractor will coordinate his activities to minimize and, where possible, avoid conflicts with utility facilities. Due to the nature of the work a significant amount of existing facilities will require relocation. Where conflicts with utility facilities are unavoidable, the contractor will coordinate any necessary relocation work with the facility owner and Kentucky Transportation Cabinet (KYTC) Section Engineer. KYTC maintains the right to remove or alter portions of this contract if a utility conflict occurs. The utility facilities as noted in the following sections have been determined using data garnered by varied means and with varying degrees of accuracy: from the facility owners, a result of S.U.E., field inspections, and/or reviews of record drawings. The facilities defined may not be inclusive of all utilities in the project scope and are not Level A quality, unless specified as such. It is the contractor's responsibility to verify all utilities and their respective locations before excavating.

The contractor shall make every effort to protect underground facilities from damage as prescribed in the Underground Facility Damage Protection Act of 1994, Kentucky Revised Statute KRS 367.4901 to 367.4917. It is the contractor's responsibility to determine and take steps necessary to be in compliance with federal and state damage prevention directives. The contractor is instructed to contact KY 811 for the location of existing underground utilities. Contact shall be made a minimum of two (2) and no more

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than ten (10) business days prior to excavation. The contractor shall submit Excavation Locate Requests to the Kentucky Contact Center (KY 811) via web ticket entry. The submission of this request does not relieve the contractor from the responsibility of contacting non-KY 811 member facility owners. Non-KY 811 member owners are to be directly contacted through their individual Protection Notification Center. It may be necessary for the contractor to contact the County Court Clerk to determine what utility companies have facilities in the area. Non-compliance with these directives can result in the enforcement of penalties.

### **Damage to Utilities**

**Any intentional or accidental disruption of service due to damage to gas, sewer or water mains caused by any of the contractor's operations without three days advance notice to the utility owner shall be cause for the Cabinet to charge liquidated damages in the amount of five thousand dollars per day (\$5,000/day) per occurrence against the contractor until such time as the utility main is restored.**

**Any intentional or accidental disruption of any individual gas, water or sewer service caused by any of the contractor's operations without three days advance notice to the utility owner shall be cause for the Cabinet to charge liquidated damages in the amount of five hundred dollars per day (\$500/day) per occurrence against the contractor until such time as service is restored.**

**In the case of a main disruption, liquidated damages shall be charged at the main disruption rate only. Liquidated damages shall not be charged in addition for service disruptions when a main disruption is involved.**

### **Flowable Fill Requirement**

The road contractor MUST use flowable fill as the backfill media any place gas, water and sewer lines **and utility conduit** cross under existing or proposed roadway surfaces. It should also be noted that the cost of the flowable fill shall be incidental to the cost of the gas, water, sewer line **and utility conduit** being installed.

### **External Utility Permits**

Kentucky Division of Water permits for water and sanitary sewer relocation construction may not be available before bidding. These items will be distributed at the preconstruction meeting.

### **Abandoned Utilities**

The contractor shall safeload the entire length of all abandoned pipes 6 inches in diameter and larger under proposed pavement and under any existing pavement that is to remain. The contractor shall safeload the entire length of all abandoned pipes 15 inches and larger which will be located outside of proposed pavement but within project limits. Appropriate bid items have been included in the road contract. The safeloading criteria above shall be observed unless otherwise directed by the KYTC Section Engineer or his representative.

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### Utility Phasing

The contractor should be aware that some utilities will need to be relocated first to accommodate the relocation of others. The contractor should review the plans and draw his own conclusions as to the phasing of the work of various utilities. The contractor should pay close attention to the proximity of construction of new facilities when working in the vicinity of existing water mains to prevent blow-outs.

### Road Construction Field Adjustments To Accommodate Utilities

Some minor adjustments to road work may be required in the field to work around some poles and other utility infrastructure. The road contractor should discuss any adjustments with the KYTC Section Engineer or his inspector as they arise. The adjustments anticipated are to ditches and other such minor items so that poles and such are not in the center bottom of ditches where debris may collect.

### **NOTE: DO NOT DISTURB THE FOLLOWING FACILITIES LOCATED WITHIN THE PROJECT DISTURB LIMITS**

The overwhelming majority of utilities within the project limits require relocation. Some will be relocated by the road contractor and others by the utility owners.

**\*The Contractor is fully responsible for protection of all utilities until relocated.\***

### **THE FOLLOWING FACILITY OWNERS ARE RELOCATING/ADJUSTING THEIR FACILITIES WITHIN THE PROJECT LIMITS AND WILL BE COMPLETE PRIOR TO CONSTRUCTION**

**No overhead or underground utility will have completed relocation prior to road construction.**

### **THE FOLLOWING FACILITY OWNERS HAVE FACILITIES TO BE RELOCATED/ADJUSTED BY THE OWNER OR THEIR SUBCONTRACTOR AND IS TO BE COORDINATED WITH THE ROAD CONTRACT**

**Duke Energy (Electric), Cincinnati Bell Telephone, Spectrum (CATV), Windstream (fiber) and CenturyLink (fiber)** have substantial existing overhead and limited underground facilities throughout the project. All overhead utility owners will relocate their own facilities to new poles to be installed by Duke Energy or to duct to be installed by the road contractor, excluding that of CenturyLink discussed in the next paragraph. Duke Energy will have started some overhead relocation; however, removal of all overhead facilities and abandonment of underground facilities is dependent on a fall 2019 electric transmission line outage and the timely installation of utility duct by the road contractor. Given the amount of overhead and underground utility work by and for these utilities, it is estimated all these

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existing overhead facilities and the existing associated underground facilities will take until December 2020 to completely clear the project of these utilities. The contractor is to coordinate and cooperate with these utility owners until they have completed their work.

**Note: Duke Energy is expected to sever an existing 12 inch storm pipe during installation of a concrete pole base along the east side of Berberich Drive opposite Biltmore Drive (in front of Kroger). Duke is expected to install this base prior to arrival of the road contractor on the project. This severed pipe is to be replaced by the road contractor as soon as practical. The design of this pipe and quantities are included in the road contract. Minor non-consequential flooding is expected in the Kroger parking lot during the period the storm pipe is out of service. The road contractor should make the replacement of this pipe a top priority upon arrival on the project. The contractor should make every effort to minimize disturbance of soils around the pole base while constructing this replacement 12 inch pipe.**

**Note: Duke Energy is also expected to sever existing storm pipes parallel to the right of centerline of Biltmore Drive between Sam Neace Drive and Berberich Drive at approximately stations 57+15, 58+35 and 60+55 due to the installation of steel poles. All locations of storm pipe at these pole locations are planned to be abandoned and replaced by a new storm pipes as a part of the road contract. Should flooding in the area become an issue due to these pole installations and blockages of the existing storm pipe, it will be the road contractors responsibility to expedite new storm pipe installation or provide temporary measures to alleviate any drainage issues.**

**CenturyLink** has an existing underground fiber cable in a small duct in the area right (south side) of Mt. Zion Road centerline from the SE corner of the US-25 intersection heading east to the Norfolk Southern railroad tracks. This fiber cable is to remain in place and protected from damage by the road contractor while roadway fill widening in this area is completed. The road contractor is expected to build the fill over the existing fiber cable. Once the fill is completed and the slope is dressed to near-final grade, CenturyLink shall be allowed to come on the site with their contractor to directionally bore a new fiber cable across the face of the new fill slope, tie in the new cable and abandon the existing cable. The road contractor will be responsible to notify CenturyLink at least four weeks in advance of when the area will be available for fiber cable installation. The road contractor is to coordinate and cooperate with CenturyLink and their contractor for this installation and allow sufficient reasonable time for CenturyLink to complete their work. CenturyLink estimates their work will take approximately four weeks to complete once they arrive on the site. The road contractor may have to do some minor redress in some areas disturbed by the fiber cable relocation installation.

NOTE: CenturyLink is being allowed to install this cable in the new fill slope due to limited available R/W. CenturyLink is not being allowed to open cut the fill slope for installation of this cable due to the potential that trenching in the slope could lead to future slope failures. CenturyLink is only being allowed to directional bore in the fill slope area.

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### THE FOLLOWING FACILITY OWNERS HAVE FACILITIES TO BE RELOCATED/ADJUSTED BY THE ROAD CONTRACTOR AS INCLUDED IN THIS CONTRACT

There is extensive joint duct installation included in the road contract to be constructed by the road contractor. This duct is being installed mainly to facilitate relocations of facilities owned by overhead utility owners Duke Energy (Electric), Cincinnati Bell Telephone, Spectrum (CATV), Windstream (fiber) and CenturyLink (fiber). Some duct in joint duct installations is for future use also. Duct is to be installed by the road contractor in three areas. Those areas are generally as follows:

- Through the I-71/I-75 interchange area under ramps and mainline along the north side of Mt. Zion Road.
- In the roundabout area where Biltmore Connector and Sherwood Lakes Drive cross.
- Along the east side of Berberich Drive from Biltmore Drive to Mt. Zion Road **and along Mt. Zion Road left of centerline to tie to new poles along Mt. Zion Road beyond the limits of the proposed retaining wall.** Timely installation of duct in these three locations is integral to facilitating relocation of existing overhead facilities on the project. The road contractor will be expected to coordinate with all these utility owners to expedite duct installation to accomplish overhead utility relocations. Plans for duct installation are included in the road plans. Specifications are included in the project proposal. Bid items are included in the road contract.

**Duke Energy (Gas) and Boone County Water District** facilities are being relocated by the road contractor. Plans for relocation of these utilities are included in the road plans. Specifications are included in the project proposal. Bid items are included in the road contract. The road contractor will do water tie-ins. Duke (Gas) will do gas tie-ins. The road contractor shall work closely with Duke to schedule timely tie-ins.

**Sanitation District No. 1** facilities on the project only require the adjustment of manhole frames and covers. The road contractor will perform this work as a part of the road contract. No plans are being provided for this minor work. Manholes needing adjustment are located as follows:

- Near centerline of Biltmore Connector at approximately station 22+80.
- Near curb line left of Investment Way at approximately station 196+60.
- Left of Biltmore Blvd at approximately station 311+85.
- Right of US-25 centerline at approximately stations 502+35, 506+25 and 507+75.

Specifications for manhole adjustments is included in the project proposal. A bid item for sanitary manhole adjustment is included in the road contract.

**RAIL COMPANIES HAVE FACILITIES IN CONJUNCTION WITH THIS PROJECT AS NOTED**

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No Rail Involvement    Rail Involved    Rail Adjacent

### FACILITY OWNER CONTACT LIST

Boone County Water District	Keith Feldhaus	(859) 586-7270
Duke Energy (Gas)	Gerry Helm	(859) 534-4405
Duke Energy (Electric Transmission)	Josh Waldroff	(513) 287-1330
Duke Energy (Electric Distribution)	Aaron Wright	(513) 479-1886
Windstream (Fiber)	Mark Ware	(606) 329-6195
CenturyLink (Fiber)	Bruce Miller	(513) 644-8943
<b>Spectrum (CATV)</b>	<b>Joseph Angel</b>	<b>(513) 233-5705</b>
Cincinnati Bell Telephone	Dan Springelmeyer	(513) 397-7165



# **GENERAL UTILITY NOTES AND INSTRUCTIONS APPLICABLE TO ALL UTILITY WORK MADE A PART OF THE ROAD CONSTRUCTION CONTRACT**

The contractor should be aware the following utility notes and KYTC Utility Bid Item Descriptions shall supersede, replace and take precedence over any and all conflicting information that may be contained in utility owner supplied specifications contained in the contract, on plans supplied by the utility owner, or any utility owner specifications or information externally referenced in this contract.

Where information may have been omitted from these notes, bid item descriptions, utility owner supplied specifications or plans; the KYTC Standard Specifications for Road and Bridge Construction shall be referenced.

## **UTILITY REFERENCE PLANS**

“Utility Reference Plans” are included in the KYTC Roadway plan set. These plans are not to be used for construction of any specific utility. The plans identify the proposed relocations of water, gas, electric, sanitary sewer, and communications for the project. These plans also include proposed traffic signal and roadway lighting. These plans are to be used only for reference in coordination of the contract work. Note that proposed utility relocations are not identified on the general roadway plans.

## **PROTECTION OF EXISTING UTILITIES**

The existing utilities shown on the plans are shown as best known at the time the plans were developed and are to be used as a guide only by the Contractor. The Contractor shall use all means at his disposal to accurately locate all existing utilities, whether shown on the plans or not, prior to excavation. The contractor shall protect these utilities during construction. Any damage to existing utilities during construction that are shown or not shown on the plans shall be repaired at the Contractor’s expense.

## **PREQUALIFIED UTILITY CONTRACTORS**

Some utility owners may require contractors that perform relocation work on their respective facilities as a part of the road contract be prequalified or preapproved by the utility owner. Those utility owners with a prequalification or preapproval requirement are as follows:

### **DUKE ENERGY (GAS)**

The bidding contractor needs to review the above list and choose from the list of approved subcontractors contained in the respective utility specifications contained in the proposal before bidding. When the list of approved subcontractors is provided, only subcontractors shown on these list(s) will be allowed to perform work on that utility as a part of this contract.

When the list of approved subcontractors for the utility work is not provided in these general notes, the utility work can be completed by the prime contractor. If the prime contractor chooses to subcontract the work, the subcontractor shall be prequalified with the KYTC Division of Construction Procurement in the work type of “Utilities” (I33). Those who would like to become prequalified may contact the Division of Construction Procurement at (502) 564-3500. Please note: it could take up to 30 calendar days for prequalification to be approved. The prequalification does not have to be approved prior to the bid, but must be approved before the subcontract will be approved by KYTC and the work can be performed.

#### CONTRACT ADMINISTRATION RELATIVE TO UTILITY WORK

All utility work is being performed as a part of a contract administered by KYTC; there is not a direct contract between the utility contractor and utility owner. The KYTC Section Engineer is ultimately responsible for the administration of the road contract and any utility work included in the contract.

#### SUBMITTALS AND CORRESPONDENCE

All submittals and correspondence of any kind relative to utility work included in the road contract shall be directed to the KYTC Section Engineer, a copy of which may also be supplied to the utility owner by the contractor to expedite handling of items like material approvals and shop drawings. All approvals and correspondence generated by the utility owner shall be directed to the KYTC Section Engineer. The KYTC Section Engineer will relay any approvals or correspondence to the utility contractor as appropriate. At no time shall any direct communication between the utility owner and utility contractor without the communication flowing through the KYTC Section Engineer be considered official and binding under the contract.

#### ENGINEER

Where the word “Engineer” appears in any utility owner specifications included in this proposal, utility owner specifications included as a part of this contract by reference or on the utility relocation plans, it shall be understood the “Engineer” is the Kentucky Transportation Cabinet (KYTC) Section Engineer or designated representative and the utility owner engineer or designated representative jointly. Both engineers must mutually agree upon all decisions made with regard to the utility construction. The Transportation Cabinet, Section Engineer shall make all final decisions in all disputes.

## INSPECTOR OR RESIDENT PROJECT REPRESENTATIVE

Where the word “Inspector” or “Resident Project Representative” appears in the utility specifications included in this proposal, utility owner specifications included as a part of this contract by reference or on the utility relocation plans, it shall be understood the “Inspector” or “Resident Project Representative” is the utility owner inspector and KYTC inspector jointly. The Transportation Cabinet, Section Engineer shall make all final decisions in all disputes.

## NOTICE TO UTILITY OWNERS OF THE START OF WORK

One month before construction is to start on a utility, the utility contractor shall make notice to the KYTC Section Engineer and the utility owner of when work on a utility is anticipated to start. The utility contractor shall again make confirmation notice to the KYTC Section Engineer and the utility owner one week before utility work is to actually start.

## UTILITY SHUTDOWNS

The Contractor shall not shut down any active and in-service mains, utility lines or services for any reason unless specifically given permission to do so by the utility owner. The opening and closing of valves and operating of other active utility facilities for main, utility line or utility service shut downs are to be performed by the utility owner unless specific permission is given to the contractor by the owner to make shutdowns. If and when the utility owner gives the contractor permission to shut down mains, utility lines or utility services, the contractor shall do so following the rules, procedures and regulations of the utility owner. Any permission given by the utility owner to the contractor to shutdown active and in-service mains, utility lines or services shall be communicated to the KYTC Section Engineer by the utility owner that such permission has been given.

Notice to customers of utility shut downs is sometimes required to be performed by the utility contractor. The contractor may be required; but, is not limited to, making notice to utility customers in a certain minimum amount of time in advance of the shut down and by whatever means of communication specified by the utility owner. The means of communication to the customer may be; but is not limited to, a door hanger, notice by newspaper ad, telephone contact, or any combination of communication methods deemed necessary, customary and appropriate by the utility owner. The contractor should refer to the utility owner specifications for requirements on customer notice.

Any procedure the utility owner may require the contractor to perform by specification or plan note and any expense the contractor may incur to comply with the utility owner’s shut down procedure and notice to customers shall be considered an incidental expense to the utility construction.

CUSTOMER SERVICE AND LATERAL ABANDONMENTS When temporary or permanent abandonment of customer water, gas, or sewer services or laterals are necessary during relocation of utilities included in the contract, the utility contractor shall perform these abandonments as part of the contract as incidental work. No separate payment will be made for service line and lateral abandonments. The contractor shall provide all labor, equipment and materials to accomplish the temporary or permanent abandonment in accordance with the plans, specifications and/or as directed by the engineer. Abandonment may include, but is not limited to, digging down on a water or gas main at the tap to turn off the tap valve

or corporation stop and/or capping or plugging the tap, digging down on a sewer tap at the main and plugging or capping the tap, digging down on a service line or lateral at a location shown on the plans or agreeable to the engineer and capping or plugging, or performing any other work necessary to abandon the service or lateral to satisfactorily accomplish the final utility relocation.

### STATIONS AND DISTANCES

All stations and distances, when indicated for utility placement in utility relocation plans or specifications, are approximate; therefore, some minor adjustment may have to be made during construction to fit actual field conditions. Any changes in excess of 6 inches of plan location shall be reviewed and approved jointly by the KYTC Section Engineer or designated representative and utility owner engineer or designated representative. Changes in location without prior approval shall be remedied by the contractor at his own expense if the unauthorized change creates an unacceptable conflict or condition.

### RESTORATION

Temporary and permanent restoration of paved or stone areas due to utility construction shall be considered incidental to the utility work. No separate payment will be made for this work. Temporary restoration shall be as directed by the KYTC Section Engineer. Permanent restoration shall be “in-kind” as existing.

Restoration of seed and sod areas will be measured and paid under the appropriate seeding and sodding bid items established in the contract for roadway work.

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BELOW ARE NOTES FOR WHEN “INST” ITEMS ARE IN THE CONTRACT MEANING THE UTILITY COMPANY IS PROVIDING CERTAIN MATERIALS FOR UTILITY RELOCATION

### MATERIAL

Contrary to Utility Bid Item Descriptions, those bid items that have the text “**Inst**” at the end of the bid item will have the major components of the bid item provided by the utility owner. No direct payment will be made for the major material component(s) supplied by the utility company. All remaining materials required to construct the bid item as detailed in utility bid item descriptions, in utility specifications and utility plans that are made a part of this contract will be supplied by the contractor. The contractor’s bid price should reflect the difference in cost due to the provided materials.

The following utility owners have elected to provide the following materials for work under this contract:

**DUKE ENERGY (GAS) will provide all pipe, fittings, valves and any other related material. The contractor will supply all bedding material and equipment.**

### SECURITY OF SUPPLIED MATERIALS

If any utility materials are to be supplied by the utility owner, it will be the responsibility of the utility contractor to secure all utility owner supplied materials after delivery to the project site. The utility

contractor shall coordinate directly with the utility owner and their suppliers for delivery and security of the supplied materials. Any materials supplied by the utility owner and delivered to the construction site that are subsequently stolen, damaged or vandalized and deemed unusable shall be replaced with like materials at the contractor's expense.

# UTILITIES AND RAIL CERTIFICATION NOTE

Boone County  
IMSTP 00757 144  
FD52 008 84338 01U  
Mile point: 175.217 TO 175.622  
**RECONSTRUCT THE I-71/I-75 AT KY-338 (RICHWOOD ROAD) INTERCHANGE. (DESIGN BUILD)**  
**ITEM NUMBER: 06-18.00**

## PROJECT NOTES ON UTILITIES

Please Note: The information presented in this Utility Note is informational in nature and the information contained herein is not guaranteed.

The contractor will be responsible for contacting all utility facility owners on the subject project to coordinate his activities. The contractor will coordinate his activities to minimize and, where possible, avoid conflicts with utility facilities. Due to the nature of the work a significant amount of existing facilities will require relocation. Where conflicts with utility facilities are unavoidable, the contractor will coordinate any necessary relocation work with the facility owner and Kentucky Transportation Cabinet (KYTC) Section Engineer. KYTC maintains the right to remove or alter portions of this contract if a utility conflict occurs. The utility facilities as noted in the following sections have been determined using data garnered by varied means and with varying degrees of accuracy: from the facility owners, a result of S.U.E., field inspections, and/or reviews of record drawings. The facilities defined may not be inclusive of all utilities in the project scope and are not Level A quality, unless specified as such. It is the contractor's responsibility to verify all utilities and their respective locations before excavating.

The contractor shall make every effort to protect underground facilities from damage as prescribed in the Underground Facility Damage Protection Act of 1994, Kentucky Revised Statute KRS 367.4901 to 367.4917. It is the contractor's responsibility to determine and take steps necessary to be in compliance with federal and state damage prevention directives. The contractor is instructed to contact KY 811 for the location of existing underground utilities. Contact shall be made a minimum of two (2) and no more than ten (10) business days prior to excavation. The contractor shall submit Excavation Locate Requests to the Kentucky Contact Center (KY 811) via web ticket entry. The submission of this request does not relieve the contractor from the responsibility of contacting non-KY 811 member facility owners. Non-KY 811 member owners are to be directly contacted through their individual Protection Notification Center. It may be necessary for the contractor to contact the County Court Clerk to determine what utility companies have facilities in the area. Non-compliance with these directives can result in the enforcement of penalties.

### **Damage to Utilities**

**Any intentional or accidental disruption of service due to damage to gas, sewer or water mains caused by any of the contractor's operations without three days advance notice to the utility owner shall be cause for the Cabinet to charge liquidated damages in the amount of five thousand dollars per day (\$5,000/day) per occurrence against the contractor until such time as the utility main is restored.**

**Any intentional or accidental disruption of any individual gas, water or sewer service caused by any of the contractor's operations without three days advance notice to the utility owner shall be cause for**

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the Cabinet to charge liquidated damages in the amount of five hundred dollars per day (\$500/day) per occurrence against the contractor until such time as service is restored.

In the case of a main disruption, liquidated damages shall be charged at the main disruption rate only. Liquidated damages shall not be charged in addition for service disruptions when a main disruption is involved.

### **Flowable Fill Requirement**

The road contractor MUST use flowable fill as the backfill media any place gas, water and sewer lines **and utility conduit** cross under existing or proposed roadway surfaces. It should also be noted that the cost of the flowable fill shall be incidental to the cost of the gas, water, sewer line **and utility conduit** being installed.

### **External Utility Permits**

Kentucky Division of Water permits for water and sanitary sewer relocation construction may not be available before bidding. These items will be distributed at the preconstruction meeting.

### **Abandoned Utilities**

The contractor shall safeload the entire length of all abandoned pipes 6 inches in diameter and larger under proposed pavement and under any existing pavement that is to remain. The contractor shall safeload the entire length of all abandoned pipes 15 inches and larger which will be located outside of proposed pavement but within project limits. Appropriate bid items have been included in the road contract. The safeloading criteria above shall be observed unless otherwise directed by the Section Engineer or his representative.

### **Utility Phasing**

The contractor should be aware that some utilities will need to be relocated first to accommodate the relocation of others. The contractor should review the plans and draw his own conclusions as to the phasing of the work of various utilities. The contractor should pay close attention to the proximity of construction of new facilities when working in the vicinity of existing water mains to prevent blow-outs.

### **Road Construction Field Adjustments To Accommodate Utilities**

Some minor adjustments to road work may be required in the field to work around some poles and other utility infrastructure. The road contractor should discuss any adjustments with the Section Engineer or his inspector as they arise. The adjustments anticipated are to ditches and other such minor items so that poles and such are not in the center bottom of ditches where debris may collect.

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### **NOTE: DO NOT DISTURB THE FOLLOWING FACILITIES LOCATED WITHIN THE PROJECT DISTURB LIMITS**

The overwhelming majority of utilities within the project limits require relocation. Some will be relocated by the road contractor and others by the utility owners.

**\*The Contractor is fully responsible for protection of all utilities until relocated.\***

### **THE FOLLOWING FACILITY OWNERS ARE RELOCATING/ADJUSTING THEIR FACILITIES WITHIN THE PROJECT LIMITS AND WILL BE COMPLETE PRIOR TO CONSTRUCTION**

**Duke Energy (Electric Transmission)** has a transmission line running north and south parallel to the east side of I-71/I-75. Duke should have relocation of this transmission line completed before road construction begins.

### **THE FOLLOWING FACILITY OWNERS HAVE FACILITIES TO BE RELOCATED/ADJUSTED BY THE OWNER OR THEIR SUBCONTRACTOR AND IS TO BE COORDINATED WITH THE ROAD CONTRACT**

**Duke Energy (Electric Distribution), Owen Electric Cooperative, Cincinnati Bell Telephone, Spectrum (CATV) and Windstream (fiber)** have substantial existing overhead and some underground facilities throughout the project. All these utility owners will relocate their own facilities to new poles to be installed by Duke or to duct to be installed by the road contractor. Duke and Owen Electric will have started some overhead relocation before road construction; however, removal of all overhead and underground facilities and abandonment of underground facilities owned by these companies is dependent on the timely installation of utility duct by the road contractor. Given the amount of overhead and underground utility work by and for these utilities, it is estimated all these existing facilities will take until December 2020 to completely clear the project. The contractor is to coordinate and cooperate with these utility owners until they have completed their work.

### **THE FOLLOWING FACILITY OWNERS HAVE FACILITIES TO BE RELOCATED/ADJUSTED BY THE ROAD CONTRACTOR AS INCLUDED IN THIS CONTRACT**

There is extensive joint duct installation included in the road contract to be constructed by the road contractor. This duct is being installed mainly to facilitate relocations of facilities owned by Duke Energy (Electric), Owen Electric Cooperative, Cincinnati Bell Telephone, Spectrum (CATV) and Windstream (fiber). Some duct in joint duct installations is for future use also. Duct is to be installed by the road contractor in two areas. Those areas are generally as follows:



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- Through the I-71/I-75 interchange area under ramps and mainline along the north side of KY-338 (Richwood Road)
- Along the west side of Grand National Blvd and Triple Crown Blvd from the beginning of construction on Grand National Blvd to the end of construction on Triple Crown Blvd.

Timely installation of duct in these two locations is integral to facilitating relocation of existing facilities owned by these companies on the project. The road contractor will be expected to coordinate with all these utility owners to expedite duct installation to accomplish their relocations. Plans for duct installation are included in the road plans. Specifications are included in the project proposal. Bid items are included in the road contract.

**Duke Energy (Gas), Sanitation District No. 1 and Boone County Water District** facilities are being relocated by the road contractor. Plans for relocation of these utilities are included in the road plans. Specifications are included in the project proposal. Bid items are included in the road contract. The road contractor will do sanitary sewer and water tie-ins. Duke (Gas) will do gas tie-ins. The road contractor shall work closely with Duke to schedule timely tie-ins.

**Sanitation District No. 1** has two segments of existing sanitary sewer that are to be lined concurrently with the road project. The pipe lining will be performed by a Sanitation District No. 1 (SD1) continuing contractor. The two existing segments to be lined are as follows:

- Under Ramp A between sanitary sewer Line A manholes at stations 15+96.14 and 17+83.42.
- Left of WB KY-338 centerline between sanitary sewer Line A manholes at stations 19+83.34 and 21+85.25.

Existing pipe cannot be lined until after adjoining manholes and sanitary sewer segments are installed and completed. The final manholes must be present at each end of lining segments to perform the lining operation. The road contractor will coordinate and cooperate with SD1 and their contractor to accomplish this work during road construction.

### RAIL COMPANIES HAVE FACILITIES IN CONJUNCTION WITH THIS PROJECT AS NOTED

No Rail Involvement    Rail Involved    Rail Adjacent

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### UTILITY OWNER CONTACT LIST

Boone County Water District	Keith Feldhaus	(859) 586-7270
Duke Energy (Gas)	Gerry Helm	(859) 534-4405
Duke Energy (Electric Transmission)	Josh Waldroff	(513) 287-1330
Duke Energy (Electric Distribution)	Aaron Wright	(513) 479-1886
Owen Electric Cooperative	Lucas McNally	(502) 563-3494
Windstream (Fiber)	Mark Ware	(606) 329-6195
<b>Spectrum (CATV)</b>	<b>Joseph Angel</b>	<b>(513) 233-5705</b>
Cincinnati Bell Telephone	Dan Springelmeyer	(513) 397-7165

**Appendix F2 -- Overhead Utility Plans (for information only)**  
*(Pending)*

**Appendix F3 -- Utility Reference Plans (for information only)**  
*(Pending)*

## **Appendix F4 -- Duke Gas Specifications**

Specifications for Gas Main Replacement  
within  
STATE OF KENTUCKY ROAD PROJECTS

Revised for:

**KYTC Item 6-14.00**

Mt. Zion Rd

Duke Energy Job No. 29244894  
Mt. Zion Rd Reconstruction

August, 2019

**Note: KYTC has prepared “STANDARD GAS BID ITEM DESCRIPTIONS” for all items of gas work contained in the road contract. These “STANDARD GAS BID ITEM DESCRIPTIONS” are contained elsewhere in the project proposal. These “STANDARD GAS BID ITEM DESCRIPTIONS” shall supersede any and all conflicting information in the following gas specifications. Where conflicts do not exist, the following shall apply.**

## **1.0 GENERAL**

### **1.1 Scope of Work**

Gas main relocation work required for the proposed Mt. Zion Rd project consists of the following work:

- Installing approximately 6,053’ of 8” plastic gas main. There is also 731’ of 6” PL main, 117’ of 4” PL main and ’ of 2” PL main.
- Renewing M-C services as needed. We’ve estimated that there will be (14) long side services and (15) short side services to be replaced.
- Installing valves per drawings.

A Gas Contractor, approved by Duke Energy, shall perform the gas facility relocation work. **The General Contractor awarded the KYTC road project, shall hire an approved Gas Contractor listed at the end of these specifications.**

A Duke Energy Inspector will oversee all piping work performed by the Gas Contractor. Transportation Cabinet inspectors will primarily oversee vertical and horizontal placement of the main, all backfill, traffic control work, and record pay quantities for gas work in the road contract in consultation with the gas inspector.

### **1.2 Acceptable Gas Contractors**

Installation of gas facilities on this project is limited to the following Gas Contractors due to their pre-qualification for such work with Duke Energy:

1. AMS Construction
2. RLA Investments
3. KS Energy
4. Premier Services

At the end of these specifications is a phone list for the Duke Energy approved Gas Contractors. Contrary to previous road contracts, gas contractors (which are now considered **specialty contractors** by the Kentucky Transportation Cabinet) are no longer are required to be prequalified by the Cabinet to perform utility work included in the road contract. All gas contractors prequalified by Duke Energy are now allowed to perform gas work in road contracts. **Department of Transportation regulations prohibit any non-qualified contractor from performing any gas main work. This includes, but is not limited to excavation, main lowering, pipe installation, service installation, and back filling.**

### 1.3 Standards

In addition to these specifications, all facilities must be installed in accordance with the 2007 Advanced Main Replacement Program (AMRP) Specifications, the Duke Energy's Gas Division Specifications (GD-150 Composite), CFR part 192, and all applicable specifications. These General and Technical Provisions shall be made a part of this project contract by reference. Copies are available from Duke Energy. Where the following specifications and those referenced are in conflict, the following specifications shall govern and take precedence.

### 1.4 Definitions

Where the word "**Engineer**" appears in these specifications or on the gas plans, it shall be understood the "Engineer" is the Kentucky Transportation Cabinet (KYTC) Section Engineer or his/her designated representative and the Duke Energy Engineer or his/her designated representative jointly. Both Engineers must mutually agree upon all decisions made with regard to the gas line construction. The Transportation Cabinet, Section Engineer shall make all final decisions in all disputes. The Section Engineer is ultimately responsible for the engineering supervision of the road contract.

Where the word "**Gas Inspector**" or "Inspector" appears in these specifications or on the gas plans, it shall be understood the "Inspector" is the Duke Energy Gas Inspector or his designated representative.

Where the words "**Resident Engineer**" appears in these specifications or on the gas plans, it shall be understood the "**Resident Engineer**" is the KYTC Section Engineer or his designated representative.

Where the word "**Road Contractor**" appears in these specifications or on the gas plans, it shall be understood the "**Road Contractor**" is the General Contractor that was awarded the road improvement project by KYTC and that hired the Gas Contractor for the gas replacement work.

Where the word "**Gas Contractor**" appears in these specifications or on the gas plans, it shall be understood the "**Gas Contractor**" is the Duke Energy and KYTC approved contractor hired by the Road Contractor to perform the gas replacement work within the KYTC Road Project.

### 1.5 Video Taping

Duke Energy recommends that the Gas Contractor videotape every project prior to starting. The video is extremely important in settling disputes with governing agencies.

### 1.6 Permits & Fees

All permits for the replacement work will be obtained by Duke Energy, and will be provided to the Gas Contractor by the Gas Inspector prior to the start of work. Duke Energy will pay all permit fees except cut/fill fees. Cut/fill fees required for dumpsites will not be paid by Duke Energy except for material dumped for main tie-ins where the Gas Contractor is paid directly by Duke Energy on a time and material (T&M) basis. The Gas Contractor will be responsible for



all tree damage unless the damage was a result of a direct order by the Engineer. Clean up and restoration on all projects must be in compliance with KYTC and local governmental agencies and must be approved by the Duke Energy Inspector. It is the sole responsibility of the Gas Contractor to check with governing agencies for work hour restrictions. No compensation will be given for restricted work hours or crews working at night.

## **1.7 Training**

Duke Energy will require the Gas Contractor to qualify all necessary personnel on polyethylene fusion and mechanical connections. Duke Energy will provide training to the Gas Contractor on the renewal of services by insertion and mechanical, installation of meter sets, turn off, turn on and appliance light up. Gas Contractors will be trained for free on Duke Energy policies associated with spotting unacceptable meter locations and the identification of tin meters and mercury regulators. Only Duke Energy personnel shall handle mercury regulators. Safety procedures, grounding procedures, and a review for sizing services will also be covered in the training.

## **1.8 Security**

Picture ID's are required for all Gas Contractor employees. Gas Contractor personnel are required to show their ID's whenever asked by customers or Duke Energy Personnel.

## **MATERIAL**

### **2.1 Duke Energy Supplied Materials**

Duke Energy will provide all:

- Steel and polyethylene pipe,
- Steel and polyethylene pipe fittings, flanges, adapters, couplings, etc.
- Valves and valve assemblies,
- Regulators,
- Regulator vaults or enclosures,
- Cathodic protection material,
- Other associated gas pipe materials required for the replacement work.

#### **2.1.1 Material Delivery and Tracking**

Duke Energy supplied material will be delivered, as the Gas Contractor needs it. Material for the entire project will not be delivered all at once. It will be the responsibility of the Gas Contractor to meet the delivery truck, to track material received, and to provide weekly reports showing material received, material used, and material remaining. The material assigned to a specific project is to be used on that project only. All surplus materials, at the end of the project, are to be returned to the storeroom or a credit requisition completed allocating the material to another job. The material must be returned or requisitioned to another job in the same condition that it

was received. A certain percentage of waste will be applied to the pipe. All other unaccounted, damaged or material left unprotected will be the responsibility of the Gas Contractor.

Service Material will be delivered to each Gas Contractor yard. Each Gas Contractor will be required to provide an adequate shelter area with shelves to organize all the service material. The Gas Contractor will provide a person to receive material, organize and reorder material as needed.

## **2.2 Contractor Supplied Materials**

The Gas Contractor is required to provide all materials and equipment other than as indicated on the construction drawings that are necessary to construct the project. All welding materials such as welding rods, grinding wheels, clamps, etc is to be provided by the Gas Contractor.

### Pipe Bedding

Pipe bedding shall meet the requirements for Pipe Bedding as contained in Kentucky Department of Highways, Standard Specifications for Road and Bridge Construction.

### Flowable Fill / Low Strength Mortar Mix

Flowable fill & Low Strength Mortar shall meet the requirements of the Kentucky Department of Highways, Standard Specifications for Road and Bridge Construction. Low Strength Mortar is required as backfill under all existing and proposed KYTC roads.

### Surface Restoration Materials (Temporary and Permanent)

All restoration materials shall meet the requirements of the appropriate sections of Kentucky Department of Highways, Standard Specifications for Road and Bridge Construction.

## **2.3 Contractor Requirements for Coiled MDPE Pipe Delivery & Handling**

Coiled pipe will not be used on this project.

## **3.0 JOINING PIPE**

### **3.1 Welding Steel Pipe**

All welds will be made in accordance with Duke Energy's Gas Division welding specifications. The Gas Contractor is responsible for ensuring that the proper Welding Specification is used for the grades and wall thicknesses of pipes being welded together.

Specification No. 501-2      Standard Welding Procedure SA-II-A-II: For Steel Pipe  
With O.D. from 2 3/8" to, and including 12 3/4 " and wall

thickness 0.188” to, but not including 0.250”

Specification No. 501-3 Standard Welding Procedure SA-III-A-III: For Steel Pipe with O.D. greater than 12 ¾ “ and wall thickness 0.250” to, but not including 0.344”

Specification No 501-20 Standard welding Procedure SA-F1-A-V: for fillet welds on steel pipe for socket –weld couplings, slip-on flanges, and full encirclement welding sleeves.

All welders must be pre-qualified in accordance with Duke Energy’s Gas Division specifications prior to the start of construction. All testing for welders will be in accordance with API Standard 1104, Section 3.3 at the Gas Contractor’s cost. The Inspector will visually inspect all welds.

### 3.2 Joining Plastic Pipe

Butt fusion will be considered the primary method of joining longitudinal sections of MDPE main. Rotary scrapers will be required when joining 4” and larger pipe in the trench. Electro-fusion may be used at the discretion of the Inspector. Electro-fusion couplings are the second choice in joining MDPE pipe. Two couplings are required per Duke Energy Gas Standards when joining directionally drilled pipe.

Bar clamps must be used to secure 2” pipe and larger pipe when joined by electrofusion. Personnel found joining pipe without the proper line up clamps and fusion equipment will lose their fusion cards. **NO SECOND CHANCES WILL BE GIVEN FOR SHORT CUTS TAKEN WHEN JOINING PIPE.**

When installing plastic valves using electrofusion couplings a 3 ft pup-piece of pipe should be fused to the valve prior to electrofusion so that the coupling could be cut-off in case of incomplete/improper fusion.

## 4.0 GAS MAINS

### 4.1 Inspection

**The road contractor must contact Duke Energy (Greg Menetrey, 513-659-0066) one month prior to the beginning of any gas main work so that Duke Energy can plan for the construction project.** Duke Energy will provide a Gas Inspector on all main replacement projects. The Inspector will have multiple projects to cover and will not be on site at all times. No changes to the project drawings shall be made without the joint consent of the Duke Energy Engineer or Gas Inspector AND the KYTC Section Engineer or his inspector. The Gas Inspector will record the as-built location of the gas main, track the pay and non-pay item quantities, and provide general guidance to the Gas Contractor and assistance to the Section Engineer. **The Gas Inspector works for Duke Energy and not the Road Contractor.**

### 4.2 Depth and Location of Main

**Gas mains on this project shall have 5' of cover from proposed grade unless noted otherwise.**

All mains are to be installed at the depth or elevation, and location specified on the project drawings. No changes to the project drawings shall be made without the joint consent of the Duke Energy Engineer or the Gas Inspector AND the KYTC Section Engineer or his inspector. The Duke Energy Engineer has designed the proposed gas main location to avoid conflicts with proposed and existing utilities and grades. Changes to the planned alignment without the consent of the Duke Energy Engineer AND KYTC Section Engineer may result in conflicts with other proposed facilities. **It is the responsibility of the Road Contractor to stake the proposed alignment of the gas mains for the Gas Contractor.**

### 4.3 Installation Methods

Direct bury is the preferred installation method for the gas main replacement work within the Road Project. Directional drilling of main is an alternative installation method that will be considered by the Duke Energy Engineer AND the KYTC Resident Engineer on a case-by-case basis. The following paragraphs discuss these installation methods.

#### 4.3.1 **Direct Bury**

The trench shall be excavated to accommodate the minimum specified cover over the main from proposed final grade, the pipe outside diameter, and a minimum of 3 inches of bedding material below the pipe. Where the main is being constructed within proposed ditch lines, across final pavements, and along final roadways, the trench shall be excavated to accommodate a minimum of 48 inches of cover over the main from final grade. The minimum cover shall be increased to 60 inches when crossing streams. The minimum trench width shall be 24 inches. The Gas Contractor shall string the pipe along the trench and join the pipe. Services shall be installed with a minimum horizontal separation from the existing service of 12 inches.

Once the pipe has been joined, the contractor shall lift and carefully lower the pipe into the center of the trench. The Gas Contractor is cautioned to handle the pipe carefully so as to minimize damage to the pipe. Additional bedding material shall be placed around the pipe and compacted in equal lifts so as to avoid lateral displacement. Bedding material shall be placed in lifts not to exceed 6 inches compacted depth. Bedding material shall be placed to a level approximately 12 inches above the pipe barrel. Bedding material shall not exceed the approximate 12 inches level over the pipe barrel. The bedding material under, around, and over the pipe shall be compacted using a vibratory compactor.

Once the pipe has been placed, trench excavated material or flowable fill shall be used to backfill the remainder of the trench. Trench excavated material shall be placed in the trench and shall be compacted to 95% maximum standard Proctor density with hand operated equipment. The Gas Contractor may use flowable fill for trench backfill at his cost. **When installing gas mains under existing or proposed KYTC roadways, the contractor must backfill with flowable fill to the subgrade elevation.** The cost of this flowable fill shall be incidental to the gas bid items. Granular material shall not be used as trench backfill.

#### **4.3.2 Directional Drilling**

Directional drilling is an accepted method for pipe installation and must comply with all the guidelines set forth in this specification. **The Duke Energy Engineer must approve all directional drilling.** The Gas Contractor must record the location and depth of the directional-drilled gas main at an interval of fifty (50) feet or less. The Gas Contractor shall excavate a test hole at least every 200-feet of bore to verify the location and depth of the drilled gas main.

For all directional-drilled gas main, the location and depth of all sewer laterals shall be determined and documented prior to drilling to insure there is no conflict between the proposed gas main and the existing sewer. A Sewer Lateral Location Plan must be submitted to Duke Energy and approved prior to the Gas Contractor performing any directional drill work; no additional money will be paid for this plan. **The gas contractor must perform a pre and post camera of all sewer lines and laterals.** Acceptable methods for locating the laterals are a camera or by physically uncovering the lateral. The Gas Contractor must install a sewer tag on every sewer clean out. Duke Energy will supply these tags.

#### **4.4 Backfill**

Backfill shall be compacted to 95% optimum density throughout the project regardless of location unless otherwise shown in the plans or directed by the Engineer. Granular backfill will not be allowed.

##### **4.4.1 Flowable Fill (Low Strength Mortar Material)**

When installing gas mains under existing or proposed roadway pavement, or when shown on the plans, the contractor must backfill with flowable fill to the subgrade elevation.

#### **4.5 Lowering Main in Place**

The Gas Contractor shall excavate along existing gas mains and lower the top of the mains in place to the elevations specified on the Gas Plans. The length of trench either side of the point to be lowered, required to ensure stresses are minimized in the pipe after it is lowered, is specified on the Gas Plans. Lowering mains in place shall be accomplished by:

- Excavate trench along both sides the existing main so it transitions down from the bottom of the main at one end of the trench to below the required top of pipe elevation at the point or length to be lowered, and then transitions back up to the bottom of the main at the opposite end of the trench. Excavate the soil from over and under the main as the trench is excavated. Additional trench depth should be excavated to accommodate sand bedding.
- Support the exposed steel mains at a minimum of 50-foot intervals and MDPE mains at a minimum of 100-foot intervals (unless specified otherwise on the plans) using side booms, track-hoes, blocking/skids, or sling supported from a beam or section of pipe placed across the trench width.
- Clean the pipe and visually check line for any damage. The protective coating on steel mains should be jeeped for holidays. Make repairs as needed per Duke Energy standards.
- Bed the bottom of the trench with 3” of sand.
- Lift the pipe using slings and side booms or track-hoes. Remove the pipe supports and lower the main into the trench. Adjust supports before lifting the main so they are not at or near girth welds.
- Check the top of main elevation at the point or over the points to be lowered to see if the top has been lowered to or below the elevation specified.

**The lowering of main in place shall only be done by Duke Energy approved Gas Contractors or Duke Energy Crews.**

#### **4.6 Damage to Gas Facilities**

The Gas Contractor must notify the Duke Energy Inspector whenever gas leaks or any questionable situation is encountered. The Gas Contractor shall not repair any active services or mains that may be damaged during construction.

#### **4.7.2 Casing under Railroad Tracks**

Agreements between Duke Energy and the Railroad must be signed before any utility work is performed on Railroad property. Railroad crossings require steel mains encased in steel casing if the top of the casing pipe is installed between 5.5 feet and 10 feet below the base of the rails. Un-cased steel mains can be installed if the top of the main is installed below 10 feet from the base of the rails. The Gas Contractor shall follow the terms and conditions outlined in the Crossing Agreement.

Railroad personnel are required to be present at the time of the crossing. The Gas Contractor must notify the Railroad before the crossing. Bored and Jacked installations shall have a borehole diameter essentially the same as the outside diameter of the casing pipe. The top of the

casing pipe shall be more than 5.5-feet below the base of the railway rail. The carrier pipe shall be centered in the casing pipe and sealed and vented in accordance with Duke Energy Standards.

#### **4.8 Leak Testing**

Leak Testing shall be performed on all newly installed gas main. The contractor must supply all test gauges and the appropriate certification to Duke Energy prior to performing any air leak test on installed piping facilities. The testing equipment must be certified annually and the certification sent to Duke Energy Gas Engineering. The contractor will also be required to have certified purging equipment.

#### **4.9 Hydrostatic Testing**

The contractor must supply all labor, equipment, and material to perform and complete the hydrostatic testing of all installed feeder line. Dead weight testers, temperature, and pressure recorders (8" diameter minimum chart size) must be certified for accuracy within the last 6 months of their use date. The contractor will also be required to have certified purging equipment. The minimum test pressure is 750 psi (1.5 x design MAOP) and the preferred test media is water. The maximum test pressure should not exceed 50% of the pipes SMYS. If elevation differences between the low and high spot along a test section are significant, pressure gauges should be placed at these locations to ensure that the minimum test pressure of 750 psi is reached for the entire length of main. The minimum hydrostatic test length is 8-hours. All hydrostatic test waters shall be disposed of in accordance with local and state regulations.

#### **4.10 Gas Main Tie-Ins**

The Gas Contractor will be required to assist Duke Energy at most tie-ins. When assisting Duke Energy at tie-ins, the contractor will be working for Duke Energy and not the General Contractor/KYTC. Contractor will be paid at established rates (not prevailing wage) when performing work for Duke Energy. **Duke Energy reserves the right to perform all tie-ins to the existing gas mains.** On steel mains, tie-ins will require the installation and tapping of TD Williamson fittings. Tie-ins on polyethylene mains will require squeezing off the main and installing the appropriate saddles. The Gas Contractor will be required to have the following equipment:

- T D Williamson equipment for 2" through 6" steel mains. The Gas Contractor is not required to purchase 8" and 12" T D Williamson and other pertinent equipment; however, Duke Energy would like the Gas Contractor to own this equipment.
- Squeeze-off equipment for 2-inch through 8-inch polyethylene,
- 4-inch and smaller guillotine saws,
- Electro-fusion equipment,
- Air Test and Hydrostatic Testing Equipment, and
- Other pertinent equipment necessary to tie in 2-inch through 6-inch steel and polyethylene mains.

It will be the responsibility of the Gas Contractor to meet with the Duke Energy inspector, prior to scheduling any tie in work, to discuss the equipment and personnel necessary to perform the work. Duke Energy will provide pressure crews to assist on tie in and purging activities.

Wipe test are required when performing tie-ins over 4" in diameter. The Gas Contractor must notify the Gas Inspector whenever liquid condensate is visible in the existing mains. The Road Contractor is responsible to provide a space for a roll off box if it is determined that there is PCB contaminated pipe on site. The Gas Contractor is responsible to keep the roll off box covered at all times. Duke Energy will provide the roll off box and dispose of any PCB contaminated pipe found on site.

The Gas Contractor must supply all labor, equipment, and material necessary to abandon mains that are replaced in the road project. This work includes purging, capping, sealing, cutting, or removing and disposing of sections of abandoned main.

**Tie-ins on many Duke Energy mains are pressure and/or temperature dependent. Duke Energy will not allow tie-ins to be made on most mains between November 1 and April 30 if the temperature is below 45 degrees Fahrenheit. During this time of year tie-ins will be looked at on a case by case basis by Duke Energy's Gas Control and Pressure Departments to evaluate the feasibility of completing the tie-in.**

#### **4.11 Restoration**

All gas facility replacement work will likely be performed within the limits of the KYTC Road Project during its active construction by the Road Contractor. **Final restoration of all areas is the responsibility of the Road Contractor;** however, the Gas Contractor may have to perform some restoration to maintain traffic and insure public safety. All areas, which are disturbed during gas main construction, which are outside of road construction limits, shall be replaced in-kind. All restoration shall be performed to the satisfaction of the KYTC Section Engineer. The KYTC Section Engineer shall approve all temporary and permanent restoration materials and their placement. Contractors will be responsible for maintenance of any restoration they install.

## **5.0 GAS SERVICES**

The Gas Contractor may be required to renew customer services from the gas main to the customer's service meter. The service lines are broken into two portions: the main to curb cock portion (M-C) and the curb cock to service meter portion (C-M). The M-C portion of the gas service line is usually contained entirely within road right-of way. The C-M portion of a service line is mostly on private property, but a portion of it may be within road right-of-way. Duke Energy and its contractors are solely responsible for gas work performed outside the road construction limits. Curb to Meter (C-M) work will be performed for Duke Energy direct and will be paid based on established service work pricing.

The Gas Contractor is required to complete all associated Job Control Forms (JCF's) with the service work. JCF's must be completed within one day of the completion of the service work. JCF's which are not filled out correctly will be returned to the contractor for correction.



## **5.1 Main to Curb (M-C) Services**

M-C services are broken up between short-side and long-side M-C. Method of payment is as defined in Standard Gas Bid Item Descriptions contained elsewhere in the bid proposal. Contrary to past road projects, the length of the gas service to be under or over 15 feet is no longer the determining factor in paying short vs. long side services. The determining factor is defined in the Standard Gas Bid Item Descriptions. The main to curb portion of the service lines must be installed at the depth of the relocated main or five feet deep, whichever is greater. This is particularly critical when crossing existing or proposed roads with the long-side piping.

## **5.2 Curb to Meter (C-M) Services**

C-M services that do not pass the required pressure test or services that are metallic (steel or copper) will be renewed. The renewal work shall include turning on and off the services, separating existing facilities for testing, excavating, air testing, rebuilding of the meter set, setting a new meter bracket, replacing the meter as required, and re-lighting the customer appliances. Renewed C-M service lines shall be installed at a minimum depth of 18 inches on customer owned property.

Existing polyethylene services shall be reconnected to the new mains if it passes testing. The Gas Contractor will be required to turn off and to re-light customer appliances in accordance with the planned service replacement work and the Duke Energy approved procedures. The Gas Contractor shall red tag all customer bad appliances and notify the Gas Inspector of the problem. Duke Energy will deal with the customer. Contact the gas inspector whenever anything unacceptable is found.

Conversion projects where gas services must be converted from standard pressure to intermediate or high pressure will require the installation of regulators and vent piping. The Gas Contractor must make arrangements with the Gas Inspector to Leak Survey every C-M service the same day it is installed. All service holes outside the pavement area are to be covered with ¾" plywood and flasher barricade.

The Gas Contractor will be required to replace tin meters and mercury regulators associated with the renewal of curb to meter services. This replacement cost must be included in the curb to meter renewal unit price. Duke Energy will train Gas Contractors for free on the policies associated with spotting unacceptable meter and house service line locations and the identification of tin meters and mercury regulators. Only Duke Energy personnel shall handle mercury regulators. If the household service lines or meters are found in an unacceptable location, the meters may be relocated to the outside.

## **6.0 DESCRIPTION OF PAY ITEMS**

This section describes the gas utility pay items for this project. Pay items are broken up in to two categories:

- 1.) Pay items billed to the Road Contractor; and
- 2.) Pay items billed to Duke Energy directly.

## 6.1 Pay Items Billed to the Road Contractor

The Gas Contractor shall invoice the Road Contractor for all contracted pay items under **Section 7.1** according to the actual units installed. **The Road Contractor shall pay the Gas Contractor for any work performed at the Road Contractor's request that is outside the items contracted with the Road Contractor and that was not pre-approved by Duke Energy and the Cabinet; Duke Energy shall not be billed for this work.** The Road Contractor shall pay the Gas Contractor for actual quantities installed and not for those estimated on the bid sheet. The Road Contractor shall be reimbursed by KYTC. KYTC will bill Duke Energy for the gas facility work after the entire Road Project is completed.

### 6.1.1 Length of Gas Main Installed

The length of gas main will be **paid on a linear foot or meter basis** based on the type and size of pipe installed. Payment will only be made for main that has been placed into service. Each size pipe shall be measured along the centerline of the pipe through fittings and casements from end to end. Where the pipe changes size, the particular size pipe shall be measured to the center of the transition fitting. No payment will be made for temporary offsets. **No additional payment will be made for rock excavation or extra depth; bidders must draw their own conclusions as to the subsurface conditions to be encountered.**

This item shall include all costs for labor, equipment, and materials (besides pipe and fittings) necessary to install the gas main. Installation of gas main shall include costs for the following:

- Mobilization,
- Saw cutting pavement,
- Traffic Control (flag-persons, arrow-boards, signs, plates, etc). Gas Contractors should be able to take advantage of the Road Contractors Traffic Control.
- Excavating the trench to the proper depth and width or drilling **in rock or soil**,
- Removal and disposal of spoil,
- Bores required to install 6-inch and smaller mains,
- Stringing the pipe along trench,
- Fusing or welding the pipe,
- Test welds or fusions,
- Sand bedding material,
- Flowable Fill or Low Strength Mortar backfill under existing and proposed roads and as required,
- Bedding the pipe,
- Lifting the joined pipe into trench,
- Coating welds and couplings,
- Excavation for utility location, including test holes,
- Installing tracer wire and test boxes,
- Installing anodes and test boxes,

- Backfilling the trench,
- Air testing,
- All temporary restoration
- All final restoration outside the disturbed road limits (including seed) as required in accordance with the plans and specifications.

No additional payments will be made for restoration and backfill if mains are directional drilled instead of direct buried.

### **6.1.2 Lower Main In Place**

Gas mains lowered in place will be **paid on a linear foot or meter basis** of excavated trench per the size of pipe to be lowered. If service lines have to be relocated for the lowering, they will be paid for under the appropriate bid item. **No additional payment will be made for rock excavation, flowable fill, or extra depth.**

### **6.1.3 Boring – No Casing**

This unit will be **paid on a linear foot or meter basis** for bores required to install 8 inch and larger steel main. The cost for bores required to install 6-inch and smaller mains must be included in the main installation unit price. This unit shall be reported for payment by size of the pipe installed in the bore regardless of the size of the bore and shall include all costs associated with completing the bore as well as setting up the bore machine. The cost of installing the gas main in the bore is in addition to the cost of the actual bore and should be reported for payment under length of gas main installed.

### **6.1.4 Boring With Steel Casing**

This unit will be **paid on a linear foot or meter basis** for the size of the casing installed in the bore regardless of the size of the bore and shall include joining, excavation, the installation of all insulators, seals and vents in accordance with Engineering Standard 2.12.1. The Gas Contractor shall be paid for installing the gas main in the casing on a linear foot or meter basis per type and size of main in addition to the length of casing installed. No additional payment will be made for boring through rock.

### **6.1.5 Steel Casing – No Bore (Open Cut)**

This unit will be **paid on a linear foot or meter basis** for the size of the casing installed in the trench. This work shall include joining the casing pipe, coating welds, installing anodes, installing test connections and test boxes, and sealing ends around carrier pipe. The Gas Contractor shall be paid for installing the gas main in the casing on a linear foot or meter basis per type and size of main in addition to the length of casing installed.

### **6.1.6 Valve Assembly**

Valve assemblies will be **paid for on a lump sum basis** for the type and size of valve installed. The unit price for each valve installation includes setting the valve box to proper grade and the

installation of pressure stems in accordance with the appropriate standard. For steel valves, the cost of welding the companion flanges, bolting the valve to the companion flange or welding the valve directly onto the line is included in the valve installation unit.

When installing plastic valves using electrofusion couplings a 3 ft pup-piece of pipe should be fused to the valve prior to electrofusion so that the coupling could be cut-off in case of incomplete/improper fusion.

### **6.1.7 Main Tie-Ins**

Main tie-ins will be **paid on a lump sum basis** based on the size and type of main. The lump sum costs shall include:

- All time associated with separating the existing facilities and reconnecting to the new main,
- Preparation of any and all by-pass requirements,
- Installation of fittings, such as TD Williamson,
- Excavation, without regard to the classification of the materials.
- Preparing cast iron mains by installing appropriate saddles and making appropriate taps in accordance with standards,
- Abandonment of the existing facilities to include purge and sealing the main ends in accordance with standards,
- Transportation and cleaning of the T D Williamson equipment,
- Traffic Control (Flag-persons, arrow- boards, signs, and plates). Gas Contractors should be able to take advantage of the Road Contractors Traffic Control.
- Backfill material including Low Strength Mortar as required
- Surface restoration

Duke Energy reserves the right to allocate work to company personnel at any time to provide assistance with the tie-ins to insure completion in a timely manner.

### **6.1.8 Services - Main to Curb (M-C) Short Side & Long Side**

Main to Curb (M-C) service work shall be **paid on a lump sum basis**. This item shall include all labor, equipment, and materials, necessary to install the gas service. This bid item includes installing 4 inch x 1 inch plastic electrofusion tee, all plastic couplings, stop cock, 1 inch plastic cap (at tee and end of service), plastic curb box (bottom and top), curb box lid, and necessary 1 inch plastic pipe with tracer wire. This item also includes air testing service and tapping tee. Services shall be installed with a 12-inch horizontal separation from the existing service.

M-C service work shall include all costs for the Gas Contractor's completion of all associated paperwork (JCF's, etc). Any temporary or permanent hard or soft surface restoration required for main to curb or curb to meter service installations outside the limits of road construction shall be considered incidental to the contract. No separate payment shall be made for restoration outside the limits of road construction. The Gas Inspector must be notified after a failed service line has been repaired so a record of the event can be logged and the inspector can verify that the repair was adequate.

## 6.2 Pay Items Billed to Duke Energy

The Gas Contractor shall invoice Duke Energy directly for all work, requested by Duke Energy, that is not included in the road contract.

The Gas Contractor shall only bill one project per invoice; do not send two or more projects on one invoice. The Gas Contractor shall not add any items to the pay sheets after the Gas Inspector has signed them. Additional pay items shall be placed on a separate pay sheet and signed by the Duke Energy Inspector.

**The Road Contractor shall pay the Gas Contractor for any work performed at the Road Contractor's request that is outside the items contracted with the Road Contractor and that was not pre-approved by Duke Energy and the Cabinet; Duke Energy shall not be billed for this work.**

## 7.0 INVOICING

**It is the Gas Contractor's responsibility to know how, by whom, and for what he is being paid.**

The Gas Contractor shall invoice the Road Contractor for all work performed to complete items listed under **Section 7.1** and for any extra work negotiated with the Road Contractor. The Road Contractor then invoices KYTC for this work. The Gas Contractor shall talk to the Section Engineer if the Road Contractor is behind in paying the invoices.

The Gas Contractor shall invoice Duke Energy for all work performed to complete items not included in the road contract and for any extra items (contract addendums) directly negotiated and intended to be paid by Duke Energy. These invoices shall be sent to: Duke Energy at 139 E. 4<sup>th</sup> Street, Room 460A, Cincinnati, OH, 45201, to the attention of the sponsoring engineer. These addendum items should not be invoiced with items that were bid.

## 7.1 Weekly Pay Sheets

The Gas Contractor must **meet** with the Duke Energy Inspector and the Section Engineer or inspector on a **weekly basis** to sign off on all pay sheets (preferably Friday evening or Monday morning). The pay sheets must describe all T&M work and break out the costs according to the appropriate Duke Energy work code. The daily sheets should clearly identify the start and stop times for the T&M on each date along with the inspector's signature for approval on that date.

Duke Energy Pre-qualified Gas Contractor Phone Numbers (REVISED 9/1/16)

**AMS Construction** – 10670 Loveland Madeira Rd., Loveland, OH 45140

Phone- 513-794-0410      Fax: 513-794-0414

Contact: Dale Franklin, Cell Phone - 513-276-0329 [dale@amsdigs.com](mailto:dale@amsdigs.com)

**RLA Investments** – 603 Sheperd Lane, Cincinnati, Ohio 45215

Office: 513-554-1469      Fax: 513-554-1221

Contact: Scott Moody, Cell Phone – 513-623-4258, [rlainvestment@fuse.net](mailto:rlainvestment@fuse.net)

**KS Energy Co** – 755 US-50, Milford, OH 45150

Office: 513-271-5616

Contact: Leon Morrison, Cell Phone – 513-582-9024, [Lmorrison@ksenergyservices.com](mailto:Lmorrison@ksenergyservices.com)

**Premier Energy** – 370 Industrial Dr., Suite 100, Lawrenceburg, IN 47025

Contact: Ron Barton, cell Phone – 513-335-8484, [RBarton@premierenergyservices.com](mailto:RBarton@premierenergyservices.com)

# Standard Gas Bid Item Descriptions

**BOLLARDS** This item is for payment for furnishing and installing protective guard posts at above ground utility installations. A bollard may consist of, but not limited to, a steel post set in concrete or any other substantial post material. This item shall include all labor, equipment, and materials needed for complete installation of the bollard as specified by the utility owner specifications and plans. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

*NOTE: A bid code for this item has been established in standard roadway bid items and shall be used for payment of this item. The bid code is 21341ND.*

**G DIRECTIONAL BORE** Payment under this item is made whenever the plans or specifications specifically show directional boring is to be utilized in order to minimize the impact of open cut for the installation of gas main under streets, creeks, etc. Payment under this item shall include the specified bore pipe, labor, and equipment. No separate payment shall be made for bore pipe installed in the bore whether used as a carrier pipe or an encasement of a separate carrier pipe. Carrier pipe installed within a bore pipe shall be paid separately under pipe items. Payment under this item shall be for all sizes and not be size specific. No separate bid items will be established for size variations. The bore pipe sizes to be included under this item shall be as shown on the plans and/or in the specifications. This bid item shall also include the cost of pre and/or post directional bore gas installation video inspection of adjacent sanitary and storm sewer mains, manholes, and laterals when the utility specifications associated with the contract require such video inspection. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

**G ELECTRONIC ID MARKER** This bid item is to pay for labor, equipment, computer programming, and installation of an electronic ID marker at the locations shown on the plans or as directed by the engineer. The marker may be in the form of a ball, disk, cylinder, post, or other shape as required by specification and may be buried, at grade, or above grade as specified. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. Paid EACH (EA) when complete.

*NOTE: This bid item is not for payment of standard non-electronic markers or monuments. A separate "Line Marker" bid item is established for this purpose.*

**G ENCASUREMENT STEEL BORED** This item shall include the steel encasement pipe size as specified on the plans and in the specifications, casing spacers, end seals, vents, labor, and equipment to bore and install the encasement in accordance with the plans and specifications, complete and ready for use. The size shall be the measured internal diameter of the encasement pipe. The sizes of encasement to be paid under the size ranges specified in the bid items shall be as follows:

- Range 1 = All encasement sizes greater than 2 inches to and including 6 inches
- Range 2 = All encasement sizes greater than 6 inches to and including 10 inches
- Range 3 = All encasement sizes greater than 10 inches to and including 14 inches
- Range 4 = All encasement sizes greater than 14 inches to and including 18 inches
- Range 5 = All encasement sizes greater than 18 inches to and including 24 inches
- Range 6 = All encasement sizes greater than 24 inches

*(Encasement sizes of 2 inches internal diameter or less shall not be paid separately; but, shall be considered incidental to the carrier pipe.)* Payment under this bid item shall not include the carrier pipe. Carrier pipe shall be paid under a separate bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

**G ENCASEMENT STEEL OPEN CUT** This item shall include the steel encasement pipe size as specified on the plans and in the specifications, casing spacers, end seals, vents, labor, and equipment to open cut and install the encasement in accordance with the plans and specifications, complete and ready for use. The size shall be the measured internal diameter of the encasement pipe. The size encasement to be paid under the size ranges specified in the bid items shall be as follows:

- Range 1 = All encasement sizes greater than 2 inches to and including 6 inches
- Range 2 = All encasement sizes greater than 6 inches to and including 10 inches
- Range 3 = All encasement sizes greater than 10 inches to and including 14 inches
- Range 4 = All encasement sizes greater than 14 inches to and including 18 inches
- Range 5 = All encasement sizes greater than 18 inches to and including 24 inches
- Range 6 = All encasement sizes greater than 24 inches

*(Encasement sizes of 2 inches internal diameter or less shall not be paid separately; but, shall be considered incidental to the carrier pipe.)* Payment under this bid item shall not include the carrier pipe. Carrier pipe shall be paid under a separate bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

**G FARM TAP AND REGULATOR** This item is for the installation of gas service tap and regulator assembly on a gas transmission main. This item shall include excavation, labor, equipment, and all tapping, piping, fittings, and regulator materials to install the farm tap and regulator assembly in accordance with the plans, specifications, and standard drawings complete and ready for use. Only one pay item has been established for Farm Tap and Regulator installations. Payment shall be made under this item regardless of farm tap service and regulator size. No separate pay items will be established for size variation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**G LINE MARKER** This item is for payment for furnishing and installing a gas utility line marker as specified by the utility owner specifications and plans. A line marker may consist of a post or monument of whatever materials specified and shall include markings and/or signage on same as specified by plans or specifications. This item shall include all labor, equipment, and materials needed for complete installation of the marker. This item shall be paid EACH (EA) when complete.

*NOTE: This bid item is not for payment of "Electronic ID Markers". Electronic ID Markers are paid under a separate bid item.*

**G MAIN ABANDON** This bid item is in full payment for all efforts in abandonment of all gas mains and facilities shown to be abandoned on the plans, for removal of any sections of abandoned main that is in conflict with road construction, and for nitrogen purge and plug of any sections of main that are to remain. All work shall be done in accordance with the plans and specifications, and in accordance with



all pipeline safety regulations. This bid item is for all work to abandon and purge gas main in the total project regardless of size or length. No adjustment in the unit bid price will be allowed if the scope of work described in this item should increase in this contract for any reason. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item is to be paid LUMP SUM (LS) when complete.

**G MAIN POINT RELOCATE** This item is intended for payment for horizontal and/or vertical relocation of a short length of an existing main at the locations shown on the plans. This bid item is to be used to relocate an existing gas main at point locations such as to clear a conflict at a proposed drainage structure, pipe or any other similar short relocation situation. All new materials are to be used. The materials provided shall be of the same type and specification as those that exist. Substitution of alternative materials shall be approved by the engineer in advance on a case by case basis. Payment under this item shall be for each location requiring an existing main to be relocated horizontally or vertically regardless of pipe size or relocation length. No separate pay items will be established for pipe size variations or relocation segment length variations. Main Point Relocate shall not be paid on a linear feet basis; but shall be paid EACH (EA) at each location when complete and placed in service. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced.

**G METER AND REGULATOR** This bid item description shall be used for all meter and regulator bid items of every size except those defined as "Special". These pay items are for all labor, equipment, and materials needed for the installation of a service meter and regulator assembly at the locations shown on the plans or as directed by the engineer in accordance with specifications and standard drawings complete and ready for use. Materials to be provided under this bid item shall include, but are not limited to, meter, regulator, piping, fittings, building anchoring brackets, and hardware needed to create and install the assembly. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**G PIPE** This description shall apply to all polyethylene/plastic and steel pipe bid items of every size and type to be used as gas main, except those bid items defined as "Special". This item includes the pipe specified by the plans and specifications, all fittings (including, but not limited to, bends, tees, reducers, plugs, and caps), tracing wire with test boxes (if required by specification), corrosion protective coatings of steel pipe and fittings, labor, equipment, excavation, bedding, restoration, pressure testing, backfill, etc., required to install the specified new pipe and new fittings at the locations shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. For steel pipe, this bid item shall include all cathodic protection anodes, lead wire, test boxes or stations, and any accessories. No additional payment will be made for rock excavation. This bid item shall include material and placement of flowable fill under existing and proposed pavement, and wherever else specified on the plans or in the specifications. This bid item shall also include the cost of pre and/or post directional bore gas installation video inspection of adjacent sanitary and storm sewer mains, manholes, and laterals when the utility specifications associated with the contract require such video inspection. Measurement of quantities under this item shall be through valves (including horizontal measurements through above grade valves), fittings, encasements, and directional bores (only when a separate carrier pipe is specified within the directional bore pipe). Measurements shall be further defined to be to the center of tie-in where new pipe contacts existing pipe at the center of connecting fittings, to the outside face of vault or structure walls, or to the point of main termination at dead ends. No separate payment will be made under pipe items when the directional bore pipe is the carrier pipe. Please refer to the Utility

Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

**G REGULATOR STATION** Includes all labor, equipment, materials and restoration, to install a new gas regulator station as indicated on plans and on standard drawings complete and ready for use. Only one pay item has been established for regulator station installations. Payment shall be made under this item regardless of regulator station size. No separate pay items will be established for size variation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

*NOTE: This item is to be used to pay for regulator stations to reduce the pressure of gas from a higher pressure main to feed a lower pressure main. This item is not to be used to pay for regulators used on individual customer service lines.*

**G SERVICE LONG SIDE** This bid item description shall apply to all service line installations of every size bid up to and including 2 inch inside diameter, except those service bid items defined as "Special". This item includes the specified piping material, main tap, coupling for connecting the new piping to the surviving existing piping, encasement of 2 inches or less internal diameter (if required by plan or specification), labor, equipment, excavation, backfill, testing, and restoration, at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready for use. This bid item is to pay for service installations where the ends of the service connection are on opposite sides of the public roadway and the service line crosses the centerline of the public roadway as shown on the plans. The length of the service line is not to be specified. Payment under this item shall not be restricted by a minimum or maximum length. The contractor shall draw his own conclusions as to the length of piping that may be needed. Payment under this item shall include boring, jacking, or excavating across the public roadway for placement. Placement of a service across a private residential or commercial entrance alone shall not be reason to make payment under this item. Private or commercial entrances shall not be considered a public roadway in defining payment under this item. This pay item does not include installation or relocation of meters. Meters will be paid separately. This bid item shall also include the cost of pre and/or post directional bore gas installation video inspection of adjacent sanitary and storm sewer mains, manholes, and laterals when the utility specifications associated with the contract require such video inspection. No additional payment will be made for rock excavation or for special bedding required in rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**G SERVICE SHORT SIDE** This bid item description shall apply to all service line installations of every size up to and including 2 inch internal diameter, except those service bid items defined as "Special". This item includes installation of the specified piping material of the size specified on plans, encasement of 2 inches or less internal diameter (if required by plan or specification), main tap, coupling for connecting the new piping to the surviving existing piping, labor, equipment, excavation, backfill, testing, and restoration, at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready for use. This bid item is to pay for service installations where both ends of the service connection are on the same side of the public roadway, or when an existing service crossing a public roadway will remain and is being extended, reconnected, or relocated with all work on one side of the public roadway centerline as shown on the plans. The length of the service line is not to be specified and shall not be restricted to any minimum or maximum length. Payment shall be made under this item even if the service crosses a private residential or commercial entrance; but, not a public roadway. Private or commercial entrances shall not be considered a public

roadway in defining payment under this item. The contractor shall draw his own conclusions as to the length of piping that may be needed. This pay item does not include installation or relocation of meters. Meters will be paid separately. This bid item shall also include the cost of pre and/or post directional bore gas installation video inspection of adjacent sanitary and storm sewer mains, manholes, and laterals when the utility specifications associated with the contract require such video inspection. No additional payment will be made for rock excavation or for bedding required in rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**G SERVICE RELOCATE** This item is for the relocation of an existing gas service line where a meter is not involved, and where an existing service line can easily be adjusted by excavating alongside and moving the line horizontally and/or vertically a short distance without cutting the service line to avoid conflicts with road construction. This item shall include excavation, labor, equipment, bedding, and backfill to relocate the line in accordance with the plans and specifications complete and ready for use. Payment under this item shall be for each location requiring relocation. Payment shall be made under this item regardless of service size or relocation length. No separate pay items will be established for size or length variation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**G TIE-IN** This bid description shall be used for all polyethylene/plastic or steel gas main tie-in bid items of every size except those that include a temporary bypass or are defined as "Special". This item includes all labor, equipment, excavation, fittings, sleeves, reducers, couplings, restoration, testing and backfill required to make the gas main tie-in as shown on the plans, and in accordance with the specifications complete and ready for use. Pipe for tie-ins shall be paid under separate bid items. No additional payment will be made for rock excavation. This bid item shall also include material and placement of flowable fill backfill under existing and proposed pavement, and wherever else specified on the plans or in the specifications. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**G TIE-IN W/BYPASS** This bid description shall be used for all polyethylene/plastic or steel gas main tie-in bid items that include temporary bypass of every size except those defined as "Special". This item includes all labor, equipment (including tapping, stopple and/or squeeze equipment), excavation, permanent and temporary fittings (including, but not limited to, tees, split tees, bends, reducers, plugs, caps, and couplings), temporary bypass piping, restoration, testing and backfill required to make the gas main tie-in with temporary bypass as shown on the plans, and in accordance with the specifications complete and ready for use. Mainline pipe for tie-ins shall be paid under separate bid items. No additional payment will be made for rock excavation. This bid item shall also include material and placement of flowable fill backfill under existing and proposed pavement, and wherever else specified on the plans or in the specifications. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

*NOTE: The tie-in size reflected in the bid item reflects the nominal internal diameter size of the main gas line being tied-in, not the bypass pipe size.*

**G VALVE** This description shall apply to all buried valves of every size and type required in the plans and specifications except those bid items defined as "Special". Payment under this description is to be

for gas valves being installed with new main. This item includes the valve as specified in the plans and specifications, protective coating and corrosion protection, labor, equipment, excavation, valve box and valve stem extensions, backfill, restoration, testing, and etc., required to install the specified valve at the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**G VALVE ABOVE GRADE** This description shall apply to all above grade valve assemblies of every size and type required in the plans and specifications except those bid items defined as "Special". Payment under this description is to be for above grade gas valves being installed with new main. This item includes the above grade valve, pipe, and fittings as specified in the plans, specifications and standard drawings. This bid items shall also include protective coating and corrosion protection, labor, equipment, excavation, backfill, restoration, testing, etc., required to install the specified above grade valve at the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**G VALVE BOX ADJUST** Includes all labor, equipment, valve box and valve stem extensions (if required), excavation, backfill, concrete pad around valve box (when specified in specifications or plans), restoration, etc. to adjust the top of the box to finished grade complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**G WELD X-RAY INSPECTION** This description shall apply to all radiographic x-ray inspections of steel pipe joints of every size within the pipe size ranges given in the bid item text. This bid includes all labor, equipment, materials, to assess the acceptability of the weld to comply with specifications and to industry and regulatory standards. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) for each pipe joint inspected.

Specifications for Gas Main Replacement  
within  
STATE OF KENTUCKY ROAD PROJECTS

Revised for:  
KYTC Item 6-18.00  
Richwood Rd.

Duke Energy Job No. 29545566  
Richwood Rd. Replacement

August, 2019

**Note: KYTC has prepared “STANDARD GAS BID ITEM DESCRIPTIONS” for all items of gas work contained in the road contract. These “STANDARD GAS BID ITEM DESCRIPTIONS” are contained elsewhere in the project proposal. These “STANDARD GAS BID ITEM DESCRIPTIONS” shall supersede any and all conflicting information in the following gas specifications. Where conflicts do not exist, the following shall apply.**

## **1.0 GENERAL**

### **1.1 Scope of Work**

Gas main relocation work required for the proposed Mt. Zion Rd project consists of the following work:

- Installing approximately 12,037’ of 6” plastic gas main.
- Renewing M-C services as needed. We’ve estimated that there will be (15) long side services and (4) short side services to be replaced.
- Installing valves per drawings.

A Gas Contractor, approved by Duke Energy, shall perform the gas facility relocation work. **The General Contractor awarded the KYTC road project, shall hire an approved Gas Contractor listed at the end of these specifications.**

A Duke Energy Inspector will oversee all piping work performed by the Gas Contractor. Transportation Cabinet inspectors will primarily oversee vertical and horizontal placement of the main, all backfill, traffic control work, and record pay quantities for gas work in the road contract in consultation with the gas inspector.

### **1.2 Acceptable Gas Contractors**

Installation of gas facilities on this project is limited to the following Gas Contractors due to their pre-qualification for such work with Duke Energy:

1. AMS Construction
2. RLA Investments
3. KS Energy
4. Premier Services

At the end of these specifications is a phone list for the Duke Energy approved Gas Contractors. Contrary to previous road contracts, gas contractors (which are now considered **specialty contractors** by the Kentucky Transportation Cabinet) are no longer required to be prequalified by the Cabinet to perform utility work included in the road contract. All gas contractors prequalified by Duke Energy are now allowed to perform gas work in road contracts. **Department of Transportation regulations prohibit any non-qualified contractor from performing any gas main work. This includes, but is not limited to excavation, main lowering, pipe installation, service installation, and back filling.**

### 1.3 Standards

In addition to these specifications, all facilities must be installed in accordance with the 2007 Advanced Main Replacement Program (AMRP) Specifications, the Duke Energy's Gas Division Specifications (GD-150 Composite), CFR part 192, and all applicable specifications. These General and Technical Provisions shall be made a part of this project contract by reference. Copies are available from Duke Energy. Where the following specifications and those referenced are in conflict, the following specifications shall govern and take precedence.

### 1.4 Definitions

Where the word "**Engineer**" appears in these specifications or on the gas plans, it shall be understood the "Engineer" is the Kentucky Transportation Cabinet (KYTC) Section Engineer or his/her designated representative and the Duke Energy Engineer or his/her designated representative jointly. Both Engineers must mutually agree upon all decisions made with regard to the gas line construction. The Transportation Cabinet, Section Engineer shall make all final decisions in all disputes. The Section Engineer is ultimately responsible for the engineering supervision of the road contract.

Where the word "**Gas Inspector**" or "Inspector" appears in these specifications or on the gas plans, it shall be understood the "Inspector" is the Duke Energy Gas Inspector or his designated representative.

Where the words "**Resident Engineer**" appears in these specifications or on the gas plans, it shall be understood the "**Resident Engineer**" is the KYTC Section Engineer or his designated representative.

Where the word "**Road Contractor**" appears in these specifications or on the gas plans, it shall be understood the "**Road Contractor**" is the General Contractor that was awarded the road improvement project by KYTC and that hired the Gas Contractor for the gas replacement work.

Where the word "**Gas Contractor**" appears in these specifications or on the gas plans, it shall be understood the "**Gas Contractor**" is the Duke Energy and KYTC approved contractor hired by the Road Contractor to perform the gas replacement work within the KYTC Road Project.

### 1.5 Video Taping

Duke Energy recommends that the Gas Contractor videotape every project prior to starting. The video is extremely important in settling disputes with governing agencies.

### 1.6 Permits & Fees

All permits for the replacement work will be obtained by Duke Energy, and will be provided to the Gas Contractor by the Gas Inspector prior to the start of work. Duke Energy will pay all permit fees except cut/fill fees. Cut/fill fees required for dumpsites will not be paid by Duke Energy except for material dumped for main tie-ins where the Gas Contractor is paid directly by Duke Energy on a time and material (T&M) basis. The Gas Contractor will be responsible for

all tree damage unless the damage was a result of a direct order by the Engineer. Clean up and restoration on all projects must be in compliance with KYTC and local governmental agencies and must be approved by the Duke Energy Inspector. It is the sole responsibility of the Gas Contractor to check with governing agencies for work hour restrictions. No compensation will be given for restricted work hours or crews working at night.

## **1.7 Training**

Duke Energy will require the Gas Contractor to qualify all necessary personnel on polyethylene fusion and mechanical connections. Duke Energy will provide training to the Gas Contractor on the renewal of services by insertion and mechanical, installation of meter sets, turn off, turn on and appliance light up. Gas Contractors will be trained for free on Duke Energy policies associated with spotting unacceptable meter locations and the identification of tin meters and mercury regulators. Only Duke Energy personnel shall handle mercury regulators. Safety procedures, grounding procedures, and a review for sizing services will also be covered in the training.

## **1.8 Security**

Picture ID's are required for all Gas Contractor employees. Gas Contractor personnel are required to show their ID's whenever asked by customers or Duke Energy Personnel.

## **MATERIAL**

### **2.1 Duke Energy Supplied Materials**

Duke Energy will provide all:

- Steel and polyethylene pipe,
- Steel and polyethylene pipe fittings, flanges, adapters, couplings, etc.
- Valves and valve assemblies,
- Regulators,
- Regulator vaults or enclosures,
- Cathodic protection material,
- Other associated gas pipe materials required for the replacement work.

#### **2.1.1 Material Delivery and Tracking**

Duke Energy supplied material will be delivered, as the Gas Contractor needs it. Material for the entire project will not be delivered all at once. It will be the responsibility of the Gas Contractor to meet the delivery truck, to track material received, and to provide weekly reports showing material received, material used, and material remaining. The material assigned to a specific project is to be used on that project only. All surplus materials, at the end of the project, are to be returned to the storeroom or a credit requisition completed allocating the material to another job. The material must be returned or requisitioned to another job in the same condition that it



was received. A certain percentage of waste will be applied to the pipe. All other unaccounted, damaged or material left unprotected will be the responsibility of the Gas Contractor.

Service Material will be delivered to each Gas Contractor yard. Each Gas Contractor will be required to provide an adequate shelter area with shelves to organize all the service material. The Gas Contractor will provide a person to receive material, organize and reorder material as needed.

## **2.2 Contractor Supplied Materials**

The Gas Contractor is required to provide all materials and equipment other than as indicated on the construction drawings that are necessary to construct the project. All welding materials such as welding rods, grinding wheels, clamps, etc is to be provided by the Gas Contractor.

### Pipe Bedding

Pipe bedding shall meet the requirements for Pipe Bedding as contained in Kentucky Department of Highways, Standard Specifications for Road and Bridge Construction.

### Flowable Fill / Low Strength Mortar Mix

Flowable fill & Low Strength Mortar shall meet the requirements of the Kentucky Department of Highways, Standard Specifications for Road and Bridge Construction. Low Strength Mortar is required as backfill under all existing and proposed KYTC roads.

### Surface Restoration Materials (Temporary and Permanent)

All restoration materials shall meet the requirements of the appropriate sections of Kentucky Department of Highways, Standard Specifications for Road and Bridge Construction.

## **2.3 Contractor Requirements for Coiled MDPE Pipe Delivery & Handling**

Coiled pipe will not be used on this project.

## **3.0 JOINING PIPE**

### **3.1 Welding Steel Pipe**

All welds will be made in accordance with Duke Energy's Gas Division welding specifications. The Gas Contractor is responsible for ensuring that the proper Welding Specification is used for the grades and wall thicknesses of pipes being welded together.

Specification No. 501-2      Standard Welding Procedure SA-II-A-II: For Steel Pipe  
With O.D. from 2 3/8" to, and including 12 3/4 " and wall

thickness 0.188” to, but not including 0.250”

Specification No. 501-3 Standard Welding Procedure SA-III-A-III: For Steel Pipe with O.D. greater than 12 ¾ “ and wall thickness 0.250” to, but not including 0.344”

Specification No 501-20 Standard welding Procedure SA-F1-A-V: for fillet welds on steel pipe for socket –weld couplings, slip-on flanges, and full encirclement welding sleeves.

All welders must be pre-qualified in accordance with Duke Energy’s Gas Division specifications prior to the start of construction. All testing for welders will be in accordance with API Standard 1104, Section 3.3 at the Gas Contractor’s cost. The Inspector will visually inspect all welds.

### 3.2 Joining Plastic Pipe

Butt fusion will be considered the primary method of joining longitudinal sections of MDPE main. Rotary scrapers will be required when joining 4” and larger pipe in the trench. Electro-fusion may be used at the discretion of the Inspector. Electro-fusion couplings are the second choice in joining MDPE pipe. Two couplings are required per Duke Energy Gas Standards when joining directionally drilled pipe.

Bar clamps must be used to secure 2” pipe and larger pipe when joined by electrofusion. Personnel found joining pipe without the proper line up clamps and fusion equipment will lose their fusion cards. **NO SECOND CHANCES WILL BE GIVEN FOR SHORT CUTS TAKEN WHEN JOINING PIPE.**

When installing plastic valves using electrofusion couplings a 3 ft pup-piece of pipe should be fused to the valve prior to electrofusion so that the coupling could be cut-off in case of incomplete/improper fusion.

## 4.0 GAS MAINS

### 4.1 Inspection

**The road contractor must contact Duke Energy (Greg Menetrey, 513-659-0066) one month prior to the beginning of any gas main work so that Duke Energy can plan for the construction project.** Duke Energy will provide a Gas Inspector on all main replacement projects. The Inspector will have multiple projects to cover and will not be on site at all times. No changes to the project drawings shall be made without the joint consent of the Duke Energy Engineer or Gas Inspector AND the KYTC Section Engineer or his inspector. The Gas Inspector will record the as-built location of the gas main, track the pay and non-pay item quantities, and provide general guidance to the Gas Contractor and assistance to the Section Engineer. **The Gas Inspector works for Duke Energy and not the Road Contractor.**

### 4.2 Depth and Location of Main

**Gas mains on this project shall have 5' of cover from proposed grade under pavement and within 3' of cover unless noted otherwise.**

All mains are to be installed at the depth or elevation, and location specified on the project drawings. No changes to the project drawings shall be made without the joint consent of the Duke Energy Engineer or the Gas Inspector AND the KYTC Section Engineer or his inspector. The Duke Energy Engineer has designed the proposed gas main location to avoid conflicts with proposed and existing utilities and grades. Changes to the planned alignment without the consent of the Duke Energy Engineer AND KYTC Section Engineer may result in conflicts with other proposed facilities. **It is the responsibility of the Road Contractor to stake the proposed alignment of the gas mains for the Gas Contractor.**

### 4.3 Installation Methods

Direct bury is the preferred installation method for the gas main replacement work within the Road Project. Directional drilling of main is an alternative installation method that will be considered by the Duke Energy Engineer AND the KYTC Resident Engineer on a case-by-case basis. The following paragraphs discuss these installation methods.

#### 4.3.1 **Direct Bury**

The trench shall be excavated to accommodate the minimum specified cover over the main from proposed final grade, the pipe outside diameter, and a minimum of 3 inches of bedding material below the pipe. Where the main is being constructed within proposed ditch lines, across final pavements, and along final roadways, the trench shall be excavated to accommodate a minimum of 48 inches of cover over the main from final grade. The minimum cover shall be increased to 60 inches when crossing streams. The minimum trench width shall be 24 inches. The Gas Contractor shall string the pipe along the trench and join the pipe. Services shall be installed with a minimum horizontal separation from the existing service of 12 inches.

Once the pipe has been joined, the contractor shall lift and carefully lower the pipe into the center of the trench. The Gas Contractor is cautioned to handle the pipe carefully so as to minimize damage to the pipe. Additional bedding material shall be placed around the pipe and compacted in equal lifts so as to avoid lateral displacement. Bedding material shall be placed in lifts not to exceed 6 inches compacted depth. Bedding material shall be placed to a level approximately 12 inches above the pipe barrel. Bedding material shall not exceed the approximate 12 inches level over the pipe barrel. The bedding material under, around, and over the pipe shall be compacted using a vibratory compactor.

Once the pipe has been placed, trench excavated material or flowable fill shall be used to backfill the remainder of the trench. Trench excavated material shall be placed in the trench and shall be compacted to 95% maximum standard Proctor density with hand operated equipment. The Gas Contractor may use flowable fill for trench backfill at his cost. **When installing gas mains under existing or proposed KYTC roadways, the contractor must backfill with flowable fill to the subgrade elevation.** The cost of this flowable fill shall be incidental to the gas bid items. Granular material shall not be used as trench backfill.

#### **4.3.2 Directional Drilling**

Directional drilling is an accepted method for pipe installation and must comply with all the guidelines set forth in this specification. **The Duke Energy Engineer must approve all directional drilling.** The Gas Contractor must record the location and depth of the directional-drilled gas main at an interval of fifty (50) feet or less. The Gas Contractor shall excavate a test hole at least every 200-feet of bore to verify the location and depth of the drilled gas main.

For all directional-drilled gas main, the location and depth of all sewer laterals shall be determined and documented prior to drilling to insure there is no conflict between the proposed gas main and the existing sewer. A Sewer Lateral Location Plan must be submitted to Duke Energy and approved prior to the Gas Contractor performing any directional drill work; no additional money will be paid for this plan. **The gas contractor must perform a pre and post camera of all sewer lines and laterals.** Acceptable methods for locating the laterals are a camera or by physically uncovering the lateral. The Gas Contractor must install a sewer tag on every sewer clean out. Duke Energy will supply these tags.

#### **4.4 Backfill**

Backfill shall be compacted to 95% optimum density throughout the project regardless of location unless otherwise shown in the plans or directed by the Engineer. Granular backfill will not be allowed.

##### **4.4.1 Flowable Fill (Low Strength Mortar Material)**

When installing gas mains under existing or proposed roadway pavement, or when shown on the plans, the contractor must backfill with flowable fill to the subgrade elevation.

#### **4.5 Lowering Main in Place**

The Gas Contractor shall excavate along existing gas mains and lower the top of the mains in place to the elevations specified on the Gas Plans. The length of trench either side of the point to be lowered, required to ensure stresses are minimized in the pipe after it is lowered, is specified on the Gas Plans. Lowering mains in place shall be accomplished by:

- Excavate trench along both sides the existing main so it transitions down from the bottom of the main at one end of the trench to below the required top of pipe elevation at the point or length to be lowered, and then transitions back up to the bottom of the main at the opposite end of the trench. Excavate the soil from over and under the main as the trench is excavated. Additional trench depth should be excavated to accommodate sand bedding.
- Support the exposed steel mains at a minimum of 50-foot intervals and MDPE mains at a minimum of 100-foot intervals (unless specified otherwise on the plans) using side booms, track-hoes, blocking/skids, or sling supported from a beam or section of pipe placed across the trench width.
- Clean the pipe and visually check line for any damage. The protective coating on steel mains should be jeeped for holidays. Make repairs as needed per Duke Energy standards.
- Bed the bottom of the trench with 3” of sand.
- Lift the pipe using slings and side booms or track-hoes. Remove the pipe supports and lower the main into the trench. Adjust supports before lifting the main so they are not at or near girth welds.
- Check the top of main elevation at the point or over the points to be lowered to see if the top has been lowered to or below the elevation specified.

**The lowering of main in place shall only be done by Duke Energy approved Gas Contractors or Duke Energy Crews.**

#### **4.6 Damage to Gas Facilities**

The Gas Contractor must notify the Duke Energy Inspector whenever gas leaks or any questionable situation is encountered. The Gas Contractor shall not repair any active services or mains that may be damaged during construction.

#### **4.7.2 Casing under Railroad Tracks**

Agreements between Duke Energy and the Railroad must be signed before any utility work is performed on Railroad property. Railroad crossings require steel mains encased in steel casing if the top of the casing pipe is installed between 5.5 feet and 10 feet below the base of the rails. Un-cased steel mains can be installed if the top of the main is installed below 10 feet from the base of the rails. The Gas Contractor shall follow the terms and conditions outlined in the Crossing Agreement.

Railroad personnel are required to be present at the time of the crossing. The Gas Contractor must notify the Railroad before the crossing. Bored and Jacked installations shall have a borehole diameter essentially the same as the outside diameter of the casing pipe. The top of the

casing pipe shall be more than 5.5-feet below the base of the railway rail. The carrier pipe shall be centered in the casing pipe and sealed and vented in accordance with Duke Energy Standards.

#### **4.8 Leak Testing**

Leak Testing shall be performed on all newly installed gas main. The contractor must supply all test gauges and the appropriate certification to Duke Energy prior to performing any air leak test on installed piping facilities. The testing equipment must be certified annually and the certification sent to Duke Energy Gas Engineering. The contractor will also be required to have certified purging equipment.

#### **4.9 Hydrostatic Testing**

The contractor must supply all labor, equipment, and material to perform and complete the hydrostatic testing of all installed feeder line. Dead weight testers, temperature, and pressure recorders (8" diameter minimum chart size) must be certified for accuracy within the last 6 months of their use date. The contractor will also be required to have certified purging equipment. The minimum test pressure is 750 psi (1.5 x design MAOP) and the preferred test media is water. The maximum test pressure should not exceed 50% of the pipes SMYS. If elevation differences between the low and high spot along a test section are significant, pressure gauges should be placed at these locations to ensure that the minimum test pressure of 750 psi is reached for the entire length of main. The minimum hydrostatic test length is 8-hours. All hydrostatic test waters shall be disposed of in accordance with local and state regulations.

#### **4.10 Gas Main Tie-Ins**

The Gas Contractor will be required to assist Duke Energy at most tie-ins. When assisting Duke Energy at tie-ins, the contractor will be working for Duke Energy and not the General Contractor/KYTC. Contractor will be paid at established rates (not prevailing wage) when performing work for Duke Energy. **Duke Energy reserves the right to perform all tie-ins to the existing gas mains.** On steel mains, tie-ins will require the installation and tapping of TD Williamson fittings. Tie-ins on polyethylene mains will require squeezing off the main and installing the appropriate saddles. The Gas Contractor will be required to have the following equipment:

- T D Williamson equipment for 2" through 6" steel mains. The Gas Contractor is not required to purchase 8" and 12" T D Williamson and other pertinent equipment; however, Duke Energy would like the Gas Contractor to own this equipment.
- Squeeze-off equipment for 2-inch through 8-inch polyethylene,
- 4-inch and smaller guillotine saws,
- Electro-fusion equipment,
- Air Test and Hydrostatic Testing Equipment, and
- Other pertinent equipment necessary to tie in 2-inch through 6-inch steel and polyethylene mains.

It will be the responsibility of the Gas Contractor to meet with the Duke Energy inspector, prior to scheduling any tie in work, to discuss the equipment and personnel necessary to perform the work. Duke Energy will provide pressure crews to assist on tie in and purging activities.

Wipe test are required when performing tie-ins over 4" in diameter. The Gas Contractor must notify the Gas Inspector whenever liquid condensate is visible in the existing mains. The Road Contractor is responsible to provide a space for a roll off box if it is determined that there is PCB contaminated pipe on site. The Gas Contractor is responsible to keep the roll off box covered at all times. Duke Energy will provide the roll off box and dispose of any PCB contaminated pipe found on site.

The Gas Contractor must supply all labor, equipment, and material necessary to abandon mains that are replaced in the road project. This work includes purging, capping, sealing, cutting, or removing and disposing of sections of abandoned main.

**Tie-ins on many Duke Energy mains are pressure and/or temperature dependent. Duke Energy will not allow tie-ins to be made on most mains between November 1 and April 30 if the temperature is below 45 degrees Fahrenheit. During this time of year tie-ins will be looked at on a case by case basis by Duke Energy's Gas Control and Pressure Departments to evaluate the feasibility of completing the tie-in.**

#### **4.11 Restoration**

All gas facility replacement work will likely be performed within the limits of the KYTC Road Project during its active construction by the Road Contractor. **Final restoration of all areas is the responsibility of the Road Contractor;** however, the Gas Contractor may have to perform some restoration to maintain traffic and insure public safety. All areas, which are disturbed during gas main construction, which are outside of road construction limits, shall be replaced in-kind. All restoration shall be performed to the satisfaction of the KYTC Section Engineer. The KYTC Section Engineer shall approve all temporary and permanent restoration materials and their placement. Contractors will be responsible for maintenance of any restoration they install.

## **5.0 GAS SERVICES**

The Gas Contractor may be required to renew customer services from the gas main to the customer's service meter. The service lines are broken into two portions: the main to curb cock portion (M-C) and the curb cock to service meter portion (C-M). The M-C portion of the gas service line is usually contained entirely within road right-of way. The C-M portion of a service line is mostly on private property, but a portion of it may be within road right-of-way. Duke Energy and its contractors are solely responsible for gas work performed outside the road construction limits. Curb to Meter (C-M) work will be performed for Duke Energy direct and will be paid based on established service work pricing.

The Gas Contractor is required to complete all associated Job Control Forms (JCF's) with the service work. JCF's must be completed within one day of the completion of the service work. JCF's which are not filled out correctly will be returned to the contractor for correction.

## **5.1 Main to Curb (M-C) Services**

M-C services are broken up between short-side and long-side M-C. Method of payment is as defined in Standard Gas Bid Item Descriptions contained elsewhere in the bid proposal. Contrary to past road projects, the length of the gas service to be under or over 15 feet is no longer the determining factor in paying short vs. long side services. The determining factor is defined in the Standard Gas Bid Item Descriptions. The main to curb portion of the service lines must be installed at 60" under and within 3' of roadway pavement; 42" deep in all areas. This is particularly critical when crossing existing or proposed roads with the long-side piping.

## **5.2 Curb to Meter (C-M) Services**

C-M services that do not pass the required pressure test or services that are metallic (steel or copper) will be renewed. The renewal work shall include turning on and off the services, separating existing facilities for testing, excavating, air testing, rebuilding of the meter set, setting a new meter bracket, replacing the meter as required, and re-lighting the customer appliances. Renewed C-M service lines shall be installed at a minimum depth of 18 inches on customer owned property.

Existing polyethylene services shall be reconnected to the new mains if it passes testing. The Gas Contractor will be required to turn off and to re-light customer appliances in accordance with the planned service replacement work and the Duke Energy approved procedures. The Gas Contractor shall red tag all customer bad appliances and notify the Gas Inspector of the problem. Duke Energy will deal with the customer. Contact the gas inspector whenever anything unacceptable is found.

Conversion projects where gas services must be converted from standard pressure to intermediate or high pressure will require the installation of regulators and vent piping. The Gas Contractor must make arrangements with the Gas Inspector to Leak Survey every C-M service the same day it is installed. All service holes outside the pavement area are to be covered with ¾" plywood and flasher barricade.

The Gas Contractor will be required to replace tin meters and mercury regulators associated with the renewal of curb to meter services. This replacement cost must be included in the curb to meter renewal unit price. Duke Energy will train Gas Contractors for free on the policies associated with spotting unacceptable meter and house service line locations and the identification of tin meters and mercury regulators. Only Duke Energy personnel shall handle mercury regulators. If the household service lines or meters are found in an unacceptable location, the meters may be relocated to the outside.

## **6.0 DESCRIPTION OF PAY ITEMS**

This section describes the gas utility pay items for this project. Pay items are broken up in to two categories:



- 1.) Pay items billed to the Road Contractor; and
- 2.) Pay items billed to Duke Energy directly.

## 6.1 Pay Items Billed to the Road Contractor

The Gas Contractor shall invoice the Road Contractor for all contracted pay items under **Section 7.1** according to the actual units installed. **The Road Contractor shall pay the Gas Contractor for any work performed at the Road Contractor's request that is outside the items contracted with the Road Contractor and that was not pre-approved by Duke Energy and the Cabinet; Duke Energy shall not be billed for this work.** The Road Contractor shall pay the Gas Contractor for actual quantities installed and not for those estimated on the bid sheet. The Road Contractor shall be reimbursed by KYTC. KYTC will bill Duke Energy for the gas facility work after the entire Road Project is completed.

### 6.1.1 Length of Gas Main Installed

The length of gas main will be **paid on a linear foot or meter basis** based on the type and size of pipe installed. Payment will only be made for main that has been placed into service. Each size pipe shall be measured along the centerline of the pipe through fittings and casements from end to end. Where the pipe changes size, the particular size pipe shall be measured to the center of the transition fitting. No payment will be made for temporary offsets. **No additional payment will be made for rock excavation or extra depth; bidders must draw their own conclusions as to the subsurface conditions to be encountered.**

This item shall include all costs for labor, equipment, and materials (besides pipe and fittings) necessary to install the gas main. Installation of gas main shall include costs for the following:

- Mobilization,
- Saw cutting pavement,
- Traffic Control (flag-persons, arrow-boards, signs, plates, etc). Gas Contractors should be able to take advantage of the Road Contractors Traffic Control.
- Excavating the trench to the proper depth and width or drilling **in rock or soil**,
- Removal and disposal of spoil,
- Bores required to install 6-inch and smaller mains,
- Stringing the pipe along trench,
- Fusing or welding the pipe,
- Test welds or fusions,
- Sand bedding material,
- Flowable Fill or Low Strength Mortar backfill under existing and proposed roads and as required,
- Bedding the pipe,
- Lifting the joined pipe into trench,
- Coating welds and couplings,
- Excavation for utility location, including test holes,
- Installing tracer wire and test boxes,
- Installing anodes and test boxes,

- Backfilling the trench,
- Air testing,
- All temporary restoration
- All final restoration outside the disturbed road limits (including seed) as required in accordance with the plans and specifications.

No additional payments will be made for restoration and backfill if mains are directional drilled instead of direct buried.

### **6.1.2 Lower Main In Place**

Gas mains lowered in place will be **paid on a linear foot or meter basis** of excavated trench per the size of pipe to be lowered. If service lines have to be relocated for the lowering, they will be paid for under the appropriate bid item. **No additional payment will be made for rock excavation, flowable fill, or extra depth.**

### **6.1.3 Boring – No Casing**

This unit will be **paid on a linear foot or meter basis** for bores required to install 8 inch and larger steel main. The cost for bores required to install 6-inch and smaller mains must be included in the main installation unit price. This unit shall be reported for payment by size of the pipe installed in the bore regardless of the size of the bore and shall include all costs associated with completing the bore as well as setting up the bore machine. The cost of installing the gas main in the bore is in addition to the cost of the actual bore and should be reported for payment under length of gas main installed.

### **6.1.4 Boring With Steel Casing**

This unit will be **paid on a linear foot or meter basis** for the size of the casing installed in the bore regardless of the size of the bore and shall include joining, excavation, the installation of all insulators, seals and vents in accordance with Engineering Standard 2.12.1. The Gas Contractor shall be paid for installing the gas main in the casing on a linear foot or meter basis per type and size of main in addition to the length of casing installed. No additional payment will be made for boring through rock.

### **6.1.5 Steel Casing – No Bore (Open Cut)**

This unit will be **paid on a linear foot or meter basis** for the size of the casing installed in the trench. This work shall include joining the casing pipe, coating welds, installing anodes, installing test connections and test boxes, and sealing ends around carrier pipe. The Gas Contractor shall be paid for installing the gas main in the casing on a linear foot or meter basis per type and size of main in addition to the length of casing installed.

### **6.1.6 Valve Assembly**

Valve assemblies will be **paid for on a lump sum basis** for the type and size of valve installed. The unit price for each valve installation includes setting the valve box to proper grade and the

installation of pressure stems in accordance with the appropriate standard. For steel valves, the cost of welding the companion flanges, bolting the valve to the companion flange or welding the valve directly onto the line is included in the valve installation unit.

When installing plastic valves using electrofusion couplings a 3 ft pup-piece of pipe should be fused to the valve prior to electrofusion so that the coupling could be cut-off in case of incomplete/improper fusion.

### **6.1.7 Main Tie-Ins**

Main tie-ins will be **paid on a lump sum basis** based on the size and type of main. The lump sum costs shall include:

- All time associated with separating the existing facilities and reconnecting to the new main,
- Preparation of any and all by-pass requirements,
- Installation of fittings, such as TD Williamson,
- Excavation, without regard to the classification of the materials.
- Preparing cast iron mains by installing appropriate saddles and making appropriate taps in accordance with standards,
- Abandonment of the existing facilities to include purge and sealing the main ends in accordance with standards,
- Transportation and cleaning of the T D Williamson equipment,
- Traffic Control (Flag-persons, arrow- boards, signs, and plates). Gas Contractors should be able to take advantage of the Road Contractors Traffic Control.
- Backfill material including Low Strength Mortar as required
- Surface restoration

Duke Energy reserves the right to allocate work to company personnel at any time to provide assistance with the tie-ins to insure completion in a timely manner.

### **6.1.8 Services - Main to Curb (M-C) Short Side & Long Side**

Main to Curb (M-C) service work shall be **paid on a lump sum basis**. This item shall include all labor, equipment, and materials, necessary to install the gas service. This bid item includes installing 4 inch x 1 inch plastic electrofusion tee, all plastic couplings, stop cock, 1 inch plastic cap (at tee and end of service), plastic curb box (bottom and top), curb box lid, and necessary 1 inch plastic pipe with tracer wire. This item also includes air testing service and tapping tee. Services shall be installed with a 12-inch horizontal separation from the existing service.

M-C service work shall include all costs for the Gas Contractor's completion of all associated paperwork (JCF's, etc). Any temporary or permanent hard or soft surface restoration required for main to curb or curb to meter service installations outside the limits of road construction shall be considered incidental to the contract. No separate payment shall be made for restoration outside the limits of road construction. The Gas Inspector must be notified after a failed service line has been repaired so a record of the event can be logged and the inspector can verify that the repair was adequate.

## 6.2 Pay Items Billed to Duke Energy

The Gas Contractor shall invoice Duke Energy directly for all work, requested by Duke Energy, that is not included in the road contract.

The Gas Contractor shall only bill one project per invoice; do not send two or more projects on one invoice. The Gas Contractor shall not add any items to the pay sheets after the Gas Inspector has signed them. Additional pay items shall be placed on a separate pay sheet and signed by the Duke Energy Inspector.

**The Road Contractor shall pay the Gas Contractor for any work performed at the Road Contractor's request that is outside the items contracted with the Road Contractor and that was not pre-approved by Duke Energy and the Cabinet; Duke Energy shall not be billed for this work.**

## 7.0 INVOICING

**It is the Gas Contractor's responsibility to know how, by whom, and for what he is being paid.**

The Gas Contractor shall invoice the Road Contractor for all work performed to complete items listed under **Section 7.1** and for any extra work negotiated with the Road Contractor. The Road Contractor then invoices KYTC for this work. The Gas Contractor shall talk to the Section Engineer if the Road Contractor is behind in paying the invoices.

The Gas Contractor shall invoice Duke Energy for all work performed to complete items not included in the road contract and for any extra items (contract addendums) directly negotiated and intended to be paid by Duke Energy. These invoices shall be sent to: Duke Energy at 139 E. 4<sup>th</sup> Street, Room 460A, Cincinnati, OH, 45201, to the attention of the sponsoring engineer. These addendum items should not be invoiced with items that were bid.

## 7.1 Weekly Pay Sheets

The Gas Contractor must **meet** with the Duke Energy Inspector and the Section Engineer or inspector on a **weekly basis** to sign off on all pay sheets (preferably Friday evening or Monday morning). The pay sheets must describe all T&M work and break out the costs according to the appropriate Duke Energy work code. The daily sheets should clearly identify the start and stop times for the T&M on each date along with the inspector's signature for approval on that date.

Duke Energy Pre-qualified Gas Contractor Phone Numbers (REVISED 9/1/16)

**AMS Construction** – 10670 Loveland Madeira Rd., Loveland, OH 45140

Phone- 513-794-0410      Fax: 513-794-0414

Contact: Dale Franklin, Cell Phone - 513-276-0329 [dale@amsdigs.com](mailto:dale@amsdigs.com)

**RLA Investments** – 603 Sheperd Lane, Cincinnati, Ohio 45215

Office: 513-554-1469      Fax: 513-554-1221

Contact: Scott Moody, Cell Phone – 513-623-4258, [rlainvestment@fuse.net](mailto:rlainvestment@fuse.net)

**KS Energy Co** – 755 US-50, Milford, OH 45150

Office: 513-271-5616

Contact: Leon Morrison, Cell Phone – 513-582-9024, [Lmorrison@ksenergyservices.com](mailto:Lmorrison@ksenergyservices.com)

**Premier Energy** – 370 Industrial Dr., Suite 100, Lawrenceburg, IN 47025

Contact: Ron Barton, cell Phone – 513-335-8484, [RBarton@premierenergyservices.com](mailto:RBarton@premierenergyservices.com)

# Standard Gas Bid Item Descriptions

**BOLLARDS** This item is for payment for furnishing and installing protective guard posts at above ground utility installations. A bollard may consist of, but not limited to, a steel post set in concrete or any other substantial post material. This item shall include all labor, equipment, and materials needed for complete installation of the bollard as specified by the utility owner specifications and plans. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

*NOTE: A bid code for this item has been established in standard roadway bid items and shall be used for payment of this item. The bid code is 21341ND.*

**G DIRECTIONAL BORE** Payment under this item is made whenever the plans or specifications specifically show directional boring is to be utilized in order to minimize the impact of open cut for the installation of gas main under streets, creeks, etc. Payment under this item shall include the specified bore pipe, labor, and equipment. No separate payment shall be made for bore pipe installed in the bore whether used as a carrier pipe or an encasement of a separate carrier pipe. Carrier pipe installed within a bore pipe shall be paid separately under pipe items. Payment under this item shall be for all sizes and not be size specific. No separate bid items will be established for size variations. The bore pipe sizes to be included under this item shall be as shown on the plans and/or in the specifications. This bid item shall also include the cost of pre and/or post directional bore gas installation video inspection of adjacent sanitary and storm sewer mains, manholes, and laterals when the utility specifications associated with the contract require such video inspection. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

**G ELECTRONIC ID MARKER** This bid item is to pay for labor, equipment, computer programming, and installation of an electronic ID marker at the locations shown on the plans or as directed by the engineer. The marker may be in the form of a ball, disk, cylinder, post, or other shape as required by specification and may be buried, at grade, or above grade as specified. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. Paid EACH (EA) when complete.

*NOTE: This bid item is not for payment of standard non-electronic markers or monuments. A separate "Line Marker" bid item is established for this purpose.*

**G ENCASUREMENT STEEL BORED** This item shall include the steel encasement pipe size as specified on the plans and in the specifications, casing spacers, end seals, vents, labor, and equipment to bore and install the encasement in accordance with the plans and specifications, complete and ready for use. The size shall be the measured internal diameter of the encasement pipe. The sizes of encasement to be paid under the size ranges specified in the bid items shall be as follows:

- Range 1 = All encasement sizes greater than 2 inches to and including 6 inches
- Range 2 = All encasement sizes greater than 6 inches to and including 10 inches
- Range 3 = All encasement sizes greater than 10 inches to and including 14 inches
- Range 4 = All encasement sizes greater than 14 inches to and including 18 inches
- Range 5 = All encasement sizes greater than 18 inches to and including 24 inches
- Range 6 = All encasement sizes greater than 24 inches

*(Encasement sizes of 2 inches internal diameter or less shall not be paid separately; but, shall be considered incidental to the carrier pipe.)* Payment under this bid item shall not include the carrier pipe. Carrier pipe shall be paid under a separate bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

**G ENCASEMENT STEEL OPEN CUT** This item shall include the steel encasement pipe size as specified on the plans and in the specifications, casing spacers, end seals, vents, labor, and equipment to open cut and install the encasement in accordance with the plans and specifications, complete and ready for use. The size shall be the measured internal diameter of the encasement pipe. The size encasement to be paid under the size ranges specified in the bid items shall be as follows:

- Range 1 = All encasement sizes greater than 2 inches to and including 6 inches
- Range 2 = All encasement sizes greater than 6 inches to and including 10 inches
- Range 3 = All encasement sizes greater than 10 inches to and including 14 inches
- Range 4 = All encasement sizes greater than 14 inches to and including 18 inches
- Range 5 = All encasement sizes greater than 18 inches to and including 24 inches
- Range 6 = All encasement sizes greater than 24 inches

*(Encasement sizes of 2 inches internal diameter or less shall not be paid separately; but, shall be considered incidental to the carrier pipe.)* Payment under this bid item shall not include the carrier pipe. Carrier pipe shall be paid under a separate bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

**G FARM TAP AND REGULATOR** This item is for the installation of gas service tap and regulator assembly on a gas transmission main. This item shall include excavation, labor, equipment, and all tapping, piping, fittings, and regulator materials to install the farm tap and regulator assembly in accordance with the plans, specifications, and standard drawings complete and ready for use. Only one pay item has been established for Farm Tap and Regulator installations. Payment shall be made under this item regardless of farm tap service and regulator size. No separate pay items will be established for size variation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**G LINE MARKER** This item is for payment for furnishing and installing a gas utility line marker as specified by the utility owner specifications and plans. A line marker may consist of a post or monument of whatever materials specified and shall include markings and/or signage on same as specified by plans or specifications. This item shall include all labor, equipment, and materials needed for complete installation of the marker. This item shall be paid EACH (EA) when complete.

*NOTE: This bid item is not for payment of "Electronic ID Markers". Electronic ID Markers are paid under a separate bid item.*

**G MAIN ABANDON** This bid item is in full payment for all efforts in abandonment of all gas mains and facilities shown to be abandoned on the plans, for removal of any sections of abandoned main that is in conflict with road construction, and for nitrogen purge and plug of any sections of main that are to remain. All work shall be done in accordance with the plans and specifications, and in accordance with

all pipeline safety regulations. This bid item is for all work to abandon and purge gas main in the total project regardless of size or length. No adjustment in the unit bid price will be allowed if the scope of work described in this item should increase in this contract for any reason. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item is to be paid LUMP SUM (LS) when complete.

**G MAIN POINT RELOCATE** This item is intended for payment for horizontal and/or vertical relocation of a short length of an existing main at the locations shown on the plans. This bid item is to be used to relocate an existing gas main at point locations such as to clear a conflict at a proposed drainage structure, pipe or any other similar short relocation situation. All new materials are to be used. The materials provided shall be of the same type and specification as those that exist. Substitution of alternative materials shall be approved by the engineer in advance on a case by case basis. Payment under this item shall be for each location requiring an existing main to be relocated horizontally or vertically regardless of pipe size or relocation length. No separate pay items will be established for pipe size variations or relocation segment length variations. Main Point Relocate shall not be paid on a linear feet basis; but shall be paid EACH (EA) at each location when complete and placed in service. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced.

**G METER AND REGULATOR** This bid item description shall be used for all meter and regulator bid items of every size except those defined as "Special". These pay items are for all labor, equipment, and materials needed for the installation of a service meter and regulator assembly at the locations shown on the plans or as directed by the engineer in accordance with specifications and standard drawings complete and ready for use. Materials to be provided under this bid item shall include, but are not limited to, meter, regulator, piping, fittings, building anchoring brackets, and hardware needed to create and install the assembly. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**G PIPE** This description shall apply to all polyethylene/plastic and steel pipe bid items of every size and type to be used as gas main, except those bid items defined as "Special". This item includes the pipe specified by the plans and specifications, all fittings (including, but not limited to, bends, tees, reducers, plugs, and caps), tracing wire with test boxes (if required by specification), corrosion protective coatings of steel pipe and fittings, labor, equipment, excavation, bedding, restoration, pressure testing, backfill, etc., required to install the specified new pipe and new fittings at the locations shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. For steel pipe, this bid item shall include all cathodic protection anodes, lead wire, test boxes or stations, and any accessories. No additional payment will be made for rock excavation. This bid item shall include material and placement of flowable fill under existing and proposed pavement, and wherever else specified on the plans or in the specifications. This bid item shall also include the cost of pre and/or post directional bore gas installation video inspection of adjacent sanitary and storm sewer mains, manholes, and laterals when the utility specifications associated with the contract require such video inspection. Measurement of quantities under this item shall be through valves (including horizontal measurements through above grade valves), fittings, encasements, and directional bores (only when a separate carrier pipe is specified within the directional bore pipe). Measurements shall be further defined to be to the center of tie-in where new pipe contacts existing pipe at the center of connecting fittings, to the outside face of vault or structure walls, or to the point of main termination at dead ends. No separate payment will be made under pipe items when the directional bore pipe is the carrier pipe. Please refer to the Utility



Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

**G REGULATOR STATION** Includes all labor, equipment, materials and restoration, to install a new gas regulator station as indicated on plans and on standard drawings complete and ready for use. Only one pay item has been established for regulator station installations. Payment shall be made under this item regardless of regulator station size. No separate pay items will be established for size variation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

*NOTE: This item is to be used to pay for regulator stations to reduce the pressure of gas from a higher pressure main to feed a lower pressure main. This item is not to be used to pay for regulators used on individual customer service lines.*

**G SERVICE LONG SIDE** This bid item description shall apply to all service line installations of every size bid up to and including 2 inch inside diameter, except those service bid items defined as "Special". This item includes the specified piping material, main tap, coupling for connecting the new piping to the surviving existing piping, encasement of 2 inches or less internal diameter (if required by plan or specification), labor, equipment, excavation, backfill, testing, and restoration, at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready for use. This bid item is to pay for service installations where the ends of the service connection are on opposite sides of the public roadway and the service line crosses the centerline of the public roadway as shown on the plans. The length of the service line is not to be specified. Payment under this item shall not be restricted by a minimum or maximum length. The contractor shall draw his own conclusions as to the length of piping that may be needed. Payment under this item shall include boring, jacking, or excavating across the public roadway for placement. Placement of a service across a private residential or commercial entrance alone shall not be reason to make payment under this item. Private or commercial entrances shall not be considered a public roadway in defining payment under this item. This pay item does not include installation or relocation of meters. Meters will be paid separately. This bid item shall also include the cost of pre and/or post directional bore gas installation video inspection of adjacent sanitary and storm sewer mains, manholes, and laterals when the utility specifications associated with the contract require such video inspection. No additional payment will be made for rock excavation or for special bedding required in rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**G SERVICE SHORT SIDE** This bid item description shall apply to all service line installations of every size up to and including 2 inch internal diameter, except those service bid items defined as "Special". This item includes installation of the specified piping material of the size specified on plans, encasement of 2 inches or less internal diameter (if required by plan or specification), main tap, coupling for connecting the new piping to the surviving existing piping, labor, equipment, excavation, backfill, testing, and restoration, at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready for use. This bid item is to pay for service installations where both ends of the service connection are on the same side of the public roadway, or when an existing service crossing a public roadway will remain and is being extended, reconnected, or relocated with all work on one side of the public roadway centerline as shown on the plans. The length of the service line is not to be specified and shall not be restricted to any minimum or maximum length. Payment shall be made under this item even if the service crosses a private residential or commercial entrance; but, not a public roadway. Private or commercial entrances shall not be considered a public

roadway in defining payment under this item. The contractor shall draw his own conclusions as to the length of piping that may be needed. This pay item does not include installation or relocation of meters. Meters will be paid separately. This bid item shall also include the cost of pre and/or post directional bore gas installation video inspection of adjacent sanitary and storm sewer mains, manholes, and laterals when the utility specifications associated with the contract require such video inspection. No additional payment will be made for rock excavation or for bedding required in rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**G SERVICE RELOCATE** This item is for the relocation of an existing gas service line where a meter is not involved, and where an existing service line can easily be adjusted by excavating alongside and moving the line horizontally and/or vertically a short distance without cutting the service line to avoid conflicts with road construction. This item shall include excavation, labor, equipment, bedding, and backfill to relocate the line in accordance with the plans and specifications complete and ready for use. Payment under this item shall be for each location requiring relocation. Payment shall be made under this item regardless of service size or relocation length. No separate pay items will be established for size or length variation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**G TIE-IN** This bid description shall be used for all polyethylene/plastic or steel gas main tie-in bid items of every size except those that include a temporary bypass or are defined as "Special". This item includes all labor, equipment, excavation, fittings, sleeves, reducers, couplings, restoration, testing and backfill required to make the gas main tie-in as shown on the plans, and in accordance with the specifications complete and ready for use. Pipe for tie-ins shall be paid under separate bid items. No additional payment will be made for rock excavation. This bid item shall also include material and placement of flowable fill backfill under existing and proposed pavement, and wherever else specified on the plans or in the specifications. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**G TIE-IN W/BYPASS** This bid description shall be used for all polyethylene/plastic or steel gas main tie-in bid items that include temporary bypass of every size except those defined as "Special". This item includes all labor, equipment (including tapping, stopple and/or squeeze equipment), excavation, permanent and temporary fittings (including, but not limited to, tees, split tees, bends, reducers, plugs, caps, and couplings), temporary bypass piping, restoration, testing and backfill required to make the gas main tie-in with temporary bypass as shown on the plans, and in accordance with the specifications complete and ready for use. Mainline pipe for tie-ins shall be paid under separate bid items. No additional payment will be made for rock excavation. This bid item shall also include material and placement of flowable fill backfill under existing and proposed pavement, and wherever else specified on the plans or in the specifications. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

*NOTE: The tie-in size reflected in the bid item reflects the nominal internal diameter size of the main gas line being tied-in, not the bypass pipe size.*

**G VALVE** This description shall apply to all buried valves of every size and type required in the plans and specifications except those bid items defined as "Special". Payment under this description is to be

for gas valves being installed with new main. This item includes the valve as specified in the plans and specifications, protective coating and corrosion protection, labor, equipment, excavation, valve box and valve stem extensions, backfill, restoration, testing, and etc., required to install the specified valve at the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**G VALVE ABOVE GRADE** This description shall apply to all above grade valve assemblies of every size and type required in the plans and specifications except those bid items defined as "Special". Payment under this description is to be for above grade gas valves being installed with new main. This item includes the above grade valve, pipe, and fittings as specified in the plans, specifications and standard drawings. This bid items shall also include protective coating and corrosion protection, labor, equipment, excavation, backfill, restoration, testing, etc., required to install the specified above grade valve at the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**G VALVE BOX ADJUST** Includes all labor, equipment, valve box and valve stem extensions (if required), excavation, backfill, concrete pad around valve box (when specified in specifications or plans), restoration, etc. to adjust the top of the box to finished grade complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**G WELD X-RAY INSPECTION** This description shall apply to all radiographic x-ray inspections of steel pipe joints of every size within the pipe size ranges given in the bid item text. This bid includes all labor, equipment, materials, to assess the acceptability of the weld to comply with specifications and to industry and regulatory standards. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) for each pipe joint inspected.

## **Appendix F5 -- Water Specifications**

# WATER MAIN SPECIFICATIONS

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- **Owners:** Boone County Water District  
2475 Burlington Pike  
Burlington, Kentucky 41005-0018  
Ph. (859) 586-7270
  
- **Description:** Water Main Relocation
  
- **Location:** Boone County  
KY. 536 from I-75/71 Interchange  
To U.S. 25  
Kentucky Transportation Cabinet  
Road Widening Project  
FD52 106 0053 006-009  
Item No. 06-14.00
  
- **Date:** June 26, 2019

# Water Specifications

## Section I

### GENERAL INSTRUCTIONS AND SPECIAL NOTES

1. **WATER SHUTDOWNS:** No customer of Boone County Water District shall be without water for a period longer than 4 hours unless approved by Boone County Water District. All customers to be without water shall be notified 24 hours in advance. No active water main shall be shut down without prior approval of Boone County Water District. Tie-ins on this project may have to be scheduled at night, on weekends or other off peak hours.
2. **FIRE HYDRANT DISCONNECTION:** No fire hydrant shall be removed from service without prior approval of Boone County Water District, and the proper fire authority.
3. **WATER MAIN INSPECTION:** Boone County Water District and their inspectors, and the resident engineer and his inspectors shall be jointly responsible for inspection of water line facilities installation. Where the phrase "as directed" appears in these specifications without defining who is doing the directing, it shall be understood "as directed" means jointly directed by the KYTC Section Engineer and Boone County Water District.
4. **PRIOR INSPECTION OF EXISTING METER SETTINGS:** The Contractor with the Boone County Water District's inspector shall make an inspection of all meter settings to adjusted or relocated prior to construction. Any meter setting not up to Boone County Water District standard shall be noted and parts furnished to the Contractor by the Boone County Water District for installation as needed. Any water meter setting, fire hydrant or any other water facilities that are to be relocated, adjusted, reused or remain and are damaged by the Contractor shall be repaired at the contractor's expense. Any old water meter settings removed and not reused shall be turned over to the Boone County Water District.
5. **SPECIAL BACKFILL NOTE:** No sand or granular material shall be used for backfill above (12") over the top of the pipe or around structures. Only compacted soil or flowable fill shall be used unless approved or otherwise directed by the KYTC Section Engineer.
6. **GENERAL SAFETY:** For the security and safety of people in and adjacent to trenches or construction operations, the "Manual of Accident Prevention in Construction" published by the Associated General Contractors Association of America, the "Manual On Uniform Traffic Control Devices" published by the Federal Highway Administration, and the safety regulations of the appropriate state and local agencies shall be followed when specifically applicable, or by similarity of operation or as necessary for adequate protection.
7. **MATERIAL HANDLING:** Pipe, fittings, valves, hydrants, and accessories shall be loaded, unloaded, and handled by lifting with hoists or skidding so as to avoid

shock or damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against other pipe.

8. **PROTECTION OF PAVEMENT:** Where main construction is located in or adjacent to pavements, all construction equipment shall have rubber tires. Crawler equipment will be permitted when there is no danger of damaging pavement.
9. **NOISE, DUST AND ODOR CONTROL:** The Contractors construction activities shall be conducted so as to eliminate all unnecessary noise, dust, and odors. The use of oil or other materials, for dust control, which may cause tracking, will not be permitted.
10. **EXCAVATION AND CONSTRUCTION MATERIALS:** All excavated material and all construction materials in prosecution of the work shall be deposited so as not to endanger the work, create unnecessary annoyance to the public, or interfere with natural drainage courses. During the course of the work, all material piles shall be kept trimmed up and maintained in a neat, workmanlike manner. All material piles shall be kept a reasonable distance away from roadways so as not to cause a hazard and block the motorist's view.
11. **PROTECTION OF TREES, SHRUBS, AND OTHER ITEMS TO REMAIN:** Special care shall be taken by the Contractor to avoid unnecessary damage to trees or shrubs and their root systems or any other items shown to remain. Should the Contractor do unnecessary damage to any item shown to remain, the item shall be repaired or replaced at the contractor's expense. Should unnecessary damage be caused to items to remain and is determined not repairable, the Contractor shall compensate the owner for the loss if any.
12. **UNACCEPTABLE EXCAVATED TRENCH MATERIAL:** Any excavated trench material which is determined unacceptable for backfill shall be removed from the area and wasted at a location acquired by the Contractor and approved by the KYTC Section Engineer. Acceptable backfill material shall be acquired by the Contractor at a location approved by the KYTC Section Engineer. The disposition and handling of unacceptable material and the acquisition and handling of acceptable material shall be at the Contractors expense.
13. **BLASTING ROCK:** Blasting of rock shall not be permitted on this project.
14. **ABANDONED VALVES:** The valve boxes shall be removed from all abandoned valves prior to final roadway paving. This shall be done to the satisfaction of the Engineer. Paving over a valve box without removing same will not be acceptable. No separate payment will be made for removal of valve boxes but shall be considered incidental to water line construction.
15. **CONSTRUCTION PROCEDURE:** The successful contractor to prepare construction procedure with respect to the installation of water utilities. The Sequence and Procedure of Water Utilities Construction shall be approved by the Boone County Water District's Engineering Department and KYTC Section Engineer prior to the beginning of the water utilities relocations.

## Section II

### MATERIAL SPECIFICATIONS

1. **CONCRETE:** All concrete shall be Class A in accordance with KYDOH Standard Specs. for Road and Bridge Construction current edition and shall be placed in accordance with same unless otherwise noted. The concrete shall be placed to the dimensions as required in the plans or specifications. Reinforcing steel shall be placed in the concrete as required in the plans or specifications.
2. **CONCRETE REINFORCING STEEL:** All reinforcing steel shall be Grade 40. The size, location, placement, and quantity shall be as required in the plans or specifications.
3. **WATER MAIN**

A-1. **DUCTILE IRON PIPE:** Ductile iron pipe shall meet the requirements of ANSI A21.51 (AWWA C151)

1. **Material:** The chemical constituents shall meet the physical property recommendations of ASTM A536 to ensure that the iron is suitable for satisfactory drilling and cutting.
2. **Minimum Thickness:** Unless otherwise shown on the plans, the minimum thickness of the barrel of the pipe shall be Class 50. All pipe shall be clearly marked as to class by the manufacturer.
3. **Coating and Lining:** The pipe shall be coated outside with a bituminous coating in accordance with ANSI A 21.51 (AWWA C151) and lined inside with cement mortar and seal coated in accordance with ANSI A21.4 (AWWA- C104).
4. **Fittings & Glands:** Fittings and glands shall be ductile iron as specified in Section 3A, "Ductile Iron Fittings".
5. **Polyethylene Encasement:** Ductile Iron Pipe shall be encased with Polyethylene film conforming to ANSI A21.5 (AWWA C105)

A-2. **POLYVINYL CHLORIDE PIPE** – Polyvinyl Chloride Pipe shall meet the requirements of ANSI/AWWA C900-81, "Polyvinyl Chloride (PVC) Pressure Pipe (DR 14), 4 in. through 12 in., for water."

Three inch Blue Magnetically Detectable Tape is required in the trench above water main as specified on detail.



B. **PIPE JOINTS**

1. **Push on and Mechanical:** Push-on and mechanical joints including accessories shall conform to ANSI A21.11 (AWWA-C111). Bolts shall be high strength COR-10 tee head with hex nuts. The maximum deflection at push-on joints and/or mechanical joints shall be 5 degrees or as recommended by the Manufacturer.
2. **Flanged:** Flanged joints shall meet the requirements of ANSI A21.15 (AWWA C115) or ANSI B16.1
  - a. **Gaskets:** All flanged joints shall be furnished with 1/16 inch thick full face red rubber.
  - b. **Bolts:** Bolts shall have American Standard heavy unfinished hexagonal head and nut dimensions all as specified in ANSI B18.2. For bolts of 1-3/4 inches in diameter and larger, bolt studs with a nut on each end are recommended. Material for bolts and nuts shall conform to ASTM A307, Grade B.
3. **Restrained:** If restrained joint system is required on the plans, all pipes, bends, valves, etc. shall be restrained. Restrained joints shall consist of a device to provide a flexible, tied joint. Acceptable devices would be a clamp type joint or bell-bolt flexible tied joint or approved equal. Method of restraining and laying schedule shall be approved by the Engineer prior to the start of the project. Manufacturer installation instructions shall be followed. Restrained joints shall be capable of withstanding a maximum joint pressure of 14 kg/sq.cm (200 psi.) unless otherwise noted.
  - a. **Bell and Spigot:** Bell and spigot joints shall conform to ANSI A21.6.
  - b. **Push-on:** Restrained push-on joints shall conform to ANSI A21.11 (AWWA C111). When bolts and nuts are required, they shall be corrosion resistant high strength steel. **Mechanical joints with retainer gland and Lok-Set joints are not acceptable unless otherwise specified.**

4. **FITTINGS**

- A. **DUCTILE IRON FITTINGS:** Ductile Iron Compact Fittings and accessories shall conform to AWWA C153 and Full Body Fittings - and accessories to AWWA C110. Bolts and nuts shall be high strength, corrosion resistant alloy, such as "Cor-Ten" or approved equal.
1. **Working Pressures:** All fittings and accessories shall be Ductile Iron, rated for a minimum of 14 kg/sq.cm (200 psi) working pressure or as specified herein. The fittings and accessories shall be new and unused. (NOTE: Certain areas of the District's service area require materials used, to be of a higher working pressure than 14 kg/sq.cm (200 psi.)

2. **Coating and Lining:** The fittings shall be coated outside with a bituminous coating in accordance with ANSI A21.10 (AWWA C110) and lined inside with cement mortar and seal coated in accordance with ANSI A21.4 (AWWA C104).
3. **Fittings and Glands:** All pipe fittings shall be mechanical joint fittings. Mechanical joints shall conform to AWWA C111.
4. **Polyethylene Encasement:** Ductile Iron Fittings shall be encased with polyethylene film conforming to ANSI A21.5 (AWWA C105)

B. **JOINTS**

1. **Mechanical:** Mechanical joints including accessories shall conform to ANSI A21.11 (AWWA C111). Glands shall be ductile iron. Bolts shall be high strength COR-10 tee head with hex nuts.
2. **Flanged:** Flanged joints shall meet the requirements of ANSI A21.15 (AWWA C115) OR ANSI B16.1 and be used with the express approval of the Engineer.
  - a. **Gaskets:** All flanged joints shall be furnished with 1/16 inch thick full face red rubber.
  - b. **Bolts:** Bolts shall be stainless steel and have American Standard heavy unfinished hexagonal head and nut dimensions all as specified in ANSI B18.2. For bolts of 1-3/4 inches in diameter and larger, bolt studs with a nut on each end are recommended. Material for bolts and nuts shall conform to ASTM A307, Grade B.
3. **Restrained:** If restrained joints is shown on the plans, all pipe, bends, valves, etc. shall be restrained.
  - a. **Bell and Spigot:** Bell and spigot joints shall conform to ANSI A21.6.

5. **POLYETHYLENE WRAP**

All ductile iron pipe, fittings, valves, and fire hydrant leads shall be polyethylene wrapped, installed according to the current edition of AWWA C105. Ductile iron fittings, valves, and fire hydrant leads used in the installation of P.V.C. pipe shall be included.

- A. **MATERIAL:** Polyethylene wrap shall be a minimum of a 8-mil polyethylene tube.

- B. **INSTALLATION:** The contractor shall cut the roll in tubes 2 feet longer than a standard length of pipe. Each tube shall be slipped over the length of pipe, centering to allow a (1') overlap on each adjacent pipe section. After the lap is made, slack in the tubing shall be taken up for a snug fit and the overlay shall be secured with polyethylene tape.

Pipe shall not be wrapped and stored on site for any period of time, but wrapped and immediately placed in the trench, fittings shall be wrapped prior to installing blocking or pads. (see Standard Drawing #104) Polyvinyl chloride pipe requires no wrap. Odd shaped appurtenances such as valves, tees, fittings, and other ferrous metal pipeline appurtenances shall be wrapped by using a flat sheet of polyethylene. Wrapping shall be done by placing the sheet under the appliances and bringing the edges together, folding twice, and taping down.

## 6. **FIRE HYDRANTS**

- A. **DESCRIPTION:** The Contractor shall provide all labor, materials, tools, and equipment required to furnish and install in good workmanlike manner all fire hydrants complete and ready for service where shown on the plans or where directed by the Engineer and as specified herein.

- B. **FIRE HYDRANTS:** Fire hydrants shall conform to AWWA C502. Hydrants shall conform to the standards of the Boone County Water District as SHOWN on the plans. All fire hydrants shall have auxiliary valves for isolating water flow to the hydrant. All fire hydrants and auxiliary valves shall be positively locked to the water main by restrained joints, hydrant adapters, or other approved method.

Hydrants shall be designed to (200 psi) working pressure and shall be shop tested to (300 psi) hydrostatic pressure with the main valve both open and closed. The barrel shall have a breakable safety section and/or base bolts just above the ground line. Hydrants shall have a main valve opening of 5 1/4 inches, a 6 inch mechanical joint inlet to be suitable for setting in a trench (3' 6") deep minimum, and shall be the traffic style hydrant so that the main valve remains closed when the barrel is broken off. Hydrants shall have a dry top and shall be self draining, when the main valve is closed. Self draining hydrants shall drain to dry wells provided exclusively for that purpose. Hydrant drains shall not be connected to storm or sanitary sewers. Hydrants located in areas determined by the Engineer (flood zones) shall have all drain holes plugged prior to installation. Hydrants shall be rotatable in a minimum of eight (8) positions in 360 degrees. All hydrants shall have two (2)- two and one half (2 1/2) inch hose nozzles and one (1) steamer or pumper connection threaded to conform to Boone County Water District Standards: steamer nozzle shall be National Standard Thread and 2 1/2" outlets shall be Boone County Water District Standard Thread (Old Cincinnati Thread).

The operating nut and the nuts of the nozzle caps shall be square in shape, measuring one (1) inch from side to side. Hydrant body shall be painted yellow for areas designed for (150 psi) working pressure and red for areas in excess of (150 psi). Hydrants used in areas in excess of (150 psi) working pressure shall be designed to operate at the higher pressures and shall have independent operating valves on each 2 1/2" outlet.

All hydrants shall be right hand open, clockwise as specified in Standard Drawings and shall have a direction arrow of operation cast into the dome of the hydrant. Installation per Standard Drawing.

- C. **INSTALLATION**: The installation of fire hydrants shall be in conformance with "Mains Installation" section, paragraph "Setting Hydrants".
- D. **POLYETHYLENE ENCASEMENT**: Fire hydrant tee, anchoring pipe and part of the fire hydrant shoe shall be encased with Polyethylene film conforming to ANSI A21.5 (AWWA C105). . (See Standard Drawing)

## 7. **VALVES**

- A. **DESCRIPTION**: The Contractor shall provide all labor, materials, tools, and equipment required to furnish and install in good workmanlike manner all valves and accessories complete and ready for service where shown on the plans or where directed by the Engineer and as specified herein.
- B. **GATE VALVES**: Gate valves (including 16") shall conform to AWWA C509 and shall be cast iron or ductile body, resilient wedge, non-rising stem with rubber "O" ring packing seals. The valves shall open by turning counter-clockwise. All valves shall have openings through the body of the same circular area as that of the pipe to which they are attached. Valves shall have mechanical joint ends unless otherwise shown on the plans or directed by the Engineer. All valves shall be designed for a working pressure of (250 psi) unless otherwise noted on the plans or in the "Supplemental Specifications". An extension stem shall be furnished if required, to bring the operating nut within (3-1/2 feet) of finished grade. Extension stems shall be securely fastened to the valve stem. The Contractor shall make all valves tight under their working pressures after they have been placed and before the main is placed in operation.
- C. **BUTTERFLY VALVES**: Unless otherwise specified (valves larger than 16 inches) shall be butterfly valves rated at (250 psi) working pressure and conform to the applicable portions of AWWA Standard C504, latest edition. Engineer shall approve all butterfly valves before installation. The contractor shall be required to transport all butterfly valves to the District's Warehouse for testing and pick them up after testing is completed. Valve testing will be completed at a rate of one valve per day under normal conditions, with prior notice given to the District.

1. **Body:** The valves shall be AWWA Class 250B designed for tight shut-off against a differential pressure of (250 psi). Valve bodies shall be constructed of ductile iron. Two trunnions for shaft bearing shall be integral with the valve body. The valves and appurtenances shall be suitable for buried service.
  2. **Ends:** Valves shall have mechanical joint ends and shall be furnished with high strength COR-10 tee head with hex nuts, ductile iron glands, and rubber gaskets for each mechanical joint end.
    - a. **Prestressed Concrete Pipe:** Valves for use with prestressed concrete pipe shall be furnished with victualic ends for victualic coupling Style 44, unless otherwise shown on the plans. The use of mechanical joint type valves with the proper adapter pieces on both sides of the valves are acceptable in lieu of the victualic style valve with prestressed concrete pipe.
  3. **Discs:** Valve discs of cast steel, fabricated steel, or cast bronze are not acceptable.
  4. **Seats:** Seats bonded on the discs are not acceptable.
  5. **Shaft Seals:** If stuffing boxes are utilized for shaft seals they shall be constructed of cast iron, ASTM A126. Gland assemblies shall be of cast bronze, ASTM B132. The packing gland shall be housed in a solid walled cast iron, ASTM A48, Class 40 one piece structure or equal.
  6. **Operators:** The valve operating mechanism shall be for counterclockwise opening. There shall be no external moving parts on valve or operator except the operator input shaft. Input shaft is to be operated by a (2") square operating nut. Maximum required input force on the operator shaft to open and close the valve shall be 40 pounds. The total number of turns applied to the operating nut required to completely open the valve from a completely closed position shall not be less than twice the normal valve diameter. An extension stem shall be furnished to bring the operating nut within (3 1/2 feet) of the finished grade. Extension stems shall be securely fastened to the valve stem.
- D. **TAPPING SLEEVES AND VALVES:** Tapping sleeves and valves shall be designed for a working pressure of (250 psi). The tapping sleeve together with the tapping valve shall be tested at (250 psi) for visible leakage and pressure drop before the main is tapped. Tapping sleeve and valve used in high pressure areas shall be tested at (350 psi).
1. **Tapping Sleeves:** Tapping sleeves shall be two piece with mechanical joint type ends, and be so designed as to assure uniform gasket pressure and permit centering of the sleeve on the pipe.
  2. **Tapping Valves:** Tapping valves shall have a flange on one end for bolting to the tapping sleeve and a mechanical joint type end connection on the outlet with slotted standard flange or other adapters

for connection to the tapping machine. The valves shall open by turning counterclockwise. Tapping valves shall conform to AWWA C509.

- E. **VALVE BOXES:** All valves shall be provided with valve boxes. Valve boxes shall be of standard, adjustable, heavy duty cast iron extension type, two piece, 5 1/4 inch shaft, screw type, and of such length as necessary to extend from valve to finished grade, Tyler #562-S, Tyler #564-S or approved equal. Valve box cover shall be stamped "Water". Tops shall be set at final established grade.
- F. **AIR RELEASE AND VACUUM VALVES:** Air release valves shall be constructed at high points in the water line as indicated on the plans. These valves shall permit the air in the pipeline to escape as the pipe line fills and allows the air to re-enter as the line empties. These valves shall be APCO Air Release Valves Model #200-A, (250 psi) working pressure, (1"), cast iron body and cover. (16") and larger water mains shall be a (2") air release valve and curb stop. Refer to Standard Drawing for reference.

8. **STEEL CASING PIPE**

Casing pipe shall be steel pipe with a minimum yield strength of (35,000 psi) with a minimum wall thickness as listed below:

Nominal Diameter Casing Pipe	Normal Wall Thickness
Under (14")	0.251"
(14"&16")	0.282"
(18")	0.313"
(20")	0.344"
(22")	0.375"
(24")	0.407"
(26")	0.438"
(28"&30")	0.469"
(32")	0.501"
(34"&36")	0.532"
(38,40&42")	0.563"
(48")	0.626"

The inside diameter of the casing pipe shall be at least (4") greater than the outside diameter of the carrier pipe joints. Steel casing sections shall be connected by welding, conforming to AWWA C206.

Adequate pipe spacers shall be installed to ensure that the carrier pipe is adequately supported in the center of the casing pipe throughout its length, particularly at the ends. There shall not be any metallic contact between the casing and carrier pipe. Casing shall be backfilled with pea gravel or sand after the carrier pipe is installed to prevent pipe movement. Casings shall have both ends sealed up in such a way as to prevent the entrance of foreign material. See Standard Drawing for installation details.

9. **MATERIAL APPROVAL:** Material certification and test samples shall be provided by the Contractor, at the contractor's expense, as required by Boone County Water District and the Kentucky Department of Highways. No material shall be used until approved. All rejected material be removed from the project and approved material acquired by the Contractor at the Contractor's expense.
10. **PAVING MATERIALS FOR REPLACEMENT IN-KIND:** All materials for replacement in-kind of streets, sidewalks, curbs, walls etc. shall meet the requirements of the applicable sections of KYDOH Standard Specifications For Road And Bridge Construction.
11. **FLOWABLE FILL:** This material shall meet the requirements Section 601.03.03 of the Kentucky Department of Highways' Standard Specifications for Road and Bridge Construction.

## Section III

### CONSTRUCTION

- A. **GENERAL**: Installation of water mains and appurtenances shall conform to the latest edition of AWWA Standard C600 for D.I.P.

Water main pipe and fittings shall be laid on a good level foundation with no gaps or humps under the pipe or fittings. Excavation shall be done by hand at joints to prevent the pipe and fittings from being supported by the mechanical joint or slip joint bell. Pipe shall be laid with the bell ends facing in the direction of laying.

The interior of the pipe shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations. ALL OPEN ENDS ARE TO BE CLOSED WITH CAPS OR PLUGS AT ALL TIMES WHEN PIPE LAYING OPERATIONS ARE NOT IN OPERATION AND AT THE END OF THE DAY. All caps or plugs shall be properly installed and blocked in advance of filling, flushing, and testing mains. All securing and blocking shall be inspected by the Engineer prior to backfilling of ditch.

- B. **HANDLING**: Pipe, fittings, valves, hydrants and accessories shall be loaded and unloaded by lifting with hoists or skidding so as to avoid damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against other pipe. Pipe hooks that extend inside the ends of the pipe shall not be used for handling the pipe since they could damage the lining. Under no circumstances shall such materials be dropped. The interior of all pipes, fittings and other accessories shall be kept free from dirt and foreign material at all times. When handling P.V.C. pipe, care should be taken to avoid abrasion damage, gouging of the pipe, rocks, and any stressing of the bell joints or damage of the bevel ends.
- C. **TREE REMOVAL**: Stumps of trees designated for removal (12") in diameter and smaller shall be physically removed. Any stump larger than (12") shall be ground down to (6") below final grade level.
- D. **DEWATERING**: Should water be encountered, the Contractor shall furnish and operate suitable pumping equipment of such capacity adequate to dewater the trench. The trench shall be sufficiently dewatered so that the laying and joining of the pipe is made in the dry. The Contractor shall convey all trench water to a natural drainage channel or storm sewer without causing any property damage.
- E. **CONSTRUCTION EQUIPMENT**: Where mains are located in or adjacent to pavements, all backfilling and material handling equipment shall have rubber tires. Crawler equipment shall be permitted when there is no danger of damaging pavement.
- F. **TRENCH SUPPORT**: Supporting open cuts for mains shall be the responsibility of the Contractor where trenching may cause unnecessary damage to street pavement, trees, structures, poles, utilities, or other private or public property. During the progress of the work, whenever and wherever it is necessary, the



Contractor shall, at his expense, support the sides of the excavation by adequate and suitable sheeting, shoring, bracing, or other approved means. Such trench support material and equipment shall remain in place until backfilling operations have progressed to the point where the supports may be withdrawn without endangering property.

G. **NOISE DUST AND ODOR CONTROL:** The Contractor's construction activities shall be conducted so as to eliminate all unnecessary noise, dust and odors.

H. **DISINFECTION AND LEAKAGE TESTING:** See Section "Disinfection and Leakage Testing."

I. **TRENCH EXCAVATION AND BOTTOM PREPARATION**

1. **General:** The Contractor shall perform all excavation of every description and of whatever substances encountered to the depths indicated on the drawings or as otherwise specified. During excavation material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. All excavated materials not required or suitable for backfill shall be removed and wasted at a site acquired by the Contractor and approved by the Engineer. Topsoil shall be stripped from the excavation area before excavation begins.

Such grading shall be done as may be required to prevent surface water from flowing into trenches or other excavations, and any water accumulating therein shall be removed by pumping or other approved methods. The trench shall be sufficiently dewatered so that the laying and joining of pipe is made in the dry. The Contractor shall take whatever action necessary to insure that water pumped from the trench will not damage private property. If necessary the Contractor shall haul trench water to another suitable location for disposal.

Such sheeting and shoring shall be furnished and installed by the Contractor, at his own expense, as may be necessary for the protection of the work, protection of other utilities, protection of structures, the safety of the personnel, and the safety of the public. All shoring shall be removed when the work is completed unless directed otherwise by the Engineer. The Contractor shall also furnish whatever barricades or fencing necessary to provide for the safety of pedestrians in excavation areas and for traffic control as discussed in other sections. All open trenches shall be adequately covered, barricaded and/or backfilled during non-working hours in order to adequately protect vehicular and pedestrian traffic.

The Contractor shall excavate whatever material encountered. Trenches shall be excavated to the widths shown in the table headed "Trench Width" or as otherwise indicated in the plans, and the banks shall be as nearly vertical as practicable. The bottom of the trenches shall be accurately graded to provide uniform bearing and support for each section of the pipe or conduit on undisturbed soil at every point along its entire length, except for bell holes and for the proper sealing of the pipe joints. Bell holes and

depressions in order that the pipe rest upon the prepared bottom for as nearly its full length as practicable, shall be only of such length, depth, and width as required for properly making the particular type of joint. Additional depth shall be excavated in rock as described elsewhere herein.

Except in cases where the elevations of the water lines are indicated on the plans, trenches for water line shall be of a depth that will provide a minimum cover over the top of the pipe of (36 inches) from the indicated finished grade, and avoid interference of the water lines with other existing or proposed utilities. Where the note occurs, "Slope to Drain", the Contractor shall manage to keep a positive slope in that direction in order that air may travel to the air vent. Where paved surfaces are to be disturbed by an open cut, the Contractor shall provide suitable machinery to cut the edges of the pavement in a smooth straight line.

2. **Rock**: The word "rock" wherever used as the name of an excavated material, shall mean boulders and solid masonry larger than (1/2 cubic yard) in volume, or solid ledge rock and masonry which, in the opinion of the Engineer, requires for its removal, drilling and blasting, wedging, sledging, barring, or breaking up with a power operated hand tool. Any material which can be excavated using a hand pick and shovel, power operated excavator, power operated backhoe or power operated shovel shall not be defined as rock.
3. **Blasting Rock**: No blasting of rock shall be permitted this job.
4. **Trench Width**: Widths of trenches shall be held to a minimum to accommodate the pipe and appurtenances. The trench width shall be measured at the top of the pipe barrel and shall conform to the following limits:

**Earth**

- a. Minimum - outside diameter of the pipe barrel plus (8 inches), (4 inches) each side of pipe.

Maximum - nominal pipe diameter plus (24 inches).

**Rock**

Minimum – (24") or less, nominal pipe size: outside diameter of pipe barrel plus (12"), @ (6") each side.

Minimum - Larger than (24"), nominal pipe size: outside diameter of pipe barrel plus (18"), @ (9") each side.

Maximum - nominal pipe diameter plus (24").

- b. **Butterfly Valves**: Trench width shall be over excavated (24") on the side that the operating mechanism is located on the butterfly valve when the surrounding area cannot be hand dug.

- c. **Structures**: The minimum excavation limits for structures shall be as indicated. In rock, the excavation limits shall not exceed (12 inches) from the outside wall and (6 inches) below the footer.
5. **Excessive Trench Width**: If, for any reason the trench width exceeds the maximum trench width defined in paragraph "Trench Width", the Contractor, subject to approval of the Engineer, shall provide compacted stone bedding, additional strength pipe or concrete encasement, at the contractor expense.
6. **Bottom Preparation**: The Contractor shall use excavation equipment that produces an even foundation. For the entire length of the trench, a compacted layer of sand bedding material shall be installed below the pipe. Bell holes and depressions for joints, valves, and fittings shall be dug after the trench bedding has been graded in order that the pipe rest upon the prepared bedding for as nearly its full length as practicable. Bell holes and depressions shall be only of such length, depth, and width as required for properly making the particular type of joint.
  - a. **Earth**: The trench shall be excavated to the depth required, so as to provide a uniform and continuous bearing and support for the pipe barrel. A minimum of a (6") sand shall be installed on the solid and undisturbed ground. The finished trench bottom shall be accurately prepared by means of hand tools.
  - b. **Rock**. Where excavation is made in rock or boulder, the trench shall be excavated 6 inches below the pipe barrel for pipe (24 inches) in diameter or less, and inches for pipe larger than (24 inches) in diameter. All loose material shall be removed from the trench bottom. After preparation of the trench bottom, a pipe bed shall be prepared using sand and thoroughly compacted. The bedding material shall be spread the full width of the trench bottom.
7. **Water Main Depth**: Mains (12") and less in size shall be not less than (36") in depth and no more than (48") in depth, unless otherwise specified. Mains larger than (12") shall be installed as shown on the plans.
8. **Excessive Trench Depth**: If, for any reason, the trench depth exceeds the trench depth shown on the Plans, the Contractor is responsible for any and all additional cost incurred for the excessive depth.

9. **Foundation:** The mains are to be built on a good foundation. If, in the Engineer's opinion, the material forming the trench bottom is not suitable for a good foundation, a further depth shall be excavated and the same filled with suitable material. Unauthorized excavation below the trench bottom shall be filled with compacted crushed stone at the Contractor expense.

J. **PIPE, VALVE, HYDRANT AND METER SETTING INSTALLATION**

The provisions of AWWA C600 shall apply in addition to the following:

1. Pipe shall not be laid in water or when trench or weather conditions are unsuitable for the work except when permitted by the Engineer. Unless otherwise indicated in the plans or in Section I, Bid Item Explanations, the material shall be new and unused. The interior of the pipe shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved methods. Pipe shall be laid with bell ends facing in the direction of laying, unless otherwise directed by the Engineer. After placing a length of pipe in the trench, the spigot end shall be centered in the bell of the pipe and forced home. All pipe shall be laid with ends abutting and true to line and grade. Deflection of pipe joints in excess of the manufacturer's recommendations will not be permitted. A watertight pipe plug or bulkhead shall be provided and used to prevent the entrance of foreign material whenever pipe laying operations are not in progress. Any pipe that has the grade or joint disturbed after laying shall be taken up and relaid. Any section of pipe found to be defective before or after laying shall be removed and replaced at the Contractor's expense.
2. **Pipe Cutting:** The cutting of pipe for installing valves, fittings, or hydrants shall be done in a neat and workmanlike manner without damage to the pipe or lining. The end shall be smooth and at right angles to the axis of the pipe. Flame cutting of metal pipe by means of an oxyacetylene torch shall not be permitted. All pipe cutting shall be at the Contractor's expense.
3. **Push-On Joints:** The surfaces with which the rubber gaskets comes in contact shall be thoroughly cleaned just prior to assembly. The gasket shall then be inserted into the groove in the bell. Before starting joint assembly, a liberal coating of special lubricant shall be applied to the spigot end. (Special lubricant shall be suitable for use in potable water) With the spigot end centered in the bell, the spigot end is pushed home.
4. **Mechanical Joints:** Mechanical joints require that the spigot be centrally located in the bell. The surfaces with which the rubber gasket comes in contact shall be thoroughly cleaned just prior to assembly. The clean surfaces shall be brushed with a special lubricant just prior to slipping the gasket over the spigot end and into the bell. (Special lubricant shall be suitable for use in potable water) The lubricant shall also be brushed over the gasket prior to installation to remove the loose dirt and lubricate the gasket as it is forced into its retaining space. P.V.C. pipe spigot ends shall be field cut smooth and at right angles to the axis of the pipe for installation in mechanical joint fittings.

- a. **Bolt Torque:** The normal range of bolt torque to be applied to standard cast iron bolts in a joint are:

RANGE OF TORQUE	
Size	In Foot - Pounds
5/8"	40 - 60
3/4"	60 - 90
1"	70 - 100
1-1/4"	90 - 120

5. **Restrained Joints**

- a. **Ball and Socket:** Ball and Socket joints shall be assembled and installed according to the manufacturer's recommendations. The joint shall be thoroughly cleaned and lubricated. Check the retainer ring fastener. After installation, all slack shall be taken out of the pipe joint.
- b. **Push-On:** Assemble and install the push-on joint according to the manufacturer's recommendations. Restrained joint-type pipe and fittings shall only be used as approval by the Engineer. Retaining glands, field lock gaskets, or retaining flanges shall not be considered as providing a restrained joint. The joint shall be thoroughly cleaned and lubricated. Check the retainer ring fastener. After installation, all slack shall be taken out of the pipe joint.

6. **Setting Valves:** Valves shall be set on a firm solid concrete block foundation so that no load will be transferred to the connecting pipe. Valves in water mains shall, where possible, be located on the street property lines extended, unless otherwise shown on the plans. A valve box shall be provided for every valve. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the operating nut of the valve. The box cover shall be set flush with the surface of the finished pavement unless otherwise shown. All valves boxes with the exception of isolating valves for fire hydrants that are located in non-paved areas shall have a minimum of (2'x2'x4") concrete pad as shown in Standard Drawing.

7. **Setting Hydrants:** Hydrants shall be located as shown on the plans or as directed by the Engineer. The location shall provide complete accessibility and minimize the possibility of damage from vehicles or injury to pedestrians. All hydrants shall stand plumb with the pumper nozzle facing the curb. Hydrant shall be set to the established grade, with the traffic flange within (4") above final grade in accordance to Standard Drawing. Each hydrant shall be controlled by an independent gate valve with valve box. All valves used for hydrant control shall be anchored to the branch tee.

8. **Thrust Blocking:** All bends over five (5) degrees, plugs, caps, and tees shall be securely blocked against movement with concrete thrust blocks placed against undisturbed earth in accordance with Standard Drawing. Thrust blocks shall be approved by the Engineer prior to backfilling. Water mains shall have concrete thrust block at all pipe intersections and changes of direction to resist forces acting on the pipeline. All concrete thrust blocks shall be poured in such a manner that the bolts can be replaced without disturbing the blocking.

All caps or plugs used in mains to undergo hydrostatic test shall be properly installed and blocked in advance of testing mains. All caps or plug installations shall be approved by the Engineer's representative before the main is subjected to the pressure test.

- a. **Concrete Blocking:** Concrete blocking shall be K.D.O.T. Class A concrete as specified in Section "Concrete". Blocking shall be placed between undisturbed ground and the fitting to be anchored. The area of bearing on the fitting and on the ground in each instance shall be that shown herein. The blocking shall, unless otherwise shown, be so placed that the pipe and fitting joints will be accessible for repair.
- b. **Tie Rods:** If shown or specified, movement shall be prevented by attaching suitable metal rods, clamps or restrained fittings. Steel tie rods or clamps, where permitted, shall be of adequate strength to prevent movement. Steel tie rods or clamps shall be painted with three coats of an approved bituminous paint or coal tar enamel. A minimum of 3/4" welded eye bolts @ a 90 degree bend and 3/4" threaded rods may only be used with the approval of the Engineer for temporary restraint only. Duc-Lucs are prohibited for use.
- c. **Restrained Fittings:** Restrained fittings, where permitted, shall be subject to the approval of the Engineer.

9. **Meter Setting Installation**

The Contractor shall furnish all labor, equipment, excavation, backfill, testing, disinfection, and restoration to install the pipe at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready for use. No additional payment will be made for rock excavation or for bedding required in rock excavation. It will be the Contractors responsibility to remove and reset the service at his own expense if he fails to notify and receive the approval from the District. Contractors work shall be warranted for a period of one year of the date of activation of each service (meter set date).

- a. **Inspection & Notification**: The Contractor shall notify all affected District customers prior to interrupting water service. The Contractor shall make 24 hours notification. Routine service inspection and final inspections will be made by the District upon request by the Contractor and in a timely manner. The Contractor shall provide the District 24 hours notification for inspection by the District. It is the Contractors responsibility to post "No Parking" signs and safety devices.
  
- b. **Installation of Service Lines**: The Contractor shall be familiar with copper piping, fittings and connections, and have available equipment to work with said materials. No sweat type fittings shall be permitted. Service line shall be installed as shown on the plans or as directed by the District. The Contractor shall excavate whatever material encountered. The service lines shall be installed using boring and jacking or open cut (as specified on the plans) at the depth required to clear existing and proposed sewers, but in no case shall the line be installed with less than 36 inches cover from final grade. The trench width shall be as excavated to a maximum of 2 feet. The line shall be laid on firm soil. In rock, sufficient extra depth shall be excavated and refilled with acceptable compacted soil or bedding sand to provide a cushion for the elimination of the possibility of crushing or perforating the pipe. Connections shall be made using normal practices for water line installation and in accordance with the standards in the plans or contained herein.
  1. **Water Service Taps**: The Contractor shall maintain a minimum of 36" cover over any tap. The corporation installed into the main shall have no more the 4 threads showing between the top of the water main and the bottom of the corporation.
  2. **Service Line**: The Contractor shall maintain a constant cover of 36" over any water line. Methods of pushing or jacking under the existing street must avoid bending or kinking the pipe. No open cuts of the pavement will be permitted unless pre-approved by the District. All copper shall be cut using a copper-tubing cutter. All connections shall be flared connections. No oil base or other contaminating materials will be used in lubricants, caulking and sealers. The Contractor shall be responsible for making all joints watertight.
  3. **Meter Vault**: All meter vaults shall be located inside existing right-of-ways or water main easements of record or as directed by the District. Typically the meter vault shall sit 5' behind the back edge of curb or edge of pavement. The Contractor shall contact the customer and determine a suitable location of the setting within the above guidelines. It is the Contractors responsibility to notify the District's Inspector if these conditions cannot be met. The District's Inspector will inspect any questionable meter setting location prior to the Contractor installing.

Meter vaults shall be set to allow the meter cover to be level with the back edge of the existing curb or the back edge of paving along roadways without curbs. It is the Contractor's responsibility to ensure that the meter vault does not settle due to poor compaction or any other reason within the Contractor's control. The Contractor at no additional expense to the District shall adjust any meter vault that sinks below grade due to poor workmanship by the Contractor to grade.

K. **TRENCH BACKFILL**

All trench backfill shall be free from cinders, refuse, organic material, boulders, rocks or other material which is unsuitable in the opinion of the Districts inspector. No backfill shall be made with frozen material.

- a. **Trench Bottom Preparation:** The pipe shall be bedded on sand to achieve full pipe barrel support. In any event not less than (6") of sand bedding shall be used.
- b. **Backfill to (12") Over Pipe Barrel:** All trench excavations shall be backfilled immediately after pipe is laid with the exception of thrust blocks. Compacted sand shall be used to backfill the trench from the bottom of the pipe barrel to the (12") over the pipe barrel. No flushing of backfill shall be permitted to achieve compaction. Clay bulkheads shall be installed as specified under Bulkheads Section.
- c. **Remaining Trench Backfill:** From (12") above the pipe barrel to the surface, compacted earth or flowable fill may be used as backfill material. No material shall be used for backfill that contains frozen earth, vegetation or organic material, debris, rocks **(8")** or larger measured in any direction, or earth with an exceptionally high void content.
- d. **Compaction:** All backfill shall be placed in uniform loose layers, not to exceed (12") layers, and each layer shall be compacted to a density not less than 95 percent of the standard Proctor maximum dry density (ASTM D698). The backfill shall be compacted in such a manner and with appropriate equipment so that there is no pipe damage, pipe misalignment or damage to joints. No flushing of backfill shall be permitted to achieve compaction.
- e. **Bulkheads:** When a granular bedding is provided in rock or when granular backfill is used, the Contractor shall place bulkheads of clay soil across the trench at (100') intervals to resist the movement of groundwater through the granular material. Such bulkheads shall be carefully compacted and shall extend approximately (3 feet) in a direction parallel to the pipe and shall extend from the bottom of the trench to a point (4") below final grade level.
- f. **Flowable Fill as Backfill:** As required Department of Highways Standard Specifications for Road and Bridge Construction.



- g. **Surface Conditions:** The trench surface shall be periodically attended to during the course of the contract. The trench surface shall be maintained in a safe condition and shall not interfere with natural drainage.
- L. **INSTALLATION OF PIPE BY BORING OR JACKING:** At certain locations where designated on the plans, the Contractor will be required to install pipe under paved areas or other obstacles by boring a hole large enough to pull the pipe through without obstructing the designated area, or by jacking, whichever is the most feasible.
- M. **WATER METERS:** Water Meters shall be installed at locations shown on the plans. The meter shall be constructed as shown on Standard Drawings contained herein or in the plans.
- N. **CONNECTIONS (TIE-INS) TO EXISTING WATER LINES:** All connections to existing water lines shall be made at location shown on the plans. Care shall be taken in each case that none of the sterilizing water may enter the system during the sterilizing operation. Each connection shall be preceded with a one inch corporation stop and drain to allow bleeding of the water line of air and sterilizing water. This corporation stop shall be furnished and installed at the Contractor's expense. All sections of pipe and appurtenances to be used for tie-ins and not sterilized shall be thoroughly cleaned by scrubbing with a chlorine solution prior to installation. All tie-ins of mains shall be done with transitional or straight solid sleeves. Mains shall be flushed of sterilizing water before tie-ins to existing mains are made.
- O. **INSTALLATION OF SERVICE LINES:** Service line shall be installed as shown on the plans or as directed. The Contractor shall excavate whatever material encountered. The service lines shall be installed using boring and jacking or open cut (as specified on the plans) at the depth required to clear existing and proposed sewers, but in no case shall the line be installed with less than (36") cover from final grade. The trench width shall be as excavated to a maximum of (2'). The line shall be laid on firm soil. In rock, sufficient extra depth shall be excavated and refilled with acceptable compacted soil or bedding sand to provide a cushion for the elimination of the possibility of crushing or perforating the pipe. Connections shall be made using normal practices for water line installation and in accordance with the standards in the plans or contained herein. Backfill shall meet the same requirements as that described in PIPE TRENCH BACKFILL.
- P. **APPLICABLE SPECIFICATIONS & STANDARDS**  
The following specifications and standards form a part of these Specification:
1. **American Water Works Association (AWWA) Standards**
  2. **Boone County Water District Standard Drawings & Specifications**
  3. **"Manual of Accident Prevention in Construction" published by the Associated General contractors of America**

4. **Kentucky Occupational Safety and Health Administration's** "Kentucky Occupational Safety and Health Standards for General Industry" current edition.
5. **American National Standards Institute (ANSI)**
6. **American Society for Testing & Materials (ASTM)**
7. **Kentucky Division of Water Quality**
8. **"Recommended Standards for Water Works"** current edition

## Section IV

### **DISINFECTION AND LEAKAGE TEST**

- A. **SCOPE:** This section covers the disinfection of the new water mains, fittings, temporary services and associated appurtenances. The Contractor shall provide all labor, materials, tools, equipment, and incidentals required to test the mains for water tightness and disinfect the mains as directed by the District and as specified herein. Gauges for the test shall be furnished by the Contractor.
- B. **TEST SECTION:** After the main has been installed and backfilled all newly installed pipe or any valved section thereof shall be considered a test section.
- C. **WITNESS:** All tests performed for each test section shall be witnessed and approved by the District before acceptance. In the event the Contractor performs any test without witness by the District, the Contractor will be required to test the section again in conformance with this specification at no cost to the District.
- D. **GENERAL:** All disinfection work shall conform to the requirements of the latest revision of ANSI/AWWA C651 and the requirements of the Kentucky Division of Water. If any State requirements conflict with the provisions of this section, the State requirements shall govern.

Water required for flushing and disinfection work will be provided as stipulated in the temporary facilities.

When it is necessary to interrupt service to water customers, each customer affected shall be notified in advance of the proposed service interruption and its probable duration in accordance with the project requirements.

- E. **DISINFECTION PROCEDURE:** During construction or after the installation of the pipe and fittings is complete, an approved disinfection method, according to governing standards, shall be used. The disinfection solution shall be allowed to stand in the main and associated appurtenances for a period of at least twenty-four (24) hours.

During disinfection, all valves, hydrants, and service line connections shall be operated to ensure that all appurtenances are disinfected. Valves shall be manipulated in such a manner that the strong disinfection solution in the main from flowing back into the supply line. Check valves shall be used if required.

All non-disinfected fittings used for tie-ins or repairs shall be cleaned and swabbed with a liquid sodium hypochlorite disinfecting solution prior to installation.

- F. **FINAL FLUSHING:** Upon completion of chlorination but before sampling and bacteriological testing, Contractor shall remove all heavily chlorinated water from the main and temporary services by flushing with potable water at the maximum velocity which can be developed under the direction and control of the District.

The Contractor shall properly neutralize and dispose of the chlorinated water and flushing water in accordance with all applicable regulations. Contractor shall obtain all special waste disposal permits necessary.

- G. **DISPOSAL OF HEAVILY CHLORINATED WATER:** Contractor shall apply a de-chlorinating agent to the water to be wasted to neutralize thoroughly the chlorine residual remaining in the water. (See the following table for neutralizing chemicals.) Federal, state, and local regulatory agencies should be contacted to determine special provisions for disposal of heavily chlorinated water.

Chlorine residual of water being disposed of shall be de-chlorinated by treating with one of the chemicals listed in the following table:

**Pounds of Chemicals Required to De-chlorinate Various Residual Chlorine Concentrations in 100,000 Gallons of Water\***

Residual Chlorine Concentration <i>mg/L</i>	Sulfur Dioxide (SO <sub>2</sub> )	Sodium Bisulfate (NaHSO <sub>3</sub> )	Sodium Sulfite (Na <sub>2</sub> SO <sub>3</sub> )	Sodium Thiosulfate (Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> @5H <sub>2</sub> O)
1	0.8	1.2	1.4	1.2
2	1.7	2.5	2.9	2.4
10	8.3	12.5	14.6	12.0
50	41.7	62.6	73.0	60.0

\* Except for residual chlorine concentration, all amounts are in pounds.

The Contractor shall provide all necessary materials, equipment and labor for applying the de-chlorinating chemical in a manner such that proper mixing and contact time of the chemical and the heavily chlorinated water is obtained for complete removal of chlorine being flushed. The Contractor shall periodically test the flush water to verify that the chlorine residual is zero.

- H. **CHLORINE RESIDUAL TESTS:** Upon completion of final flushing, the District will perform chlorine residual tests to ensure the chlorine residual in the main and temporary services is not higher than that generally prevailing in the remainder of the water distribution system and is acceptable to the District.
- I. **BACTERIOLOGICAL TESTS**
- a. After flushing has been completed and the chlorine residual is not greater than 1.2 ppm, a bacteriological sample shall be taken in accordance with the Kentucky Department of Environmental Protection Agency, Safe Drinking Water Act.
  - b. The mouth of the valve, hydrant, blow-off, etc. shall be sterilized using a propane torch or equivalent and then allowed to flow for a period of not less than 5 minutes.

- c. The standard sample shall be collected in sterile bottles, by the representative of the certified laboratory, care being taken not to contaminate the neck of the bottle or stopper during collection.
  - d. This sample will then be delivered to a certified laboratory by the individual collecting the sample.
  - e. Copies of the analysis shall be sent to the Boone County Water District inspector directly from the laboratories.
  - f. In the event that the laboratory analysis shows bacteria present, the line shall be re-chlorinated, sterilized, flushed, and a new sample taken until such time that the line meets the Safe Drinking Water Act Standards.
- J. **REDISINFECTION:** Should the bacteriological tests indicate the presence of coliform organisms at any sampling point, the main and temporary services shall be re-flushed, re-sampled, and re-tested. If check samples show the presence of coliform organisms, the main and temporary services shall be re-chlorinated at no additional cost to the District until results acceptable to the District are obtained.

Re-disinfection shall be completed by the continuous feed or by the slug method. Unless otherwise permitted, the chlorination agent shall be injected into the main and temporary services at the supply end through a corporation cock installed in the top of the pipe. All materials, equipment and labor necessary for the re-disinfection shall be supplied by Contractor at no additional cost to the District.

- K. **HYDROSTATIC TESTING:** Hydrostatic Testing will be in accordance with AWWA C600. The water main being tested shall have all air expelled by additional flushing or installation of taps on high points in the line. The pressure of the water main shall be gradually increased to obtain a minimum pressure of (100 psi) over the design pressure (250 psi). at the lowest elevation point of the water main or as directed by the Engineer. The test will be for a two (2) hour duration and will not vary by more than (5 psi). All tests performed for each test section shall be witnessed and approved by a representative of the Engineer, in the event any test is performed without a representative of the Engineer, the Contractor shall be required to test the section again. Leakage is defined as the amount of water used to maintain the test pressure.

## Section V

### VEHICULAR AND PEDESTRIAN TRAFFIC CONTROL

1. **REFERENCE MATERIALS:** Traffic shall be maintained in accordance with the "Manual on Uniform Traffic Control" published by the Federal Highway Administration, current edition of Kentucky Department of Highways Standard Specifications for Road & Bridge Construction and current KYDOH Standard Drawings.
2. **PEDESTRIAN TRAFFIC:** Should the Contractor be required to remove sidewalk or any other pavement used by pedestrians, the Contractor shall construct an approved, safe, alternate route with acceptable paving materials. Approval for alternate routes and temporary paving materials shall be acquired from the Engineer. The Contractor shall also construct temporary barricades and fences as required. No extra payment will be made for construction of temporary pedestrian walkways, fences or barricades required for water line construction, but shall be considered incidental to water line construction.
3. **VEHICULAR TRAFFIC:** Vehicular traffic shall be maintained as required by the referenced materials listed above. The cost of all temporary paving materials for pavement restoration due to water line construction shall be considered incidental to the contract. The cost for all traffic control materials including signs, barricades, etc. shall be considered incidental to the contract. The Contractor shall be required to keep the construction area safe at all times and check that traffic control devices are in place. Should temporary paving materials used for water line construction fail to perform satisfactorily, the Contractor shall repair same at his own expense.

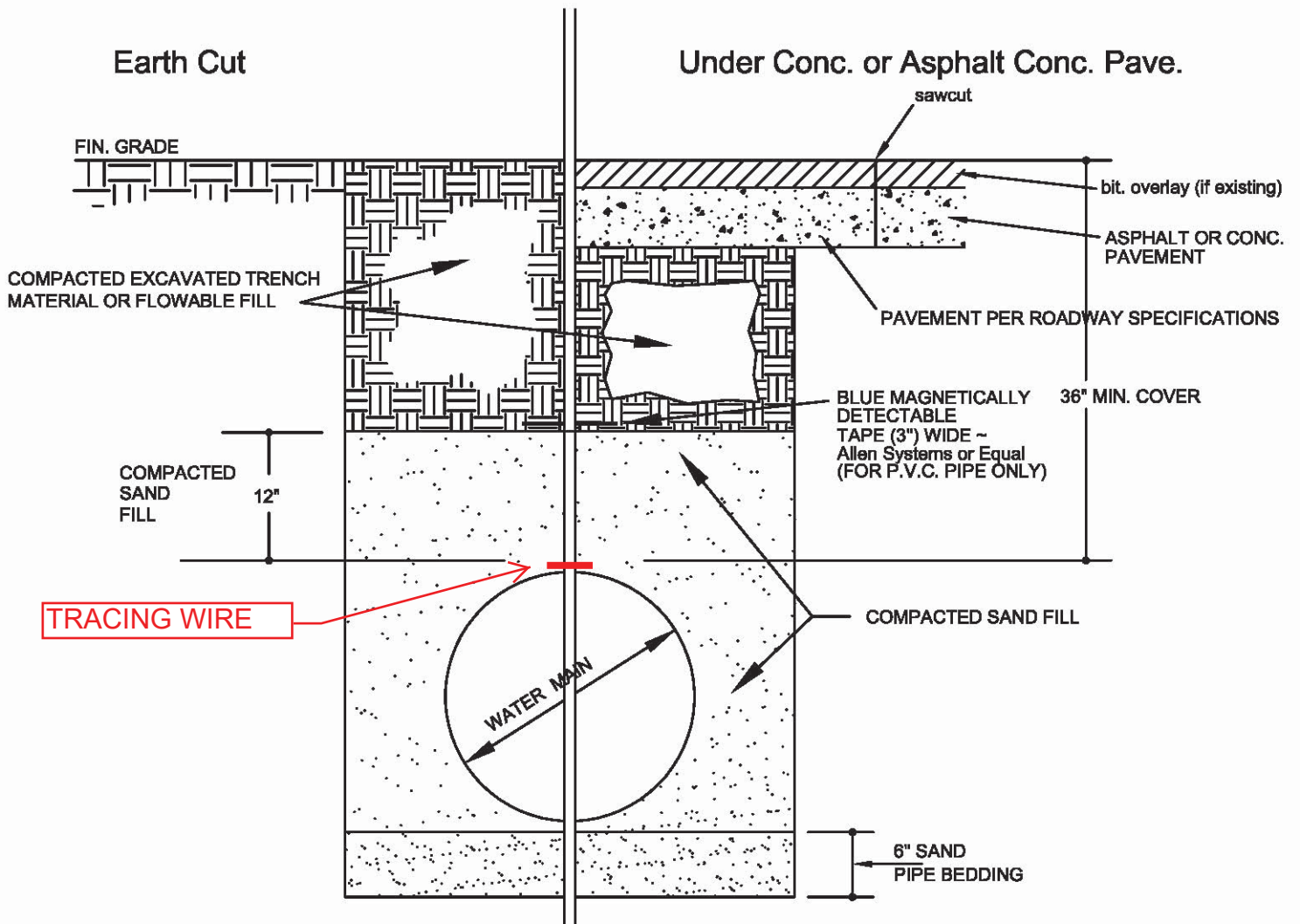
# BOONE COUNTY WATER DISTRICT

## WATER MAIN DETAILS

STANDARD DRAWINGS

Backfill of all trenches will be compacted by the Standard Proctor Methods, ASTM D 698

All areas will require compaction to 95% of maximum density or to the satisfaction of the Geo-Technical Engineer.



9/06/17

KYTC SPEC.

2

# WATER MAIN TRENCH DETAIL

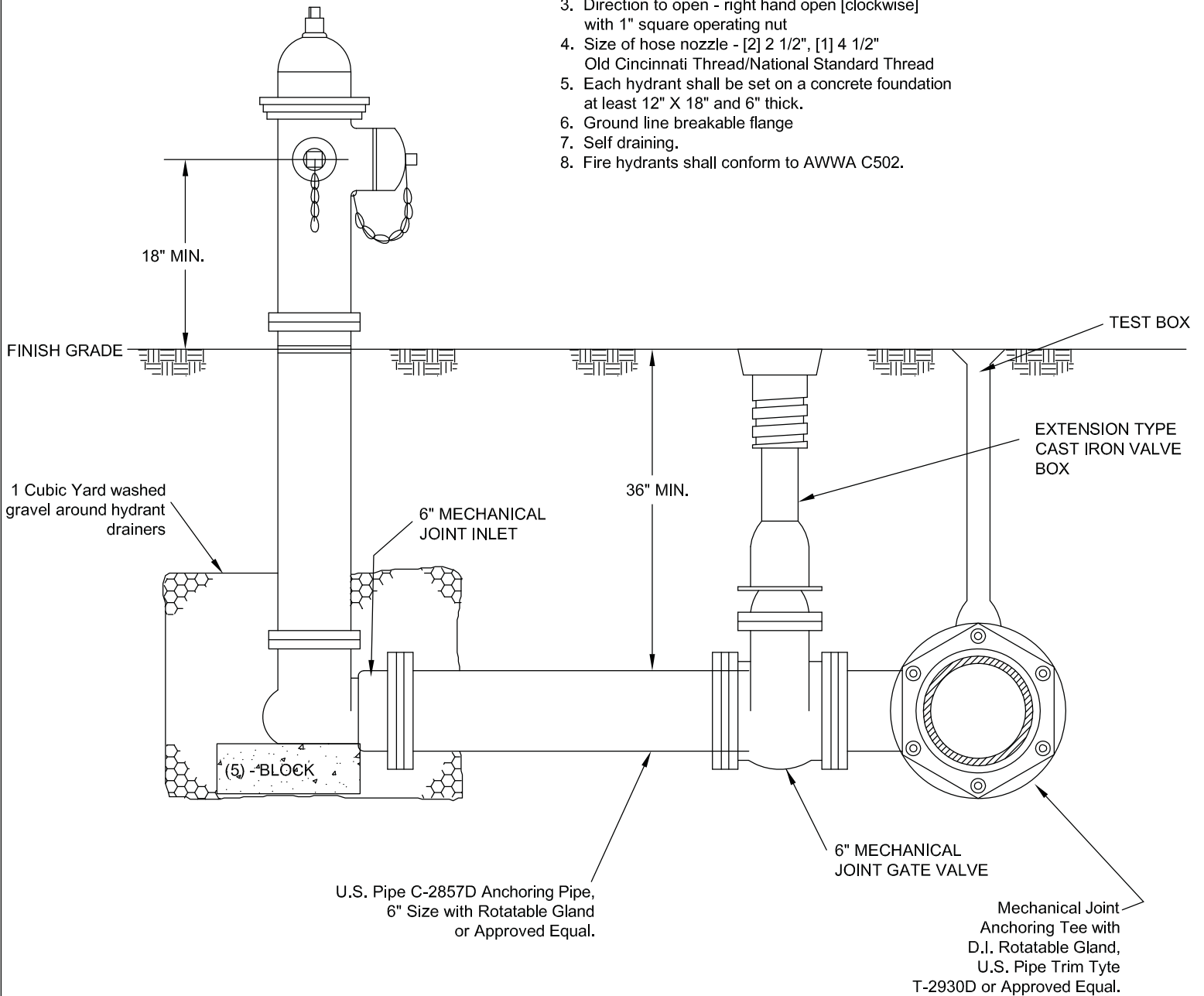
BCWD

SCALE: N.T.S.



HYDRANT DATA

1. Kennedy, Mueller, M&H, American Flow Control or Clow.
2. Size of Hydrant, minimum 6 inch
3. Direction to open - right hand open [clockwise] with 1" square operating nut
4. Size of hose nozzle - [2] 2 1/2", [1] 4 1/2" Old Cincinnati Thread/National Standard Thread
5. Each hydrant shall be set on a concrete foundation at least 12" X 18" and 6" thick.
6. Ground line breakable flange
7. Self draining.
8. Fire hydrants shall conform to AWWA C502.



9/3/17

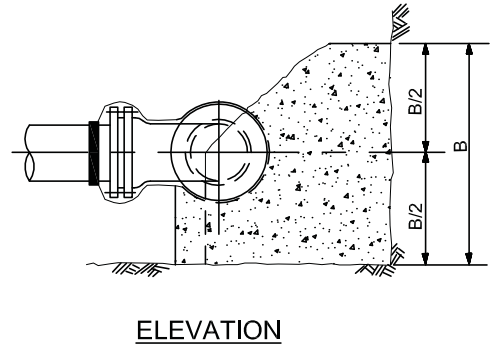
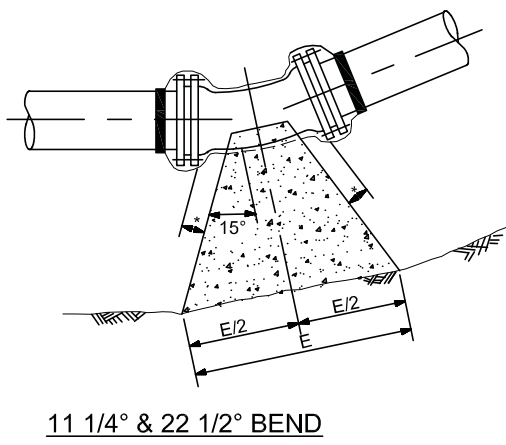
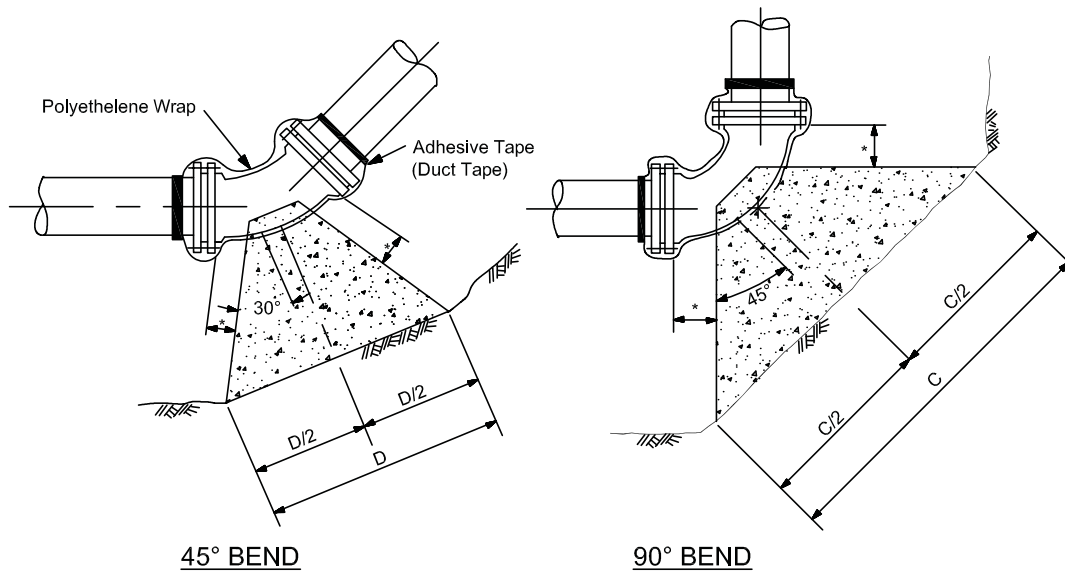
3

# HYDRANT ASSEMBLY

BCWD

SCALE: N.T.S.

Addendum #4 -- 8-30-19



Blocking shall be poured after polyethelene wrap is in place.  
 Blocking shall be inspected by the District prior to backfilling.

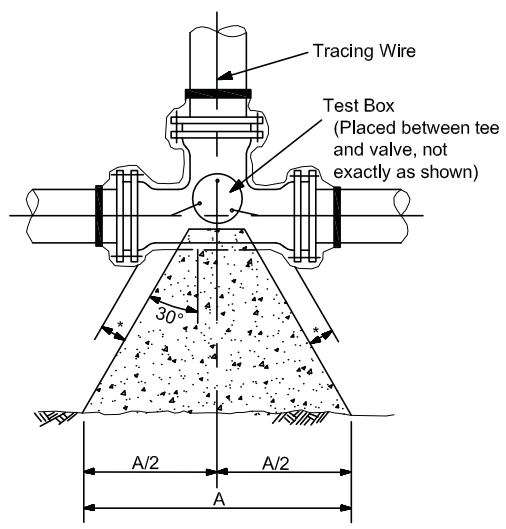
**150 PSI/250 PSI**

PIPE SIZE	A	B	C	D	E
6"	2'0"/2'6"	1'6"/1'6"	3'0"/3'6"	1'6"/2'0"	1'0"/1'0"
8"	2'6"/3'6"	2'0"/2'0"	3'6"/4'6"	2'0"/2'6"	1'0"/1'6"
10"	3'6"/4'0"	2'6"/2'6"	4'6"/5'6"	2'6"/3'0"	1'6"/1'6"
12"	4'0"/5'0"	3'0"/3'0"	5'6"/6'6"	3'0"/3'6"	1'6"/2'0"
16"	5'0"/6'0"	3'0"/4'0"	7'0"/8'6"	4'0"/4'6"	3'0"/3'0"
20"	6'0"/7'6"	5'0"/5'0"	7'0"/10'6"	4'0"/6'0"	3'0"/3'0"

\* Distance to be 1/2" longer than entire length of the bolt used.

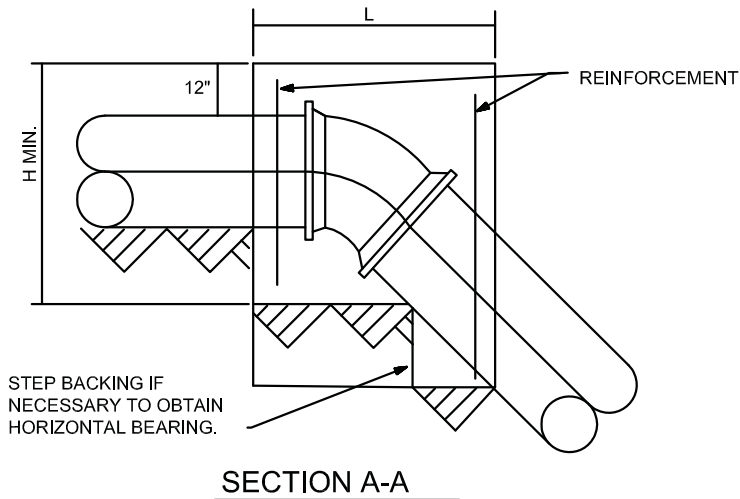
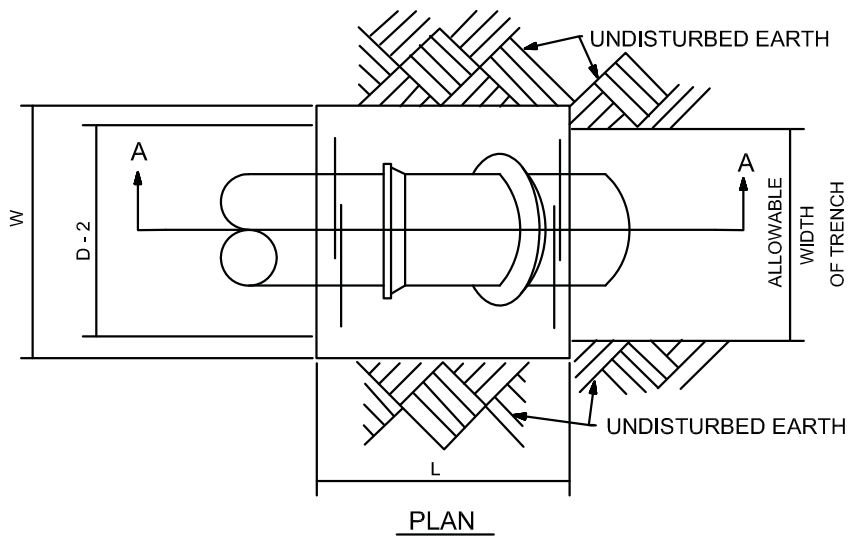
**NOTES**

- 1 PVC Fittings shall be per specifications.
- 2 Concrete to be 3500 psi.
- 3 All fittings to be Mechanical Joint.
- 4 Thrust blocks to be placed against undisturbed earth - use additional concrete as required for over excavation.
- 5 Blocking to be placed in a manner so that bolts can be removed without disturbing the block.



**TEE (DEAD END OR FIRE HYDRANT SIMILAP)**

4/2/07



### CONCRETE BACKING FOR VERTICAL BENDS

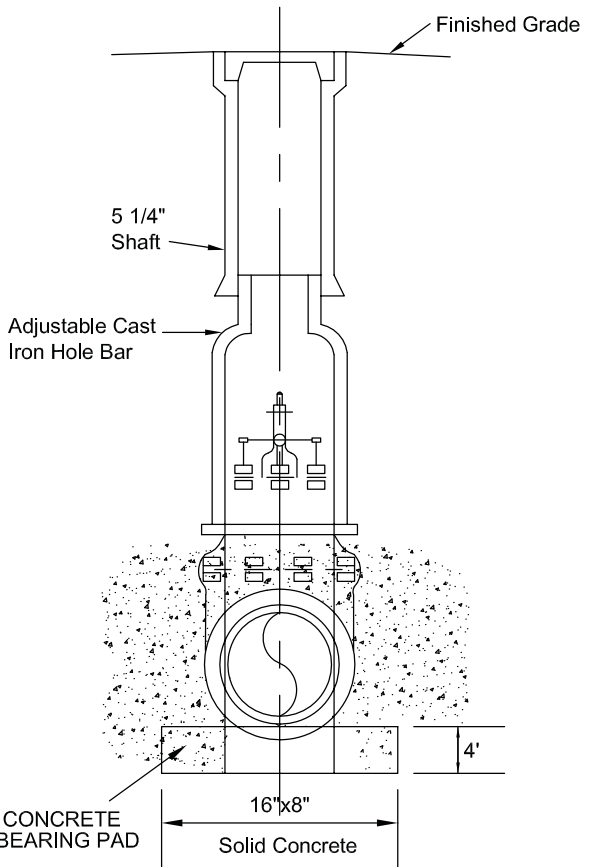
1. BACKING DESIGNED FOR 3000 POUNDS PER SQUARE FOOT SOIL BEARING AND 150 POUNDS PER SQUARE INCH INTERNAL PRESSURE.
2. PROVIDE MINIMUM CONCRETE REINFORCEMENT OF 2 PAIR OF TWO 5" "U" BARS @ 12" C.
3. CENTER BACKING ON BEND.

NO BLOCKING REQUIRED FOR VERTICAL "UP" BENDS

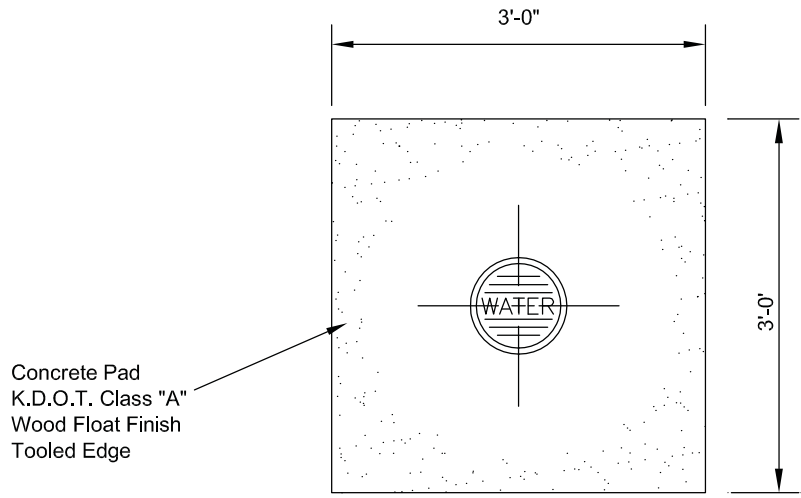
SIZE of PIPE	DEGREE OF BEND											
	11 1/4				22 1/2				45			
	L"	W"	H"	VOL.	L"	W"	H"	VOL.	L"	W"	H"	VOL.
4"	12	24	16	2.7	15	30	18	4.7	22	36	24	11.0
6"	12	43	18	5.4	16	48	34	15.1	30	55	24	22.9
8"	12	54	24	9.0	18	57	36	21.4	36	57	33	39.2
12"	20	63	36	26.3	37	62	37	49.2	48	62	51	88.0
16"	31	65	38	44.4	60	65	39	88.2	65	65	65	159.2
20"	45	70	40	73.0	56	70	60	136.4	72	76	78	247.5
24"	47	72	54	106.0	67	74	69	198.4	88	84	84	360.1

NOTE: VOLUMES GIVEN IN CUBIC FEET

BLOCKING FOR SIZES NOT SHOWN SHALL USE THE NEXT LARGER SIZE.

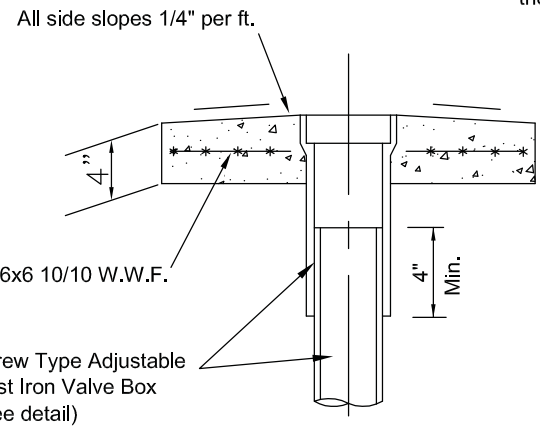


**DETAIL VALVE BOX INSTALLATION**



**PLAN**

2'0" Concrete Pad may be used in urban arces as approved by the District.



**ELEVATION**

- NOTES:**
- Concrete Pads shall be constructed around all main line valves except within hard paved areas.
  - Concrete Pads shall be constructed around customer service line valve ---- 3" and larger valves.
  - \*\*\*TRACER WIRE SHALL NOT BE RUN UP THROUGH VALVE BOXES. ONLY IN TEST BOXES

9/3/17

# 6 VALVE BOX AND VALVE PAD

BCWD

SCALE: N.T.S.

### Boone County Water District Self Centering Alignment Ring Specification

Each valve box shall have a two piece AFC Centering Ring that centers the valve box directly in a vertical position. The Centering Ring must have an adjustable detented slide to compensate for multiple stem diameters. The installation of the alignment ring below the operating nut should not disturb the function of the operating nut nor should the operating nut have to be removed to install the Centering Ring. Alternate centering devices other than that listed above must have the approval of the Boone County Water District.

4/2/07

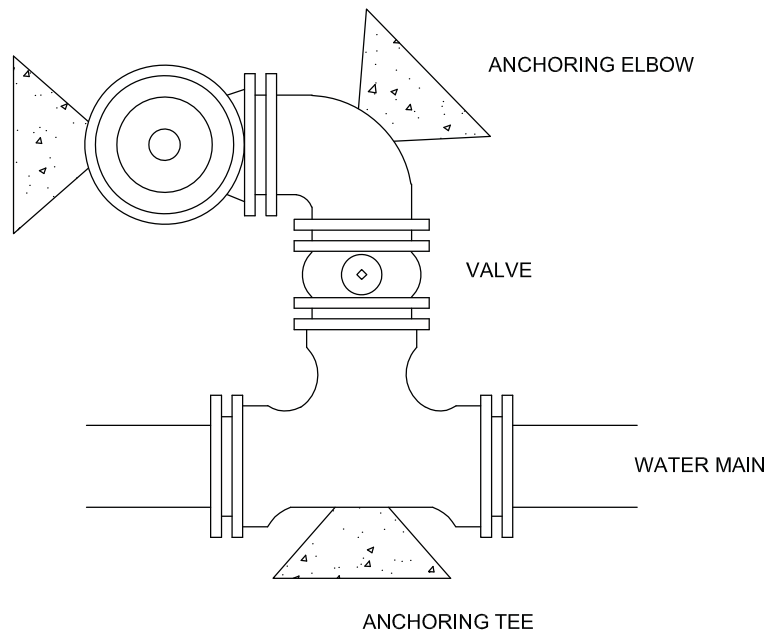
7

## CENTER RING NOTE

BCWD

SCALE: N.T.S.

HYDRANT POINTS UP GRADE  
(FOR PROPER AIR RELEASE)



SPECS SAME AS FIRE HYDRANT ASSEMBLY  
(STD. DRWG. NO. 109)

4/2/07

8

# FIRE HYDRANT ASSEMBLY WITH 90° BEND

BCWD

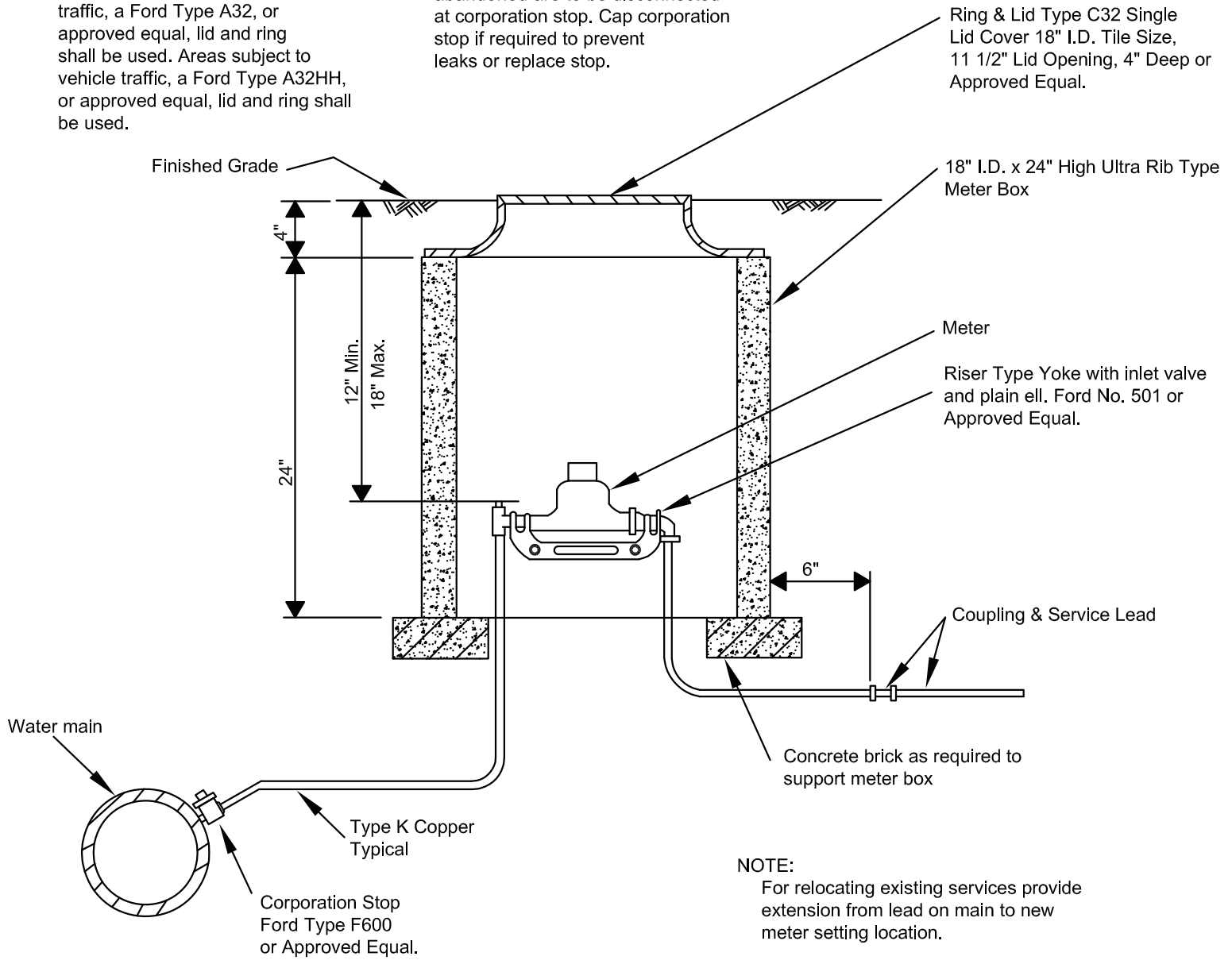
SCALE: N.T.S.

**NOTE:**

Services installed in concrete areas, not subject to vehicle traffic, a Ford Type A32, or approved equal, lid and ring shall be used. Areas subject to vehicle traffic, a Ford Type A32HH, or approved equal, lid and ring shall be used.

**NOTE:**

Services to be removed & abandoned are to be disconnected at corporation stop. Cap corporation stop if required to prevent leaks or replace stop.



**NOTE:**

For relocating existing services provide extension from lead on main to new meter setting location.

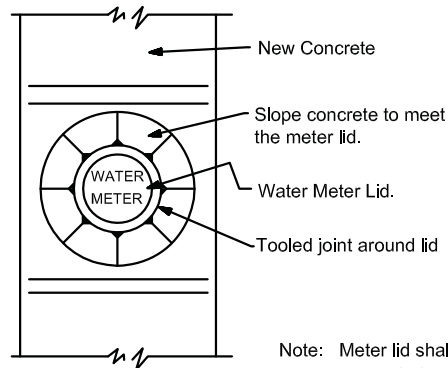
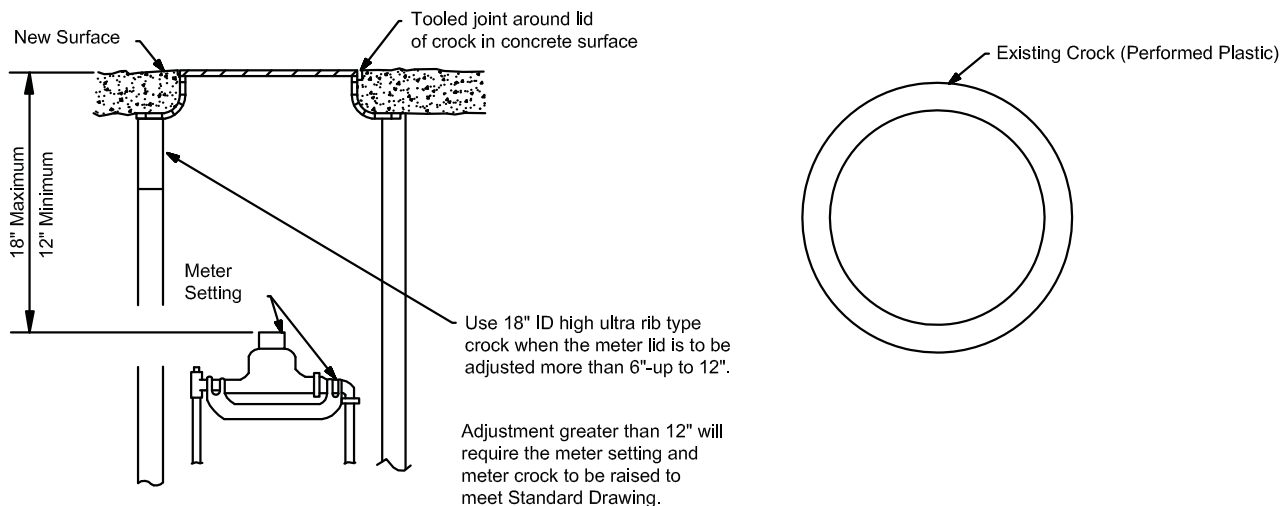
PVC Mains-Use single band brass saddle  
Ford Type 101 BS or equal.

4/2/07

# 9 5/8" & 1" METER SETTING

BCWD

SCALE: N.T.S.



Note: Meter lid shall be flush with the top of the concrete surface. The concrete surface shall be tapered to provide a smooth transition to the meter lid. A tooled joint shall be formed around the meter lid.

NOTE: SERVICES INSTALLED IN CONCRETE AREAS, NOT SUBJECT TO VEHICLE TRAFFIC, A FORD TYPE A32, OR APPROVED EQUAL, LID AND RING SHALL BE USED. AREAS SUBJECT TO VEHICLE TRAFFIC, A FORD TYPE A32HH, OR APPROVED EQUAL, LID AND RING SHALL BE USED.

PLASTIC (PVC) METER CROCKS shall be raised by use of an adapter with a section of plastic crock cut to achieve final grade.

At no time shall wood be used to adjust the ring and lid to grade.

Meter ring and lids shall be reset solidly and shall have no broken edge to allow dirt to enter the crock.

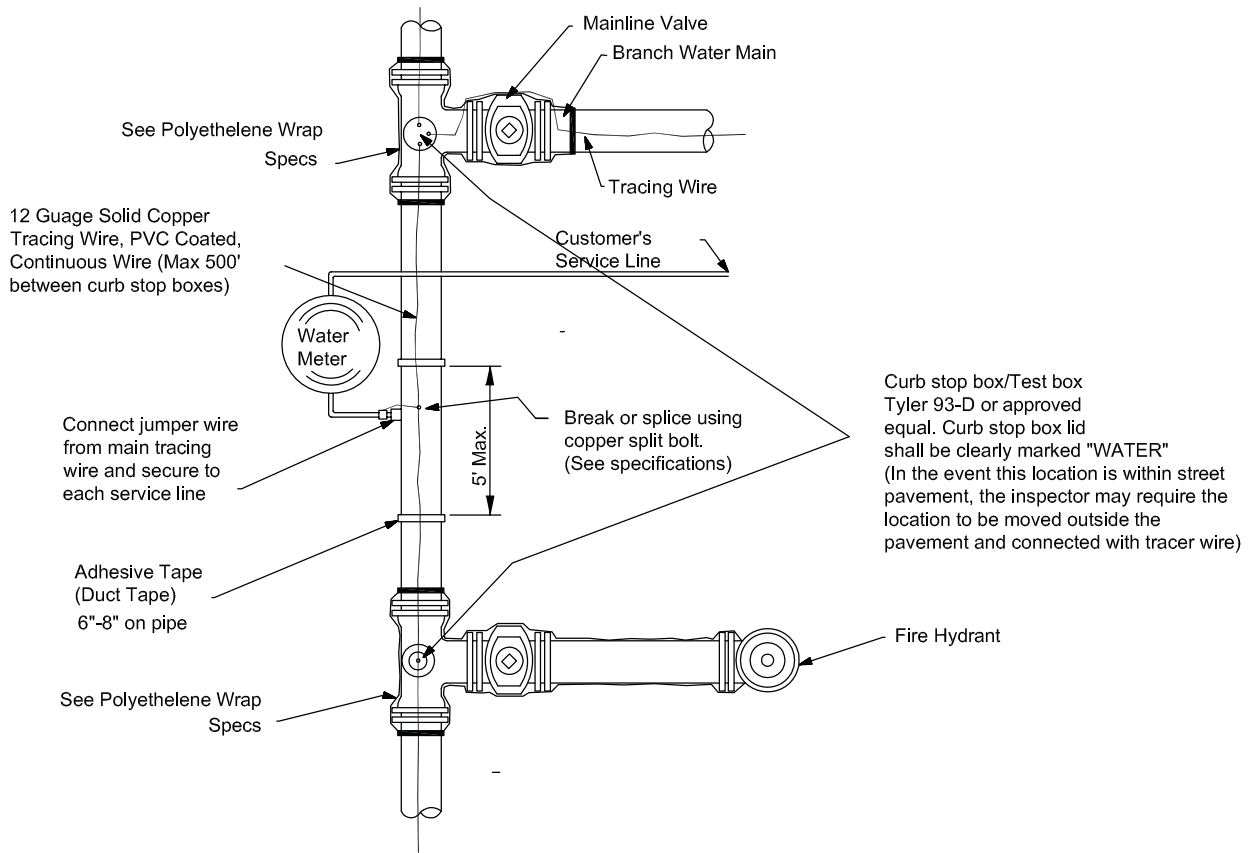
If the meter box is damaged beyond repair it shall be replaced. See Meter Setting detail.

**RAISING CURB STOPS OR VALVE BOXES:**

Curb stop boxes and valve boxes shall be raised by turning the upper section to meet grade. If the upper section cannot be raised in this manner it shall be carefully broken off and replaced.

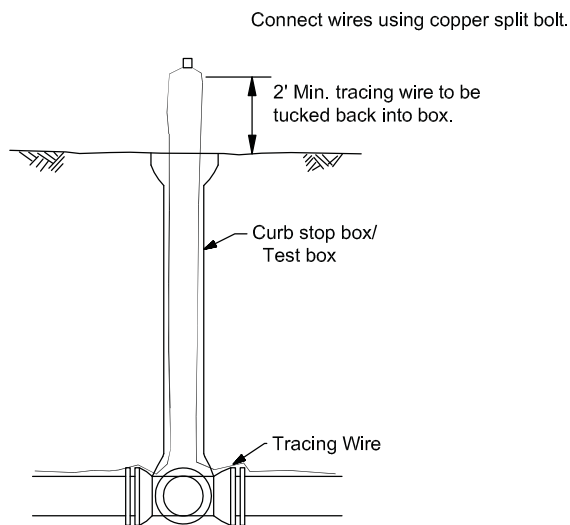
New upper sections shall be supplied by Contractor.





## TRACER WIRE TO BE INSTALLED ON ALL WM INCLUDING PVC AND DUCTILE IRON

Note: Curb stop box/test box shall not be installed in paved areas unless approved by the District.



9/3/17

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# TRACING WIRE

BCWD

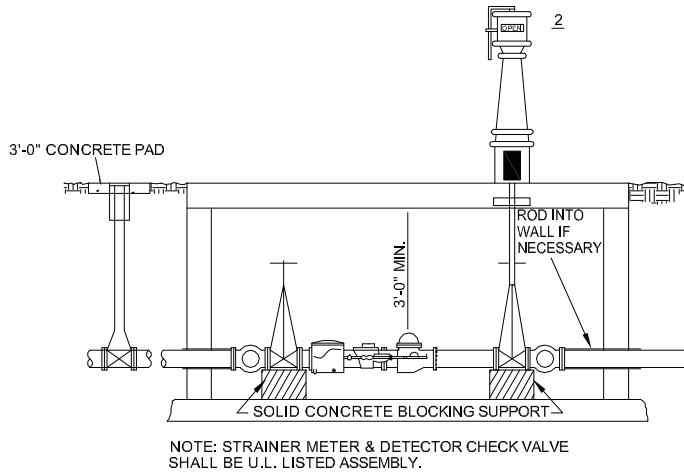
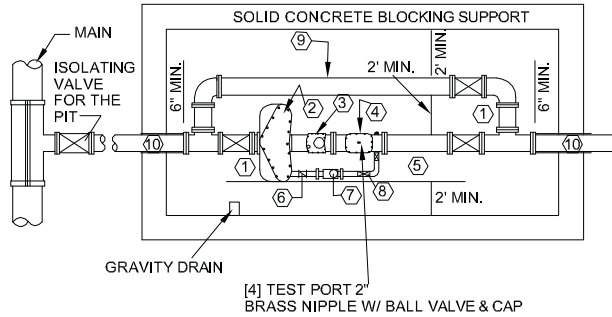
-This shall be included and incidental to Water Main Construction-

Addendum # 8-30-19

SCALE: N.T.S.

DRAWING NOTES

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>① VALVES WITH OUTSIDE STEM AND YOKE, FLANGED CONNECTION (RESILIENT SEATED VALVES)</li> <li>② U.L. FIRE RATED STRAINER</li> <li>③ METER</li> <li>④ U.L. LISTED DETECTOR CHECK</li> <li>⑤ SPOOL PIECE, 12", FLANGED AND PLAIN END</li> <li>⑥ GATE VALVE</li> <li>⑦ LOW FLOW METER</li> <li>⑧ CHECK VALVE</li> <li>⑨ BYPASS LINE SHALL BE EQUALIVENT IN SIZE AS THE FEED LINE</li> <li>⑩ CLASS 52 PIPING WITH FLANGED END WITHIN PIT</li> </ul> | <ul style="list-style-type: none"> <li>1. ANY PUMPER CONNECTION SHALL BE INSTALLED DOWN STREAM OF OUTLET VALVE &amp; BACKFLOW DEVICE.</li> <li>2. A POST INDICATOR SHALL BE THE TYPE THAT WILL ATTACH TO THE WHEEL OPERATOR AND ALLOW OPERATION OF VALVE WITHIN THE PIT.</li> <li>3. SEE DRAWINGS.</li> <li>4. A BACKFLOW PREVENTION ASSEMBLY SHALL BE INSTALLED AS FIRST DEVICE INSIDE OF THE BUILDING. THERE SHALL NOT BE BRANCHES OR TAPS BETWEEN THE METERING ASSEMBLY AND THE BACKFLOW PREVENTION ASSEMBLY.</li> <li>5. ALL PIPING IN PIT MUST BE FLANGED.</li> </ul> |
|---|--|



BOONE COUNTY MASTER METER PIT

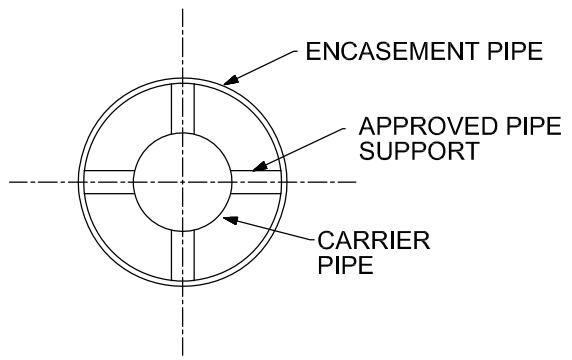
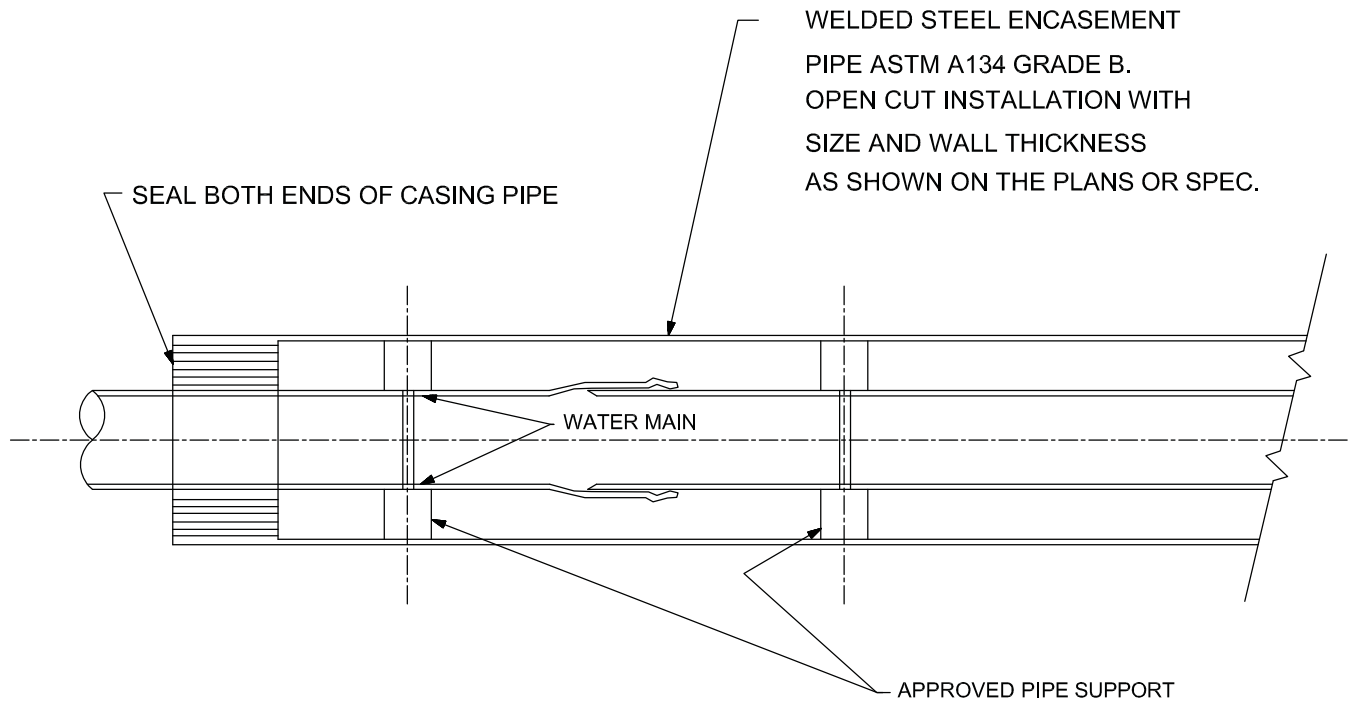
4/2/07

12

B.C. - MASTER - METER - PIT

BCWD

SCALE: N.T.S.



NOTE: CASING PIPE JOINTS SHALL BE SEAM WELDED SO THAT CASING IS WATER TIGHT FROM END TO END.

4/2/07

13

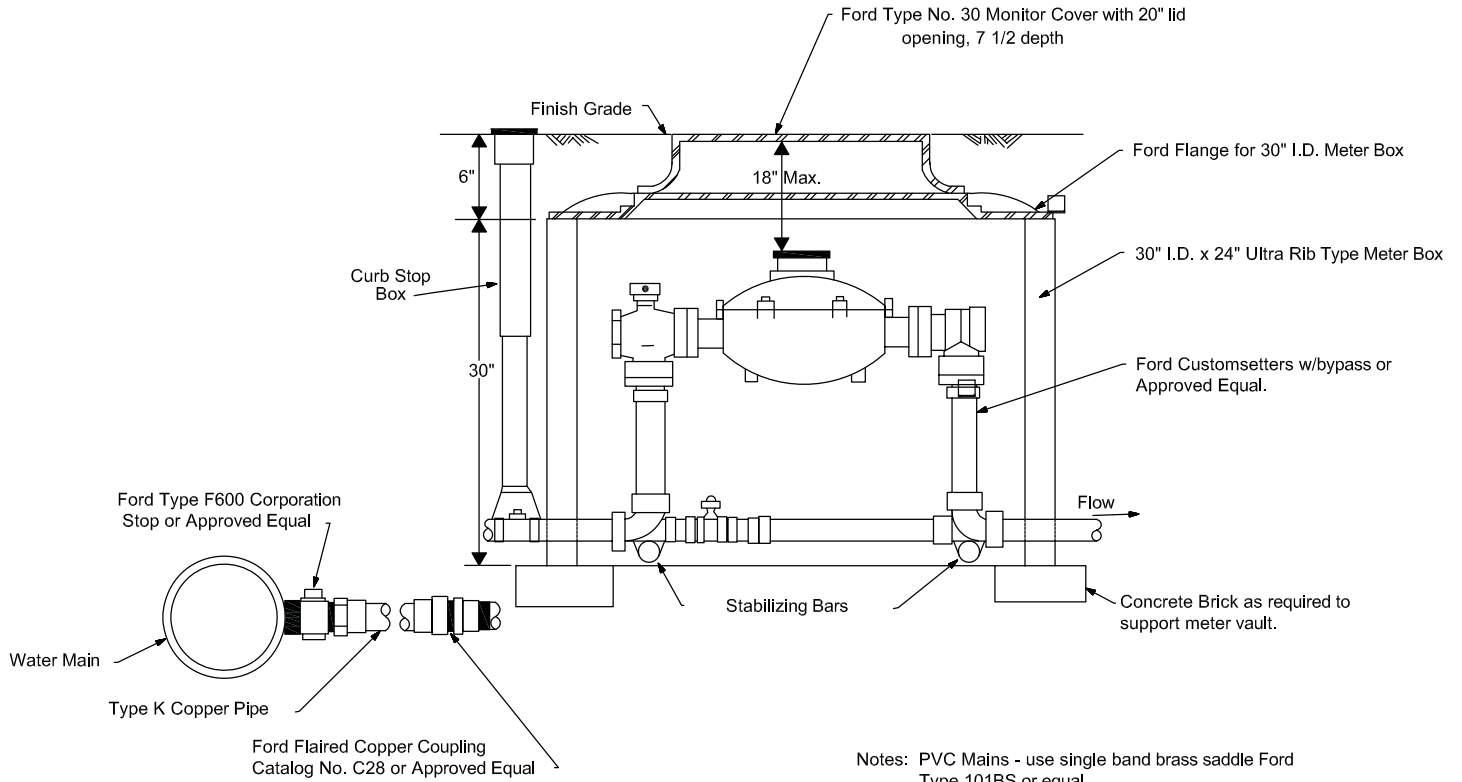
# STEEL ENCASEMENT PIPE DETAIL

BCWD

SCALE: N.T.S.

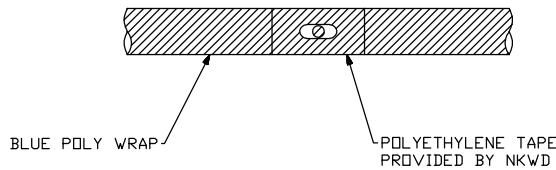
Note: Services to be removed & abandoned are to be disconnected at corporation stop. Cap corporation stop if required to prevent leaks or replace stop. For relocating existing services provide extension from lead on main to new meter setting location.

Note: If service is installed in sidewalk or pavement area, a heavy duty lid shall be installed.



Notes: PVC Mains - use single band brass saddle Ford Type 101BS or equal.  
D.I.P. Mains 8" or smaller use a double strap brass tapping saddle Ford Type 202B or equal.

ONLY FOR D.I. PIPE



4/27/18

14

# METER SETTING- 2"

BCWD

SCALE: N.T.S.

# Standard Water Bid Item Descriptions

**W AIR RELEASE VALVE** This bid item description shall apply to all air release valve installations of every size except those defined as “Special”. This item shall include the air release valve, main to valve connecting line or piping, manhole, vault, structure, access casting or doors, tapping the main, labor, equipment, excavation, proper backfill and restoration required to install the air release valve at the location shown on the plans or as directed in accordance with the specifications and standard drawings complete and ready for use. All air release/vacuum valves on a project shall be paid under one bid item regardless of size. No separate pay items will be established for size variations. Only in the case of the uniqueness of a particular air release valve would a separate bid item be established. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**BOLLARDS** This item is for payment for furnishing and installing protective guard posts at above ground utility installations. A bollard may consist of, but not limited to, a steel post set in concrete or any other substantial post material. This item shall include all labor, equipment, and materials needed for complete installation of the bollard as specified by the utility owner specifications and plans. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

*NOTE: A bid code for this item has been established in standard roadway bid items and shall be used for payment of this item. The bid code is 21341ND*

**W CAP EXISTING MAIN** This item shall include the specified cap, concrete blocking and/or mechanical anchoring, labor, equipment, excavation, backfill, and restoration required to install the cap at the location shown on the plans or as directed in accordance with the specifications. This item is not to be paid on new main installations. This pay item is only to be paid to cap existing mains. Caps on new mains are incidental to the new main. Any and all caps on existing mains shall be paid under one bid item included in the contract regardless of size. No separate bid items will be established for size variations. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W DIRECTIONAL BORE** Payment under this item is made whenever the plans or specifications specifically show directional boring is to be utilized in order to minimize the impact of open cut for the installation of water main under streets, creeks, and etc. Payment under this item shall include the specified bore pipe, labor, and equipment. No separate payment shall be made for bore pipe installed in the bore whether used as a carrier pipe or an encasement of a separate carrier pipe. This item shall also include pipe anchors at each end of the bore when specified to prevent the creep or contraction of the bore pipe. Carrier pipe installed within a bore pipe shall be paid separately under pipe items. Payment under this item shall not be size specific and no separate bid items will be established for size variations. The bore pipe sizes to be included under this item shall be as shown on the plans and/or in the specifications. Any and all directional bores in each contract shall be paid under one directional bore bid item included in the contract regardless of size. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

**W ENCASUREMENT CONCRETE** Includes all labor, equipment, excavation, concrete, reinforcing steel, backfill, restoration, and etc., to construct the concrete encasement of the water main as shown on the plans, and in accordance with the specifications and standard drawings. Payment under this item shall be in addition to the carrier pipe as paid under separate bid items. Carrier pipe is not included in this bid item. Any and all concrete encasement shall be paid under one bid item included in the contract regardless of the size of the carrier pipe or the volume of concrete or steel reinforcement as specified in the plans and specifications. No separate bid items will be established for size variations. Measurement of pay quantity shall be from end of concrete to end of concrete. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

**W ENCASUREMENT STEEL BORED** This item shall include the steel encasement pipe size as specified on the plans and in the specifications, casing spacers, end seals, labor, and equipment to bore and install the encasement in accordance with the plans and specifications, complete and ready for use. The size shall be the measured internal diameter of the encasement pipe. The sizes of encasement to be paid under the size ranges specified in the bid items shall be as follows:

- Range 1 = All encasement sizes greater than 2 inches to and including 6 inches
- Range 2 = All encasement sizes greater than 6 inches to and including 10 inches
- Range 3 = All encasement sizes greater than 10 inches to and including 14 inches
- Range 4 = All encasement sizes greater than 14 inches to and including 18 inches
- Range 5 = All encasement sizes greater than 18 inches to and including 24 inches
- Range 6 = All encasement sizes greater than 24 inches

*(Encasement sizes of 2 inches internal diameter or less shall not be paid separately; but, shall be considered incidental to the carrier pipe.)* Payment under this bid item shall not include the carrier pipe. Carrier pipe shall be paid under a separate bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

**W ENCASUREMENT STEEL OPEN CUT** This item shall include the steel encasement pipe size as specified on the plans and in the specifications, casing spacers, end seals, labor, and equipment to open cut and install the encasement in accordance with the plans and specifications, complete and ready for use. The size shall be the measured internal diameter of the encasement pipe. The size encasement to be paid under the size ranges specified in the bid items shall be as follows:

- Range 1 = All encasement sizes greater than 2 inches to and including 6 inches
- Range 2 = All encasement sizes greater than 6 inches to and including 10 inches
- Range 3 = All encasement sizes greater than 10 inches to and including 14 inches
- Range 4 = All encasement sizes greater than 14 inches to and including 18 inches
- Range 5 = All encasement sizes greater than 18 inches to and including 24 inches
- Range 6 = All encasement sizes greater than 24 inches

*(Encasement sizes of 2 inches internal diameter or less shall not be paid separately; but, shall be considered incidental to the carrier pipe.)* Payment under this bid item shall not include the carrier pipe. Carrier pipe shall be paid under a separate bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

**W FIRE HYDRANT ADJUST** Includes all labor, equipment, excavation, materials, and backfill to adjust the existing fire hydrant using the fire hydrant manufacturer's extension kit for adjustments of 18" or less. Adjustments greater than 18" require anchoring couplings and vertical bends to adjust to grade. The Contractor will supply and install all anchor couplings, bends, fire hydrant extension, concrete blocking, restoration, granular drainage material, etc, needed to adjust the fire hydrant complete and ready for use as shown on the plans, and in accordance with the specifications and standard drawings. This also includes allowing for the utility owner inspector to inspect the existing fire hydrant prior to adjusting, contractor returning unusable fire hydrants to the utility owner warehouse and picking up a replacement hydrant. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete and ready for use.

**W FIRE HYDRANT ASSEMBLY** Includes all labor, equipment, new fire hydrant, isolating valve and valve box, concrete pad around valve box (when specified in specifications or plans), piping, anchoring tee, anchoring couplings, fire hydrant extension, excavation, concrete blocking, granular drainage material, backfill, and restoration, to install a new fire hydrant assembly as indicated on plans and on standard drawings complete and ready for use. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W FIRE HYDRANT RELOCATE** This item includes all labor and equipment to remove the existing fire hydrant from its existing location and reinstalling at a new location. This item shall include a new isolating valve and valve box, concrete pad around valve box (when required in specifications or plans), new piping, new anchoring tee, anchoring couplings, fire hydrant extensions, concrete blocking, restoration, granular drainage material, excavation, and backfill as indicated on plans, specifications, and on standard drawings complete and ready for use. This item shall also include allowing for utility owner inspector to inspect the existing fire hydrant prior to reuse, contractor returning unusable fire hydrants to the utility owner warehouse and picking up a replacement hydrant for use, if the existing fire hydrant is determined unfit for reuse. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W FIRE HYDRANT REMOVE** This bid item includes removal of an abandoned fire hydrant, isolating valve, and valve box to the satisfaction of the engineer. The removed fire hydrant, isolating valve and valve box shall become the property of the contractor for his disposal as salvage or scrap. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W FLUSH HYDRANT ASSEMBLY** This item shall include the flushing hydrant assembly, service line, tapping the main, labor, equipment, excavation, backfill, and restoration required to install the flush hydrant at the location shown on the plans and in accordance with the specifications and standard drawings, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W FLUSHING ASSEMBLY** This item shall include the flushing device assembly, service line, meter box and lid, tapping the main, labor, equipment, excavation, backfill, and restoration required to install the

flushing device at the location shown on the plans and in accordance with the specifications and standard drawings, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W LEAK DETECTION METER** This item is for payment for installation of a water meter at main valve locations where shown on the plans for detection of water main leaks. The meter shall be of the size and type specified in the plans or specifications. This item shall include all labor, equipment, meter, meter box or vault, connecting pipes between main and meter, main taps, tapping saddles, casting, yoke, and any other associated material needed for installation of a functioning water meter in accordance with the plans and specifications, complete and ready for use. No separate payment will be made under any other contract item for connecting pipe or main taps. Any and all leak detection meters shall be paid under one bid item included in the contract regardless of size. No separate bid items will be established for size variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete and ready for use.

**W LINE MARKER** This item is for payment for furnishing and installing a water utility line marker as specified by the utility owner specifications and plans. A line marker may consist of a post or monument of whatever materials specified and shall include markings and/or signage on same as specified by plans or specifications. This item shall include all labor, equipment, and materials needed for complete installation of the marker. This item shall be paid EACH (EA) when complete.

**W MAIN POINT RELOCATE** This item is intended for payment for horizontal and/or vertical relocation of a short length of an existing main at the locations shown on the plans. This bid item is to be used to relocate an existing water main at point locations such as to clear a conflict at a proposed drainage structure, pipe or any other similar short relocation situation, and where the existing pipe material is to be reused. The contractor shall provide any additional pipe or fitting material needed to complete the work as shown on the plans and specifications. The materials provided shall be of the same type and specification as those that exist. Substitution of alternative materials shall be approved by the engineer in advance on a case by case basis. New polyethylene wrap is to be provided (if wrap exists or is specified in the specifications to be used). If it is necessary that the pipe be disassembled for relay, payment under this item shall also include replacement of joint gaskets as needed. Bedding and backfill shall be provided and performed the same as with any other pipe installation as detailed in the plans and specifications. Payment under this item shall be for each location requiring an existing main to be relocated horizontally or vertically regardless of pipe size or relocation length. No separate pay items will be established for pipe size variations or relocation segment length variations. Water Main Relocate shall not be paid on a linear feet basis; but, shall be Paid EACH (EA) at each location when complete and placed in service. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced.

**W METER** This item is for payment for installation of all standard water meters of all sizes 2 inches ID or less as specified on the plans. This item shall include all labor, equipment, meter, meter box, casting, yoke, and any other associated material needed for installation of a functioning water meter in accordance with the plans and specifications, complete and ready for use. This item shall include connections to the new or existing water service line. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.



**W METER ADJUST** This item includes all labor, equipment, excavation, materials, backfill, restoration, and etc., to adjust the meter casting to finished grade (whatever size exists) at the location shown on the plans or as directed in accordance with the specifications and standard drawings complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W METER RELOCATE** This item includes all labor, equipment, excavation, additional fittings, disinfection, testing, restoration, and etc., to relocate the existing water meter (whatever size exists), meter yoke, meter box, casting, and etc., from its old location to the location shown on the plans or as directed, in accordance with the specifications and standard drawings complete and ready for use. The new service pipe (if required) will be paid under short side or long side service bid items. Any and all meter relocations of 2 inches or less shall be paid under one bid item included in the contract regardless of size. Each individual relocation shall be paid individually under this item; however, no separate bid items will be established for meter size variations of 2 inches ID or less. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W METER VAULT SIZE RANGE 1 OR 2** This item is for payment for installation of an underground structure for housing of a larger water meter, fittings, and valves as required by the plans and specifications. This item shall include all labor, equipment, excavation, concrete, manhole castings or access doors, the specified meter(s) valve(s), all piping, and fitting materials associated with installing a functioning meter and vault in accordance with the plans, standard drawings, and specifications, complete and ready for use. The size shall be the measured internal diameter of the meter and piping to be installed. The size meter vault to be paid under size 1 or 2 shall be as follows:

- Size Range 1 = All meter and piping sizes greater than 2 inches up to and including 6 inches
- Size Range 2 = All meter and piping sizes greater than 6 inches

This item shall be paid EACH (EA) when complete. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced.

**W METER/FIRE SERVICE COMBO VAULT** This item is for payment for installation of an underground structure for housing of a water meter and fire service piping, fittings, and valves as required by the plans and specifications. This item shall include all labor, equipment, excavation, concrete, manhole castings or access doors, the specified meter(s), valve(s), all piping, and fitting materials associated with installing a functioning meter and fire service vault in accordance with the plans and specifications, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W METER WITH PRESSURE REDUCING VALVE (PRV)** This item is for payment for installation of all standard water meters with pressure reducing valves (PRV) of all sizes 2 inches ID or less as specified on the plans. This item shall include all labor, equipment, meter, PRV, meter box, casting, yoke, and any other associated material needed for installation of a functioning water meter with PRV in accordance with the plans and specifications, complete and ready for use. This item shall include connections to the new or existing water service line. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced.

This item shall be paid EACH (EA) when complete.

**W PIPE** This description shall apply to all PVC, ductile iron, and polyethylene/plastic pipe bid items of every size and type to be used as water main, except those bid items defined as “Special”. This item includes the pipe specified by the plans and specifications, all fittings (including, but not limited to, bends, tees, reducers, plugs, and caps), tracing wire with test boxes (if required by specification), polyethylene wrap (when specified), labor, equipment, excavation, bedding, restoration, testing, sanitizing, backfill, and etc., required to install the specified new pipe and new fittings at the locations shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. No additional payment will be made for rock excavation. This bid item includes material and placement of flowable fill under existing and proposed pavement, and wherever else specified on the plans or in the specifications. **This item shall include all temporary and permanent materials and equipment required to pressure test and sanitize mains including, but not limited to, pressurization pumps, hoses, tubing, gauges, main taps, saddles, temporary main end caps or plugs and blocking, main end taps for flushing, chlorine liquids or tablets for sanitizing, water for testing/sanitizing and flushing (when not supplied by the utility), chlorine neutralization equipment and materials, and any other items needed to accomplish pressure testing and sanitizing the main installation.** This item shall also include pipe anchors, at each end of polyethylene pipe runs when specified to prevent the creep or contraction of the pipe. Measurement of quantities under this item shall be through fittings, encasements, and directional bores (only when a separate carrier pipe is specified within the directional bore pipe). Measurements shall be further defined to be to the center of tie-in where new pipe contacts existing pipe at the center of connecting fittings, to the outside face of vault or structure walls, or to the point of main termination at dead ends. No separate payment will be made under pipe items when the directional bore pipe is the carrier pipe. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

**W PLUG EXISTING MAIN** This item shall include the specified plug, concrete blocking and/or anchoring, labor, equipment, excavation, backfill, and restoration required to install the plug in an existing in-service main that is to remain at the location shown on the plans or as directed in accordance with the specifications. Any and all plugs on all existing in-service mains shall be paid under one bid item included in the contract regardless of size. No separate bid items will be established for size variations. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

*NOTE: This utility bid item is not to be paid on new main installations or abandoned mains. This pay item is to plug existing in-service mains only. Plugs on new mains are incidental to the new main just like all other fittings.*

*NOTE: Plugging of existing abandon mains shall be performed and paid in accordance with Section 708.03.05 of KYTC Standard Specifications For Road And Bridge Construction and paid using Bid Code 01314 Plug Pipe.*

**W PRESSURE REDUCING VALVE** This description shall apply to all pressure reducing valves (PRV) of every size required in the plans and specifications except those bid items defined as “Special”. Payment under this description is to be for PRVs being installed with new main. This item includes the PRV as specified in the plans and specifications, polyethylene wrap (if required by specification), labor, equipment, excavation, anchoring (if any), pit or vault, backfill, restoration, testing, disinfection, and etc., required to install the specified PRV at the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. If required on plans and/or proposed adjoining DIP is restrained, PRVs shall be restrained. PRV restraint shall be considered incidental to the

PRV and adjoining pipe. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W PUMP STATION** This item is for payment for installation of pumps and an above or below ground structure for housing of the pumps. This item shall include all pumps, piping, fittings, valves, electrical components, building materials, concrete, any other appurtenances, labor, equipment, excavation, and backfill, to complete the pump station installation as required by the plans, standard drawings, and specifications, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LUMP SUM (LS) when complete.

**W REMOVE TRANSITE (AC) PIPE** This item shall include all labor, equipment, and materials needed for removal and disposal of the pipe as hazardous material. All work shall be performed by trained and certified personnel in accordance with all environmental laws and regulations. Any and all transite AC pipe removed shall be paid under one bid item included in the contract regardless of size. No separate bid items will be established for size variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

**W SERVICE LONG SIDE** This bid item description shall apply to all service line installations of every size bid up to and including 2 inch inside diameter, except those service bid items defined as "Special". This item includes the specified piping material, main tap, tapping saddle (if required), and corporation stop materials, coupling for connecting the new piping to the surviving existing piping, encasement of 2 inches or less internal diameter (if required by plan or specification), labor, equipment, excavation, backfill, testing, disinfection, and restoration, at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready for use. This bid item is to pay for service installations where the ends of the service connection are on opposite sides of the public roadway and the service line crosses the centerline of the public roadway as shown on the plans. The length of the service line is not to be specified. Payment under this item shall not be restricted by a minimum or maximum length. The contractor shall draw his own conclusions as to the length of piping that may be needed. Payment under this item shall include boring, jacking, or excavating across the public roadway for placement. Placement of a service across a private residential or commercial entrance alone shall not be reason to make payment under this item. Private or commercial entrances shall not be considered a public roadway in defining payment under this item. This pay item does not include installation or relocation of meters. Meters will be paid separately. No additional payment will be made for rock excavation or for special bedding required in rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W SERVICE SHORT SIDE** This bid item description shall apply to all service line installations of every size up to and including 2 inch internal diameter, except those service bid items defined as "Special". This item includes installation of the specified piping material of the size specified on plans, encasement of 2 inches or less internal diameter (if required by plan or specification), main tap, tapping saddle (if required), corporation stop, coupling for connecting the new piping to the surviving existing piping, labor, equipment, excavation, backfill, testing, disinfection, and restoration, at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and

ready for use. This bid item is to pay for service installations where both ends of the service connection are on the same side of the public roadway, or when an existing service crossing a public roadway will remain and is being extended, reconnected, or relocated with all work on one side of the public roadway centerline as shown on the plans. The length of the service line is not to be specified and shall not be restricted to any minimum or maximum length. Payment shall be made under this item even if the service crosses a private residential or commercial entrance; but, not a public roadway. Private or commercial entrances shall not be considered a public roadway in defining payment under this item. The contractor shall draw his own conclusions as to the length of piping that may be needed. This pay item does not include installation or relocation of meters. Meters will be paid separately. No additional payment will be made for rock excavation or for bedding required in rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W SERVICE RELOCATE** This item is for the relocation of an existing water service line where a meter is not involved, and where an existing service line can easily be adjusted by excavating alongside and moving the line horizontally and/or vertically a short distance without cutting the service line to avoid conflicts with road construction. This item shall include excavation, labor, equipment, bedding, and backfill to relocate the line in accordance with the plans and specifications complete and ready for use. Payment under this item shall be for each location requiring relocation. Payment shall be made under this item regardless of service size or relocation length. No separate pay items will be established for size or length variation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W STRUCTURE ABANDONMENT** This item is to be used to pay for abandonment of larger above or below ground water structures such as meter vaults, fire pits, pump stations, tanks, and etc. Payment under this item shall not be limited to size or scope; however structures with connecting pipes of 2 inches or less shall not be paid under this item; but, shall be considered incidental to water construction, (i.e., abandonment of standard water meters up to and including 2 inches would not be paid under this item). Payment under this item shall include all labor, equipment, and compacted fill or flowable fill for abandonment of the structure in place and restoration complete. No separate bid items will be established for size or structure variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W STRUCTURE REMOVAL** This item is to be used to pay for removal of larger above or below ground water structures such as meter vaults, fire pits, pump stations, tanks, and etc. Payment under this item shall not be limited to size or scope; however structures with connecting pipes of 2 inches or less shall not be paid under this item; but, shall be considered incidental to water construction, (i.e., removal of standard water meters up to and including 2 inches would not be paid under this item). Payment under this item shall include all labor, equipment, and compacted backfill for removal of the structure and restoration complete. No separate bid items will be established for size or structure variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W TAPPING SLEVE AND VALVE SIZE 1 OR 2** This item shall include the specified tapping sleeve, valve, valve box, concrete pad around valve box (when required in specifications or plans), labor, and equipment to install the specified tapping sleeve and valve, complete and ready for use in accordance with

the plans and specifications. The size shall be the measured internal diameter of the live pipe to be tapped. The size tapping sleeve and valve to be paid under sizes 1 or 2 shall be as follows:

Size 1 = All live tapped main sizes up to and including 8 inches

Size 2 = All live tapped main sizes greater than 8 inches

Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W TIE-IN** This bid description shall be used for all main tie-in bid items of every size except those defined as "Special". This item includes all labor, equipment, excavation, fittings, sleeves, reducers, couplings, blocking, anchoring, restoration, disinfection, testing and backfill required to make the water main tie-in as shown on the plans, and in accordance with the specifications complete and ready for use. Pipe for tie-ins shall be paid under separate bid items. This item shall be paid EACH (EA) when complete.

**W VALVE** This description shall apply to all valves of every size required in the plans and specifications except those bid items defined as "Special". Payment under this description is to be for gate or butterfly valves being installed with new main. This item includes the valve as specified in the plans and specifications, polyethylene wrap (if required by specification), labor, equipment, excavation, anchoring (if any), valve box and valve stem extensions, backfill, concrete pad around valve box (if required by specification), restoration, testing, disinfection, and etc., required to install the specified valve at the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. If required on plans and/or proposed adjoining DIP is restrained, valves shall be restrained. Valve restraint shall be considered incidental to the valve and adjoining pipe. This description does not apply to cut-in valves. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W VALVE ANCHOR EXISTING** This bid item is intended to pay for installation of restraint hardware on an existing valve where no restraint exists to hold the valve in place to facilitate tie-ins and other procedures where restraint is prudent. This work shall be performed in accordance with water specifications and plans. This bid item shall include all labor equipment, excavation, materials and backfill to complete restraint of the designated valve, regardless of size, at the location shown on the plans, complete and ready for use. Materials to be provided may include, but is not limited to, retainer glands, lugs, threaded rod, concrete, reinforcing steel or any other material needed to complete the restraint. Should the associated valve box require removal to complete the restraint, the contractor shall reinstall the existing valve box, the cost of which shall be considered incidental to this bid item. No separate bid items are being provided for size variations. All sizes shall be paid under one bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W VALVE BOX ADJUST** Includes all labor, equipment, valve box and valve stem extensions (if required), excavation, backfill, concrete pad around valve box (when specified in specifications or plans), restoration, and etc., to adjust the top of the box to finished grade complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W VALVE CUT-IN** This bid description is for new cut-in valve installations of all sizes where installation is accomplished by cutting out a section of existing main. This item shall include cutting the existing pipe, supplying the specified valve, couplings or sleeves, valve box, concrete pad around valve box (when required in specifications or plans), labor, equipment, and materials to install the valve at the locations shown on the plans, or as directed by the engineer, complete and ready for use. Any pipe required for installation shall be cut from that pipe removed or supplied new by the contractor. No separate payment will be made for pipe required for cut-in valve installation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W VALVE VAULT** This item is for payment for installation of an underground structure for housing of specific valve(s) as required by the plans and specifications. This item shall include all labor, equipment, excavation, concrete, manhole castings or doors, the specified valve(s), all piping, and fitting materials associated with installing a functioning valve vault in accordance with the plans, standard drawing, and specifications, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

# WATER MAIN SPECIFICATIONS

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- **Owners:** Boone County Water District  
2475 Burlington Pike  
Burlington, Kentucky 41005-0018  
Ph. (859) 586-7270
  
- **Description:** Water Main Relocation
  
- **Location:** Boone County  
KY. 338 and U.S. 25 Interchange  
Kentucky Transportation Cabinet  
Road Widening Project  
Item No. 06-18.00
  
- **Date:** July 24, 2019

# Water Specifications

## Section I

### GENERAL INSTRUCTIONS AND SPECIAL NOTES

1. **WATER SHUTDOWNS:** No customer of Boone County Water District shall be without water for a period longer than 4 hours unless approved by Boone County Water District. All customers to be without water shall be notified 24 hours in advance. No active water main shall be shut down without prior approval of Boone County Water District. Tie-ins on this project may have to be scheduled at night, on weekends or other off peak hours.
2. **FIRE HYDRANT DISCONNECTION:** No fire hydrant shall be removed from service without prior approval of Boone County Water District, and the proper fire authority.
3. **WATER MAIN INSPECTION:** Boone County Water District and their inspectors, and the resident engineer and his inspectors shall be jointly responsible for inspection of water line facilities installation. Where the phrase "as directed" appears in these specifications without defining who is doing the directing, it shall be understood "as directed" means jointly directed by the Resident Engineer and Boone County Water District.
4. **PRIOR INSPECTION OF EXISTING METER SETTINGS:** The Contractor with the Boone County Water District's inspector shall make an inspection of all meter settings to adjusted or relocated prior to construction. Any meter setting not up to Boone County Water District standard shall be noted and parts furnished to the Contractor by the Boone County Water District for installation as needed. Any water meter setting, fire hydrant or any other water facilities that are to be relocated, adjusted, reused or remain and are damaged by the Contractor shall be repaired at the contractor's expense. Any old water meter settings removed and not reused shall be turned over to the Boone County Water District.
5. **SPECIAL BACKFILL NOTE:** No sand or granular material shall be used for backfill above (12") over the top of the pipe or around structures. Only compacted soil or flowable fill shall be used unless approved or otherwise directed by the Resident Engineer.
6. **GENERAL SAFETY:** For the security and safety of people in and adjacent to trenches or construction operations, the "Manual of Accident Prevention in Construction" published by the Associated General Contractors Association of America, the "Manual On Uniform Traffic Control Devices" published by the Federal Highway Administration, and the safety regulations of the appropriate state and local agencies shall be followed when specifically applicable, or by similarity of operation or as necessary for adequate protection.
7. **MATERIAL HANDLING:** Pipe, fittings, valves, hydrants, and accessories shall be loaded, unloaded, and handled by lifting with hoists or skidding so as to avoid



shock or damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against other pipe.

8. **PROTECTION OF PAVEMENT:** Where main construction is located in or adjacent to pavements, all construction equipment shall have rubber tires. Crawler equipment will be permitted when there is no danger of damaging pavement.
9. **NOISE, DUST AND ODOR CONTROL:** The Contractors construction activities shall be conducted so as to eliminate all unnecessary noise, dust, and odors. The use of oil or other materials, for dust control, which may cause tracking, will not be permitted.
10. **EXCAVATION AND CONSTRUCTION MATERIALS:** All excavated material and all construction materials in prosecution of the work shall be deposited so as not to endanger the work, create unnecessary annoyance to the public, or interfere with natural drainage courses. During the course of the work, all material piles shall be kept trimmed up and maintained in a neat, workmanlike manner. All material piles shall be kept a reasonable distance away from roadways so as not to cause a hazard and block the motorist's view.
11. **PROTECTION OF TREES, SHRUBS, AND OTHER ITEMS TO REMAIN:** Special care shall be taken by the Contractor to avoid unnecessary damage to trees or shrubs and their root systems or any other items shown to remain. Should the Contractor do unnecessary damage to any item shown to remain, the item shall be repaired or replaced at the contractor's expense. Should unnecessary damage be caused to items to remain and is determined not repairable, the Contractor shall compensate the owner for the loss if any.
12. **UNACCEPTABLE EXCAVATED TRENCH MATERIAL:** Any excavated trench material which is determined unacceptable for backfill shall be removed from the area and wasted at a location acquired by the Contractor and approved by the Resident Engineer. Acceptable backfill material shall be acquired by the Contractor at a location approved by the Resident Engineer. The disposition and handling of unacceptable material and the acquisition and handling of acceptable material shall be at the Contractors expense.
13. **BLASTING ROCK:** Blasting of rock shall not be permitted on this project.
14. **ABANDONED VALVES:** The valve boxes shall be removed from all abandoned valves prior to final roadway paving. This shall be done to the satisfaction of the Engineer. Paving over a valve box without removing same will not be acceptable. No separate payment will be made for removal of valve boxes but shall be considered incidental to water line construction.
15. **CONSTRUCTION PROCEDURE:** The successful contractor to prepare construction procedure with respect to the installation of water utilities. The Sequence and Procedure of Water Utilities Construction shall be approved by the Boone County Water District's Engineering Department and KYTC Section Engineer prior to the beginning of the water utilities relocations.

## Section II

### MATERIAL SPECIFICATIONS

1. **CONCRETE:** All concrete shall be Class A in accordance with KYDOH Standard Specs. for Road and Bridge Construction current edition and shall be placed in accordance with same unless otherwise noted. The concrete shall be placed to the dimensions as required in the plans or specifications. Reinforcing steel shall be placed in the concrete as required in the plans or specifications.
2. **CONCRETE REINFORCING STEEL:** All reinforcing steel shall be Grade 40. The size, location, placement, and quantity shall be as required in the plans or specifications.
3. **WATER MAIN**

A-1. **DUCTILE IRON PIPE:** Ductile iron pipe shall meet the requirements of ANSI A21.51 (AWWA C151)

1. **Material:** The chemical constituents shall meet the physical property recommendations of ASTM A536 to ensure that the iron is suitable for satisfactory drilling and cutting.
2. **Minimum Thickness:** Unless otherwise shown on the plans, the minimum thickness of the barrel of the pipe shall be Class 50. All pipe shall be clearly marked as to class by the manufacturer.
3. **Coating and Lining:** The pipe shall be coated outside with a bituminous coating in accordance with ANSI A 21.51 (AWWA C151) and lined inside with cement mortar and seal coated in accordance with ANSI A21.4 (AWWA- C104).
4. **Fittings & Glands:** Fittings and glands shall be ductile iron as specified in Section 3A, "Ductile Iron Fittings".
5. **Polyethylene Encasement:** Ductile Iron Pipe shall be encased with Polyethylene film conforming to ANSI A21.5 (AWWA C105)

A-2. **POLYVINYL CHLORIDE PIPE** – Polyvinyl Chloride Pipe shall meet the requirements of ANSI/AWWA C900-81, "Polyvinyl Chloride (PVC) Pressure Pipe (DR 14), 4 in. through 12 in., for water."

Three inch Blue Magnetically Detectable Tape is required in the trench above water main as specified on detail.

B. **PIPE JOINTS**

1. **Push on and Mechanical:** Push-on and mechanical joints including accessories shall conform to ANSI A21.11 (AWWA-C111). Bolts shall be high strength COR-10 tee head with hex nuts. The maximum deflection at push-on joints and/or mechanical joints shall be 5 degrees or as recommended by the Manufacturer.
2. **Flanged:** Flanged joints shall meet the requirements of ANSI A21.15 (AWWA C115) or ANSI B16.1
  - a. **Gaskets:** All flanged joints shall be furnished with 1/16 inch thick full face red rubber.
  - b. **Bolts:** Bolts shall have American Standard heavy unfinished hexagonal head and nut dimensions all as specified in ANSI B18.2. For bolts of 1-3/4 inches in diameter and larger, bolt studs with a nut on each end are recommended. Material for bolts and nuts shall conform to ASTM A307, Grade B.
3. **Restrained:** If restrained joint system is required on the plans, all pipes, bends, valves, etc. shall be restrained. Restrained joints shall consist of a device to provide a flexible, tied joint. Acceptable devices would be a clamp type joint or bell-bolt flexible tied joint or approved equal. Method of restraining and laying schedule shall be approved by the Engineer prior to the start of the project. Manufacturer installation instructions shall be followed. Restrained joints shall be capable of withstanding a maximum joint pressure of 14 kg/sq.cm (200 psi.) unless otherwise noted.
  - a. **Bell and Spigot:** Bell and spigot joints shall conform to ANSI A21.6.
  - b. **Push-on:** Restrained push-on joints shall conform to ANSI A21.11 (AWWA C111). When bolts and nuts are required, they shall be corrosion resistant high strength steel. **Mechanical joints with retainer gland and Lok-Set joints are not acceptable unless otherwise specified.**

4. **FITTINGS**

- A. **DUCTILE IRON FITTINGS:** Ductile Iron Compact Fittings and accessories shall conform to AWWA C153 and Full Body Fittings - and accessories to AWWA C110. Bolts and nuts shall be high strength, corrosion resistant alloy, such as "Cor-Ten" or approved equal.
  1. **Working Pressures:** All fittings and accessories shall be Ductile Iron, rated for a minimum of 14 kg/sq.cm (200 psi) working pressure or as specified herein. The fittings and accessories shall be new and unused. (NOTE: Certain areas of the District's service area require materials used, to be of a higher working pressure than 14 kg/sq.cm (200 psi.)

2. **Coating and Lining:** The fittings shall be coated outside with a bituminous coating in accordance with ANSI A21.10 (AWWA C110) and lined inside with cement mortar and seal coated in accordance with ANSI A21.4 (AWWA C104).
3. **Fittings and Glands:** All pipe fittings shall be mechanical joint fittings. Mechanical joints shall conform to AWWA C111.
4. **Polyethylene Encasement:** Ductile Iron Fittings shall be encased with polyethylene film conforming to ANSI A21.5 (AWWA C105)

B. **JOINTS**

1. **Mechanical:** Mechanical joints including accessories shall conform to ANSI A21.11 (AWWA C111). Glands shall be ductile iron. Bolts shall be high strength COR-10 tee head with hex nuts.
2. **Flanged:** Flanged joints shall meet the requirements of ANSI A21.15 (AWWA C115) OR ANSI B16.1 and be used with the express approval of the Engineer.
  - a. **Gaskets:** All flanged joints shall be furnished with 1/16 inch thick full face red rubber.
  - b. **Bolts:** Bolts shall be stainless steel and have American Standard heavy unfinished hexagonal head and nut dimensions all as specified in ANSI B18.2. For bolts of 1-3/4 inches in diameter and larger, bolt studs with a nut on each end are recommended. Material for bolts and nuts shall conform to ASTM A307, Grade B.
3. **Restrained:** If restrained joints is shown on the plans, all pipe, bends, valves, etc. shall be restrained.
  - a. **Bell and Spigot:** Bell and spigot joints shall conform to ANSI A21.6.

5. **POLYETHYLENE WRAP**

All ductile iron pipe, fittings, valves, and fire hydrant leads shall be polyethylene wrapped, installed according to the current edition of AWWA C105. Ductile iron fittings, valves, and fire hydrant leads used in the installation of P.V.C. pipe shall be included.

- A. **MATERIAL:** Polyethylene wrap shall be a minimum of a 8-mil polyethylene tube.

- B. **INSTALLATION:** The contractor shall cut the roll in tubes 2 feet longer than a standard length of pipe. Each tube shall be slipped over the length of pipe, centering to allow a (1') overlap on each adjacent pipe section. After the lap is made, slack in the tubing shall be taken up for a snug fit and the overlay shall be secured with polyethylene tape.

Pipe shall not be wrapped and stored on site for any period of time, but wrapped and immediately placed in the trench, fittings shall be wrapped prior to installing blocking or pads. (see Standard Drawing #104) Polyvinyl chloride pipe requires no wrap. Odd shaped appurtenances such as valves, tees, fittings, and other ferrous metal pipeline appurtenances shall be wrapped by using a flat sheet of polyethylene. Wrapping shall be done by placing the sheet under the appliances and bringing the edges together, folding twice, and taping down.

## 6. **FIRE HYDRANTS**

- A. **DESCRIPTION:** The Contractor shall provide all labor, materials, tools, and equipment required to furnish and install in good workmanlike manner all fire hydrants complete and ready for service where shown on the plans or where directed by the Engineer and as specified herein.

- B. **FIRE HYDRANTS:** Fire hydrants shall conform to AWWA C502. Hydrants shall conform to the standards of the Boone County Water District as SHOWN on the plans. All fire hydrants shall have auxiliary valves for isolating water flow to the hydrant. All fire hydrants and auxiliary valves shall be positively locked to the water main by restrained joints, hydrant adapters, or other approved method.

Hydrants shall be designed to (200 psi) working pressure and shall be shop tested to (300 psi) hydrostatic pressure with the main valve both open and closed. The barrel shall have a breakable safety section and/or base bolts just above the ground line. Hydrants shall have a main valve opening of 5 1/4 inches, a 6 inch mechanical joint inlet to be suitable for setting in a trench (3' 6") deep minimum, and shall be the traffic style hydrant so that the main valve remains closed when the barrel is broken off. Hydrants shall have a dry top and shall be self draining, when the main valve is closed. Self draining hydrants shall drain to dry wells provided exclusively for that purpose. Hydrant drains shall not be connected to storm or sanitary sewers. Hydrants located in areas determined by the Engineer (flood zones) shall have all drain holes plugged prior to installation. Hydrants shall be rotatable in a minimum of eight (8) positions in 360 degrees. All hydrants shall have two (2)- two and one half (2 1/2) inch hose nozzles and one (1) steamer or pumper connection threaded to conform to Boone County Water District Standards: steamer nozzle shall be National Standard Thread and 2 1/2" outlets shall be Boone County Water District Standard Thread (Old Cincinnati Thread).

The operating nut and the nuts of the nozzle caps shall be square in shape, measuring one (1) inch from side to side. Hydrant body shall be painted yellow for areas designed for (150 psi) working pressure and red for areas in excess of (150 psi). Hydrants used in areas in excess of (150 psi) working pressure shall be designed to operate at the higher pressures and shall have independent operating valves on each 2 1/2" outlet.

All hydrants shall be right hand open, clockwise as specified in Standard Drawings and shall have a direction arrow of operation cast into the dome of the hydrant. Installation per Standard Drawing.

- C. **INSTALLATION**: The installation of fire hydrants shall be in conformance with "Mains Installation" section, paragraph "Setting Hydrants".
- D. **POLYETHYLENE ENCASEMENT**: Fire hydrant tee, anchoring pipe and part of the fire hydrant shoe shall be encased with Polyethylene film conforming to ANSI A21.5 (AWWA C105). . (See Standard Drawing)

## 7. **VALVES**

- A. **DESCRIPTION**: The Contractor shall provide all labor, materials, tools, and equipment required to furnish and install in good workmanlike manner all valves and accessories complete and ready for service where shown on the plans or where directed by the Engineer and as specified herein.
- B. **GATE VALVES**: Gate valves (6"-16") shall conform to AWWA C509 and shall be cast iron or ductile body, resilient wedge, non-rising stem with rubber "O" ring packing seals. The valves shall open by turning counter-clockwise. All valves shall have openings through the body of the same circular area as that of the pipe to which they are attached. Valves shall have mechanical joint ends unless otherwise shown on the plans or directed by the Engineer. All valves shall be designed for a working pressure of (250 psi) unless otherwise noted on the plans or in the "Supplemental Specifications". An extension stem shall be furnished if required, to bring the operating nut within (3-1/2 feet) of finished grade. Extension stems shall be securely fastened to the valve stem. The Contractor shall make all valves tight under their working pressures after they have been placed and before the main is placed in operation.
- C. **BUTTERFLY VALVES**: Unless otherwise specified (larger than 16 inches) shall be butterfly valves rated at (250 psi) working pressure and conform to the applicable portions of AWWA Standard C504, latest edition. Engineer shall approve all butterfly valves before installation. The contractor shall be required to transport all butterfly valves to the District's Warehouse for testing and pick them up after testing is completed. Valve testing will be completed at a rate of one valve per day under normal conditions, with prior notice given to the District.

1. **Body:** The valves shall be AWWA Class 250B designed for tight shut-off against a differential pressure of (250 psi). Valve bodies shall be constructed of ductile iron. Two trunnions for shaft bearing shall be integral with the valve body. The valves and appurtenances shall be suitable for buried service.
  2. **Ends:** Valves shall have mechanical joint ends and shall be furnished with high strength COR-10 tee head with hex nuts, ductile iron glands, and rubber gaskets for each mechanical joint end.
    - a. **Prestressed Concrete Pipe:** Valves for use with prestressed concrete pipe shall be furnished with victualic ends for victualic coupling Style 44, unless otherwise shown on the plans. The use of mechanical joint type valves with the proper adapter pieces on both sides of the valves are acceptable in lieu of the victualic style valve with prestressed concrete pipe.
  3. **Discs:** Valve discs of cast steel, fabricated steel, or cast bronze are not acceptable.
  4. **Seats:** Seats bonded on the discs are not acceptable.
  5. **Shaft Seals:** If stuffing boxes are utilized for shaft seals they shall be constructed of cast iron, ASTM A126. Gland assemblies shall be of cast bronze, ASTM B132. The packing gland shall be housed in a solid walled cast iron, ASTM A48, Class 40 one piece structure or equal.
  6. **Operators:** The valve operating mechanism shall be for counterclockwise opening. There shall be no external moving parts on valve or operator except the operator input shaft. Input shaft is to be operated by a (2") square operating nut. Maximum required input force on the operator shaft to open and close the valve shall be 40 pounds. The total number of turns applied to the operating nut required to completely open the valve from a completely closed position shall not be less than twice the normal valve diameter. An extension stem shall be furnished to bring the operating nut within (3 1/2 feet) of the finished grade. Extension stems shall be securely fastened to the valve stem.
- D. **TAPPING SLEEVES AND VALVES:** Tapping sleeves and valves shall be designed for a working pressure of (250 psi). The tapping sleeve together with the tapping valve shall be tested at (250 psi) for visible leakage and pressure drop before the main is tapped. Tapping sleeve and valve used in high pressure areas shall be tested at (350 psi).
1. **Tapping Sleeves:** Tapping sleeves shall be two piece with mechanical joint type ends, and be so designed as to assure uniform gasket pressure and permit centering of the sleeve on the pipe.
  2. **Tapping Valves:** Tapping valves shall have a flange on one end for bolting to the tapping sleeve and a mechanical joint type end connection on the outlet with slotted standard flange or other adapters

for connection to the tapping machine. The valves shall open by turning counterclockwise. Tapping valves shall conform to AWWA C509.

- E. **VALVE BOXES:** All valves shall be provided with valve boxes. Valve boxes shall be of standard, adjustable, heavy duty cast iron extension type, two piece, 5 1/4 inch shaft, screw type, and of such length as necessary to extend from valve to finished grade, Tyler #562-S, Tyler #564-S or approved equal. Valve box cover shall be stamped "Water". Tops shall be set at final established grade.
- F. **AIR RELEASE AND VACUUM VALVES:** Air release valves shall be constructed at high points in the water line as indicated on the plans. These valves shall permit the air in the pipeline to escape as the pipe line fills and allows the air to re-enter as the line empties. These valves shall be APCO Air Release Valves Model #200-A, (250 psi) working pressure, (1"), cast iron body and cover. (16") and larger water mains shall be a (2") air release valve and curb stop. Refer to Standard Drawing for reference.

8. **STEEL CASING PIPE**

Casing pipe shall be steel pipe with a minimum yield strength of (35,000 psi) with a minimum wall thickness as listed below:

Nominal Diameter Casing Pipe	Normal Wall Thickness
Under (14")	0.251"
(14"&16")	0.282"
(18")	0.313"
(20")	0.344"
(22")	0.375"
(24")	0.407"
(26")	0.438"
(28"&30")	0.469"
(32")	0.501"
(34"&36")	0.532"
(38,40&42")	0.563"
(48")	0.626"

The inside diameter of the casing pipe shall be at least (4") greater than the outside diameter of the carrier pipe joints. Steel casing sections shall be connected by welding, conforming to AWWA C206.



Adequate pipe spacers shall be installed to ensure that the carrier pipe is adequately supported in the center of the casing pipe throughout its length, particularly at the ends. There shall not be any metallic contact between the casing and carrier pipe. Casing shall be backfilled with pea gravel or sand after the carrier pipe is installed to prevent pipe movement. Casings shall have both ends sealed up in such a way as to prevent the entrance of foreign material. See Standard Drawing for installation details.

9. **MATERIAL APPROVAL:** Material certification and test samples shall be provided by the Contractor, at the contractor's expense, as required by Boone County Water District and the Kentucky Department of Highways. No material shall be used until approved. All rejected material be removed from the project and approved material acquired by the Contractor at the Contractor's expense.
10. **PAVING MATERIALS FOR REPLACEMENT IN-KIND:** All materials for replacement in-kind of streets, sidewalks, curbs, walls etc. shall meet the requirements of the applicable sections of KYDOH Standard Specifications For Road And Bridge Construction.
11. **FLOWABLE FILL:** This material shall meet the requirements Section 601.03.03 of the Kentucky Department of Highways' Standard Specifications for Road and Bridge Construction.

## Section III

### CONSTRUCTION

- A. **GENERAL**: Installation of water mains and appurtenances shall conform to the latest edition of AWWA Standard C600 for D.I.P.

Water main pipe and fittings shall be laid on a good level foundation with no gaps or humps under the pipe or fittings. Excavation shall be done by hand at joints to prevent the pipe and fittings from being supported by the mechanical joint or slip joint bell. Pipe shall be laid with the bell ends facing in the direction of laying.

The interior of the pipe shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations. ALL OPEN ENDS ARE TO BE CLOSED WITH CAPS OR PLUGS AT ALL TIMES WHEN PIPE LAYING OPERATIONS ARE NOT IN OPERATION AND AT THE END OF THE DAY. All caps or plugs shall be properly installed and blocked in advance of filling, flushing, and testing mains. All securing and blocking shall be inspected by the Engineer prior to backfilling of ditch.

- B. **HANDLING**: Pipe, fittings, valves, hydrants and accessories shall be loaded and unloaded by lifting with hoists or skidding so as to avoid damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against other pipe. Pipe hooks that extend inside the ends of the pipe shall not be used for handling the pipe since they could damage the lining. Under no circumstances shall such materials be dropped. The interior of all pipes, fittings and other accessories shall be kept free from dirt and foreign material at all times. When handling P.V.C. pipe, care should be taken to avoid abrasion damage, gouging of the pipe, rocks, and any stressing of the bell joints or damage of the bevel ends.
- C. **TREE REMOVAL**: Stumps of trees designated for removal (12") in diameter and smaller shall be physically removed. Any stump larger than (12") shall be ground down to (6") below final grade level.
- D. **DEWATERING**: Should water be encountered, the Contractor shall furnish and operate suitable pumping equipment of such capacity adequate to dewater the trench. The trench shall be sufficiently dewatered so that the laying and joining of the pipe is made in the dry. The Contractor shall convey all trench water to a natural drainage channel or storm sewer without causing any property damage.
- E. **CONSTRUCTION EQUIPMENT**: Where mains are located in or adjacent to pavements, all backfilling and material handling equipment shall have rubber tires. Crawler equipment shall be permitted when there is no danger of damaging pavement.
- F. **TRENCH SUPPORT**: Supporting open cuts for mains shall be the responsibility of the Contractor where trenching may cause unnecessary damage to street pavement, trees, structures, poles, utilities, or other private or public property. During the progress of the work, whenever and wherever it is necessary, the

Contractor shall, at his expense, support the sides of the excavation by adequate and suitable sheeting, shoring, bracing, or other approved means. Such trench support material and equipment shall remain in place until backfilling operations have progressed to the point where the supports may be withdrawn without endangering property.

G. **NOISE DUST AND ODOR CONTROL:** The Contractor's construction activities shall be conducted so as to eliminate all unnecessary noise, dust and odors.

H. **DISINFECTION AND LEAKAGE TESTING:** See Section "Disinfection and Leakage Testing."

I. **TRENCH EXCAVATION AND BOTTOM PREPARATION**

1. **General:** The Contractor shall perform all excavation of every description and of whatever substances encountered to the depths indicated on the drawings or as otherwise specified. During excavation material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. All excavated materials not required or suitable for backfill shall be removed and wasted at a site acquired by the Contractor and approved by the Engineer. Topsoil shall be stripped from the excavation area before excavation begins.

Such grading shall be done as may be required to prevent surface water from flowing into trenches or other excavations, and any water accumulating therein shall be removed by pumping or other approved methods. The trench shall be sufficiently dewatered so that the laying and joining of pipe is made in the dry. The Contractor shall take whatever action necessary to insure that water pumped from the trench will not damage private property. If necessary the Contractor shall haul trench water to another suitable location for disposal.

Such sheeting and shoring shall be furnished and installed by the Contractor, at his own expense, as may be necessary for the protection of the work, protection of other utilities, protection of structures, the safety of the personnel, and the safety of the public. All shoring shall be removed when the work is completed unless directed otherwise by the Engineer. The Contractor shall also furnish whatever barricades or fencing necessary to provide for the safety of pedestrians in excavation areas and for traffic control as discussed in other sections. All open trenches shall be adequately covered, barricaded and/or backfilled during non-working hours in order to adequately protect vehicular and pedestrian traffic.

The Contractor shall excavate whatever material encountered. Trenches shall be excavated to the widths shown in the table headed "Trench Width" or as otherwise indicated in the plans, and the banks shall be as nearly vertical as practicable. The bottom of the trenches shall be accurately graded to provide uniform bearing and support for each section of the pipe or conduit on undisturbed soil at every point along its entire length, except for bell holes and for the proper sealing of the pipe joints. Bell holes and

depressions in order that the pipe rest upon the prepared bottom for as nearly its full length as practicable, shall be only of such length, depth, and width as required for properly making the particular type of joint. Additional depth shall be excavated in rock as described elsewhere herein.

Except in cases where the elevations of the water lines are indicated on the plans, trenches for water line shall be of a depth that will provide a minimum cover over the top of the pipe of (36 inches) from the indicated finished grade, and avoid interference of the water lines with other existing or proposed utilities. Where the note occurs, "Slope to Drain", the Contractor shall manage to keep a positive slope in that direction in order that air may travel to the air vent. Where paved surfaces are to be disturbed by an open cut, the Contractor shall provide suitable machinery to cut the edges of the pavement in a smooth straight line.

2. **Rock**: The word "rock" wherever used as the name of an excavated material, shall mean boulders and solid masonry larger than (1/2 cubic yard) in volume, or solid ledge rock and masonry which, in the opinion of the Engineer, requires for its removal, drilling and blasting, wedging, sledging, barring, or breaking up with a power operated hand tool. Any material which can be excavated using a hand pick and shovel, power operated excavator, power operated backhoe or power operated shovel shall not be defined as rock.
3. **Blasting Rock**: No blasting of rock shall be permitted this job.
4. **Trench Width**: Widths of trenches shall be held to a minimum to accommodate the pipe and appurtenances. The trench width shall be measured at the top of the pipe barrel and shall conform to the following limits:

**Earth**

- a. Minimum - outside diameter of the pipe barrel plus (8 inches), (4 inches) each side of pipe.

Maximum - nominal pipe diameter plus (24 inches).

**Rock**

Minimum – (24") or less, nominal pipe size: outside diameter of pipe barrel plus (12"), @ (6") each side.

Minimum - Larger than (24"), nominal pipe size: outside diameter of pipe barrel plus (18"), @ (9") each side.

Maximum - nominal pipe diameter plus (24").

- b. **Butterfly Valves**:. Trench width shall be over excavated (24") on the side that the operating mechanism is located on the butterfly valve when the surrounding area cannot be hand dug.

- c. **Structures:** The minimum excavation limits for structures shall be as indicated. In rock, the excavation limits shall not exceed (12 inches) from the outside wall and (6 inches) below the footer.
5. **Excessive Trench Width:** If, for any reason the trench width exceeds the maximum trench width defined in paragraph "Trench Width", the Contractor, subject to approval of the Engineer, shall provide compacted stone bedding, additional strength pipe or concrete encasement, at the contractor expense.
6. **Bottom Preparation:** The Contractor shall use excavation equipment that produces an even foundation. For the entire length of the trench, a compacted layer of sand bedding material shall be installed below the pipe. Bell holes and depressions for joints, valves, and fittings shall be dug after the trench bedding has been graded in order that the pipe rest upon the prepared bedding for as nearly its full length as practicable. Bell holes and depressions shall be only of such length, depth, and width as required for properly making the particular type of joint.
- a. **Earth:** The trench shall be excavated to the depth required, so as to provide a uniform and continuous bearing and support for the pipe barrel. A minimum of a (6") sand shall be installed on the solid and undisturbed ground. The finished trench bottom shall be accurately prepared by means of hand tools.
- b. **Rock.** Where excavation is made in rock or boulder, the trench shall be excavated 6 inches below the pipe barrel for pipe (24 inches) in diameter or less, and inches for pipe larger than (24 inches) in diameter. All loose material shall be removed from the trench bottom. After preparation of the trench bottom, a pipe bed shall be prepared using sand and thoroughly compacted. The bedding material shall be spread the full width of the trench bottom.
7. **Water Main Depth:** Mains (12") and less in size shall be not less than (36") in depth and no more than (48") in depth, unless otherwise specified. Mains larger than (12") shall be installed as shown on the plans.
8. **Excessive Trench Depth:** If, for any reason, the trench depth exceeds the trench depth shown on the Plans, the Contractor is responsible for any and all additional cost incurred for the excessive depth.

9. **Foundation:** The mains are to be built on a good foundation. If, in the Engineer's opinion, the material forming the trench bottom is not suitable for a good foundation, a further depth shall be excavated and the same filled with suitable material. Unauthorized excavation below the trench bottom shall be filled with compacted crushed stone at the Contractor expense.

J. **PIPE, VALVE, HYDRANT AND METER SETTING INSTALLATION**

The provisions of AWWA C600 shall apply in addition to the following:

1. Pipe shall not be laid in water or when trench or weather conditions are unsuitable for the work except when permitted by the Engineer. Unless otherwise indicated in the plans or in Section I, Bid Item Explanations, the material shall be new and unused. The interior of the pipe shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved methods. Pipe shall be laid with bell ends facing in the direction of laying, unless otherwise directed by the Engineer. After placing a length of pipe in the trench, the spigot end shall be centered in the bell of the pipe and forced home. All pipe shall be laid with ends abutting and true to line and grade. Deflection of pipe joints in excess of the manufacturer's recommendations will not be permitted. A watertight pipe plug or bulkhead shall be provided and used to prevent the entrance of foreign material whenever pipe laying operations are not in progress. Any pipe that has the grade or joint disturbed after laying shall be taken up and relaid. Any section of pipe found to be defective before or after laying shall be removed and replaced at the Contractor's expense.
2. **Pipe Cutting:** The cutting of pipe for installing valves, fittings, or hydrants shall be done in a neat and workmanlike manner without damage to the pipe or lining. The end shall be smooth and at right angles to the axis of the pipe. Flame cutting of metal pipe by means of an oxyacetylene torch shall not be permitted. All pipe cutting shall be at the Contractor's expense.
3. **Push-On Joints:** The surfaces with which the rubber gaskets comes in contact shall be thoroughly cleaned just prior to assembly. The gasket shall then be inserted into the groove in the bell. Before starting joint assembly, a liberal coating of special lubricant shall be applied to the spigot end. (Special lubricant shall be suitable for use in potable water) With the spigot end centered in the bell, the spigot end is pushed home.
4. **Mechanical Joints:** Mechanical joints require that the spigot be centrally located in the bell. The surfaces with which the rubber gasket comes in contact shall be thoroughly cleaned just prior to assembly. The clean surfaces shall be brushed with a special lubricant just prior to slipping the gasket over the spigot end and into the bell. (Special lubricant shall be suitable for use in potable water) The lubricant shall also be brushed over the gasket prior to installation to remove the loose dirt and lubricate the gasket as it is forced into its retaining space. P.V.C. pipe spigot ends shall be field cut smooth and at right angles to the axis of the pipe for installation in mechanical joint fittings.

- a. **Bolt Torque:** The normal range of bolt torque to be applied to standard cast iron bolts in a joint are:

RANGE OF TORQUE	
Size	In Foot - Pounds
5/8"	40 - 60
3/4"	60 - 90
1"	70 - 100
1-1/4"	90 - 120

5. **Restrained Joints**

- a. **Ball and Socket:** Ball and Socket joints shall be assembled and installed according to the manufacturer's recommendations. The joint shall be thoroughly cleaned and lubricated. Check the retainer ring fastener. After installation, all slack shall be taken out of the pipe joint.
- b. **Push-On:** Assemble and install the push-on joint according to the manufacturer's recommendations. Restrained joint-type pipe and fittings shall only be used as approval by the Engineer. Retaining glands, field lock gaskets, or retaining flanges shall not be considered as providing a restrained joint. The joint shall be thoroughly cleaned and lubricated. Check the retainer ring fastener. After installation, all slack shall be taken out of the pipe joint.

6. **Setting Valves:** Valves shall be set on a firm solid concrete block foundation so that no load will be transferred to the connecting pipe. Valves in water mains shall, where possible, be located on the street property lines extended, unless otherwise shown on the plans. A valve box shall be provided for every valve. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the operating nut of the valve. The box cover shall be set flush with the surface of the finished pavement unless otherwise shown. All valves boxes with the exception of isolating valves for fire hydrants that are located in non-paved areas shall have a minimum of (2'x2'x4") concrete pad as shown in Standard Drawing.

7. **Setting Hydrants:** Hydrants shall be located as shown on the plans or as directed by the Engineer. The location shall provide complete accessibility and minimize the possibility of damage from vehicles or injury to pedestrians. All hydrants shall stand plumb with the pumper nozzle facing the curb. Hydrant shall be set to the established grade, with the traffic flange within (4") above final grade in accordance to Standard Drawing. Each hydrant shall be controlled by an independent gate valve with valve box. All valves used for hydrant control shall be anchored to the branch tee.

8. **Thrust Blocking:** All bends over five (5) degrees, plugs, caps, and tees shall be securely blocked against movement with concrete thrust blocks placed against undisturbed earth in accordance with Standard Drawing. Thrust blocks shall be approved by the Engineer prior to backfilling. Water mains shall have concrete thrust block at all pipe intersections and changes of direction to resist forces acting on the pipeline. All concrete thrust blocks shall be poured in such a manner that the bolts can be replaced without disturbing the blocking.

All caps or plugs used in mains to undergo hydrostatic test shall be properly installed and blocked in advance of testing mains. All caps or plug installations shall be approved by the Engineer's representative before the main is subjected to the pressure test.

- a. **Concrete Blocking:** Concrete blocking shall be K.D.O.T. Class A concrete as specified in Section "Concrete". Blocking shall be placed between undisturbed ground and the fitting to be anchored. The area of bearing on the fitting and on the ground in each instance shall be that shown herein. The blocking shall, unless otherwise shown, be so placed that the pipe and fitting joints will be accessible for repair.
- b. **Tie Rods:** If shown or specified, movement shall be prevented by attaching suitable metal rods, clamps or restrained fittings. Steel tie rods or clamps, where permitted, shall be of adequate strength to prevent movement. Steel tie rods or clamps shall be painted with three coats of an approved bituminous paint or coal tar enamel. A minimum of 3/4" welded eye bolts @ a 90 degree bend and 3/4" threaded rods may only be used with the approval of the Engineer for temporary restraint only. Duc-Lucs are prohibited for use.
- c. **Restrained Fittings:** Restrained fittings, where permitted, shall be subject to the approval of the Engineer.

9. **Meter Setting Installation**

The Contractor shall furnish all labor, equipment, excavation, backfill, testing, disinfection, and restoration to install the pipe at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready for use. No additional payment will be made for rock excavation or for bedding required in rock excavation. It will be the Contractors responsibility to remove and reset the service at his own expense if he fails to notify and receive the approval from the District. Contractors work shall be warranted for a period of one year of the date of activation of each service (meter set date).



- a. **Inspection & Notification**: The Contractor shall notify all affected District customers prior to interrupting water service. The Contractor shall make 24 hours notification. Routine service inspection and final inspections will be made by the District upon request by the Contractor and in a timely manner. The Contractor shall provide the District 24 hours notification for inspection by the District. It is the Contractors responsibility to post "No Parking" signs and safety devices.
  
- b. **Installation of Service Lines**: The Contractor shall be familiar with copper piping, fittings and connections, and have available equipment to work with said materials. No sweat type fittings shall be permitted. Service line shall be installed as shown on the plans or as directed by the District. The Contractor shall excavate whatever material encountered. The service lines shall be installed using boring and jacking or open cut (as specified on the plans) at the depth required to clear existing and proposed sewers, but in no case shall the line be installed with less than 36 inches cover from final grade. The trench width shall be as excavated to a maximum of 2 feet. The line shall be laid on firm soil. In rock, sufficient extra depth shall be excavated and refilled with acceptable compacted soil or bedding sand to provide a cushion for the elimination of the possibility of crushing or perforating the pipe. Connections shall be made using normal practices for water line installation and in accordance with the standards in the plans or contained herein.
  1. **Water Service Taps**: The Contractor shall maintain a minimum of 36" cover over any tap. The corporation installed into the main shall have no more the 4 threads showing between the top of the water main and the bottom of the corporation.
  2. **Service Line**: The Contractor shall maintain a constant cover of 36" over any water line. Methods of pushing or jacking under the existing street must avoid bending or kinking the pipe. No open cuts of the pavement will be permitted unless pre-approved by the District. All copper shall be cut using a copper-tubing cutter. All connections shall be flared connections. No oil base or other contaminating materials will be used in lubricants, caulking and sealers. The Contractor shall be responsible for making all joints watertight.
  3. **Meter Vault**: All meter vaults shall be located inside existing right-of-ways or water main easements of record or as directed by the District. Typically the meter vault shall sit 5' behind the back edge of curb or edge of pavement. The Contractor shall contact the customer and determine a suitable location of the setting within the above guidelines. It is the Contractors responsibility to notify the District's Inspector if these conditions cannot be met. The District's Inspector will inspect any questionable meter setting location prior to the Contractor installing.

Meter vaults shall be set to allow the meter cover to be level with the back edge of the existing curb or the back edge of paving along roadways without curbs. It is the Contractor's responsibility to ensure that the meter vault does not settle due to poor compaction or any other reason within the Contractor's control. The Contractor at no additional expense to the District shall adjust any meter vault that sinks below grade due to poor workmanship by the Contractor to grade.

K. **TRENCH BACKFILL**

All trench backfill shall be free from cinders, refuse, organic material, boulders, rocks or other material which is unsuitable in the opinion of the Districts inspector. No backfill shall be made with frozen material.

- a. **Trench Bottom Preparation:** The pipe shall be bedded on sand to achieve full pipe barrel support. In any event not less than (6") of sand bedding shall be used.
- b. **Backfill to (12") Over Pipe Barrel:** All trench excavations shall be backfilled immediately after pipe is laid with the exception of thrust blocks. Compacted sand shall be used to backfill the trench from the bottom of the pipe barrel to the (12") over the pipe barrel. No flushing of backfill shall be permitted to achieve compaction. Clay bulkheads shall be installed as specified under Bulkheads Section.
- c. **Remaining Trench Backfill:** From (12") above the pipe barrel to the surface, compacted earth or flowable fill may be used as backfill material. No material shall be used for backfill that contains frozen earth, vegetation or organic material, debris, rocks **(8")** or larger measured in any direction, or earth with an exceptionally high void content.
- d. **Compaction:** All backfill shall be placed in uniform loose layers, not to exceed (12") layers, and each layer shall be compacted to a density not less than 95 percent of the standard Proctor maximum dry density (ASTM D698). The backfill shall be compacted in such a manner and with appropriate equipment so that there is no pipe damage, pipe misalignment or damage to joints. No flushing of backfill shall be permitted to achieve compaction.
- e. **Bulkheads:** When a granular bedding is provided in rock or when granular backfill is used, the Contractor shall place bulkheads of clay soil across the trench at (100') intervals to resist the movement of groundwater through the granular material. Such bulkheads shall be carefully compacted and shall extend approximately (3 feet) in a direction parallel to the pipe and shall extend from the bottom of the trench to a point (4") below final grade level.
- f. **Flowable Fill as Backfill:** As required Department of Highways Standard Specifications for Road and Bridge Construction.

- g. **Surface Conditions:** The trench surface shall be periodically attended to during the course of the contract. The trench surface shall be maintained in a safe condition and shall not interfere with natural drainage.
- L. **INSTALLATION OF PIPE BY BORING OR JACKING:** At certain locations where designated on the plans, the Contractor will be required to install pipe under paved areas or other obstacles by boring a hole large enough to pull the pipe through without obstructing the designated area, or by jacking, whichever is the most feasible.
- M. **WATER METERS:** Water Meters shall be installed at locations shown on the plans. The meter shall be constructed as shown on Standard Drawings contained herein or in the plans.
- N. **CONNECTIONS (TIE-INS) TO EXISTING WATER LINES:** All connections to existing water lines shall be made at location shown on the plans. Care shall be taken in each case that none of the sterilizing water may enter the system during the sterilizing operation. Each connection shall be preceded with a one inch corporation stop and drain to allow bleeding of the water line of air and sterilizing water. This corporation stop shall be furnished and installed at the Contractor's expense. All sections of pipe and appurtenances to be used for tie-ins and not sterilized shall be thoroughly cleaned by scrubbing with a chlorine solution prior to installation. All tie-ins of mains shall be done with transitional or straight solid sleeves. Mains shall be flushed of sterilizing water before tie-ins to existing mains are made.
- O. **INSTALLATION OF SERVICE LINES:** Service line shall be installed as shown on the plans or as directed. The Contractor shall excavate whatever material encountered. The service lines shall be installed using boring and jacking or open cut (as specified on the plans) at the depth required to clear existing and proposed sewers, but in no case shall the line be installed with less than (36") cover from final grade. The trench width shall be as excavated to a maximum of (2'). The line shall be laid on firm soil. In rock, sufficient extra depth shall be excavated and refilled with acceptable compacted soil or bedding sand to provide a cushion for the elimination of the possibility of crushing or perforating the pipe. Connections shall be made using normal practices for water line installation and in accordance with the standards in the plans or contained herein. Backfill shall meet the same requirements as that described in PIPE TRENCH BACKFILL.
- P. **APPLICABLE SPECIFICATIONS & STANDARDS**  
The following specifications and standards form a part of these Specification:
1. **American Water Works Association (AWWA) Standards**
  2. **Boone County Water District Standard Drawings & Specifications**
  3. **"Manual of Accident Prevention in Construction" published by the Associated General contractors of America**

4. **Kentucky Occupational Safety and Health Administration's** "Kentucky Occupational Safety and Health Standards for General Industry" current edition.
5. **American National Standards Institute (ANSI)**
6. **American Society for Testing & Materials (ASTM)**
7. **Kentucky Division of Water Quality**
8. **"Recommended Standards for Water Works"** current edition

## Section IV

### **DISINFECTION AND LEAKAGE TEST**

- A. **SCOPE**: This section covers the disinfection of the new water mains, fittings, temporary services and associated appurtenances. The Contractor shall provide all labor, materials, tools, equipment, and incidentals required to test the mains for water tightness and disinfect the mains as directed by the District and as specified herein. Gauges for the test shall be furnished by the Contractor.
- B. **TEST SECTION**: After the main has been installed and backfilled all newly installed pipe or any valved section thereof shall be considered a test section.
- C. **WITNESS**: All tests performed for each test section shall be witnessed and approved by the District before acceptance. In the event the Contractor performs any test without witness by the District, the Contractor will be required to test the section again in conformance with this specification at no cost to the District.
- D. **GENERAL**: All disinfection work shall conform to the requirements of the latest revision of ANSI/AWWA C651 and the requirements of the Kentucky Division of Water. If any State requirements conflict with the provisions of this section, the State requirements shall govern.

Water required for flushing and disinfection work will be provided as stipulated in the temporary facilities.

When it is necessary to interrupt service to water customers, each customer affected shall be notified in advance of the proposed service interruption and its probable duration in accordance with the project requirements.

- E. **DISINFECTION PROCEDURE**: During construction or after the installation of the pipe and fittings is complete, an approved disinfection method, according to governing standards, shall be used. The disinfection solution shall be allowed to stand in the main and associated appurtenances for a period of at least twenty-four (24) hours.

During disinfection, all valves, hydrants, and service line connections shall be operated to ensure that all appurtenances are disinfected. Valves shall be manipulated in such a manner that the strong disinfection solution in the main from flowing back into the supply line. Check valves shall be used if required.

All non-disinfected fittings used for tie-ins or repairs shall be cleaned and swabbed with a liquid sodium hypochlorite disinfecting solution prior to installation.

- F. **FINAL FLUSHING**: Upon completion of chlorination but before sampling and bacteriological testing, Contractor shall remove all heavily chlorinated water from the main and temporary services by flushing with potable water at the maximum velocity which can be developed under the direction and control of the District.

The Contractor shall properly neutralize and dispose of the chlorinated water and flushing water in accordance with all applicable regulations. Contractor shall obtain all special waste disposal permits necessary.

- G. **DISPOSAL OF HEAVILY CHLORINATED WATER:** Contractor shall apply a de-chlorinating agent to the water to be wasted to neutralize thoroughly the chlorine residual remaining in the water. (See the following table for neutralizing chemicals.) Federal, state, and local regulatory agencies should be contacted to determine special provisions for disposal of heavily chlorinated water.

Chlorine residual of water being disposed of shall be de-chlorinated by treating with one of the chemicals listed in the following table:

**Pounds of Chemicals Required to De-chlorinate Various Residual Chlorine Concentrations in 100,000 Gallons of Water\***

Residual Chlorine Concentration <i>mg/L</i>	Sulfur Dioxide (SO <sub>2</sub> )	Sodium Bisulfate (NaHSO <sub>3</sub> )	Sodium Sulfite (Na <sub>2</sub> SO <sub>3</sub> )	Sodium Thiosulfate (Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> @5H <sub>2</sub> O)
1	0.8	1.2	1.4	1.2
2	1.7	2.5	2.9	2.4
10	8.3	12.5	14.6	12.0
50	41.7	62.6	73.0	60.0

\* Except for residual chlorine concentration, all amounts are in pounds.

The Contractor shall provide all necessary materials, equipment and labor for applying the de-chlorinating chemical in a manner such that proper mixing and contact time of the chemical and the heavily chlorinated water is obtained for complete removal of chlorine being flushed. The Contractor shall periodically test the flush water to verify that the chlorine residual is zero.

- H. **CHLORINE RESIDUAL TESTS:** Upon completion of final flushing, the District will perform chlorine residual tests to ensure the chlorine residual in the main and temporary services is not higher than that generally prevailing in the remainder of the water distribution system and is acceptable to the District.
- I. **BACTERIOLOGICAL TESTS**
- a. After flushing has been completed and the chlorine residual is not greater than 1.2 ppm, a bacteriological sample shall be taken in accordance with the Kentucky Department of Environmental Protection Agency, Safe Drinking Water Act.
  - b. The mouth of the valve, hydrant, blow-off, etc. shall be sterilized using a propane torch or equivalent and then allowed to flow for a period of not less than 5 minutes.

- c. The standard sample shall be collected in sterile bottles, by the representative of the certified laboratory, care being taken not to contaminate the neck of the bottle or stopper during collection.
- d. This sample will then be delivered to a certified laboratory by the individual collecting the sample.
- e. Copies of the analysis shall be sent to the Boone County Water District inspector directly from the laboratories.
- f. In the event that the laboratory analysis shows bacteria present, the line shall be re-chlorinated, sterilized, flushed, and a new sample taken until such time that the line meets the Safe Drinking Water Act Standards.

- J. **REDISINFECTION:** Should the bacteriological tests indicate the presence of coliform organisms at any sampling point, the main and temporary services shall be re-flushed, re-sampled, and re-tested. If check samples show the presence of coliform organisms, the main and temporary services shall be re-chlorinated at no additional cost to the District until results acceptable to the District are obtained.

Re-disinfection shall be completed by the continuous feed or by the slug method. Unless otherwise permitted, the chlorination agent shall be injected into the main and temporary services at the supply end through a corporation cock installed in the top of the pipe. All materials, equipment and labor necessary for the re-disinfection shall be supplied by Contractor at no additional cost to the District.

- K. **HYDROSTATIC TESTING:** Hydrostatic Testing will be in accordance with AWWA C600. The water main being tested shall have all air expelled by additional flushing or installation of taps on high points in the line. The pressure of the water main shall be gradually increased to obtain a minimum pressure of (100 psi) over the design pressure (250 psi). at the lowest elevation point of the water main or as directed by the Engineer. The test will be for a two (2) hour duration and will not vary by more than (5 psi). All tests performed for each test section shall be witnessed and approved by a representative of the Engineer, in the event any test is performed without a representative of the Engineer, the Contractor shall be required to test the section again. Leakage is defined as the amount of water used to maintain the test pressure.

## Section V

### VEHICULAR AND PEDESTRIAN TRAFFIC CONTROL

1. **REFERENCE MATERIALS:** Traffic shall be maintained in accordance with the "Manual on Uniform Traffic Control" published by the Federal Highway Administration, current edition of Kentucky Department of Highways Standard Specifications for Road & Bridge Construction and current KYDOH Standard Drawings.
2. **PEDESTRIAN TRAFFIC:** Should the Contractor be required to remove sidewalk or any other pavement used by pedestrians, the Contractor shall construct an approved, safe, alternate route with acceptable paving materials. Approval for alternate routes and temporary paving materials shall be acquired from the Engineer. The Contractor shall also construct temporary barricades and fences as required. No extra payment will be made for construction of temporary pedestrian walkways, fences or barricades required for water line construction, but shall be considered incidental to water line construction.
3. **VEHICULAR TRAFFIC:** Vehicular traffic shall be maintained as required by the referenced materials listed above. The cost of all temporary paving materials for pavement restoration due to water line construction shall be considered incidental to the contract. The cost for all traffic control materials including signs, barricades, etc. shall be considered incidental to the contract. The Contractor shall be required to keep the construction area safe at all times and check that traffic control devices are in place. Should temporary paving materials used for water line construction fail to perform satisfactorily, the Contractor shall repair same at his own expense.



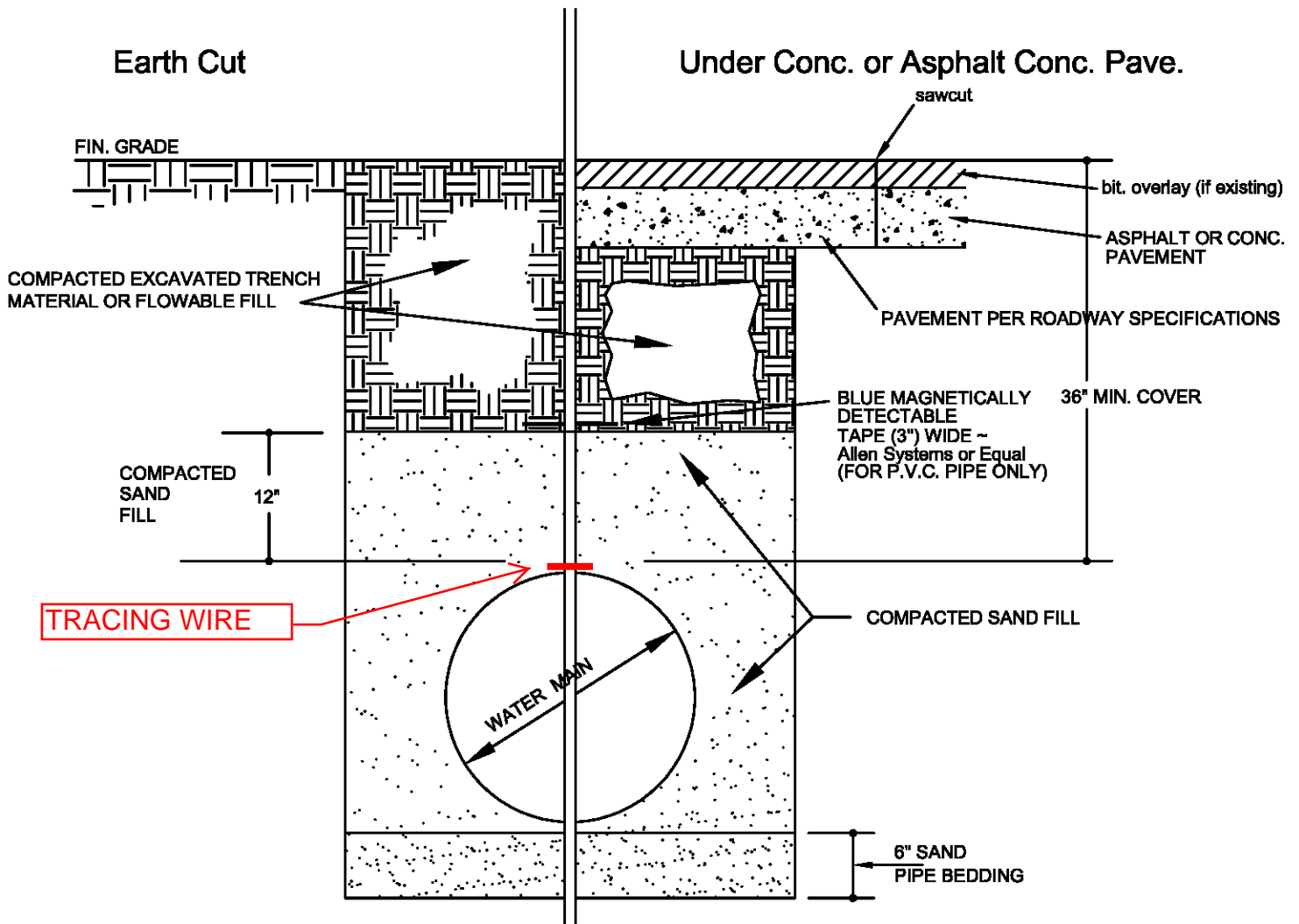
# BOONE COUNTY WATER DISTRICT

## WATER MAIN DETAILS

STANDARD DRAWINGS

Backfill of all trenches will be compacted by the Standard Proctor Methods, ASTM D 698

All areas will require compaction to 95% of maximum density or to the satisfaction of the Geo-Technical Engineer.



9/06/17

KYTC SPEC.

2

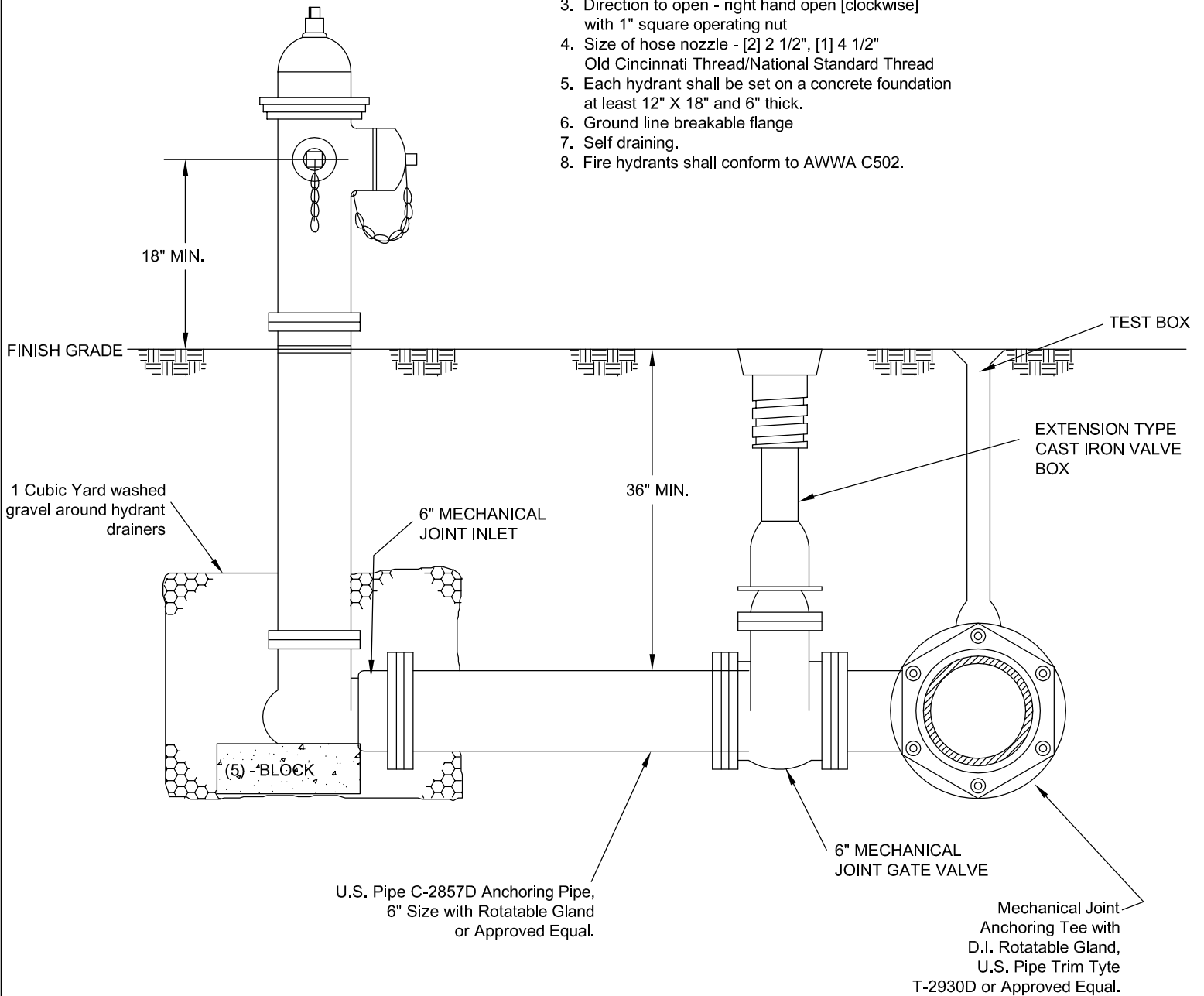
# WATER MAIN TRENCH DETAIL

BCWD

SCALE: N.T.S.

HYDRANT DATA

1. Kennedy, Mueller, M&H, American Flow Control or Clow.
2. Size of Hydrant, minimum 6 inch
3. Direction to open - right hand open [clockwise] with 1" square operating nut
4. Size of hose nozzle - [2] 2 1/2", [1] 4 1/2" Old Cincinnati Thread/National Standard Thread
5. Each hydrant shall be set on a concrete foundation at least 12" X 18" and 6" thick.
6. Ground line breakable flange
7. Self draining.
8. Fire hydrants shall conform to AWWA C502.



9/3/17

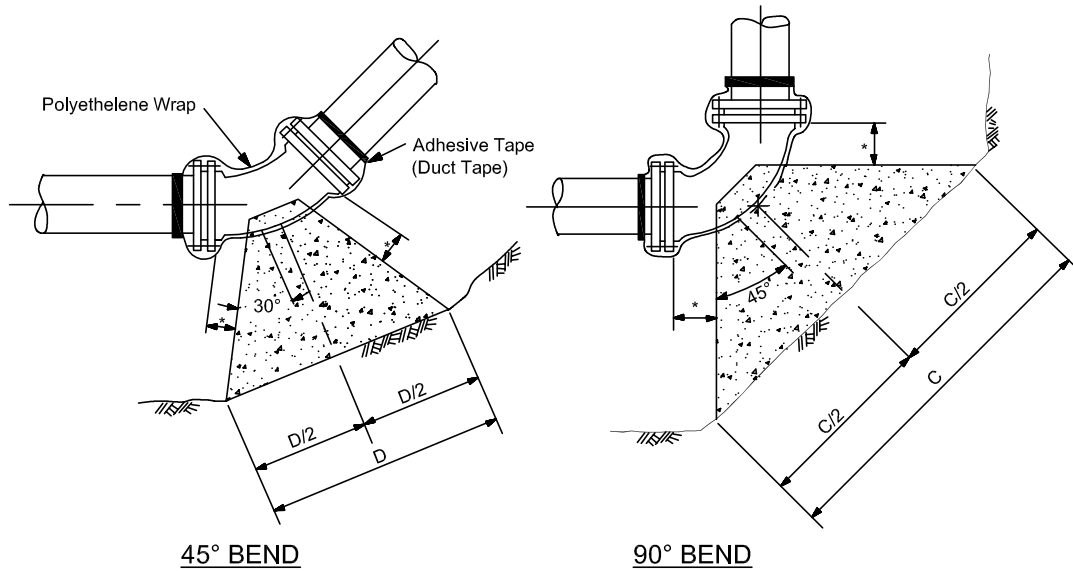
3

# HYDRANT ASSEMBLY

BCWD

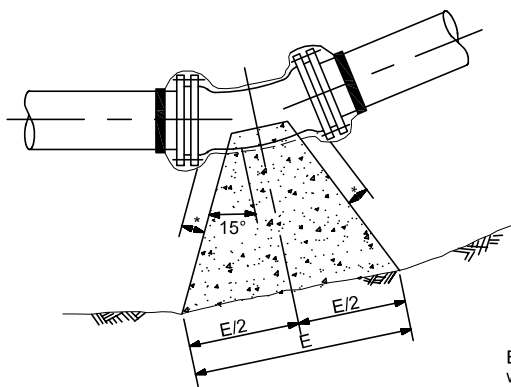
SCALE: N.T.S.

Addendum #4 -- 8-30-19

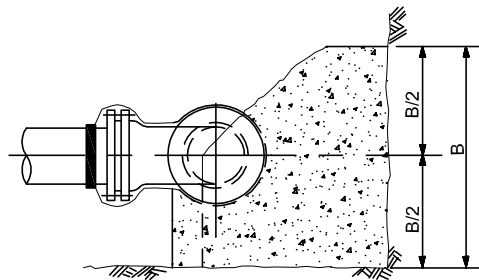


**45° BEND**

**90° BEND**



**11 1/4° & 22 1/2° BEND**



**ELEVATION**

Blocking shall be poured after polyethelene wrap is in place.  
Blocking shall be inspected by the District prior to backfilling.

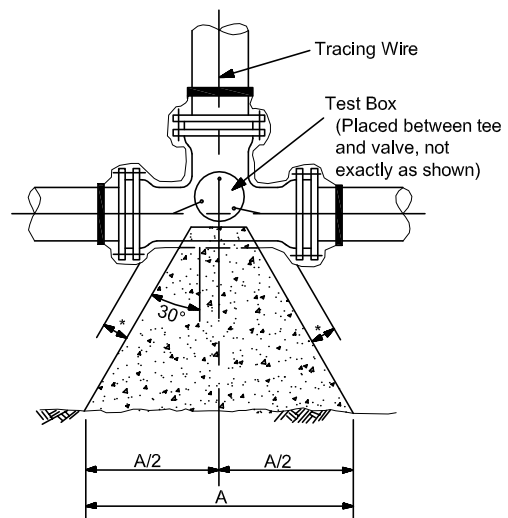
**150 PSI/250 PSI**

PIPE SIZE	A	B	C	D	E
6"	2'0"/2'6"	1'6"/1'6"	3'0"/3'6"	1'6"/2'0"	1'0"/1'0"
8"	2'6"/3'6"	2'0"/2'0"	3'6"/4'6"	2'0"/2'6"	1'0"/1'6"
10"	3'6"/4'0"	2'6"/2'6"	4'6"/5'6"	2'6"/3'0"	1'6"/1'6"
12"	4'0"/5'0"	3'0"/3'0"	5'6"/6'6"	3'0"/3'6"	1'6"/2'0"
16"	5'0"/6'0"	3'0"/4'0"	7'0"/8'6"	4'0"/4'6"	3'0"/3'0"
20"	6'0"/7'6"	5'0"/5'0"	7'0"/10'6"	4'0"/6'0"	3'0"/3'0"

\* Distance to be 1/2" longer than entire length of the bolt used.

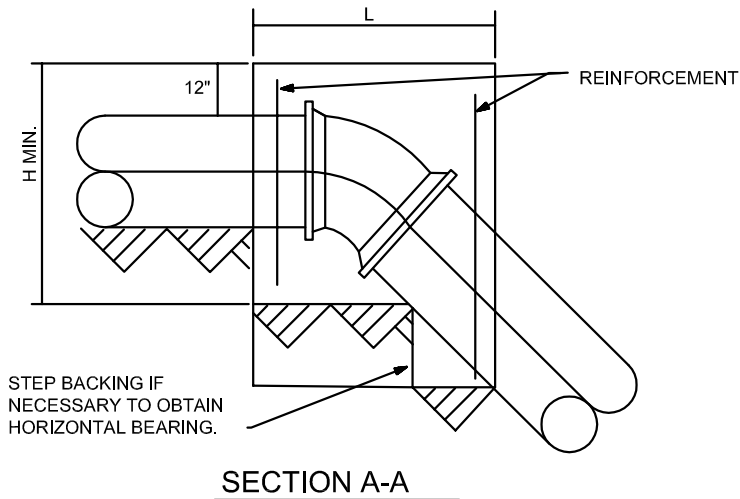
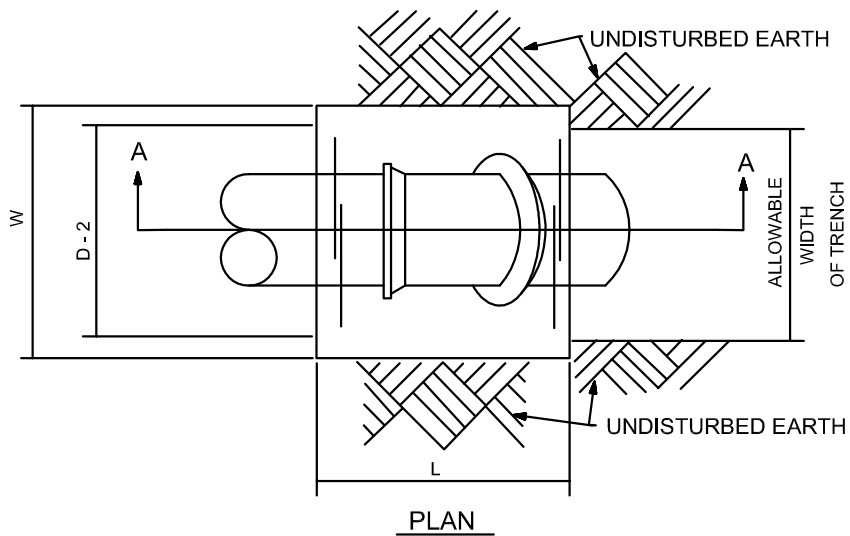
**NOTES**

- 1 PVC Fittings shall be per specifications.
- 2 Concrete to be 3500 psi.
- 3 All fittings to be Mechanical Joint.
- 4 Thrust blocks to be placed against undisturbed earth - use additional concrete as required for over excavation.
- 5 Blocking to be placed in a manner so that bolts can be removed without disturbing the block.



**TEE (DEAD END OR FIRE HYDRANT SIMILAP)**

4/2/07



### CONCRETE BACKING FOR VERTICAL BENDS

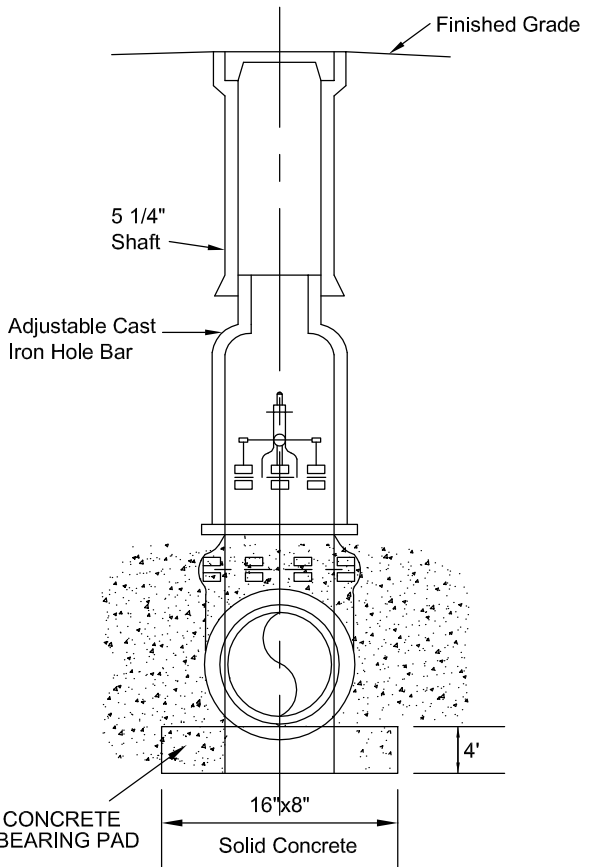
1. BACKING DESIGNED FOR 3000 POUNDS PER SQUARE FOOT SOIL BEARING AND 150 POUNDS PER SQUARE INCH INTERNAL PRESSURE.
2. PROVIDE MINIMUM CONCRETE REINFORCEMENT OF 2 PAIR OF TWO 5" "U" BARS @ 12" C.
3. CENTER BACKING ON BEND.

NO BLOCKING REQUIRED FOR VERTICAL "UP" BENDS

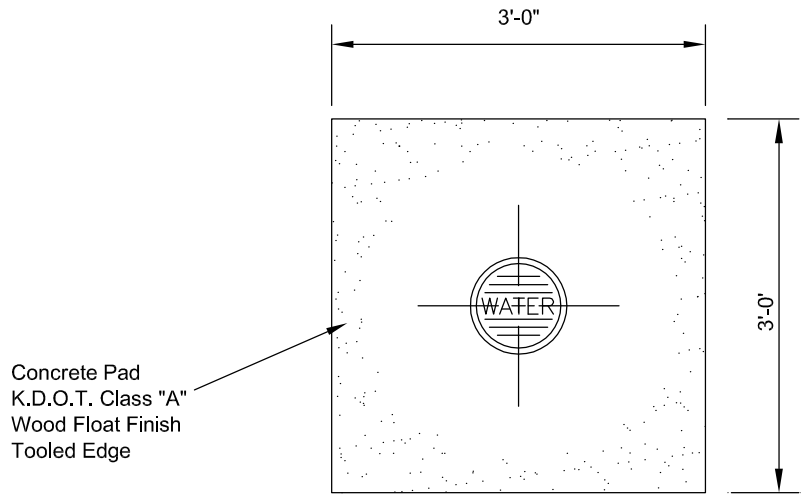
SIZE of PIPE	DEGREE OF BEND											
	11 1/4				22 1/2				45			
	L"	W"	H"	VOL.	L"	W"	H"	VOL.	L"	W"	H"	VOL.
4"	12	24	16	2.7	15	30	18	4.7	22	36	24	11.0
6"	12	43	18	5.4	16	48	34	15.1	30	55	24	22.9
8"	12	54	24	9.0	18	57	36	21.4	36	57	33	39.2
12"	20	63	36	26.3	37	62	37	49.2	48	62	51	88.0
16"	31	65	38	44.4	60	65	39	88.2	65	65	65	159.2
20"	45	70	40	73.0	56	70	60	136.4	72	76	78	247.5
24"	47	72	54	106.0	67	74	69	198.4	88	84	84	360.1

NOTE: VOLUMES GIVEN IN CUBIC FEET

BLOCKING FOR SIZES NOT SHOWN SHALL USE THE NEXT LARGER SIZE.

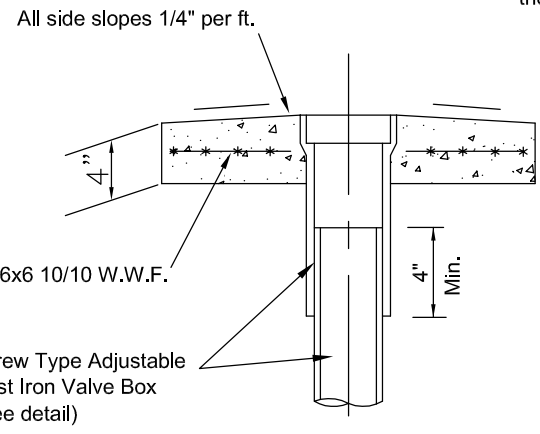


**DETAIL VALVE BOX INSTALLATION**



**PLAN**

2'0" Concrete Pad may be used in urban arces as approved by the District.



**ELEVATION**

- NOTES:**
- Concrete Pads shall be constructed around all main line valves except within hard paved areas.
  - Concrete Pads shall be constructed around customer service line valve ---- 3" and larger valves.
  - \*\*\*TRACER WIRE SHALL NOT BE RUN UP THROUGH VALVE BOXES. ONLY IN TEST BOXES

9/3/17

# 6 VALVE BOX AND VALVE PAD

BCWD

SCALE: N.T.S.

### Boone County Water District Self Centering Alignment Ring Specification

Each valve box shall have a two piece AFC Centering Ring that centers the valve box directly in a vertical position. The Centering Ring must have an adjustable detented slide to compensate for multiple stem diameters. The installation of the alignment ring below the operating nut should not disturb the function of the operating nut nor should the operating nut have to be removed to install the Centering Ring. Alternate centering devices other than that listed above must have the approval of the Boone County Water District.

4/2/07

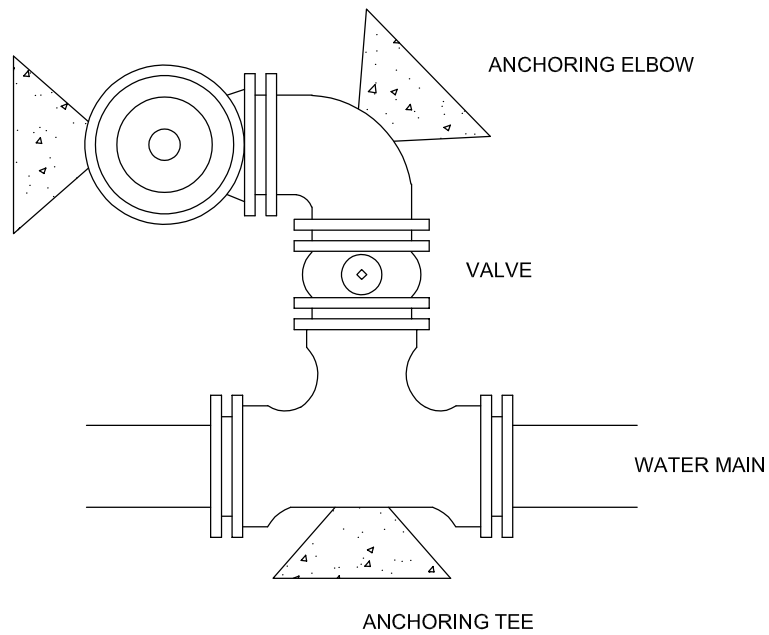
7

## CENTER RING NOTE

BCWD

SCALE: N.T.S.

HYDRANT POINTS UP GRADE  
(FOR PROPER AIR RELEASE)



SPECS SAME AS FIRE HYDRANT ASSEMBLY  
(STD. DRWG. NO. 109)

4/2/07

8

# FIRE HYDRANT ASSEMBLY WITH 90° BEND

BCWD

SCALE: N.T.S.



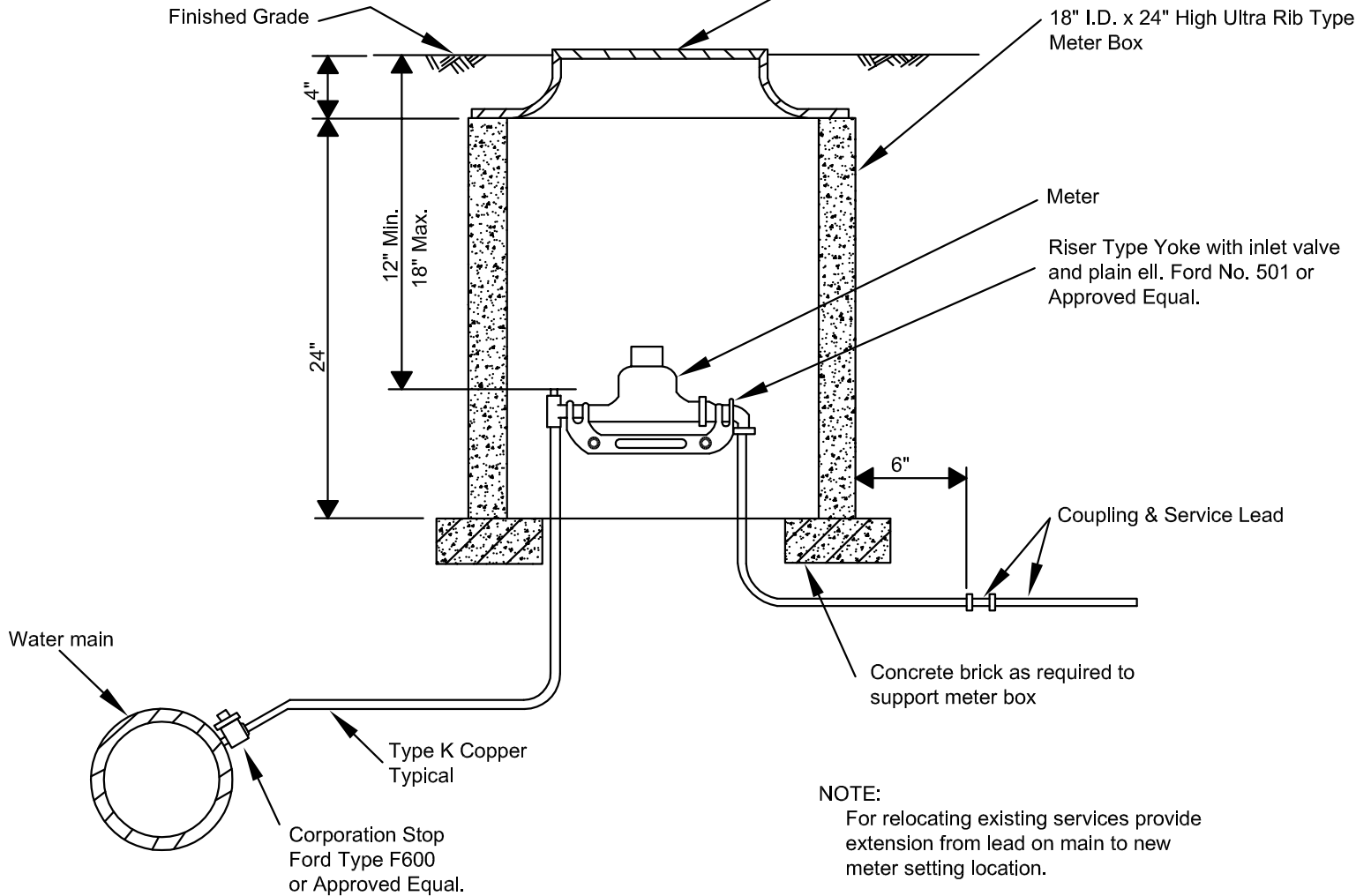
**NOTE:**

Services installed in concrete areas, not subject to vehicle traffic, a Ford Type A32, or approved equal, lid and ring shall be used. Areas subject to vehicle traffic, a Ford Type A32HH, or approved equal, lid and ring shall be used.

**NOTE:**

Services to be removed & abandoned are to be disconnected at corporation stop. Cap corporation stop if required to prevent leaks or replace stop.

Ring & Lid Type C32 Single Lid Cover 18" I.D. Tile Size, 11 1/2" Lid Opening, 4" Deep or Approved Equal.



18" I.D. x 24" High Ultra Rib Type Meter Box

Meter

Riser Type Yoke with inlet valve and plain ell. Ford No. 501 or Approved Equal.

Coupling & Service Lead

Concrete brick as required to support meter box

Water main

Type K Copper Typical

Corporation Stop Ford Type F600 or Approved Equal.

PVC Mains-Use single band brass saddle Ford Type 101 BS or equal.

**NOTE:**

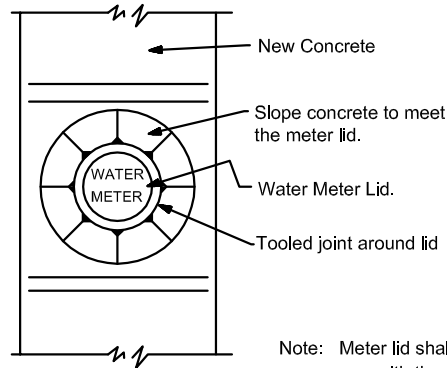
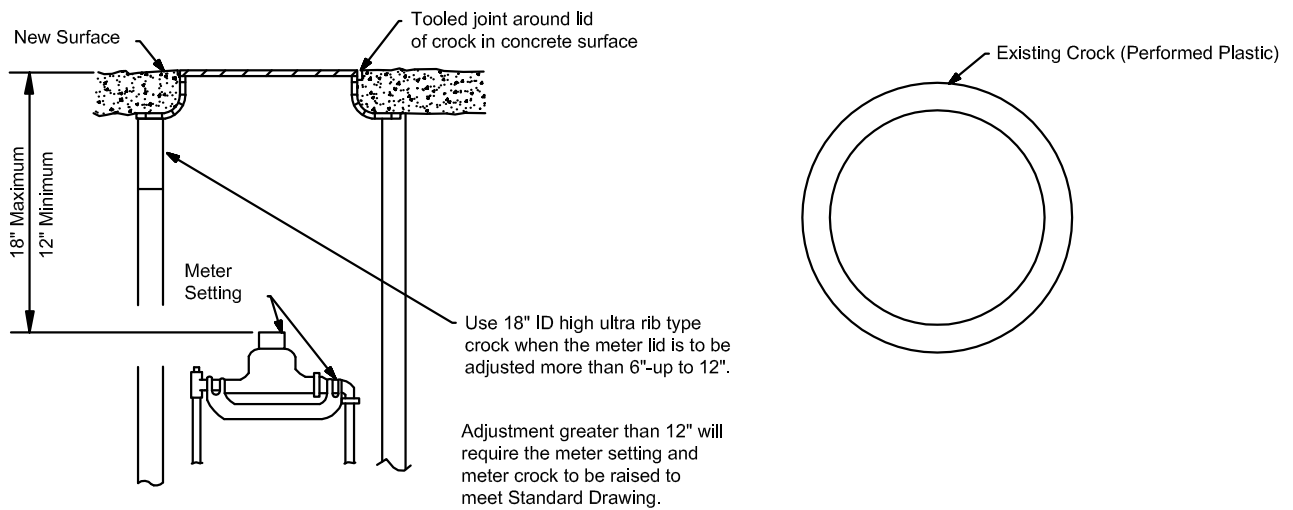
For relocating existing services provide extension from lead on main to new meter setting location.

4/2/07

# 9 5/8" & 1" METER SETTING

BCWD

SCALE: N.T.S.



Note: Meter lid shall be flush with the top of the concrete surface. The concrete surface shall be tapered to provide a smooth transition to the meter lid. A tooled joint shall be formed around the meter lid.

NOTE: SERVICES INSTALLED IN CONCRETE AREAS, NOT SUBJECT TO VEHICLE TRAFFIC, A FORD TYPE A32, OR APPROVED EQUAL, LID AND RING SHALL BE USED. AREAS SUBJECT TO VEHICLE TRAFFIC, A FORD TYPE A32HH, OR APPROVED EQUAL, LID AND RING SHALL BE USED.

PLASTIC (PVC) METER CROCKS shall be raised by use of an adapter with a section of plastic crock cut to achieve final grade.

At no time shall wood be used to adjust the ring and lid to grade.

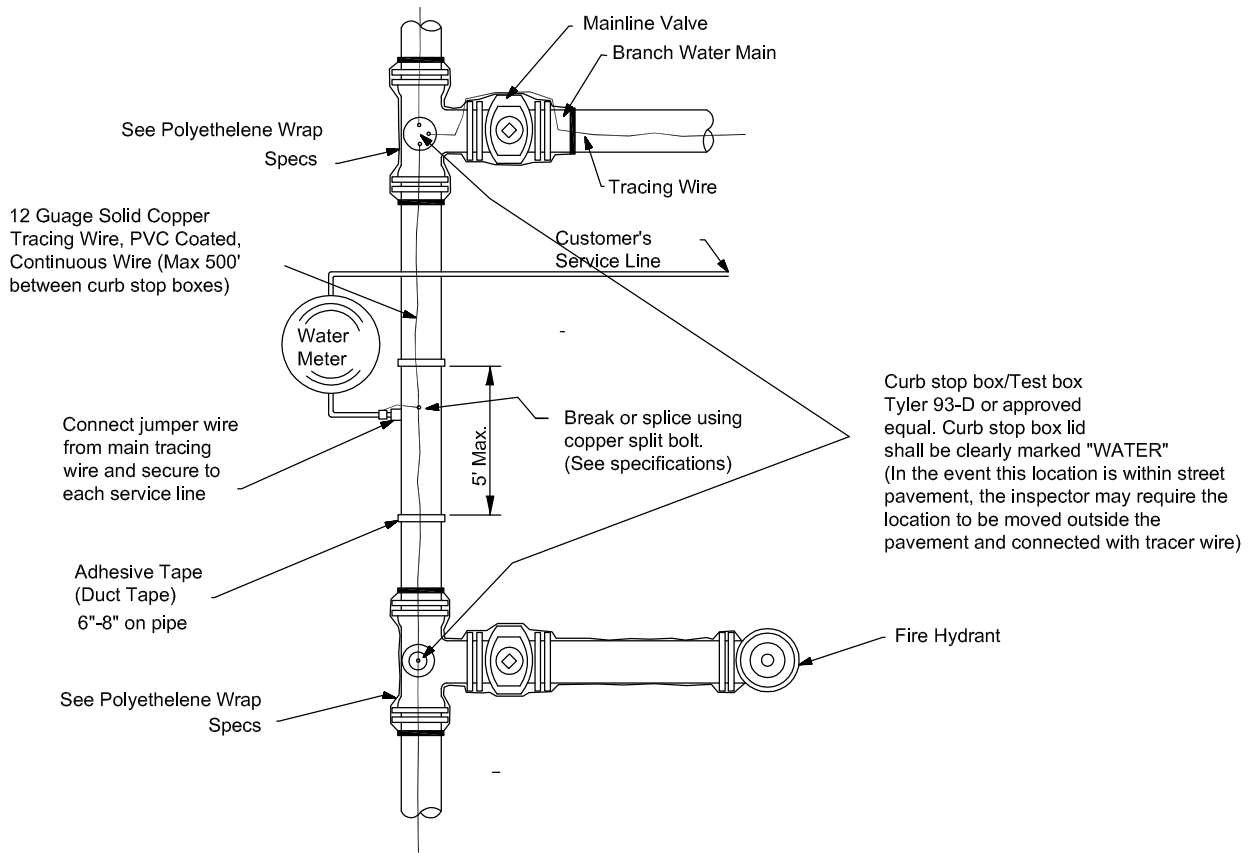
Meter ring and lids shall be reset solidly and shall have no broken edge to allow dirt to enter the crock.

If the meter box is damaged beyond repair it shall be replaced. See Meter Setting detail.

RAISING CURB STOPS OR VALVE BOXES:

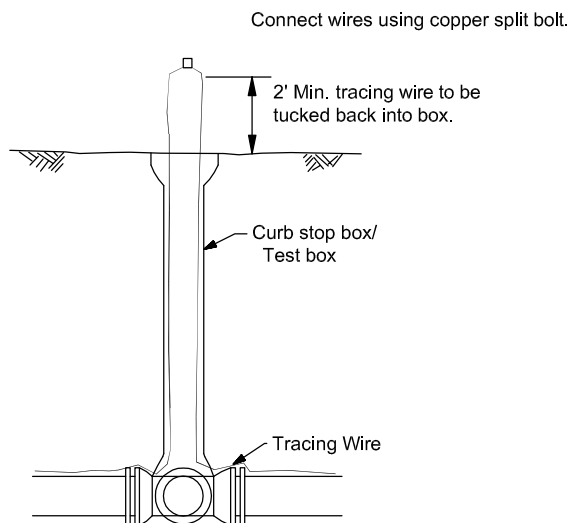
Curb stop boxes and valve boxes shall be raised by turning the upper section to meet grade. If the upper section cannot be raised in this manner it shall be carefully broken off and replaced.

New upper sections shall be supplied by Contractor.



## TRACER WIRE TO BE INSTALLED ON ALL WM INCLUDING PVC AND DUCTILE IRON

Note: Curb stop box/test box shall not be installed in paved areas unless approved by the District.



9/3/17

11

# TRACING WIRE

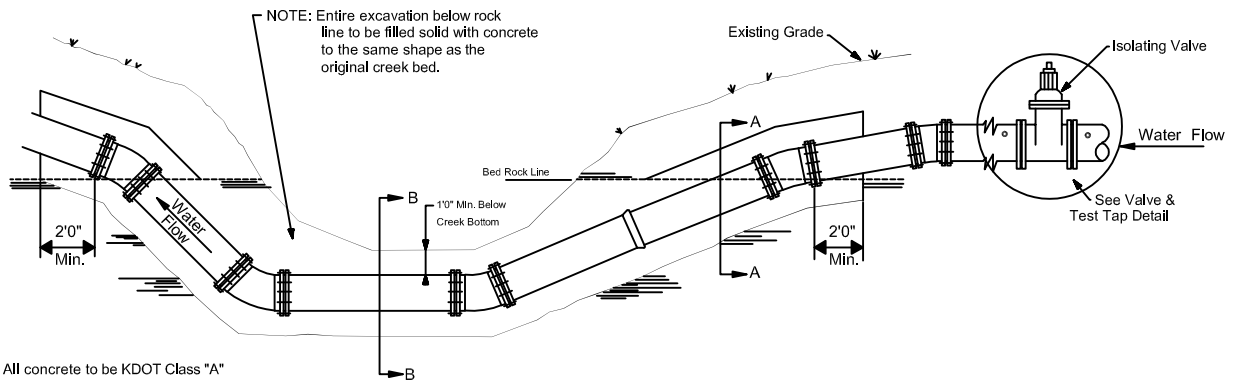
BCWD

-This shall be included and incidental to Water Main Construction-

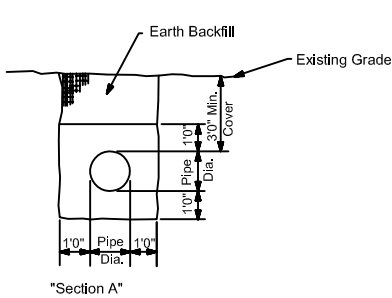
Addendum # 8-30-19

SCALE: N.T.S.

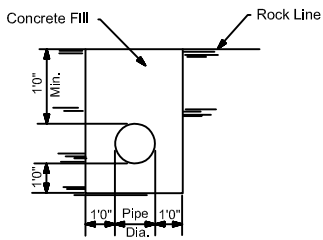
NOTE: Isolating Valve same as other side of crossing. No test taps on this side.



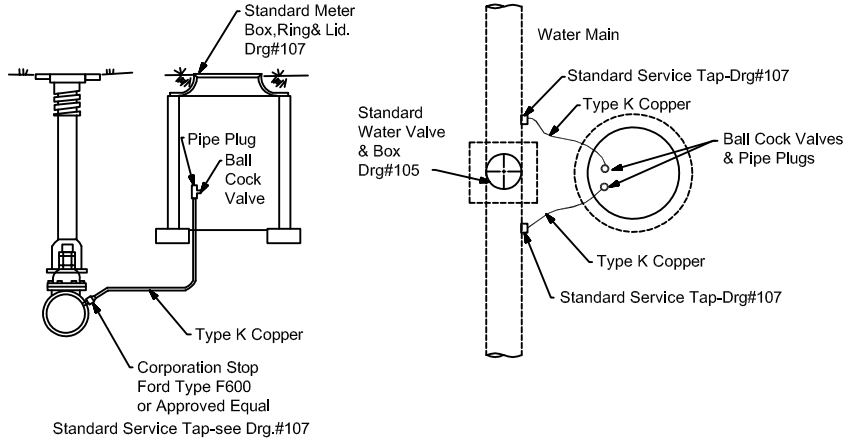
NOTE: All concrete to be KDOT Class "A"



"Section A"



"Section B"



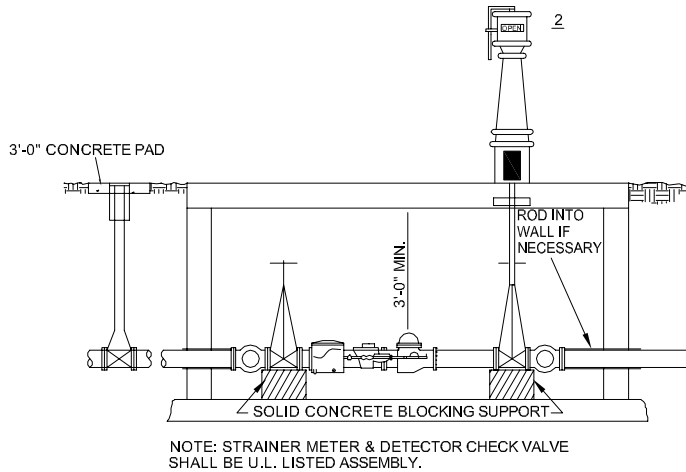
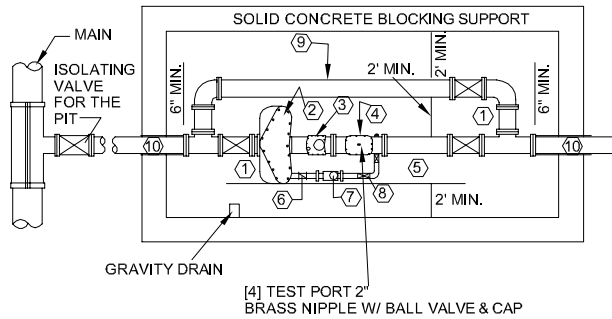
**VALVE & TEST TAP DETAIL**

Valve shall be installed in areas not subject to flooding  
No services will be tapped between the isolating valve on the creek crossings.

4/2/07

DRAWING NOTES

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>① VALVES WITH OUTSIDE STEM AND YOKE, FLANGED CONNECTION (RESILIENT SEATED VALVES)</li> <li>② U.L. FIRE RATED STRAINER</li> <li>③ METER</li> <li>④ U.L. LISTED DETECTOR CHECK</li> <li>⑤ SPOOL PIECE, 12", FLANGED AND PLAIN END</li> <li>⑥ GATE VALVE</li> <li>⑦ LOW FLOW METER</li> <li>⑧ CHECK VALVE</li> <li>⑨ BYPASS LINE SHALL BE EQUALIVENT IN SIZE AS THE FEED LINE</li> <li>⑩ CLASS 52 PIPING WITH FLANGED END WITHIN PIT</li> </ul> | <ul style="list-style-type: none"> <li>1. ANY PUMPER CONNECTION SHALL BE INSTALLED DOWN STREAM OF OUTLET VALVE &amp; BACKFLOW DEVICE.</li> <li>2. A POST INDICATOR SHALL BE THE TYPE THAT WILL ATTACH TO THE WHEEL OPERATOR AND ALLOW OPERATION OF VALVE WITHIN THE PIT.</li> <li>3. SEE DRAWINGS.</li> <li>4. A BACKFLOW PREVENTION ASSEMBLY SHALL BE INSTALLED AS FIRST DEVICE INSIDE OF THE BUILDING. THERE SHALL NOT BE BRANCHES OR TAPS BETWEEN THE METERING ASSEMBLY AND THE BACKFLOW PREVENTION ASSEMBLY.</li> <li>5. ALL PIPING IN PIT MUST BE FLANGED.</li> </ul> |
|---|--|



BOONE COUNTY MASTER METER PIT

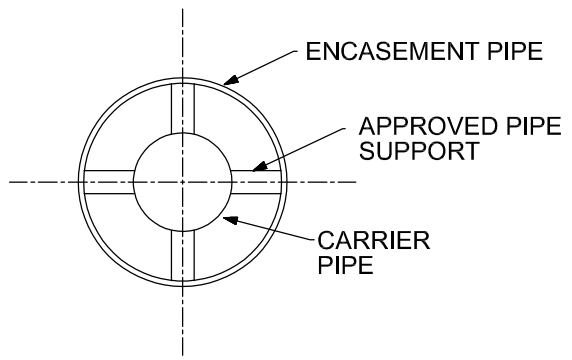
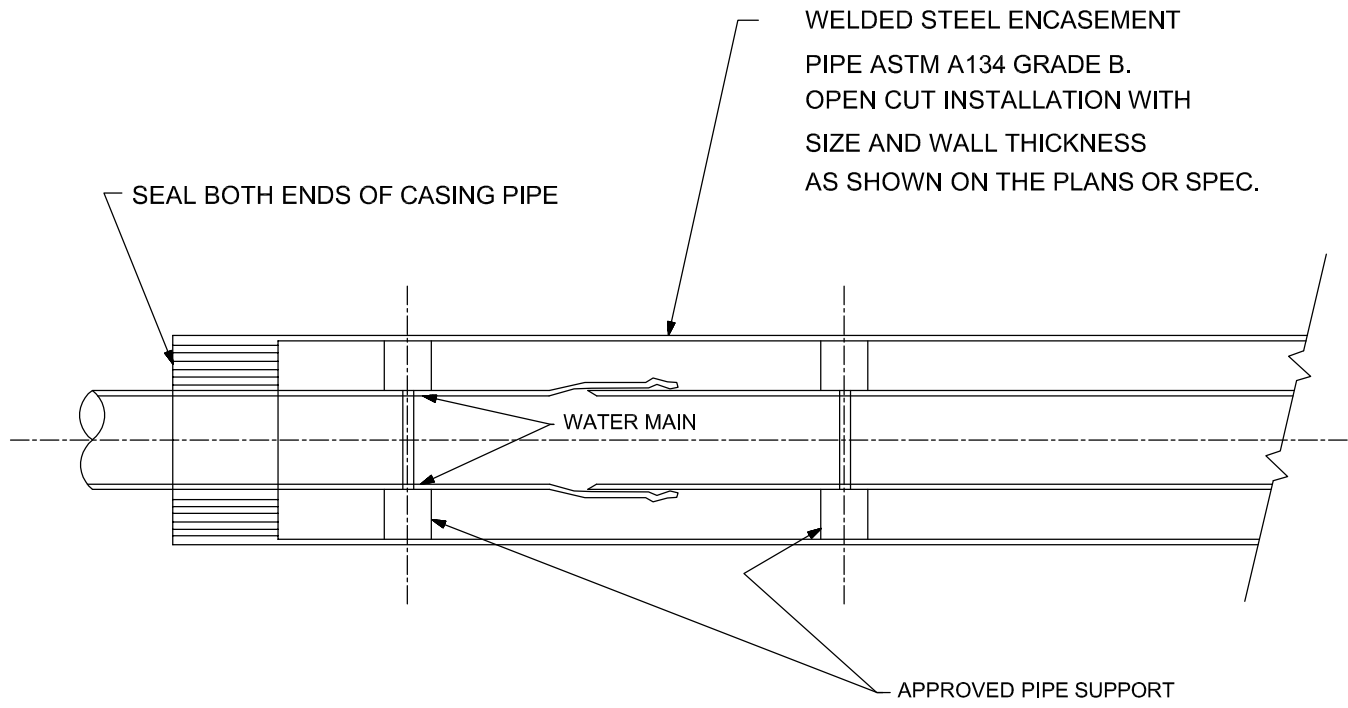
4/2/07

12

B.C. - MASTER - METER - PIT

BCWD

SCALE: N.T.S.



NOTE: CASING PIPE JOINTS SHALL BE SEAM WELDED SO THAT CASING IS WATER TIGHT FROM END TO END.

4/2/07

13

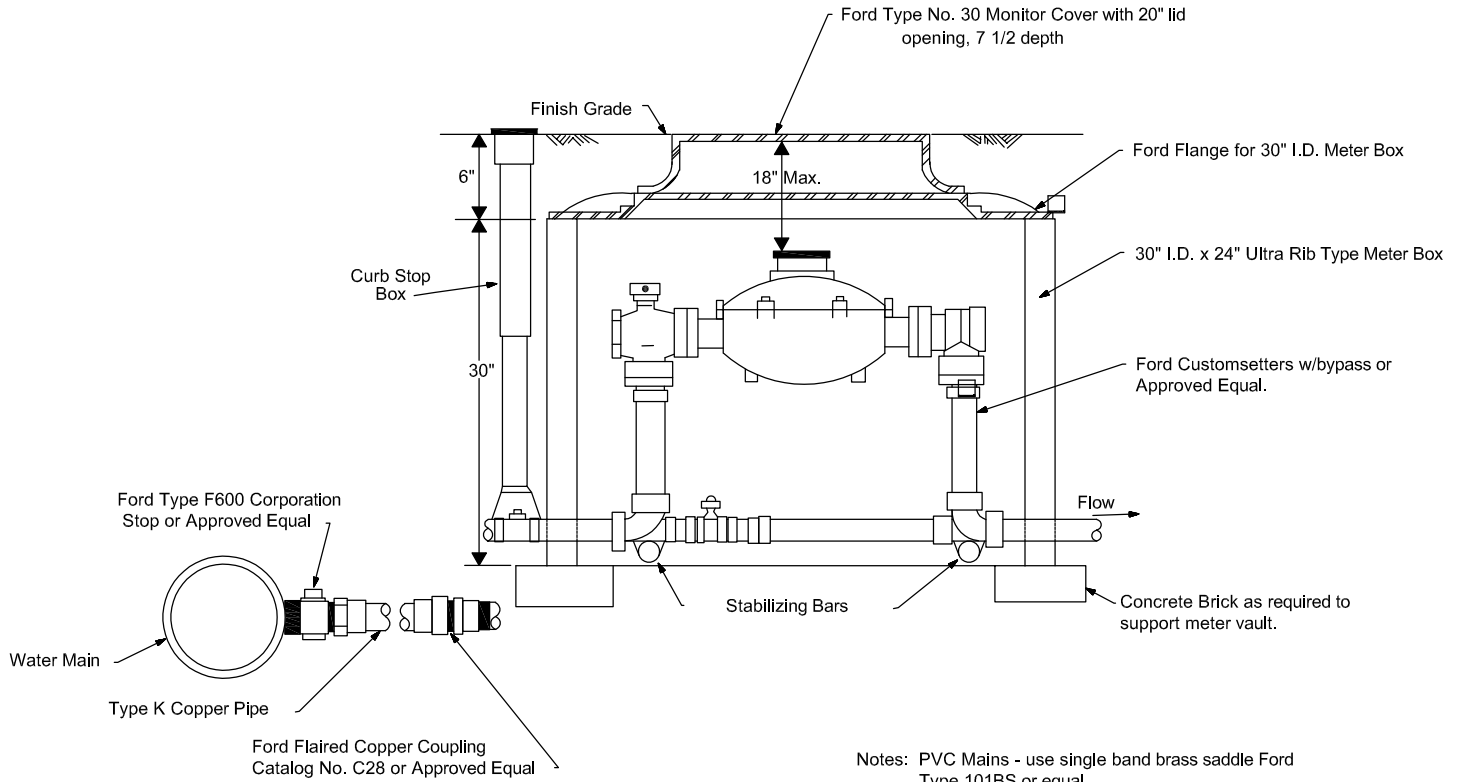
# STEEL ENCASEMENT PIPE DETAIL

BCWD

SCALE: N.T.S.

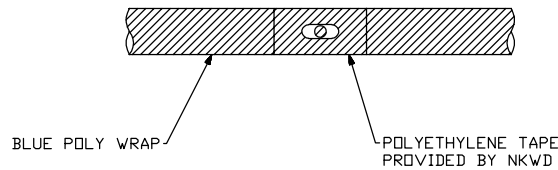
Note: Services to be removed & abandoned are to be disconnected at corporation stop. Cap corporation stop if required to prevent leaks or replace stop. For relocating existing services provide extension from lead on main to new meter setting location.

Note: If service is installed in sidewalk or pavement area, a heavy duty lid shall be installed.



Notes: PVC Mains - use single band brass saddle Ford Type 101BS or equal.  
D.I.P. Mains 8" or smaller use a double strap brass tapping saddle Ford Type 202B or equal.

ONLY FOR D.I. PIPE



4/27/18

14

# METER SETTING- 2"

BCWD

SCALE: N.T.S.

# Standard Water Bid Item Descriptions

**W AIR RELEASE VALVE** This bid item description shall apply to all air release valve installations of every size except those defined as “Special”. This item shall include the air release valve, main to valve connecting line or piping, manhole, vault, structure, access casting or doors, tapping the main, labor, equipment, excavation, proper backfill and restoration required to install the air release valve at the location shown on the plans or as directed in accordance with the specifications and standard drawings complete and ready for use. All air release/vacuum valves on a project shall be paid under one bid item regardless of size. No separate pay items will be established for size variations. Only in the case of the uniqueness of a particular air release valve would a separate bid item be established. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**BOLLARDS** This item is for payment for furnishing and installing protective guard posts at above ground utility installations. A bollard may consist of, but not limited to, a steel post set in concrete or any other substantial post material. This item shall include all labor, equipment, and materials needed for complete installation of the bollard as specified by the utility owner specifications and plans. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

*NOTE: A bid code for this item has been established in standard roadway bid items and shall be used for payment of this item. The bid code is 21341ND*

**W CAP EXISTING MAIN** This item shall include the specified cap, concrete blocking and/or mechanical anchoring, labor, equipment, excavation, backfill, and restoration required to install the cap at the location shown on the plans or as directed in accordance with the specifications. This item is not to be paid on new main installations. This pay item is only to be paid to cap existing mains. Caps on new mains are incidental to the new main. Any and all caps on existing mains shall be paid under one bid item included in the contract regardless of size. No separate bid items will be established for size variations. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W DIRECTIONAL BORE** Payment under this item is made whenever the plans or specifications specifically show directional boring is to be utilized in order to minimize the impact of open cut for the installation of water main under streets, creeks, and etc. Payment under this item shall include the specified bore pipe, labor, and equipment. No separate payment shall be made for bore pipe installed in the bore whether used as a carrier pipe or an encasement of a separate carrier pipe. This item shall also include pipe anchors at each end of the bore when specified to prevent the creep or contraction of the bore pipe. Carrier pipe installed within a bore pipe shall be paid separately under pipe items. Payment under this item shall not be size specific and no separate bid items will be established for size variations. The bore pipe sizes to be included under this item shall be as shown on the plans and/or in the specifications. Any and all directional bores in each contract shall be paid under one directional bore bid item included in the contract regardless of size. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.



**W ENCASUREMENT CONCRETE** Includes all labor, equipment, excavation, concrete, reinforcing steel, backfill, restoration, and etc., to construct the concrete encasement of the water main as shown on the plans, and in accordance with the specifications and standard drawings. Payment under this item shall be in addition to the carrier pipe as paid under separate bid items. Carrier pipe is not included in this bid item. Any and all concrete encasement shall be paid under one bid item included in the contract regardless of the size of the carrier pipe or the volume of concrete or steel reinforcement as specified in the plans and specifications. No separate bid items will be established for size variations. Measurement of pay quantity shall be from end of concrete to end of concrete. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

**W ENCASUREMENT STEEL BORED** This item shall include the steel encasement pipe size as specified on the plans and in the specifications, casing spacers, end seals, labor, and equipment to bore and install the encasement in accordance with the plans and specifications, complete and ready for use. The size shall be the measured internal diameter of the encasement pipe. The sizes of encasement to be paid under the size ranges specified in the bid items shall be as follows:

- Range 1 = All encasement sizes greater than 2 inches to and including 6 inches
- Range 2 = All encasement sizes greater than 6 inches to and including 10 inches
- Range 3 = All encasement sizes greater than 10 inches to and including 14 inches
- Range 4 = All encasement sizes greater than 14 inches to and including 18 inches
- Range 5 = All encasement sizes greater than 18 inches to and including 24 inches
- Range 6 = All encasement sizes greater than 24 inches

*(Encasement sizes of 2 inches internal diameter or less shall not be paid separately; but, shall be considered incidental to the carrier pipe.)* Payment under this bid item shall not include the carrier pipe. Carrier pipe shall be paid under a separate bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

**W ENCASUREMENT STEEL OPEN CUT** This item shall include the steel encasement pipe size as specified on the plans and in the specifications, casing spacers, end seals, labor, and equipment to open cut and install the encasement in accordance with the plans and specifications, complete and ready for use. The size shall be the measured internal diameter of the encasement pipe. The size encasement to be paid under the size ranges specified in the bid items shall be as follows:

- Range 1 = All encasement sizes greater than 2 inches to and including 6 inches
- Range 2 = All encasement sizes greater than 6 inches to and including 10 inches
- Range 3 = All encasement sizes greater than 10 inches to and including 14 inches
- Range 4 = All encasement sizes greater than 14 inches to and including 18 inches
- Range 5 = All encasement sizes greater than 18 inches to and including 24 inches
- Range 6 = All encasement sizes greater than 24 inches

*(Encasement sizes of 2 inches internal diameter or less shall not be paid separately; but, shall be considered incidental to the carrier pipe.)* Payment under this bid item shall not include the carrier pipe. Carrier pipe shall be paid under a separate bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

**W FIRE HYDRANT ADJUST** Includes all labor, equipment, excavation, materials, and backfill to adjust the existing fire hydrant using the fire hydrant manufacturer's extension kit for adjustments of 18" or less. Adjustments greater than 18" require anchoring couplings and vertical bends to adjust to grade. The Contractor will supply and install all anchor couplings, bends, fire hydrant extension, concrete blocking, restoration, granular drainage material, etc, needed to adjust the fire hydrant complete and ready for use as shown on the plans, and in accordance with the specifications and standard drawings. This also includes allowing for the utility owner inspector to inspect the existing fire hydrant prior to adjusting, contractor returning unusable fire hydrants to the utility owner warehouse and picking up a replacement hydrant. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete and ready for use.

**W FIRE HYDRANT ASSEMBLY** Includes all labor, equipment, new fire hydrant, isolating valve and valve box, concrete pad around valve box (when specified in specifications or plans), piping, anchoring tee, anchoring couplings, fire hydrant extension, excavation, concrete blocking, granular drainage material, backfill, and restoration, to install a new fire hydrant assembly as indicated on plans and on standard drawings complete and ready for use. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W FIRE HYDRANT RELOCATE** This item includes all labor and equipment to remove the existing fire hydrant from its existing location and reinstalling at a new location. This item shall include a new isolating valve and valve box, concrete pad around valve box (when required in specifications or plans), new piping, new anchoring tee, anchoring couplings, fire hydrant extensions, concrete blocking, restoration, granular drainage material, excavation, and backfill as indicated on plans, specifications, and on standard drawings complete and ready for use. This item shall also include allowing for utility owner inspector to inspect the existing fire hydrant prior to reuse, contractor returning unusable fire hydrants to the utility owner warehouse and picking up a replacement hydrant for use, if the existing fire hydrant is determined unfit for reuse. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W FIRE HYDRANT REMOVE** This bid item includes removal of an abandoned fire hydrant, isolating valve, and valve box to the satisfaction of the engineer. The removed fire hydrant, isolating valve and valve box shall become the property of the contractor for his disposal as salvage or scrap. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W FLUSH HYDRANT ASSEMBLY** This item shall include the flushing hydrant assembly, service line, tapping the main, labor, equipment, excavation, backfill, and restoration required to install the flush hydrant at the location shown on the plans and in accordance with the specifications and standard drawings, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W FLUSHING ASSEMBLY** This item shall include the flushing device assembly, service line, meter box and lid, tapping the main, labor, equipment, excavation, backfill, and restoration required to install the

flushing device at the location shown on the plans and in accordance with the specifications and standard drawings, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W LEAK DETECTION METER** This item is for payment for installation of a water meter at main valve locations where shown on the plans for detection of water main leaks. The meter shall be of the size and type specified in the plans or specifications. This item shall include all labor, equipment, meter, meter box or vault, connecting pipes between main and meter, main taps, tapping saddles, casting, yoke, and any other associated material needed for installation of a functioning water meter in accordance with the plans and specifications, complete and ready for use. No separate payment will be made under any other contract item for connecting pipe or main taps. Any and all leak detection meters shall be paid under one bid item included in the contract regardless of size. No separate bid items will be established for size variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete and ready for use.

**W LINE MARKER** This item is for payment for furnishing and installing a water utility line marker as specified by the utility owner specifications and plans. A line marker may consist of a post or monument of whatever materials specified and shall include markings and/or signage on same as specified by plans or specifications. This item shall include all labor, equipment, and materials needed for complete installation of the marker. This item shall be paid EACH (EA) when complete.

**W MAIN POINT RELOCATE** This item is intended for payment for horizontal and/or vertical relocation of a short length of an existing main at the locations shown on the plans. This bid item is to be used to relocate an existing water main at point locations such as to clear a conflict at a proposed drainage structure, pipe or any other similar short relocation situation, and where the existing pipe material is to be reused. The contractor shall provide any additional pipe or fitting material needed to complete the work as shown on the plans and specifications. The materials provided shall be of the same type and specification as those that exist. Substitution of alternative materials shall be approved by the engineer in advance on a case by case basis. New polyethylene wrap is to be provided (if wrap exists or is specified in the specifications to be used). If it is necessary that the pipe be disassembled for relay, payment under this item shall also include replacement of joint gaskets as needed. Bedding and backfill shall be provided and performed the same as with any other pipe installation as detailed in the plans and specifications. Payment under this item shall be for each location requiring an existing main to be relocated horizontally or vertically regardless of pipe size or relocation length. No separate pay items will be established for pipe size variations or relocation segment length variations. Water Main Relocate shall not be paid on a linear feet basis; but, shall be Paid EACH (EA) at each location when complete and placed in service. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced.

**W METER** This item is for payment for installation of all standard water meters of all sizes 2 inches ID or less as specified on the plans. This item shall include all labor, equipment, meter, meter box, casting, yoke, and any other associated material needed for installation of a functioning water meter in accordance with the plans and specifications, complete and ready for use. This item shall include connections to the new or existing water service line. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W METER ADJUST** This item includes all labor, equipment, excavation, materials, backfill, restoration, and etc., to adjust the meter casting to finished grade (whatever size exists) at the location shown on the plans or as directed in accordance with the specifications and standard drawings complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W METER RELOCATE** This item includes all labor, equipment, excavation, additional fittings, disinfection, testing, restoration, and etc., to relocate the existing water meter (whatever size exists), meter yoke, meter box, casting, and etc., from its old location to the location shown on the plans or as directed, in accordance with the specifications and standard drawings complete and ready for use. The new service pipe (if required) will be paid under short side or long side service bid items. Any and all meter relocations of 2 inches or less shall be paid under one bid item included in the contract regardless of size. Each individual relocation shall be paid individually under this item; however, no separate bid items will be established for meter size variations of 2 inches ID or less. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W METER VAULT SIZE RANGE 1 OR 2** This item is for payment for installation of an underground structure for housing of a larger water meter, fittings, and valves as required by the plans and specifications. This item shall include all labor, equipment, excavation, concrete, manhole castings or access doors, the specified meter(s) valve(s), all piping, and fitting materials associated with installing a functioning meter and vault in accordance with the plans, standard drawings, and specifications, complete and ready for use. The size shall be the measured internal diameter of the meter and piping to be installed. The size meter vault to be paid under size 1 or 2 shall be as follows:

- Size Range 1 = All meter and piping sizes greater than 2 inches up to and including 6 inches
- Size Range 2 = All meter and piping sizes greater than 6 inches

This item shall be paid EACH (EA) when complete. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced.

**W METER/FIRE SERVICE COMBO VAULT** This item is for payment for installation of an underground structure for housing of a water meter and fire service piping, fittings, and valves as required by the plans and specifications. This item shall include all labor, equipment, excavation, concrete, manhole castings or access doors, the specified meter(s), valve(s), all piping, and fitting materials associated with installing a functioning meter and fire service vault in accordance with the plans and specifications, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W METER WITH PRESSURE REDUCING VALVE (PRV)** This item is for payment for installation of all standard water meters with pressure reducing valves (PRV) of all sizes 2 inches ID or less as specified on the plans. This item shall include all labor, equipment, meter, PRV, meter box, casting, yoke, and any other associated material needed for installation of a functioning water meter with PRV in accordance with the plans and specifications, complete and ready for use. This item shall include connections to the new or existing water service line. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced.

This item shall be paid EACH (EA) when complete.

**W PIPE** This description shall apply to all PVC, ductile iron, and polyethylene/plastic pipe bid items of every size and type to be used as water main, except those bid items defined as “Special”. This item includes the pipe specified by the plans and specifications, all fittings (including, but not limited to, bends, tees, reducers, plugs, and caps), tracing wire with test boxes (if required by specification), polyethylene wrap (when specified), labor, equipment, excavation, bedding, restoration, testing, sanitizing, backfill, and etc., required to install the specified new pipe and new fittings at the locations shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. No additional payment will be made for rock excavation. This bid item includes material and placement of flowable fill under existing and proposed pavement, and wherever else specified on the plans or in the specifications. **This item shall include all temporary and permanent materials and equipment required to pressure test and sanitize mains including, but not limited to, pressurization pumps, hoses, tubing, gauges, main taps, saddles, temporary main end caps or plugs and blocking, main end taps for flushing, chlorine liquids or tablets for sanitizing, water for testing/sanitizing and flushing (when not supplied by the utility), chlorine neutralization equipment and materials, and any other items needed to accomplish pressure testing and sanitizing the main installation.** This item shall also include pipe anchors, at each end of polyethylene pipe runs when specified to prevent the creep or contraction of the pipe. Measurement of quantities under this item shall be through fittings, encasements, and directional bores (only when a separate carrier pipe is specified within the directional bore pipe). Measurements shall be further defined to be to the center of tie-in where new pipe contacts existing pipe at the center of connecting fittings, to the outside face of vault or structure walls, or to the point of main termination at dead ends. No separate payment will be made under pipe items when the directional bore pipe is the carrier pipe. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

**W PLUG EXISTING MAIN** This item shall include the specified plug, concrete blocking and/or anchoring, labor, equipment, excavation, backfill, and restoration required to install the plug in an existing in-service main that is to remain at the location shown on the plans or as directed in accordance with the specifications. Any and all plugs on all existing in-service mains shall be paid under one bid item included in the contract regardless of size. No separate bid items will be established for size variations. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

*NOTE: This utility bid item is not to be paid on new main installations or abandoned mains. This pay item is to plug existing in-service mains only. Plugs on new mains are incidental to the new main just like all other fittings.*

*NOTE: Plugging of existing abandon mains shall be performed and paid in accordance with Section 708.03.05 of KYTC Standard Specifications For Road And Bridge Construction and paid using Bid Code 01314 Plug Pipe.*

**W PRESSURE REDUCING VALVE** This description shall apply to all pressure reducing valves (PRV) of every size required in the plans and specifications except those bid items defined as “Special”. Payment under this description is to be for PRVs being installed with new main. This item includes the PRV as specified in the plans and specifications, polyethylene wrap (if required by specification), labor, equipment, excavation, anchoring (if any), pit or vault, backfill, restoration, testing, disinfection, and etc., required to install the specified PRV at the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. If required on plans and/or proposed adjoining DIP is restrained, PRVs shall be restrained. PRV restraint shall be considered incidental to the

PRV and adjoining pipe. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W PUMP STATION** This item is for payment for installation of pumps and an above or below ground structure for housing of the pumps. This item shall include all pumps, piping, fittings, valves, electrical components, building materials, concrete, any other appurtenances, labor, equipment, excavation, and backfill, to complete the pump station installation as required by the plans, standard drawings, and specifications, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LUMP SUM (LS) when complete.

**W REMOVE TRANSITE (AC) PIPE** This item shall include all labor, equipment, and materials needed for removal and disposal of the pipe as hazardous material. All work shall be performed by trained and certified personnel in accordance with all environmental laws and regulations. Any and all transite AC pipe removed shall be paid under one bid item included in the contract regardless of size. No separate bid items will be established for size variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

**W SERVICE LONG SIDE** This bid item description shall apply to all service line installations of every size bid up to and including 2 inch inside diameter, except those service bid items defined as "Special". This item includes the specified piping material, main tap, tapping saddle (if required), and corporation stop materials, coupling for connecting the new piping to the surviving existing piping, encasement of 2 inches or less internal diameter (if required by plan or specification), labor, equipment, excavation, backfill, testing, disinfection, and restoration, at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready for use. This bid item is to pay for service installations where the ends of the service connection are on opposite sides of the public roadway and the service line crosses the centerline of the public roadway as shown on the plans. The length of the service line is not to be specified. Payment under this item shall not be restricted by a minimum or maximum length. The contractor shall draw his own conclusions as to the length of piping that may be needed. Payment under this item shall include boring, jacking, or excavating across the public roadway for placement. Placement of a service across a private residential or commercial entrance alone shall not be reason to make payment under this item. Private or commercial entrances shall not be considered a public roadway in defining payment under this item. This pay item does not include installation or relocation of meters. Meters will be paid separately. No additional payment will be made for rock excavation or for special bedding required in rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W SERVICE SHORT SIDE** This bid item description shall apply to all service line installations of every size up to and including 2 inch internal diameter, except those service bid items defined as "Special". This item includes installation of the specified piping material of the size specified on plans, encasement of 2 inches or less internal diameter (if required by plan or specification), main tap, tapping saddle (if required), corporation stop, coupling for connecting the new piping to the surviving existing piping, labor, equipment, excavation, backfill, testing, disinfection, and restoration, at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and

ready for use. This bid item is to pay for service installations where both ends of the service connection are on the same side of the public roadway, or when an existing service crossing a public roadway will remain and is being extended, reconnected, or relocated with all work on one side of the public roadway centerline as shown on the plans. The length of the service line is not to be specified and shall not be restricted to any minimum or maximum length. Payment shall be made under this item even if the service crosses a private residential or commercial entrance; but, not a public roadway.

Private or commercial entrances shall not be considered a public roadway in defining payment under this item. The contractor shall draw his own conclusions as to the length of piping that may be needed. This pay item does not include installation or relocation of meters. Meters will be paid separately. No additional payment will be made for rock excavation or for bedding required in rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W SERVICE RELOCATE** This item is for the relocation of an existing water service line where a meter is not involved, and where an existing service line can easily be adjusted by excavating alongside and moving the line horizontally and/or vertically a short distance without cutting the service line to avoid conflicts with road construction. This item shall include excavation, labor, equipment, bedding, and backfill to relocate the line in accordance with the plans and specifications complete and ready for use. Payment under this item shall be for each location requiring relocation. Payment shall be made under this item regardless of service size or relocation length. No separate pay items will be established for size or length variation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W STRUCTURE ABANDONMENT** This item is to be used to pay for abandonment of larger above or below ground water structures such as meter vaults, fire pits, pump stations, tanks, and etc. Payment under this item shall not be limited to size or scope; however structures with connecting pipes of 2 inches or less shall not be paid under this item; but, shall be considered incidental to water construction, (i.e., abandonment of standard water meters up to and including 2 inches would not be paid under this item). Payment under this item shall include all labor, equipment, and compacted fill or flowable fill for abandonment of the structure in place and restoration complete. No separate bid items will be established for size or structure variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W STRUCTURE REMOVAL** This item is to be used to pay for removal of larger above or below ground water structures such as meter vaults, fire pits, pump stations, tanks, and etc. Payment under this item shall not be limited to size or scope; however structures with connecting pipes of 2 inches or less shall not be paid under this item; but, shall be considered incidental to water construction, (i.e., removal of standard water meters up to and including 2 inches would not be paid under this item). Payment under this item shall include all labor, equipment, and compacted backfill for removal of the structure and restoration complete. No separate bid items will be established for size or structure variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W TAPPING SLEVE AND VALVE SIZE 1 OR 2** This item shall include the specified tapping sleeve, valve, valve box, concrete pad around valve box (when required in specifications or plans), labor, and equipment to install the specified tapping sleeve and valve, complete and ready for use in accordance with

the plans and specifications. The size shall be the measured internal diameter of the live pipe to be tapped. The size tapping sleeve and valve to be paid under sizes 1 or 2 shall be as follows:

Size 1 = All live tapped main sizes up to and including 8 inches

Size 2 = All live tapped main sizes greater than 8 inches

Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W TIE-IN** This bid description shall be used for all main tie-in bid items of every size except those defined as "Special". This item includes all labor, equipment, excavation, fittings, sleeves, reducers, couplings, blocking, anchoring, restoration, disinfection, testing and backfill required to make the water main tie-in as shown on the plans, and in accordance with the specifications complete and ready for use. Pipe for tie-ins shall be paid under separate bid items. This item shall be paid EACH (EA) when complete.

**W VALVE** This description shall apply to all valves of every size required in the plans and specifications except those bid items defined as "Special". Payment under this description is to be for gate or butterfly valves being installed with new main. This item includes the valve as specified in the plans and specifications, polyethylene wrap (if required by specification), labor, equipment, excavation, anchoring (if any), valve box and valve stem extensions, backfill, concrete pad around valve box (if required by specification), restoration, testing, disinfection, and etc., required to install the specified valve at the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. If required on plans and/or proposed adjoining DIP is restrained, valves shall be restrained. Valve restraint shall be considered incidental to the valve and adjoining pipe. This description does not apply to cut-in valves. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W VALVE ANCHOR EXISTING** This bid item is intended to pay for installation of restraint hardware on an existing valve where no restraint exists to hold the valve in place to facilitate tie-ins and other procedures where restraint is prudent. This work shall be performed in accordance with water specifications and plans. This bid item shall include all labor equipment, excavation, materials and backfill to complete restraint of the designated valve, regardless of size, at the location shown on the plans, complete and ready for use. Materials to be provided may include, but is not limited to, retainer glands, lugs, threaded rod, concrete, reinforcing steel or any other material needed to complete the restraint. Should the associated valve box require removal to complete the restraint, the contractor shall reinstall the existing valve box, the cost of which shall be considered incidental to this bid item. No separate bid items are being provided for size variations. All sizes shall be paid under one bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W VALVE BOX ADJUST** Includes all labor, equipment, valve box and valve stem extensions (if required), excavation, backfill, concrete pad around valve box (when specified in specifications or plans), restoration, and etc., to adjust the top of the box to finished grade complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.



**W VALVE CUT-IN** This bid description is for new cut-in valve installations of all sizes where installation is accomplished by cutting out a section of existing main. This item shall include cutting the existing pipe, supplying the specified valve, couplings or sleeves, valve box, concrete pad around valve box (when required in specifications or plans), labor, equipment, and materials to install the valve at the locations shown on the plans, or as directed by the engineer, complete and ready for use. Any pipe required for installation shall be cut from that pipe removed or supplied new by the contractor. No separate payment will be made for pipe required for cut-in valve installation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**W VALVE VAULT** This item is for payment for installation of an underground structure for housing of specific valve(s) as required by the plans and specifications. This item shall include all labor, equipment, excavation, concrete, manhole castings or doors, the specified valve(s), all piping, and fitting materials associated with installing a functioning valve vault in accordance with the plans, standard drawing, and specifications, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

## **Appendix F6 -- SD1 Sanitary Sewer Specifications**

## SECTION 02606

### SANITARY & STORM STRUCTURES

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown on the Design Drawings, specified herein and required to furnish and install all sanitary and storm structures including but not limited to precast and cast-in-place manholes, air release manholes, bypass pumping vaults, drainage structures, headwalls, outfalls, etc.

##### 1.2 RELATED WORK

- A. Division 2, Sections on Earthwork
- B. Section 03300, Cast-In-Place Concrete
- D. Section 05501, Miscellaneous Metal Fabrications
- E. Section 05536, Floor Access Hatch Covers
- F. Section 05540, Castings
- G. Division 15, Sections on Piping
- H. Section 02607, Sanitary Structure Lining System

##### 1.3 REFERENCES

- A. KY Standard Specifications and Drawings: In this section, reference is made to the current Kentucky Transportation Cabinet (KYTC) Standard Specifications for Road and Bridge Construction and the KYTC Standard Drawings. In addition, construction requirements and material specifications not specifically covered in this section or in the referenced SD1 Technical Specifications shall conform to KYTC Standards. The ENGINEER or CONTRACTOR of a storm sewer project is responsible for obtaining a current edition of the KYTC Standard Specifications and the latest edition of the KYTC Standard Drawings when designing or performing work that either involves SD1 funding or is to be accepted by SD1.

B. Reference Standards:

1. ASTM C 33, Standard Specification for Concrete Aggregate.
2. ASTM C 76, Class III Reinforced Concrete Pipes.
3. ASTM C 443, Specifications for Joints for Circular Concrete Sewer and Culvert Pipe, using Rubber Gaskets.
4. ASTM C 478, Specification for Precast Reinforced Concrete Manhole Sections.
5. ASTM C 579, Standard test method for compressive strength of chemical resistant mortars, grouts, monolithic surfacing and polymer concretes.
6. ASTM C 857, Standard Practice for Minimum Structural Design Loading for underground Precast Concrete Utility Structures.
7. ASTM C 891, Standard Practice for Installation of Underground Precast Concrete Utility Structures
8. ASTM C 913, Standard Specification for Precast Concrete Water and Wastewater Structures
9. ASTM C 923, Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
10. ASTM D 695, Standard Test Method for Compressive Properties of Rigid Plastics.
11. ASTM D 790, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
12. ASTM C 990, Standard Specification for Joints for Concrete Pipe, Manholes, Precast Box Sections Using Preformed Flexible Joint Sealants.
13. ASTM C 1244, Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill.
14. ASTM C 1478, Standard Specification for Storm Drain Resilient Connectors Between Reinforced Concrete Storm Sewer Structures, Pipes and Laterals
15. ASTM D 1737, Test Method for Elongation of Attached Organic Coatings with Cylindrical Mandrel Apparatus
16. ASTM D 2240, Standard Test Method for Rubber Property
17. ASTM D 412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers Tension
18. ASTM D 4161, Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals.
19. ASTM D 6783, Standard Specification for Polymer Concrete Pipe.
20. ASTM F 477, Specification for Elastomeric Seals (gaskets) for Joining Plastic Pipe.
21. ASTM 4060, Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser
22. ASTM 4541, Standard Test Method for Pull Off Strength of Coatings using Portable Adhesion Testers
23. AWWA C 110, Ductile-Iron and Gray-Iron Fittings, 3 in. through 48 in., for Water and Other Liquids.

24. AWWA C 111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings. AWWA C 115, Flanged Ductile-Iron Pipe with Threaded Flanges.
25. AWWA C 151, Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids.
26. AWWA C 302, Reinforced Concrete Pressure Pipe, Noncylinder Type, for Water and Other Liquids.

## 1.4 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
  1. Design Drawings showing design and construction details of all precast concrete and cast-in-place manholes including details of joints between the manhole bases and riser sections and stubs or openings for the connection of sewers. Design Drawings shall show invert elevations of all pipe connections entering and leaving the manhole along with flowline slope across the base. Shop Drawings shall show the delta angles for all points of intersection, except where more than one line intersects at the same manhole. Where more than one line intersects, the angles relating all lines shall be shown. All angles shall be shown to the nearest second.
  2. Manufacturer's name for all precast structures.
- B. For the following submit:
  1. Manholes: Include plans, elevations, sections, details, and frames and covers.
  2. Drainage Structures: Include plans, elevations, sections, details, and frames, covers, and grates.
  3. Cast-in-place and Precast Structures: Include plans, elevations, reinforcing, concrete mix design, and structural calculations stamped by a Professional Engineer, registered in the State of Kentucky, competent in structural design.
  4. Pipe material and layout for prefabricated sections
  5. Any other items as requested by the ENGINEER or SD1.
- C. Comply with all the requirements of Section 01340.

## PART 2 STRUCTURES

### 2.1 GENERAL

- A. Concrete for all cast-in-place storm drainage structures (including channels and benches) shall conform to Section 03300 of the SD1 Technical Specifications including a minimum 28-day compressive strength of 4,000 psi.
- B. Grout shall consist of a mixture of water and cement or cement with fly ash, one part cement or cement with fly ash to two parts mortar sand as defined in Section 601.03.03B of the KYTC Standard Specifications, by volume.
- C. Non-shrink grout shall be an approved non-shrink, non-staining grout consisting of either a mixture of hydraulic cement, water, fine aggregate, and an approved nonferrous expansive admixture, or a packaged commercial product and shall meet the requirements of Section 601.03.03B of the KYTC Standard Specifications.
- D. Round precast structures shall conform to ASTM C 478. Square and rectangular precast structures shall meet the requirements of ASTM C 913. Structural calculations shall be provided for all precast structures as requested by SD1.
- E. Benching is required in the bottom of all structures (curb inlets, yard drains, standard inlets, manholes) per SD1 standard details. Cast-in-place benches shall be of 4,000 psi concrete. The invert channels shall be constructed as to cause the least possible resistance to flow. The shapes of invert channels shall conform uniformly to inlet and outlet pipes. Smooth and uniform finishes will be required. Inverts may also be precast into the structure.

## 2.2 PRECAST CONCRETE MANHOLES, AIR RELEASE MANHOLES, AND BYPASS PUMPING VAULTS

- A. General:
  - 1. Precast manholes shall conform to the details shown on the Standard Details.
  - 2. Concrete shall be minimum 4000 psi compressive strength.
  - 3. Except where otherwise specified precast manhole components shall consist of reinforced concrete pipe sections especially designed for manhole construction and manufactured in accordance with ASTM C 478 except as modified herein.
    - a. Standard Manholes shall be six (6) feet or more in depth, measured from the base of the cover frame to the invert of the outlet and shall be concentric cone-type, top construction as shown on the Design Drawings.
    - b. Shallow Manholes shall be less than six (6) feet in depth, measured from the base of the cover frame to the invert of the outlet and shall be of flat-top construction as shown on the Design Drawings.

4. Precast, reinforced concrete manhole bases, riser sections, flat slabs and other components shall be manufactured by wet cast methods only, using forms which will provide smooth surfaces free from irregularities, honeycombing or other imperfections.
5. All precast manhole components shall be of approved design and of sufficient strength to withstand the loads imposed upon them. They shall be designed for a minimum earth cover loading of 130 pounds per cubic foot, an H-20 wheel loading, and an allowance of 30 percent in roadways and 15 percent in rights-of-way for impact.
6. Precast concrete manhole sections (including eccentric and concentric cones, risers and rings) shall conform to ASTM C 478 except sections deeper than 12 feet shall have reinforcing equal to that of ASTM C76 Class III reinforced concrete pipes, unless otherwise noted on the Design Drawings.
7. Lifting holes, if used in manhole components, shall be tapered, and no more than two shall be cast in each section. Tapered, solid rubber plugs shall be furnished to seal the lifting holes. The lifting holes shall be made to be sealed by plugs driven from the outside face of the section only. If lifting holes do not protrude completely through the wall, no sealing is required.
8. Mark date of manufacture, manhole number as shown on the Design Drawings, and name or trademark of manufacturer on outside of barrel.

B. Manholes downstream of force mains

1. Where a force main connects to a new or existing manhole, that manhole shall be lined with a corrosion resistant monolithic lining conforming to SD1's Technical Specifications. SD1 may also require existing manholes up to 4 manholes downstream of the new force main discharge be similarly lined on a case-by-case basis. The cover on the force main discharge manhole shall be a solid lid (not vented). SD1 may require that additional downstream vented manhole lids be replaced on a case-by-case basis.
2. Any existing manholes to be lined shall be inspected by the DESIGN ENGINEER and SD1 to determine the conditions of the manholes and confirm if the manholes are suitable for lining. If in the opinion of SD1, the existing manholes cannot be lined, then the manholes shall be replaced.

C. Manhole Bases Sections:

1. Precast concrete manhole base sections shall be "monolithic", consisting of base slab and base riser (barrel) section.
  - a. If floatation is found to occur based on the Design Engineer's review, the engineer shall specify thickness of precast base. Precast base sections shall be furnished with an integral anti-flotation

footing, thickness as specified hereinafter, extending trench bank-to-bank as shown in the Standard Details (minimum 8" projection).

- b. Precast concrete manhole base slab thickness shall comply with the following schedule:

0.0' – 15.0'	Vertical Height	- 8" Slab
15.1' – 20.0'	Vertical Height	- 10" Slab
20.1' – 25.0'	Vertical Height	- 12" Slab
25.1' – 30.0'	Vertical Height	- 14" Slab

- c. Manholes over 30 feet shall be designed by a Professional Engineer registered in the State of Kentucky. Submittals shall be provided to SD1 for review & approval.
- d. Manhole bases shall have two cages of reinforcing steel in their walls, each of the area equal to that required in the riser sections. Wall thickness shall not be less than 5 inches.
- e. There should be a minimum of twelve (12") inches between the outside diameters of all pipe penetrations in the base section. The maximum inside diameter (or horizontal dimension) of pipe to be used with a given size manhole shall be as specified on SD1 standard detail.
- f. Base riser shall extend a minimum twelve (12) inches above the top of the highest pipe in the base.

- 2. Flow channel (invert) and apron (bench) shall be poured separately at the point of manufacture to the dimensions shown on the Design Drawings.

- a. The flow channel through manholes should be made to conform in shape and slope to that of the sewers.
- b. Invert shall be smooth and semi-circular in cross-section of the same diameter of the pipe leaving the manhole.
- c. Changes of direction of flow or sewer centerline within the manhole shall be made by forming the flow channel along a smooth curve with as long radius as the inside of the manhole will allow.
- d. Bench shall slope toward invert at not less than one (1) inch per foot.

- 3. All precast base sections with pipe openings shall fulfill the connection requirements identified hereinafter in Paragraph 2.6 herein.

C. Manhole Barrel Sections:

- 1. Manhole barrel sections shall have reinforcing steel in their walls, Wall thickness shall not be less than 5 inches.
- 2. The barrel of the manhole shall be constructed of various lengths of riser pipe manufactured in increments of one foot to provide the correct height with the fewest joints. Openings in the barrel of the manholes for sewers or drop connections will not be permitted closer than one foot from the nearest joint. Special manhole base or riser sections shall be furnished as necessary to meet this requirement.



3. The barrel sections shall be of the height required, but not less than one (1) foot in height. No opening shall be cut into a barrel section, the maximum dimension of which exceeds one-half (1/2) the section height.
4. Joints between manhole components shall be the tongue and groove. The circumferential and longitudinal steel reinforcement shall extend into the tongue and groove ends of the joint without breaking the continuity of the steel.
5. Precast manhole section joints shall be joined with one of the following products:
  - a. ASTM C 443, a single, continuous rubber O-ring gasket and shall conform to AWWA C302.
  - b. ASTM C-990, flexible butyl resin sealant such as Conseal CS-102, CS-202 as manufactured by Concrete Sealants, Inc.
  - c. Hamilton-Kent "Kent-Seal No. 2"
  - d. Press Seal Gasket "E-Z Stik"
  - e. Or Equal

D. Cone Sections and Top Slab:

1. A precast concentric cone or precast top slab shall be provided at the top of the manhole barrel to receive the cast iron frame and cover or floor access hatch cover as shown on the Design Drawings. Eccentric cones will be evaluated on a case by case basis or where directed by SD1
2. Cone sections and top slabs shall be designed for an H-20 wheel loading.
3. Cone sections for standard manholes shall have a minimum 8" thick upper walls and shall not exceed 3'-0" in height.
4. Concrete top slabs shall not be less than 8 inches thick.

E. Drop Manhole:

1. Drop Manholes shall conform to all provisions specified herein, with the additional requirements for the drop pipe as shown on the Design Drawings.
2. The drop pipe shall be of the same material and diameter as the inlet sewer pipe used.
3. Drop pipe shall be totally enclosed in concrete, formed, with a minimum covering dimension of six (6) inches.
4. No drop pipes shall be allowed inside of the manholes, unless otherwise approved by SD1.

5. Base shall be cast to support drop connection.
- F. Acceptable Manufacturers
1. KOI
  2. Hanson
  3. or equal

## 2.3 MANHOLE RISERS

- A. Manhole risers (adjusting rings) 6" to 10" height shall be concrete.
- B. Manhole risers 2" to 5" height shall be high density polyethylene as manufactured by Ladtech, Inc or equal. Manholes that will be raised more than 10 inches will use 1-foot barrel section on inside of manhole.
- C. Or other method approved by SD1 on a case by case basis

## 2.4 PRECAST STORM CURB INLETS, STANDARD INLETS, CATCH BASINS & YARD DRAINS

- A. Precast storm drainage structures with knockout panels shall only be used for curb inlets (catch basins) and yard drains no greater than 6-ft in depth, unless load calculations are supplied. For pre-cast rectangular structures (other than those with knockout panels), at least 6 inches of wall (measured from the interior corner) is required on each side of the pipe beyond the precast opening for the pipe. This rule is not applicable for structures which have pipe installed in opposite walls or where one outlet reinforced concrete pipe is utilized. Less than 6 inches of wall may be approved by SD1 with the submittal of design calculations.
- B. Base and riser sections shall be custom-made with openings to meet indicated pipe alignment conditions. The minimum distance allowed between precast holes, measured from edge to edge in a standard inlet section shall be 6 inches.
- C. Joints between yard drains and standard inlet sections in the roadway or yard areas shall be sealed with one of the following:
  1. ASTM C 443, a single, continuous rubber O-ring gasket and shall conform to AWWA C302.
  2. ASTM C-990, flexible butyl resin sealant such as Conseal CS-102, CS-202 as manufactured by Concrete Sealants, Inc.
  3. Hamilton-Kent "Kent-Seal No. 2"
  4. Press Seal Gasket "E-Z Stik".
  5. Or equal
- D. Joints between riser sections for curb inlets (catch basins) are not required to have gaskets or butyl sealant between sections. These joints can be stacked dry as long as there are no holes or gaps in the joints. All holes or gaps shall be filled with non-

shrink grout.

- E. For precast structures with openings cast into the unit, the minimum vertical distance from the pipe openings to the top of the structure or segment wall shall be 12 inches. If this distance is less than 12 inches, then additional reinforcing steel shall be furnished for this section. All pipe openings shall not be in joints between two precast sections unless specifically approved by SD1. The top slab must be designed for HS-20 loading in paved areas only.
- F. All standard inlets shall conform to the appropriate Standard Drawings No. STM-08 through STM-11. All storm drains outside of the right-of-way shall be Standard Drawing No. STM-07, unless specifically approved otherwise by SD1. All curb inlets and catch basins shall conform to the appropriate Standard Drawings No. STM-01.1, STM-01.2, STM-04 and STM-12.

## 2.5 HEADWALLS AND OUTFALLS

- A. Headwalls and outfalls shall be constructed of either cast-in-place or precast reinforced concrete that conforms to KTC Standard Specifications for Road and Bridge Construction.
- B. Safety guards and railings: Safety guards and railings shall be provided along the top and sloped/winged sidewalls on all headwall inlet and outlet structures having a vertical drop of 4'-0" or greater. Such guards or railings shall be at least 42-inches in height measured vertically above the wall. Guards or railings shall not have an ornamental pattern that would provide a ladder effect. Vinyl coated chain link fencing and galvanized materials are an acceptable guard type.
- C. Grates: Grates shall be provided on inlet headwalls for all pipes.
- D. All headwalls and outfalls shall conform to the appropriate Standard Drawings, including but not limited to, No. STM-15, STM-16, STM-17.1, STM-18.1 and STM-19.

## 2.6 FLEXIBLE PIPE JOINT SEAL & CONNECTIONS

- A. For sanitary structures and manholes:
  - 1. A flexible pipe joint seal shall be provided in the connection of pipe to manholes and other miscellaneous structures. The rubber seal shall meet the requirements given in ASTM C 923. The seal shall be of a size specifically designed for the pipe size and material.
  - 2. All connecting elements of the seal shall be Type 304 stainless steel.

3. Flexible pipe joint seal shall allow for pipe alignment of up to fifteen (15) degrees deflection.
  4. Pipes entering manholes that do not have existing flows and have slopes greater than ten (10) percent may have fittings (22.5 or 11.25 degree bends) installed immediately outside the manhole. This is to be evaluated on a case by case basis by SD1 or ENGINEER.
  5. Acceptable Products:
    - a. Kor-N-Seal by NPC, Inc.
    - b. A-Lok by A-LOK Products, Inc.
    - c. Dura-Seal III by Dura-Tech
    - d. Or equal.
- B. For storm structures and manholes with flexible pipe joint seals:
1. CONTRACTOR may use flexible connections at storm manholes which shall be elastomeric gaskets or couplings, manufactured in accordance with ASTM C 1478, Standard Specification for Storm Drain Resilient Connectors Between Reinforced Concrete Structures, Pipes, and Laterals.
  2. CONTRACTOR may use a concrete collar for opening around the pipe. The pipe shall be encased with minimum 6 inch collar of concrete from the inside face of the wall to 1'-0" outside the outer face of the wall. The pipe shall be adequately supported to prevent settling while the concrete encasement is curing. The inside faces of the structure walls shall be finished with a trowel. If a concrete collar is used, the collar shall be allowed to cure to 75% of its design strength before backfilling. The diameter of the opening shall be no more than 8 inches greater than the outside diameter of the pipe.
  3. For precast structures with knockout panels, all holes for pipes shall be via a controlled cut and shall not be cut into the structural members (i.e., top beams and corner columns) and non-shrink grout shall not be allowed to be placed around the pipes without prior approval from SD1 or its Engineer. The pipes shall be encased with a minimum 6 inch concrete collar all around the outside of pipe or a minimum of 3 inches beyond the hole knocked in the wall, whichever is greater. Also, the concrete encasement shall extend from the inside face of the wall to 1'- 0" outside the outer face of the wall. The collar shall be allowed to cure to 75% of its design strength before backfilling.

## 2.7 STORM LATERAL CONNECTIONS

- A. Roof downspouts, footing or foundation drains, and sump pumps shall discharge in accordance with the local governing subdivision regulations. All storm lateral connections (downspouts, footing or foundation drains, sump pumps, etc) to the

storm sewer shall be prohibited unless explicitly reviewed and approved by SD1 due to uncommon circumstances (i.e. inadequate discharge distances from foundations, narrow side yards, etc.).

## 2.8 MANHOLE, CATCH BASIN & STRUCTURE STEPS

- A. Reinforced Polypropylene Manhole Steps: ½ inch Grade 60 steel reinforcing rod, ASTM A-615, encapsulated in copolymer polypropylene, ASTM D 2146-68 under Type II, Grade 16906. Steps shall be PS1-PF (Press Fit polypropylene plastic) as manufactured by MA Industries, or equal. Steps shall be epoxy grouted into specially sized holes cast into the manhole section. Holes shall be formed in the manhole section using an insert plug that is removed upon curing.
- B. No steps shall be aligned over the flow channel. Step spacing shall be 16” as shown the Standard Detail Drawing.
- C. Omit steps for structures that are less than 4-ft deep unless otherwise shown on the plans.

## 2.9 EXTERNAL SLEEVE FOR STRUCTURE (Sanitary Only)

- A. Provide external sleeve around all manhole joints as designated on the plans. Any manholes located within fifty (50) feet or less of a creek/ stream or within a floodplain shall have an external sleeve. External sleeve shall be a wraparound heat shrinkable sleeve that creates a barrier to water infiltration and protects support of the structure and frame from ground moisture prevents corrosion and freeze-thaw damage. The system shall be compatible with and bond to concrete, metal, and fiberglass using an adhesive type primer. The sleeve shall have the following physical properties:

Softening Point	212 degrees Fahrenheit	ASTM E-28
Lap Shear Strength	12 PSI	DIN 30 672
Tensile Strength	2900 PSI	ASTM D-638
Elongation	600%	ASTM D-638
Hardness	46 Shore D	ASTM D-2240
Abrasion Resistance	45 mg	ASTM D-1044
Peel Strength	9PLI	ASTM D-1000
Water Absorption	0.05%	ASTM D-570
Low Temperature	-40 degrees Fahrenheit	ASTM D-2671D
Minimum Width	12 inches	

- B. System shall accommodate ground movement and resists soil stress.
- C. Acceptable Products:

1. WrapidSeal – Manhole Encapsulation System by Canusa –CPS.
2. Link- Seal Riser- Wrap Heat Shrink System.
3. Or Equal.

## 2.10 PVC STORM DRAINAGE STRUCTURES AND CATCH BASINS

- A. PVC storm drainage structures and catch basins shall be approved on a case-by-case basis by SD1.

## PART 3 EXECUTION

### 3.1 MANHOLE BASES

- A. General
  1. Manholes shall be installed at the locations shown on the Design Drawings.
  2. The dimensions shall be as shown on the detail sheets and the depths shall be as indicated by either finished top elevation given or depth dimension given on the plans.
  3. Perform Site work as per the requirements of Specifications Sections 02050, 02110, 02220, and 02222.
  4. Excavation for manholes and other underground structures shall be of sufficient size to adequately accommodate installation and proper centering.
  5. The bases shall be placed directly on an 8-inch to 12-inch deep pad (compacted thickness) of pipe bedding material as specified in section 02220, placed to proper elevation and leveled, unless a deeper excavation is required to remove any loose sandy soils or soft to medium stiff, clayey soils down to a soil stratum suitable for support of the manhole and base.
    - a. The excavated soils shall be replaced with an appropriate Structural Backfill material or with controlled, low-strength material (CLSM), lean concrete, or an extra thickness of manhole base concrete.
  6. The excavation shall be kept free of water while the manhole is being constructed and manhole shall not be backfilled until inspected by the SD1.
  7. CONTRACTOR will be required to compact bedding material around the entire circumference of the manhole and manhole excavation area to at least 12-inches above the highest incoming or outgoing pipe.

8. Compacted backfill as specified on the Design Drawings or section 02220 shall then be placed above the compacted bedding material up to finished grade.
- B. Pre-Cast Bases
1. The SD1 reserves the right to inspect precast manhole base sections at the construction site and to reject the use of such sections if the SD1 determines the products unsuitable for the SD1'S installation.
  2. Doghouse manholes shall not be permitted unless written approval by SD1 or SD1 representative.
- A. Cast-in-Place Bases
1. Cast-in-Place Bases shall be used when installing a doghouse manhole over an existing sewer or as approved by the ENGINEER.
    - a. Cast-in-place bases shall be placed on suitable foundations after the pipes are laid as specified in 3.1.A.5.
  2. The base shall be cast monolithically to an elevation at least 12 inches above the top of the highest pipe entering the manhole, except where a drop connection is to be installed.
    - a. Base thickness shall be as per 2.1.B.1.
    - b. Base, walls and bottom shall be at least of the thickness shown and reinforced to withstand the loads to be expected.
    - c. Connections for sewer pipes shall conform to SD1's standard detail.
    - d. The base of the bell or groove end at joints between components shall be buttered with 1:2 cement-sand mortar to provide a uniform bearing between components.
    - e. All joints shall be sealed with cement mortar inside and out and troweled smooth to the contour of the wall surface.
    - f. Raised or rough joint finishes will not be accepted.

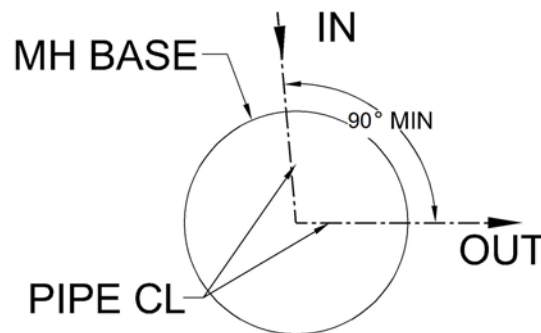
### 3.2 PRECAST MANHOLE SECTIONS

- A. Set sections vertical with steps and sections in true alignment.
- B. Install sections, joints and gaskets in accordance with manufacturer's recommendations.

### 3.3 STRUCTURE CHANNELS

- A. All invert channels through structures shall be constructed of 4000 psi concrete.

- B. For precast bases, the flow line (channel) and benches shall be cast separately from the floor and side wall at the place of manufacture, unless otherwise approved by SD1.
- C. Channels shall be properly formed to the sizes, cross sections, grades and shapes shown or as ordered.
- D. Benches shall be built up to the heights shown or as ordered and given a uniform wood float finish.
- E. Care shall be taken to slope all benches for proper drainage to the invert channel.
- F. All flow channel angles between any new incoming pipe and new outgoing pipe shall be at least 90 degrees in the direction of flow as seen in the figure below. For any pipe with velocities exceeding 5 ft/s consult SD1 engineer for the required angle or for the need of an oversized manhole.



### 3.4 STORM CURB INLETS, STANDARD INLETS, CATCH BASINS, YARD DRAINS, HEADWALLS & OUTFALLS

- A. Inlets, catch basins, drains, junction structures, and other drainage structures shall be neatly and accurately built in accordance with the plans or SD1 Standard Drawings. The structure shall be either of cast-in-place concrete or precast concrete. Precast structure sections shall be installed in accordance with ASTM C 891.
- B. All cast-in-place structures shall be built using 4,000 psi concrete as described in Paragraph 2.1. The structures shall be built on prepared foundations and conform to the dimensions and shapes shown on the Plans and SD1 Standard Drawings. The construction shall conform to the methods, forms, placement, protection, and curing for concrete as specified in accordance with KTC and SD1 Standards. Any required reinforcement shall conform to the Plans and SD1's Standard Drawings. Installed concrete reinforcing shall be inspected and approved by SD1 before any concrete is placed.



- C. Headwalls and outfalls shall be constructed of either cast-in-place or precast reinforced concrete in conformance with SD1's Standard Drawings and KTC Standard Specifications for Road and Bridge Construction. All headwalls and outfalls built into slopes shall be properly seated as to avoid disconnection from the adjoined pipe.

### 3.5 DOGHOUSE MANHOLES

- A. For joining new pipe to existing pipe, refer to Paragraph 3.1.B.2 of this section for requirements. Doghouse manholes shall only be used for connections to sewer mains with high flows, as determined by the ENGINEER. Doghouse manholes must be approved by SD1. For applications using doghouse manholes, refer to Paragraph 3.1.C of this section and SD1 Standard Detail No. SD-106 for requirements.

### 3.6 PIPE CONNECTIONS TO NEW STRUCTURES

- A. For connections to new structures:
  - 1. A flexible pipe-to-manhole joint connector shall be used for joining piping to manholes and other miscellaneous structures. The rubber seal shall meet the requirements given in ASTM C 923. The seal shall be of a size specifically designed for the pipe size and material and be as specified herein.
    - a. If a Kor-N-Seal joint seal or equal with a stainless steel tightening band is used, CONTRACTOR shall tighten the band to the proper torque as specified by the manufacturer.
    - b. If the slope of the incoming sewer exceeds 10% from the horizontal, a fitting may be used outside the manhole wall to facilitate a more perpendicular connection to the manhole wall. The use of this fitting is to be evaluated on a case by case basis by SD1.
  - 2. All pipe connections to manholes shall match crowns. If matching crowns is not possible, a drop manhole may be approved by SD1.
  - 3. All drop manholes shall be approved by SD1. Drop manholes may be acceptable under the following conditions:
    - a. If the slope of the influent sewer is greater than or equal to five (5) percent, SD1's drop connection detail 114 shall be followed. All other influent sewer slopes and drop connections will be evaluated on a case by case basis.
    - b. All other drop manhole requests shall be approved on a case by case basis including but not limited to pipe realignments, connections to existing manholes, etc.

- c. If the total height of the drop is greater than sixteen (16) feet, a drop shaft assembly shall be specifically designed for the hydraulic conditions present by a licensed professional engineer in the Commonwealth of Kentucky for the hydraulic and shall be approved by SD1.

- 4. Slide manholes shall not be used, unless otherwise approved by SD1.

### 3.7 PIPE CONNECTIONS TO EXISTING STRUCTURES

- A. Perform by core drilling in accordance with Section 01045.
- B. The connection to the structure shall be in accordance with the materials specified herein.
- C. The flow channel and bench for the new connection shall be constructed onsite or the existing flow channel and bench modified to accept the new piping.
- D. New connections to existing structures need to be greater than ninety (90) degrees to the existing flow channel in the direction of the flow.
- E. Where new flows joining an existing eight (8) inch sewer that is flowing half pipe or greater, or the existing pipe is twelve (12) inches or greater, an oversized manhole shall be installed to allow a smooth, sweeping flow transition. Consult SD1 for required manhole diameter.
- F. For sanitary applications, perform all connections in accordance with Paragraphs 3.9 and 3.11 herein.

### 3.8 SANITARY SEWER STUBS FOR FUTURE CONNECTIONS

- A. Installation of stubs for future connections shall be evaluated on a case by case basis and approved by SD1. If stubs are approved, PVC, ductile iron, or fiberglass pipe stubs with approved watertight plugs shall be installed in manholes. SD1 requires that future connections to existing manholes be cored and the benching modified to accept the new connection. Where pipe stubs, sleeves or couplings for future connections are shown or ordered, CONTRACTOR shall provide all materials and work for their construction.
- B. If stubs are approved by SD1, stubs out of manholes shall be a two (2) to five (5) foot stick of pipe with sealed caps. When future connections are made to these manholes, the stubs shall be removed and a full stick of pipe shall be installed at the proper slope.

- C. Where connections are made to existing manholes installed after May 15, 2000, the existing manhole shall be vacuum tested prior to the connection being made. If the manhole is vacuum tested prior to alterations and fails, it is the responsibility of SD1 to repair or replace the manhole. If the manhole passes the vacuum test prior to connection, but fails the vacuum test after the connection is made, then the CONTRACTOR shall repair or replace the manhole per SD1's direction and approval.

If the CONTRACTOR fails to vacuum test the manhole prior to any connections being made, and the manhole fails the vacuum test after the connection, the CONTRACTOR shall repair or replace the manhole per SD1's direction and approval.

- D. If the connection to an existing manhole is cored, the connection shall be booted and the existing manhole shall pass a vacuum test after all work is complete, if the existing manhole was installed after May 15, 2000.
- E. If the elevation or grade of an existing manhole is altered, the existing manhole shall pass a vacuum test after all work is complete, if the existing manhole was installed after May 15, 2000.

### 3.9 GRADING AT MANHOLES & STRUCTURES

- A. Manholes shall be installed to conform to the following convention unless otherwise called for on the plans. The ground surface shall be graded to drain away from the manhole. Final dimensions shall be determined after grading has taken place.
  - 1. Manholes in roads, parking lots, paved areas and lawns shall be installed flush with the surrounding area.
  - 2. Manholes in wooded or other inaccessible areas shall be installed twelve (12) inches above the final grade.
  - 3. Confirm with land owner prior to installation of manholes in cultivated fields, hay fields and pastures. If land owner agrees manhole shall be installed with the cone section flush with the final grade. After installation of the casting, a slope fill 1:5 (1 vertical to 5 horizontal) shall be installed to provide surface drainage away from the manhole.
- B. Manholes in paved areas shall be constructed to meet the final surface grade. In paved areas on State Highways, all manholes shall be 1/2 inch below final wearing surfaces. Manholes shall not project above finished roadway pavements to prevent damage from snowplows.

- C. CONTRACTOR shall be solely responsible for the proper height of all manholes necessary to reach the final grade at all locations. CONTRACTOR is cautioned that ENGINEER'S review of Shop drawings for manhole components will be general in nature and CONTRACTOR shall provide an adequate supply of random length precast manhole riser sections to adjust any manhole to meet field conditions for final grading.

### 3.10 MANHOLE WATERTIGHTNESS (Sanitary Only)

- A. All manholes shall be free of visible leakage. Each manhole shall be tested for leaks and inspected. If the manhole fails a visual leakage inspection and/or vacuum testing, SD1 will consider the manhole defective and the Contractor shall provide the Engineer a plan for leak repairs for approval or replace the manhole and make any necessary reconnections to the new or existing pipelines at no additional cost to the SD1. No leak repairs shall be performed without the ENGINEER'S approval.
- B. Vacuum test manholes to ASTM C 1244. Testing to be witnessed by SD1. Manholes not subject to vacuum testing must be in writing from SD1. This specification shall govern the negative air pressure (vacuum) testing of sanitary sewer manholes and structures and shall be used as a method of determining acceptability by the SD1, in accepting maintenance of a sanitary sewer manhole or structure on behalf of the public. Other forms of testing of some manholes may be required, as deemed necessary by the SD1.
- C. Manholes shall be tested after installation with all connections in place along with the following completed prior to testing:
  - 1. Lift holes, if any, shall be plugged with an approved, non-shrinkable grout prior to testing.
  - 2. Drop connections shall be installed prior to testing.
  - 3. The vacuum test shall include testing of the seal between the cast iron frame and the concrete cone, slab or grade rings.
  - 4. The manholes shall be backfilled and finished to design grade prior to test.
  - 5. Test pressure requirements of ASTM C-923 shall be met.
- D. Test Procedure:

1. Temporarily plug, with the plugs being braced to prevent the plugs or pipes from being drawn into the manhole, all pipes entering the manhole at least eight inches into the sewer pipe(s). The plug must be inflated at a location past the manhole/pipe gasket.
2. The test head shall be placed inside the frame at the top of the manhole and inflated, in accordance with the manufacturer's recommendations.
3. A vacuum of 10" of mercury shall be drawn on the manhole. Shut the valve on the vacuum line to the manhole and disconnect the vacuum line.
4. The pressure gauge shall be liquid filled, having a 3.5 inch diameter face with a reading from zero to thirty inches of mercury.
5. The manhole shall be considered to pass the vacuum test if it holds at least 9 inches of mercury for the following time durations:

Time (Minutes)	4' Diameter	5' Diameter	6' Diameter
Manhole Depth			
20 Feet or Less	1	2	3
20.1 to 30 Feet	2	3	4

Note: Consult SD1 on manhole diameters larger than six (6) feet.- These test pressures exceed what is in ASTM C-1244

6. If a manhole fails the vacuum test, SD1 will consider the manhole defective and the CONTRACTOR shall provide the Engineer a plan for leak repairs for approval or shall replace the manhole and/ or defective components and make any necessary reconnections to the new or existing pipelines at no additional cost to the SD1. No repairs shall be made to the manhole unless approved by the ENGINEER.
7. All temporary plugs and braces shall be removed after each test.
8. Manholes will be accepted as having passed the vacuum test requirements if they meet the criteria stated above.

### 3.11 STRUCTURE ABANDONMENT

- A. Structure abandonment shall be per SD1 standard drawings and consist of removing structure frames, covers, grates, cone section of manholes, and similar items. All connecting pipes shall be bulk headed. The walls shall be lowered to 2 feet below

final grade if in earth or to 12 inches below subgrade if in pavement. The remaining structure shall be filled with crushed stone or sand compacted to match all backfill requirements here-in or shall be filled with controlled density fill.

++ END OF SECTION ++

# **SANITARY SEWER MANHOLE ADJUST TO GRADE BID ITEM DESCRIPTION**

**S MANHOLE ADJUST TO GRADE** Payment under this item is for the adjustment of sanitary sewer casting elevation on all sizes of existing sanitary manholes. This work shall be performed in accordance with the sanitary sewer specifications. Payment shall be made under this bid item regardless of the amount of adjustment necessary to a sanitary sewer manhole casting or diameter of the manhole. Work under this pay item may be as simple as placing a bed of mortar under a casting; but, shall also be inclusive of installation of adjusting rings, and /or addition, removal, or replacement of barrel sections. The existing casting is to be reused unless a new casting is specified on the plans. New casting, when specified, shall be paid as a separate bid item. Anchoring of the casting shall be incidental to this item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

# SANITARY SEWER SPECIFICATIONS AND NOTES

Boone County  
Item 6-18.00

## I-71/I-75 INTERCHANGE RECONSTRUCTION AT KY338 (RICHWOOD ROAD)

These specifications and notes are specific to furnishing, installing, testing and placing into service the relocated gravity sanitary sewers for Sanitation District No. 1.

### 1.0 SCOPE OF WORK

The scope of work shall include the relocation of gravity sanitary sewer lines owned by Sanitation District No. 1 due to the work by KYTC in the I-75/I-71 Interchange with KY338. The sanitary sewer line relocation work is shown on project drawings U1 through U23. The project includes the following major work items:

- Relocate 2103 LF of 8-inch ductile iron pipe and 1618 LF of 8-inch PVC pipe. This includes 29 4-foot manholes, 1 5-foot manhole, encasing the sewer in steel encasement pipe or concrete at various locations, reconnecting various property service connections, and miscellaneous other appurtenances as shown on the Plans.
- Abandoning the existing sanitary sewer by safe-loading the pipe and abandoning existing manholes.
- A 16' force main is located within the project limits. The line was recently abandoned by SD1. If the pipe comes into conflict with any of the proposed relocations, the force main is to be plugged per the "Plug Pipe" bid item. Removal of the sections of conflicting force main will be considered incidental to the project.
- "Utility Reference Plans (URP)" are included in the KYTC Roadway plan set. The plans are not for construction of any utility. These plans show proposed sanitary sewer and other proposed utilities for reference purposes only.

### 2.0 MAINTENANCE OF TRAFFIC AND EROSION CONTROL

Any required maintenance of traffic and erosion control best management practices for the sewer line relocation work shall fall under the roadway project maintenance of traffic and



erosion control bid items and is not a separate pay item.

### **3.0 GEOTECHNICAL/ SUBSURFACE INFORMATION**

Utilize the Roadway Soil Profiles for existing ground, subsurface, and geotechnical information.

### **4.0 PIPELINE MATERIALS, CONSTRUCTION, TESTING AND TIE-INS**

Unless otherwise indicated on the project drawings or modified by this note, the attached Technical Specifications of Sanitation District No.1 (Sections 02060 and 02610) shall apply to the sewer line relocation materials, installation, testing and tie-ins on this project.

### **5.0 GENERAL NOTES**

**5.1 Omissions.** Where information may have been omitted from these specifications and notes, bid item descriptions, technical specifications or plans, the KYTC Standard Specifications for Road and Bridge Construction shall be referenced.

**5.2 Protection of Existing Utilities.** The existing utilities shown on the sanitary sewer plans are shown as best known at the time the plans were developed and are to be used as a guide only by the Contractor. The Contractor shall use all means at his disposal to accurately locate all existing utilities, whether shown on the plans or not, prior to excavation. The contractor shall protect these utilities during construction. Any damage to existing utilities during construction that are shown or not shown on the plans shall be repaired at the Contractor's expense.

### **6.0 UTILITY BID ITEM DESCRIPTIONS**

#### **6.1 Standard Sanitary Sewer Bid Item Descriptions.**

Contained elsewhere in the proposal are "Standard Sanitary Sewer Bid Item Descriptions". These descriptions are to be used in association with these specifications and notes in the execution of the sanitary sewer work contained in the contract. These "Standard Sanitary Sewer Bid Item Descriptions" shall supersede any conflicting information contained in these sanitary sewer specifications and notes.

#### **6.2 Special Sanitary Sewer Bid Item Descriptions**

Contained elsewhere in the proposal are "Special Sanitary Sewer Bid Item Descriptions". These descriptions are for those items contained in the contract that do not have a standard descriptions These descriptions are to be used in association with these specifications and notes in the execution of the sanitary sewer work contained in the contract. These "Special Sanitary Sewer Bid Item Descriptions" shall supersede any conflicting information contained in these sanitary sewer specifications and notes.

## **7.0 CONTRACT ADMINISTRATION RELATIVE TO SEWER RELOCATION WORK**

All sanitary sewer work is being performed as a part of the road contract administered by KYTC. There is not a direct contract between the utility contractor and utility owner.

The KYTC Section Engineer is ultimately responsible for the administration of the road contract and any utility work included in the contract.

## **8.0 SUBMITTALS AND CORRESPONDENCE**

All sanitary submittals and correspondence of any kind relative to utility work included in the road contract shall be directed to the KYTC Section Engineer. A copy of submittals and correspondence may also be supplied to the utility owner and/or utility owner engineer by the contractor to expedite handling of items, like material approvals and shop drawings. All approvals and correspondence generated by the utility owner/engineer shall be directed to the KYTC Section Engineer. The KYTC Section Engineer will relay any approvals or correspondence to the utility contractor as appropriate. At no time shall any direct communication between the utility owner and utility contractor occur without the communication flowing through the KYTC Section Engineer. Any submittals or correspondence that does not flow through the KYTC Section Engineer shall not be considered official.

## **9.0 SEWER SHUTDOWNS**

Shutdowns for tie-ins to mains and manholes shall be approved by the utility owner (SD1). Shutdown times will be limited to off peak periods and allowable durations will be determined by SD1. If and when the utility owner gives the contractor permission to shutdown sanitary sewer facilities, the contractor shall do so following the rules, procedures and regulations of the utility owner, as shown on the project drawings, specified in the Technical Specifications or as directed in the field by the SD1 inspector in consultation with the KYTC inspector.

Notice to customers of sanitary sewer shut downs is sometimes required to be performed by the utility contractor. The contractor may be required; but, is not limited to, making notice to utility customers in a certain minimum amount of time in advance of the shut down and by whatever means of communication specified by the utility owner. The means of communication to the customer may be; but is not limited to, a door hanger, notice by newspaper ad, telephone contact or any combination of communication methods deemed necessary, customary and appropriate by the utility owner. The contractor should refer to the utility owner specifications for requirements on customer notice.

Any procedure the utility owner may require the contractor to perform by specification or plan note and any expense the contractor may incur to comply with the utility owner's shut down procedure and notice to customers shall be considered an incidental expense to the utility construction.

## **10.0 STATIONS AND DISTANCES**

All stations and distances, when indicated for utility placement in utility relocation plans or specifications, are approximate; therefore, some minor adjustment may have to be made during construction to fit actual field conditions. Any changes in excess of 6 inches of plan location shall be reviewed and approved jointly by the KYTC Section Engineer or designated representative and utility owner engineer or designated representative. Changes in location without prior approval shall be remedied by the contractor at his own expense if the unauthorized change creates an unacceptable conflict or condition.

## **11.0 RESTORATION**

### **11.1 Temporary and Permanent Pavement Restoration**

Temporary and permanent restoration of paved or stone areas due to utility construction shall be considered incidental to the utility work. No separate payment will be made for this work. Temporary restoration shall be as directed by the KYTC Section Engineer. Permanent restoration shall be "in-kind" as existing.

### **11.2 Restoration of Seed and Sod Areas**

Restoration of seed and sod areas will be measured and paid separately under the appropriate seeding and sodding bid items established in the contract for roadway work.

## **12.0 RECORD DRAWINGS**

The Contractor is responsible for providing a "marked-up" set of redline Drawings to the Engineer and/or SD1 for use in developing Record Drawings of the Project.

## **13.0 TECHNICAL SPECIFICATIONS BY SANITATION DISTRICT No. 1**

The attached Technical Specifications shall govern all sanitary sewer work, with the exception of delineation of Bid Items which are governed by the KYTC "Standard Sanitary Sewer Bid Item Descriptions" contained elsewhere in the proposal.

## SECTION 02606

### SANITARY & STORM STRUCTURES

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown on the Design Drawings, specified herein and required to furnish and install all sanitary and storm structures including but not limited to precast and cast-in-place manholes, air release manholes, bypass pumping vaults, drainage structures, headwalls, outfalls, etc.

##### 1.2 RELATED WORK

- A. Division 2, Sections on Earthwork
- B. Section 03300, Cast-In-Place Concrete
- D. Section 05501, Miscellaneous Metal Fabrications
- E. Section 05536, Floor Access Hatch Covers
- F. Section 05540, Castings
- G. Division 15, Sections on Piping
- H. Section 02607, Sanitary Structure Lining System

##### 1.3 REFERENCES

- A. KY Standard Specifications and Drawings: In this section, reference is made to the current Kentucky Transportation Cabinet (KYTC) Standard Specifications for Road and Bridge Construction and the KYTC Standard Drawings. In addition, construction requirements and material specifications not specifically covered in this section or in the referenced SD1 Technical Specifications shall

conform to KYTC Standards. The ENGINEER or CONTRACTOR of a storm sewer project is responsible for obtaining a current edition of the KYTC Standard Specifications and the latest edition of the KYTC Standard Drawings when designing or performing work that either involves SD1 funding or is to be accepted by SD1.

B. Reference Standards:

1. ASTM C 33, Standard Specification for Concrete Aggregate.
2. ASTM C 76, Class III Reinforced Concrete Pipes.
3. ASTM C 443, Specifications for Joints for Circular Concrete Sewer and Culvert Pipe, using Rubber Gaskets.
4. ASTM C 478, Specification for Precast Reinforced Concrete Manhole Sections.
5. ASTM C 579, Standard test method for compressive strength of chemical resistant mortars, grouts, monolithic surfacing and polymer concretes.
6. ASTM C 857, Standard Practice for Minimum Structural Design Loading for underground Precast Concrete Utility Structures.
7. ASTM C 891, Standard Practice for Installation of Underground Precast Concrete Utility Structures
8. ASTM C 913, Standard Specification for Precast Concrete Water and Wastewater Structures
9. ASTM C 923, Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
10. ASTM D 695, Standard Test Method for Compressive Properties of Rigid Plastics.
11. ASTM D 790, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
12. ASTM C 990, Standard Specification for Joints for Concrete Pipe, Manholes, Precast Box Sections Using Preformed Flexible Joint Sealants.
13. ASTM C 1244, Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill.
14. ASTM C 1478, Standard Specification for Storm Drain Resilient Connectors Between Reinforced Concrete Storm Sewer Structures, Pipes and Laterals
15. ASTM D 1737, Test Method for Elongation of Attached Organic Coatings with Cylindrical Mandrel Apparatus
16. ASTM D 2240, Standard Test Method for Rubber Property

17. ASTM D 412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers Tension
18. ASTM D 4161, Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals.
19. ASTM D 6783, Standard Specification for Polymer Concrete Pipe.
20. ASTM F 477, Specification for Elastomeric Seals (gaskets) for Joining Plastic Pipe.
21. ASTM 4060, Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser
22. ASTM 4541, Standard Test Method for Pull Off Strength of Coatings using Portable Adhesion Testers
23. AWWA C 110, Ductile-Iron and Gray-Iron Fittings, 3 in. through 48 in., for Water and Other Liquids.
24. AWWA C 111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings. AWWA C 115, Flanged Ductile-Iron Pipe with Threaded Flanges.
25. AWWA C 151, Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids.
26. AWWA C 302, Reinforced Concrete Pressure Pipe, Noncylinder Type, for Water and Other Liquids.

#### 1.4 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
  1. Design Drawings showing design and construction details of all precast concrete and cast-in-place manholes including details of joints between the manhole bases and riser sections and stubs or openings for the connection of sewers. Design Drawings shall show invert elevations of all pipe connections entering and leaving the manhole along with flowline slope across the base. Shop Drawings shall show the delta angles for all points of intersection, except where more than one line intersects at the same manhole. Where more than one line intersects, the angles relating all lines shall be shown. All angles shall be shown to the nearest second.
  2. Manufacturer's name for all precast structures.
- B. For the following submit:

1. Manholes: Include plans, elevations, sections, details, and frames and covers.
  2. Drainage Structures: Include plans, elevations, sections, details, and frames, covers, and grates.
  3. Cast-in-place and Precast Structures: Include plans, elevations, reinforcing, concrete mix design, and structural calculations stamped by a Professional Engineer, registered in the State of Kentucky, competent in structural design.
  4. Pipe material and layout for prefabricated sections
  5. Any other items as requested by the ENGINEER or SD1.
- C. Comply with all the requirements of Section 01340.

## PART 2 STRUCTURES

### 2.1 GENERAL

- A. Concrete for all cast-in-place storm drainage structures (including channels and benches) shall conform to Section 03300 of the SD1 Technical Specifications including a minimum 28-day compressive strength of 4,000 psi.
- B. Grout shall consist of a mixture of water and cement or cement with fly ash, one part cement or cement with fly ash to two parts mortar sand as defined in Section 601.03.03B of the KYTC Standard Specifications, by volume.
- C. Non-shrink grout shall be an approved non-shrink, non-staining grout consisting of either a mixture of hydraulic cement, water, fine aggregate, and an approved nonferrous expansive admixture, or a packaged commercial product and shall meet the requirements of Section 601.03.03B of the KYTC Standard Specifications.
- D. Round precast structures shall conform to ASTM C 478. Square and rectangular precast structures shall meet the requirements of ASTM C 913. Structural calculations shall be provided for all precast structures as requested by SD1.

- E. Benching is required in the bottom of all structures (curb inlets, yard drains, standard inlets, manholes) per SD1 standard details. Cast-in-place benches shall be of 4,000 psi concrete. The invert channels shall be constructed as to cause the least possible resistance to flow. The shapes of invert channels shall conform uniformly to inlet and outlet pipes. Smooth and uniform finishes will be required. Inverts may also be precast into the structure.

## 2.2 PRECAST CONCRETE MANHOLES, AIR RELEASE MANHOLES, AND BYPASS PUMPING VAULTS

### A. General:

1. Precast manholes shall conform to the details shown on the Standard Details.
2. Concrete shall be minimum 4000 psi compressive strength.
3. Except where otherwise specified precast manhole components shall consist of reinforced concrete pipe sections especially designed for manhole construction and manufactured in accordance with ASTM C 478 except as modified herein.
  - a. Standard Manholes shall be six (6) feet or more in depth, measured from the base of the cover frame to the invert of the outlet and shall be concentric cone-type, top construction as shown on the Design Drawings.
  - b. Shallow Manholes shall be less than six (6) feet in depth, measured from the base of the cover frame to the invert of the outlet and shall be of flat-top construction as shown on the Design Drawings.
4. Precast, reinforced concrete manhole bases, riser sections, flat slabs and other components shall be manufactured by wet cast methods only, using forms which will provide smooth surfaces free from irregularities, honeycombing or other imperfections.
5. All precast manhole components shall be of approved design and of sufficient strength to withstand the loads imposed upon them. They shall be designed for a minimum earth cover loading of 130 pounds per cubic foot, an H-20 wheel loading, and an allowance of 30 percent in roadways and 15 percent in rights-of-way for impact.



6. Precast concrete manhole sections (including eccentric and concentric cones, risers and rings) shall conform to ASTM C 478 except sections deeper than 12 feet shall have reinforcing equal to that of ASTM C76 Class III reinforced concrete pipes, unless otherwise noted on the Design Drawings.
  7. Lifting holes, if used in manhole components, shall be tapered, and no more than two shall be cast in each section. Tapered, solid rubber plugs shall be furnished to seal the lifting holes. The lifting holes shall be made to be sealed by plugs driven from the outside face of the section only. If lifting holes do not protrude completely through the wall, no sealing is required.
  8. Mark date of manufacture, manhole number as shown on the Design Drawings, and name or trademark of manufacturer on outside of barrel.
- B. Manholes downstream of force mains
1. Where a force main connects to a new or existing manhole, that manhole shall be lined with a corrosion resistant monolithic lining conforming to SD1's Technical Specifications. SD1 may also require existing manholes up to 4 manholes downstream of the new force main discharge be similarly lined on a case-by-case basis. The cover on the force main discharge manhole shall be a solid lid (not vented). SD1 may require that additional downstream vented manhole lids be replaced on a case-by-case basis.
  2. Any existing manholes to be lined shall be inspected by the DESIGN ENGINEER and SD1 to determine the conditions of the manholes and confirm if the manholes are suitable for lining. If in the opinion of SD1, the existing manholes cannot be lined, then the manholes shall be replaced.
- C. Manhole Bases Sections:
1. Precast concrete manhole base sections shall be "monolithic", consisting of base slab and base riser (barrel) section.
    - a. If floatation is found to occur based on the Design Engineer's review, the engineer shall specify thickness of precast base. Precast base sections shall be furnished with an integral anti-flotation footing, thickness as specified hereinafter, extending trench bank-to-bank as shown in the Standard Details (minimum 8" projection).
    - b. Precast concrete manhole base slab thickness shall comply with the following schedule:  
 0.0' – 15.0' Vertical Height - 8" Slab

15.1' – 20.0' Vertical Height - 10" Slab  
20.1' – 25.0' Vertical Height - 12" Slab  
25.1' – 30.0' Vertical Height - 14" Slab

- c. Manholes over 30 feet shall be designed by a Professional Engineer registered in the State of Kentucky. Submittals shall be provided to SD1 for review & approval.
  - d. Manhole bases shall have two cages of reinforcing steel in their walls, each of the area equal to that required in the riser sections. Wall thickness shall not be less than 5 inches.
  - e. There should be a minimum of twelve (12") inches between the outside diameters of all pipe penetrations in the base section. The maximum inside diameter (or horizontal dimension) of pipe to be used with a given size manhole shall be as specified on SD1 standard detail.
  - f. Base riser shall extend a minimum twelve (12) inches above the top of the highest pipe in the base.
2. Flow channel (invert) and apron (bench) shall be poured separately at the point of manufacture to the dimensions shown on the Design Drawings.
- a. The flow channel through manholes should be made to conform in shape and slope to that of the sewers.
  - b. Invert shall be smooth and semi-circular in cross-section of the same diameter of the pipe leaving the manhole.
  - c. Changes of direction of flow or sewer centerline within the manhole shall be made by forming the flow channel along a smooth curve with as long radius as the inside of the manhole will allow.
  - d. Bench shall slope toward invert at not less than one (1) inch per foot.
3. All precast base sections with pipe openings shall fulfill the connection requirements identified hereinafter in Paragraph 2.6 herein.

C. Manhole Barrel Sections:

- 1. Manhole barrel sections shall have reinforcing steel in their walls, Wall thickness shall not be less than 5 inches.
- 2. The barrel of the manhole shall be constructed of various lengths of riser pipe manufactured in increments of one foot to provide the correct height with the fewest joints. Openings in the barrel of the manholes for sewers or drop connections will not be permitted closer than one foot from the

nearest joint. Special manhole base or riser sections shall be furnished as necessary to meet this requirement.

3. The barrel sections shall be of the height required, but not less than one (1) foot in height. No opening shall be cut into a barrel section, the maximum dimension of which exceeds one-half (1/2) the section height.
4. Joints between manhole components shall be the tongue and groove. The circumferential and longitudinal steel reinforcement shall extend into the tongue and groove ends of the joint without breaking the continuity of the steel.
5. Precast manhole section joints shall be joined with one of the following products:
  - a. ASTM C 443, a single, continuous rubber O-ring gasket and shall conform to AWWA C302.
  - b. ASTM C-990, flexible butyl resin sealant such as Conseal CS-102, CS-202 as manufactured by Concrete Sealants, Inc.
  - c. Hamilton-Kent "Kent-Seal No. 2"
  - d. Press Seal Gasket "E-Z Stik"
  - e. Or Equal

D. Cone Sections and Top Slab:

1. A precast concentric cone or precast top slab shall be provided at the top of the manhole barrel to receive the cast iron frame and cover or floor access hatch cover as shown on the Design Drawings. Eccentric cones will be evaluated on a case by case basis or where directed by SD1
2. Cone sections and top slabs shall be designed for an H-20 wheel loading.
3. Cone sections for standard manholes shall have a minimum 8" thick upper walls and shall not exceed 3'-0" in height.
4. Concrete top slabs shall not be less than 8 inches thick.

E. Drop Manhole:

1. Drop Manholes shall conform to all provisions specified herein, with the additional requirements for the drop pipe as shown on the Design Drawings.
2. The drop pipe shall be of the same material and diameter as the inlet

sewer pipe used.

3. Drop pipe shall be totally enclosed in concrete, formed, with a minimum covering dimension of six (6) inches.
  4. No drop pipes shall be allowed inside of the manholes, unless otherwise approved by SD1.
  5. Base shall be cast to support drop connection.
- F. Acceptable Manufacturers
1. KOI
  2. Hanson
  3. or equal

## 2.3 MANHOLE RISERS

- A. Manhole risers (adjusting rings) 6” to 10” height shall be concrete.
- B. Manhole risers 2” to 5” height shall be high density polyethylene as manufactured by Ladtech, Inc or equal. Manholes that will be raised more than 10 inches will use 1-foot barrel section on inside of manhole.
- C. Or other method approved by SD1 on a case by case basis

## 2.4 PRECAST STORM CURB INLETS, STANDARD INLETS, CATCH BASINS & YARD DRAINS

- A. Precast storm drainage structures with knockout panels shall only be used for curb inlets (catch basins) and yard drains no greater than 6-ft in depth, unless load calculations are supplied. For pre-cast rectangular structures (other than those with knockout panels), at least 6 inches of wall (measured from the interior corner) is required on each side of the pipe beyond the precast opening for the pipe. This rule is not applicable for structures which have pipe installed in opposite walls or where one outlet reinforced concrete pipe is utilized. Less than 6 inches of wall may be approved by SD1 with the submittal of design calculations.

- B. Base and riser sections shall be custom-made with openings to meet indicated pipe alignment conditions. The minimum distance allowed between precast holes, measured from edge to edge in a standard inlet section shall be 6 inches.
- C. Joints between yard drains and standard inlet sections in the roadway or yard areas shall be sealed with one of the following:
  - 1. ASTM C 443, a single, continuous rubber O-ring gasket and shall conform to AWWA C302.
  - 2. ASTM C-990, flexible butyl resin sealant such as Conseal CS-102, CS-202 as manufactured by Concrete Sealants, Inc.
  - 3. Hamilton-Kent “Kent-Seal No. 2”
  - 4. Press Seal Gasket “E-Z Stik”.
  - 5. Or equal
- D. Joints between riser sections for curb inlets (catch basins) are not required to have gaskets or butyl sealant between sections. These joints can be stacked dry as long as there are no holes or gaps in the joints. All holes or gaps shall be filled with non-shrink grout.
- E. For precast structures with openings cast into the unit, the minimum vertical distance from the pipe openings to the top of the structure or segment wall shall be 12 inches. If this distance is less than 12 inches, then additional reinforcing steel shall be furnished for this section. All pipe openings shall not be in joints between two precast sections unless specifically approved by SD1. The top slab must be designed for HS-20 loading in paved areas only.
- F. All standard inlets shall conform to the appropriate Standard Drawings No. STM-08 through STM-11. All storm drains outside of the right-of-way shall be Standard Drawing No. STM-07, unless specifically approved otherwise by SD1. All curb inlets and catch basins shall conform to the appropriate Standard Drawings No. STM-01.1, STM-01.2, STM-04 and STM-12.

## 2.5 HEADWALLS AND OUTFALLS

- A. Headwalls and outfalls shall be constructed of either cast-in-place or precast reinforced concrete that conforms to KTC Standard Specifications for Road and Bridge Construction.
- B. Safety guards and railings: Safety guards and railings shall be provided along the top and sloped/winged sidewalls on all headwall inlet and outlet structures

having a vertical drop of 4'-0" or greater. Such guards or railings shall be at least 42-inches in height measured vertically above the wall. Guards or railings shall not have an ornamental pattern that would provide a ladder effect. Vinyl coated chain link fencing and galvanized materials are an acceptable guard type.

- C. Grates: Grates shall be provided on inlet headwalls for all pipes.
- D. All headwalls and outfalls shall conform to the appropriate Standard Drawings, including but not limited to, No. STM-15, STM-16, STM-17.1, STM-18.1 and STM-19.

## 2.6 FLEXIBLE PIPE JOINT SEAL & CONNECTIONS

- A. For sanitary structures and manholes:
  - 1. A flexible pipe joint seal shall be provided in the connection of pipe to manholes and other miscellaneous structures. The rubber seal shall meet the requirements given in ASTM C 923. The seal shall be of a size specifically designed for the pipe size and material.
  - 2. All connecting elements of the seal shall be Type 304 stainless steel.
  - 3. Flexible pipe joint seal shall allow for pipe alignment of up to fifteen (15) degrees deflection.
  - 4. Pipes entering manholes that do not have existing flows and have slopes greater than ten (10) percent may have fittings (22.5 or 11.25 degree bends) installed immediately outside the manhole. This is to be evaluated on a case by case basis by SD1 or ENGINEER.
  - 5. Acceptable Products:
    - a. Kor-N-Seal by NPC, Inc.
    - b. A-Lok by A-LOK Products, Inc.
    - c. Dura-Seal III by Dura-Tech
    - d. Or equal.
- B. For storm structures and manholes with flexible pipe joint seals:
  - 1. CONTRACTOR may use flexible connections at storm manholes which shall be elastomeric gaskets or couplings, manufactured in accordance with ASTM C 1478, Standard Specification for Storm Drain Resilient

Connectors Between Reinforced Concrete Structures, Pipes, and Laterals.

2. CONTRACTOR may use a concrete collar for opening around the pipe. The pipe shall be encased with minimum 6 inch collar of concrete from the inside face of the wall to 1'-0" outside the outer face of the wall. The pipe shall be adequately supported to prevent settling while the concrete encasement is curing. The inside faces of the structure walls shall be finished with a trowel. If a concrete collar is used, the collar shall be allowed to cure to 75% of its design strength before backfilling. The diameter of the opening shall be no more than 8 inches greater than the outside diameter of the pipe.
3. For precast structures with knockout panels, all holes for pipes shall be via a controlled cut and shall not be cut into the structural members (i.e., top beams and corner columns) and non-shrink grout shall not be allowed to be placed around the pipes without prior approval from SD1 or its Engineer. The pipes shall be encased with a minimum 6 inch concrete collar all around the outside of pipe or a minimum of 3 inches beyond the hole knocked in the wall, whichever is greater. Also, the concrete encasement shall extend from the inside face of the wall to 1'- 0" outside the outer face of the wall. The collar shall be allowed to cure to 75% of its design strength before backfilling.

## 2.7 STORM LATERAL CONNECTIONS

- A. Roof downspouts, footing or foundation drains, and sump pumps shall discharge in accordance with the local governing subdivision regulations. All storm lateral connections (downspouts, footing or foundation drains, sump pumps, etc) to the storm sewer shall be prohibited unless explicitly reviewed and approved by SD1 due to uncommon circumstances (i.e. inadequate discharge distances from foundations, narrow side yards, etc.).

## 2.8 MANHOLE, CATCH BASIN & STRUCTURE STEPS

- A. Reinforced Polypropylene Manhole Steps: ½ inch Grade 60 steel reinforcing rod, ASTM A-615, encapsulated in copolymer polypropylene, ASTM D 2146-68 under Type II, Grade 16906. Steps shall be PS1-PF (Press Fit polypropylene plastic) as manufactured by MA Industries, or equal. Steps shall be epoxy grouted into specially sized holes cast into the manhole section. Holes shall be

formed in the manhole section using an insert plug that is removed upon curing.

- B. No steps shall be aligned over the flow channel. Step spacing shall be 16” as shown the Standard Detail Drawing.
- C. Omit steps for structures that are less than 4-ft deep unless otherwise shown on the plans.

2.9 EXTERNAL SLEEVE FOR STRUCTURE (Sanitary Only)

- A. Provide external sleeve around all manhole joints as designated on the plans. Any manholes located within fifty (50) feet or less of a creek/ stream or within a floodplain shall have an external sleeve. External sleeve shall be a wraparound heat shrinkable sleeve that creates a barrier to water infiltration and protects support of the structure and frame from ground moisture prevents corrosion and freeze-thaw damage. The system shall be compatible with and bond to concrete, metal, and fiberglass using an adhesive type primer. The sleeve shall have the following physical properties:

Softening Point	212 degrees Fahrenheit	ASTM E-28
Lap Shear Strength	12 PSI	DIN 30 672
Tensile Strength	2900 PSI	ASTM D-638
Elongation	600%	ASTM D-638
Hardness	46 Shore D	ASTM D-2240
Abrasion Resistance	45 mg	ASTM D-1044
Peel Strength	9PLI	ASTM D-1000
Water Absorption	0.05%	ASTM D-570
Low Temperature	-40 degrees Fahrenheit	ASTM D-2671D
Minimum Width	12 inches	

- B. System shall accommodate ground movement and resists soil stress.
- C. Acceptable Products:
  1. WrapidSeal – Manhole Encapsulation System by Canusa –CPS.
  2. Link- Seal Riser- Wrap Heat Shrink System.
  3. Or Equal.



## 2.10 PVC STORM DRAINAGE STRUCTURES AND CATCH BASINS

- A. PVC storm drainage structures and catch basins shall be approved on a case-by-case basis by SD1.

## PART 3 EXECUTION

### 3.1 MANHOLE BASES

- A. General
  1. Manholes shall be installed at the locations shown on the Design Drawings.
  2. The dimensions shall be as shown on the detail sheets and the depths shall be as indicated by either finished top elevation given or depth dimension given on the plans.
  3. Perform Site work as per the requirements of Specifications Sections 02050, 02110, 02220, and 02222.
  4. Excavation for manholes and other underground structures shall be of sufficient size to adequately accommodate installation and proper centering.
  5. The bases shall be placed directly on an 8-inch to 12-inch deep pad (compacted thickness) of pipe bedding material as specified in section 02220, placed to proper elevation and leveled, unless a deeper excavation is required to remove any loose sandy soils or soft to medium stiff, clayey soils down to a soil stratum suitable for support of the manhole and base.
    - a. The excavated soils shall be replaced with an appropriate Structural Backfill material or with controlled, low-strength material (CLSM), lean concrete, or an extra thickness of manhole base concrete.
  6. The excavation shall be kept free of water while the manhole is being constructed and manhole shall not be backfilled until inspected by the SD1.

7. CONTRACTOR will be required to compact bedding material around the entire circumference of the manhole and manhole excavation area to at least 12-inches above the highest incoming or outgoing pipe.
  8. Compacted backfill as specified on the Design Drawings or section 02220 shall then be placed above the compacted bedding material up to finished grade.
- B. Pre-Cast Bases
1. The SD1 reserves the right to inspect precast manhole base sections at the construction site and to reject the use of such sections if the SD1 determines the products unsuitable for the SD1'S installation.
  2. Doghouse manholes shall not be permitted unless written approval by SD1 or SD1 representative.
- A. Cast-in-Place Bases
1. Cast-in-Place Bases shall be used when installing a doghouse manhole over an existing sewer or as approved by the ENGINEER.
    - a. Cast-in-place bases shall be placed on suitable foundations after the pipes are laid as specified in 3.1.A.5.
  2. The base shall be cast monolithically to an elevation at least 12 inches above the top of the highest pipe entering the manhole, except where a drop connection is to be installed.
    - a. Base thickness shall be as per 2.1.B.1.
    - b. Base, walls and bottom shall be at least of the thickness shown and reinforced to withstand the loads to be expected.
    - c. Connections for sewer pipes shall conform to SD1's standard detail.
    - d. The base of the bell or groove end at joints between components shall be buttered with 1:2 cement-sand mortar to provide a uniform bearing between components.
    - e. All joints shall be sealed with cement mortar inside and out and troweled smooth to the contour of the wall surface.
    - f. Raised or rough joint finishes will not be accepted.

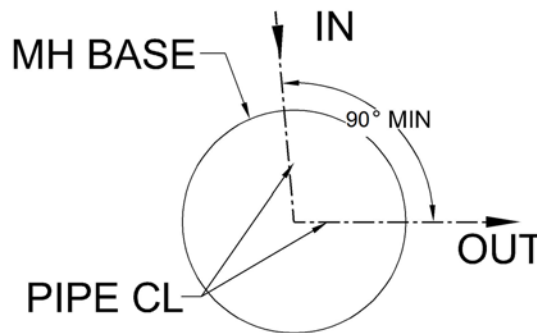
### 3.2 PRECAST MANHOLE SECTIONS

- A. Set sections vertical with steps and sections in true alignment.

- B. Install sections, joints and gaskets in accordance with manufacturer's recommendations.

### 3.3 STRUCTURE CHANNELS

- A. All invert channels through structures shall be constructed of 4000 psi concrete.
- B. For precast bases, the flow line (channel) and benches shall be cast separately from the floor and side wall at the place of manufacture, unless otherwise approved by SD1.
- C. Channels shall be properly formed to the sizes, cross sections, grades and shapes shown or as ordered.
- D. Benches shall be built up to the heights shown or as ordered and given a uniform wood float finish.
- E. Care shall be taken to slope all benches for proper drainage to the invert channel.
- F. All flow channel angles between any new incoming pipe and new outgoing pipe shall be at least 90 degrees in the direction of flow as seen in the figure below. For any pipe with velocities exceeding 5 ft/s consult SD1 engineer for the required angle or for the need of an oversized manhole.



### 3.4 STORM CURB INLETS, STANDARD INLETS, CATCH BASINS, YARD DRAINS, HEADWALLS & OUTFALLS

- A. Inlets, catch basins, drains, junction structures, and other drainage structures shall be neatly and accurately built in accordance with the plans or SD1 Standard Drawings. The structure shall be either of cast-in-place concrete or precast concrete. Precast structure sections shall be installed in accordance with ASTM C 891.
- B. All cast-in-place structures shall be built using 4,000 psi concrete as described in Paragraph 2.1. The structures shall be built on prepared foundations and conform to the dimensions and shapes shown on the Plans and SD1 Standard Drawings. The construction shall conform to the methods, forms, placement, protection, and curing for concrete as specified in accordance with KTC and SD1 Standards. Any required reinforcement shall conform to the Plans and SD1's Standard Drawings. Installed concrete reinforcing shall be inspected and approved by SD1 before any concrete is placed.
- C. Headwalls and outfalls shall be constructed of either cast-in-place or precast reinforced concrete in conformance with SD1's Standard Drawings and KTC Standard Specifications for Road and Bridge Construction. All headwalls and outfalls built into slopes shall be properly seated as to avoid disconnection from the adjoined pipe.

### 3.5 DOGHOUSE MANHOLES

- A. For joining new pipe to existing pipe, refer to Paragraph 3.1.B.2 of this section for requirements. Doghouse manholes shall only be used for connections to sewer mains with high flows, as determined by the ENGINEER. Doghouse manholes must be approved by SD1. For applications using doghouse manholes, refer to Paragraph 3.1.C of this section and SD1 Standard Detail No. SD-106 for requirements.

### 3.6 PIPE CONNECTIONS TO NEW STRUCTURES

- A. For connections to new structures:
  - 1. A flexible pipe-to-manhole joint connector shall be used for joining piping to manholes and other miscellaneous structures. The rubber seal shall meet the requirements given in ASTM C 923. The seal shall be of

a size specifically designed for the pipe size and material and be as specified herein.

- a. If a Kor-N-Seal joint seal or equal with a stainless steel tightening band is used, CONTRACTOR shall tighten the band to the proper torque as specified by the manufacturer.
- b. If the slope of the incoming sewer exceeds 10% from the horizontal, a fitting may be used outside the manhole wall to facilitate a more perpendicular connection to the manhole wall. The use of this fitting is to be evaluated on a case by case basis by SD1.

2. All pipe connections to manholes shall match crowns. If matching crowns is not possible, a drop manhole may be approved by SD1.

3. All drop manholes shall be approved by SD1. Drop manholes may be acceptable under the following conditions:

- a. If the slope of the influent sewer is greater than or equal to five (5) percent, SD1's drop connection detail 114 shall be followed. All other influent sewer slopes and drop connections will be evaluated on a case by case basis.
- b. All other drop manhole requests shall be approved on a case by case basis including but not limited to pipe realignments, connections to existing manholes, etc.
- c. If the total height of the drop is greater than sixteen (16) feet, a drop shaft assembly shall be specifically designed for the hydraulic conditions present by a licensed professional engineer in the Commonwealth of Kentucky for the hydraulic and shall be approved by SD1.

4. Slide manholes shall not be used, unless otherwise approved by SD1.

### 3.7 PIPE CONNECTIONS TO EXISTING STRUCTURES

- A. Perform by core drilling in accordance with Section 01045.
- B. The connection to the structure shall be in accordance with the materials specified herein.

- C. The flow channel and bench for the new connection shall be constructed onsite or the existing flow channel and bench modified to accept the new piping.
- D. New connections to existing structures need to be greater than ninety (90) degrees to the existing flow channel in the direction of the flow.
- E. Where new flows joining an existing eight (8) inch sewer that is flowing half pipe or greater, or the existing pipe is twelve (12) inches or greater, an oversized manhole shall be installed to allow a smooth, sweeping flow transition. Consult SD1 for required manhole diameter.
- F. For sanitary applications, perform all connections in accordance with Paragraphs 3.9 and 3.11 herein.

### 3.8 SANITARY SEWER STUBS FOR FUTURE CONNECTIONS

- A. Installation of stubs for future connections shall be evaluated on a case by case basis and approved by SD1. If stubs are approved, PVC, ductile iron, or fiberglass pipe stubs with approved watertight plugs shall be installed in manholes. SD1 requires that future connections to existing manholes be cored and the benching modified to accept the new connection. Where pipe stubs, sleeves or couplings for future connections are shown or ordered, CONTRACTOR shall provide all materials and work for their construction.
- B. If stubs are approved by SD1, stubs out of manholes shall be a two (2) to five (5) foot stick of pipe with sealed caps. When future connections are made to these manholes, the stubs shall be removed and a full stick of pipe shall be installed at the proper slope.
- C. Where connections are made to existing manholes installed after May 15, 2000, the existing manhole shall be vacuum tested prior to the connection being made. If the manhole is vacuum tested prior to alterations and fails, it is the responsibility of SD1 to repair or replace the manhole. If the manhole passes the vacuum test prior to connection, but fails the vacuum test after the connection is made, then the CONTRACTOR shall repair or replace the manhole per SD1's direction and approval.

If the CONTRACTOR fails to vacuum test the manhole prior to any connections being made, and the manhole fails the vacuum test after the connection, the

CONTRACTOR shall repair or replace the manhole per SD1's direction and approval.

- D. If the connection to an existing manhole is cored, the connection shall be booted and the existing manhole shall pass a vacuum test after all work is complete, if the existing manhole was installed after May 15, 2000.
- E. If the elevation or grade of an existing manhole is altered, the existing manhole shall pass a vacuum test after all work is complete, if the existing manhole was installed after May 15, 2000.

### 3.9 GRADING AT MANHOLES & STRUCTURES

- A. Manholes shall be installed to conform to the following convention unless otherwise called for on the plans. The ground surface shall be graded to drain away from the manhole. Final dimensions shall be determined after grading has taken place.
  - 1. Manholes in roads, parking lots, paved areas and lawns shall be installed flush with the surrounding area.
  - 2. Manholes in wooded or other inaccessible areas shall be installed twelve (12) inches above the final grade.
  - 3. Confirm with land owner prior to installation of manholes in cultivated fields, hay fields and pastures. If land owner agrees manhole shall be installed with the cone section flush with the final grade. After installation of the casting, a slope fill 1:5 (1 vertical to 5 horizontal) shall be installed to provide surface drainage away from the manhole.
- B. Manholes in paved areas shall be constructed to meet the final surface grade. In paved areas on State Highways, all manholes shall be 1/2 inch below final wearing surfaces. Manholes shall not project above finished roadway pavements to prevent damage from snowplows.
- C. CONTRACTOR shall be solely responsible for the proper height of all manholes necessary to reach the final grade at all locations. CONTRACTOR is cautioned that ENGINEER'S review of Shop drawings for manhole components will be general in nature and CONTRACTOR shall provide an adequate supply of random length precast manhole riser sections to adjust any manhole to meet field conditions for final grading.

### 3.10 MANHOLE WATERTIGHTNESS (Sanitary Only)

- A. All manholes shall be free of visible leakage. Each manhole shall be tested for leaks and inspected. If the manhole fails a visual leakage inspection and/or vacuum testing, SD1 will consider the manhole defective and the Contractor shall provide the Engineer a plan for leak repairs for approval or replace the manhole and make any necessary reconnections to the new or existing pipelines at no additional cost to the SD1. No leak repairs shall be performed without the ENGINEER'S approval.
- B. Vacuum test manholes to ASTM C 1244. Testing to be witnessed by SD1. Manholes not subject to vacuum testing must be in writing from SD1. This specification shall govern the negative air pressure (vacuum) testing of sanitary sewer manholes and structures and shall be used as a method of determining acceptability by the SD1, in accepting maintenance of a sanitary sewer manhole or structure on behalf of the public. Other forms of testing of some manholes may be required, as deemed necessary by the SD1.
- C. Manholes shall be tested after installation with all connections in place along with the following completed prior to testing:
  - 1. Lift holes, if any, shall be plugged with an approved, non-shrinkable grout prior to testing.
  - 2. Drop connections shall be installed prior to testing.
  - 3. The vacuum test shall include testing of the seal between the cast iron frame and the concrete cone, slab or grade rings.
  - 4. The manholes shall be backfilled and finished to design grade prior to test.
  - 5. Test pressure requirements of ASTM C-923 shall be met.
- D. Test Procedure:



1. Temporarily plug, with the plugs being braced to prevent the plugs or pipes from being drawn into the manhole, all pipes entering the manhole at least eight inches into the sewer pipe(s). The plug must be inflated at a location past the manhole/pipe gasket.
2. The test head shall be placed inside the frame at the top of the manhole and inflated, in accordance with the manufacturer's recommendations.
3. A vacuum of 10" of mercury shall be drawn on the manhole. Shut the valve on the vacuum line to the manhole and disconnect the vacuum line.
4. The pressure gauge shall be liquid filled, having a 3.5 inch diameter face with a reading from zero to thirty inches of mercury.
5. The manhole shall be considered to pass the vacuum test if it holds at least 9 inches of mercury for the following time durations:

Time (Minutes)	4' Diameter	5' Diameter	6' Diameter
Manhole Depth			
20 Feet or Less	1	2	3
20.1 to 30 Feet	2	3	4

Note: Consult SD1 on manhole diameters larger than six (6) feet.- These test pressures exceed what is in ASTM C-1244

6. If a manhole fails the vacuum test, SD1 will consider the manhole defective and the CONTRACTOR shall provide the Engineer a plan for leak repairs for approval or shall replace the manhole and/ or defective components and make any necessary reconnections to the new or existing pipelines at no additional cost to the SD1. No repairs shall be made to the manhole unless approved by the ENGINEER.
7. All temporary plugs and braces shall be removed after each test.
8. Manholes will be accepted as having passed the vacuum test requirements if they meet the criteria stated above.

### 3.11 STRUCTURE ABANDONMENT

- A. Structure abandonment shall be per SD1 standard drawings and consist of removing structure frames, covers, grates, cone section of manholes, and similar items. All connecting pipes shall be bulk headed. The walls shall be lowered to 2 feet below final grade if in earth or to 12 inches below subgrade if in pavement. The remaining structure shall be filled with crushed stone or sand compacted to match all backfill requirements here-in or shall be filled with controlled density fill.

++ END OF SECTION ++

## SECTION 02610

### PIPE & FITTINGS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. CONTRACTOR shall provide all labor, materials, equipment, incidentals, and services as shown, specified, and required for furnishing, installing, and testing all buried piping, fittings, and specials specified herein. Piping herein specified includes force main & gravity sewer for sanitary and storm applications. Remove and replace all existing piping that interferes with installation of new pipe or structures or that is damaged by new installations in a manner approved by the ENGINEER.
- B. The work includes, but is not limited to, the following:
1. Piping beneath structures.
  2. Supports and restraints.
  3. Pipe encasements.
  4. Work on or affecting existing piping.
  5. Testing.
  6. Cleaning and disinfecting.
  7. Installation of all jointing and gasketing materials, specials, flexible couplings, mechanical couplings, harnessed and flanged adapters, sleeves, tie rods, and all other work required to complete the buried piping installation.
  8. Incorporation of valves, meters and special items shown or specified into the piping systems as required and as specified in the Section 15100.

9. Unless otherwise specifically shown, specified, or included under other Sections, all buried piping work required, beginning at the outside face of structures or structure foundations and extending away from structure.
- C. Review installation procedures under other Sections and other contracts and coordinate with the work that is related to this Section.

## 1.2 RELATED WORK

- A. Section 02110, Clearing and Grubbing
- B. Section 02220, Excavation and Backfill
- C. Section 02606, Sanitary & Storm Structures
- D. Section 03300, Cast-In-Place Concrete
- E. Section 09900, Painting
- F. Division 15, Sections on Piping, Valves & Appurtenances
- G. Section 15052, Exposed Piping Installation
- H. Section 15100, Valves and Appurtenances
- I. Section 15121, Wall Pipes, Floor Pipes and Pipe Sleeves
- J. Section 15122, Piping Specialties
- K. Section 15140, Pipe Hangers and Supports

## 1.3 LIMITATIONS

- A. All existing piping as shown on the Design Drawings is based on the best information available, but SD1 and the ENGINEER makes no guarantees as to the accuracy of the locations or type of piping depicted. All new piping which ties into existing lines must be made compatible with that piping. So that piping conflicts may be avoided, CONTRACTOR shall open up his trench well ahead of the pipe laying operation to confirm exact locations and sizes of

existing piping before installing any new piping. CONTRACTOR shall provide all fittings and adapters necessary to complete all connections to existing piping as approved by SD1.

#### 1.4 QUALITY ASSURANCE

Requirements of Regulatory Agencies:

- A. Comply with requirements of UL, FM and other jurisdictional authorities, where applicable.
- B. Refer to the General and Supplementary Conditions regarding permit requirements for this Project.

#### 1.5 REFERENCES

Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified:

- A. AWWA C104, Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
- B. AWWA C105, Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids
- C. AWWA C110, Standard for Ductile-Iron and Gray-Iron Fittings, 3 In.-48 In. (76 mm-1,219 mm), for Water.
- D. AWWA C111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
- E. AWWA C115, Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
- F. AWWA C150, Standard for Thickness Design of Ductile-Iron Pipe.
- G. AWWA C151, Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water.
- H. AWWA C600, Installation of Ductile-Iron Water Mains and Their Appurtenances.

- I. AWWA C606, Grooved and Shouldered Joints.
- J. AWWA C800, Underground Service Line Valves and Fittings.
- K. AWWA C900, Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 In.-12 In. (100 mm-300 mm), for Water Dist.
- L. AWWA M23, PVC—Design and Installation
- M. ASTM A 27, Standard Specification for Steel Castings, Carbon, for General Application.
- N. ASTM A 82, Standard Specification for Steel Wire, Plain for Concrete Reinforcement.
- O. ASTM A 185, Welded Steel Wire Fabric for Concrete Reinforcement.
- P. ASTM A 496, Deformed Steel Wire for Concrete Reinforcement.
- Q. ASTM A 497, Steel Welded Wire Fabric, Deformed for Concrete Reinforcement.
- R. ASTM A 1011, Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
- S. ASTM A 615, Standard Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
- T. ASTM C 14, Standard Specification for Concrete Sewer, Storm Drain and Culvert Pipe.
- U. ASTM C 76, Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
- V. ASTM C 118, Concrete Pipe for Irrigation or Drainage.
- W. ASTM C 150, Standard Specification for Portland Cement

- X. ASTM C 361, Standard Specification for Reinforced Concrete Low-Head Pressure Pipe.
- Y. ASTM C 443, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
- Z. ASTM C 478, Standard Specification for Precast Reinforced Concrete Manhole Sections.
- AA. ASTM D 1238, Measuring Flow Rates of Thermoplastics by Extrusion Plastometer.
- BB. ASTM D 1598, Time-to-Failure of Plastic Pipe Under Constant Internal Pressure.
- CC. ASTM D 1599, Short Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings.
- DD. ASTM D 1784, Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
- EE. ASTM D 1785, Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
- FF. ASTM D 2122, Determining Dimensions of Thermoplastic Pipe and Fittings
- GG. ASTM D 2412, Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
- HH. ASTM D 2464, Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
- II. ASTM D 2467, Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
- JJ. ASTM D 2564, Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
- KK. ASTM D 2774, Practice for Underground Installation of Thermoplastic Pressure Piping.

- LL. ASTM D 3034, Bell and Spigot-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.
- MM. ASTM D 3212, Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
- NN. ASTM D 3261, Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
- OO. ASTM D 3262, Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Sewer Pipe.
- PP. ASTM D 3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
- QQ. ASTM D 3754, “Fiberglass” (Glass-Fiber-Reinforced-Thermosetting-Resin) Sewer and Industrial Pressure Pipe.
- RR. ASTM D 4161 Standard Specification for Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals.
- SS. ASTM D 5685, “Fiberglass” (Glass-Fiber-Reinforced-Thermosetting-Resin) Pressure Pipe Fittings.
- TT. ASTM F 437, Threaded Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
- UU. ASTM F 439, Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
- VV. ASTM F 441, Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
- WW. ASTM F 493, Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
- XX. ASTM F 714, Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.
- YY. ASCE MOP No. 37, Design and Construction of Sanitary and Storm Sewers



- ZZ. ASTM C 507, Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain and Sewer Pipe
- AAA. ASTM F 679, Standard Specification for Polyvinyl Chloride (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings
- BBB. ASTM F 794, Standard Specification for Polyvinyl Chloride (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter
- CCC. ASTM F 949, Standard Specification for Polyvinyl Chloride (PVC) Corrugated Sewer Pipe with Smooth Interior and Fittings
- DDD. ASTM F 477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
- EEE. ASTM F 2306, Standard Specification for 12-60 inch Annular Corrugated Profile-Wall Polyethylene (PE) Pipe and Fittings for Gravity-Flow Storm Sewer and Subsurface Drainage Applications
- FFF. ASTM D 2321, Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

## 1.6 SUBMITTALS

- A. In addition to the requirements of Section 01300, provide the following:
  - 1. Size, class and other details of pipe to be used.
  - 2. Full details of piping, specials, joints, harnessing, and connections to existing piping, structures, equipment and appurtenances.
- B. Tests: Submit description of proposed testing methods, procedures and apparatus. Prepare and submit report for each test.
- C. Certificates: Submit certificates of compliance with referenced standards.
- D. As requested by SD1, all pipe manufacturers that supply pipe for the project shall provide a detailed structural design taking in account the depth of burial, highway loads, bedding and backfill requirements, water elevation, soil conditions and installation procedures. All designs submitted shall have a

Professional ENGINEER's stamp from Kentucky. Such design shall be received, reviewed, and approved prior to manufacture.

- E. As requested by SD1, pipe manufacturer for each pipe type used shall be present and instruct CONTRACTOR on proper installation technique per shop drawings and manufacturer's recommended procedures. As requested by SD1, pipe manufacturer's representative shall visit job site to monitor progress of pipe installation and shall notify in writing the CONTRACTOR and SD1 of any discrepancy, changes, or incorrect procedures that would prevent the pipe from performing as designed.
- F. Record Drawings: Submit record drawings in accordance with Section 01720 and Section 01721.

PART 2 PIPING & FITTINGS

2.1 MATERIALS

- A. Piping herein specified includes force main & gravity sewer. Refer to the pipe material schedule shown below to determine which pipe materials are acceptable for each application.

Type	Size	Depth	Acceptable Materials
Sanitary - Aerial	Any		Ductile Iron; PVC SDR 35 inside casing pipe
Sanitary - Gravity	Any	Less than 20'	PVC SDR 35; Fiberglass Polymer Mortar Pipe SN 46; Ductile Iron; HDPE; RCP, polypropylene (HDPP)
Sanitary - Gravity	Any	20.1' to 30'	PVC SDR 26; Ductile Iron; Fiberglass Polymer Mortar Pipe SN 72
Sanitary - Gravity	Any	30.1' or greater	Fiberglass Polymer Mortar Pipe; Ductile Iron
Sanitary - Horizontal Directional Drill	Any	Any	HDPE ; Ductile Iron; Restrained Joint PVC C-900
Sanitary - Force Main	Any	Any	HDPE; Ductile Iron; PVC C-900

Sanitary – Low Pressure Force Main	Smaller than 4”	Any	PVC SDR 21, PVC Schedule 40, HPDE
Sanitary – Low Pressure Force Main	4”and Larger	Any	PVC C900, HDPE, Ductile Iron
Storm – Gravity	Any	Less than 20’	RCP; CMP; Ductile Iron; PVC SDR 35; HDPE Corrugated; Polypropylene (HDPP), Fiberglass Polymer Mortar Pipe SN 72
Storm – Gravity	Any	20.1’ or greater	RCP; CMP; Ductile Iron; PVC SDR 26; HDPE Corrugated; Polypropylene (HDPP), Fiberglass Polymer Mortar Pipe SN 72

Note: Pipe selected shall be designed for the cover and loading requirements to each project. Design calculations for pipe wall thickness and structural design shall be provided by the ENGINEER, as requested by SD1. Restrained joint calculations for force mains shall be provided for all projects.

Depth is based on maximum cover to top of pipe between structures or manhole runs Pipe shall be the same thickness between structures or manholes.

B. Refer to applicable Sections for material specifications.

C. General:

1. Marking Piping:

- a.
- b. Cast or paint material, type and pressure designation on each piece of pipe or fitting 4 inches in diameter and larger.
- c. Pipe and fittings smaller than 4 inches in diameter shall be clearly marked by manufacturer as to material, type and rating.

## 2.2 DUCTILE IRON PIPE AND FITTINGS

- A. Piping furnished hereunder shall be complete with all joint gaskets, bolts, and nuts required for installation of valves and equipment furnished by others for installation under this contract.
- B. Pipe Manufacturer's Experience and Field Services.
1. All ductile iron pipe, fittings, and specials shall be fabricated, lined and coated by the pipe manufacturer. Minimum required experience shall include manufacture of a similar pipeline in length to this contract, of equal or larger diameter than the pipe to be provided with joints, lining, and coating suitable for the same or greater pressure rating specified herein, which has performed satisfactorily for the past 5 years.
  2. An experienced, competent, and authorized field service representative shall be provided by the pipe manufacturer to perform all pipe manufacturer's field services specified herein. The field service representative's minimum required experience qualifications shall include 5 years of practical knowledge and experience installing ductile iron pipe with joints, lining, and coating of the pipe to be provided.
  3. All ductile iron pipe shall be installed in accordance with the pipe manufacturer's recommendations. The pipe manufacturer's field service representative shall visit the site and inspect, check, instruct, guide, and direct CONTRACTOR's procedures for pipe handling and installation at the start of the pipe installation. The pipe manufacturer's field service representative shall coordinate his services with CONTRACTOR.
  4. Each joint, including all restrained joints, shall be checked by CONTRACTOR as instructed by the pipe manufacturer's field service representative to determine that the joint and the restraints are installed properly.
  5. As requested, the pipe manufacturer's field service representative shall furnish to SD1, through ENGINEER, a written report certifying that CONTRACTOR's installation personnel have been properly instructed and have demonstrated the proper pipe handling and installation procedures. The pipe manufacturer's field service representative shall also furnish to SD1, through ENGINEER, a written report of each site visit. The pipe manufacturer's field service representative shall revisit the site as often as necessary until all trouble is corrected and the pipeline

installation and operation are satisfactory in the opinion of the ENGINEER.

6. All costs for these services shall be included in the Contract Price.

#### C. Materials

1. Where ductile iron pipe is required, it shall conform to ANSI/AWWA C151/A21.51, Table 1 or Table 3. Pressure class 350 shall be used for all piping, unless otherwise shown on the drawings or specified. Fittings shall conform to ANSI/AWWA C110/A21.10 , or ANSI/AWWA C153/A21.53, with a minimum working pressure rating of 350 psi. All fittings shall be suitable for a test pressure as specified herein without leakage or damage.
2. All buried pressure piping shall be push-on joint or mechanical joint. Restrained joint pipe shall be installed at the station locations shown on the Contract Drawings. All above ground piping or piping in vaults shall be flanged.
3. All gravity sewer piping shall be push-on joint or mechanical joint.
4. Push-on joints and mechanical joints shall be in accordance with ANSI/AWWA C111/A21.11.
5. As requested, restrained joint pipe shall be fabricated to the lengths required as determined by the laying schedule to be submitted as specified herein. If deviations from the approved laying schedule are required in the field as approved by SD1 and ENGINEER and field-cuts are required, CONTRACTOR shall provide restraint on the field-cut piping using, EBAA Iron “Megalug” restrained joints as specified below.
6. Field cuts shall be minimized and will be limited to only locations as necessary to install pipe, when no other alternative to using factory provided joint restraint exists.

#### D. Joints

1. Certification of joint design shall be provided in accordance with ANSI/AWWA C111/A21.11-90, Section 4.5, Performance Requirements, as modified herein.

2. The joint test pressure for each type of joint used on this project shall be 1-1/2 times the working pressure at the lowest elevation of the pipeline for a duration of two hours or as specified by the design engineer. The same certification and testing shall also be provided for restrained joints. For restrained joints, the piping shall not be blocked to prevent separation and the joint shall not leak or show evidence of failure.
3. It is not necessary that such tests be made on pipe manufactured specifically for this project. Certified reports covering tests made on other pipe of the same size and design as specified herein and on the drawings and manufactured from materials of equivalent type and quality may be accepted as adequate proof of design.
4. Nuts, bolts, and tie -rods used on buried pressure pipe and fittings shall be low alloy steel T- bolts with Zinc anode caps for all T-bolts and rods. The entire installation shall be wrapped in one layers of polyethylene encasement. Nuts, bolts and stiffener plates which will be in contact with sewage shall be stainless steel Type 316.

E. Material Schedule

Push-on Joints and Mechanical Joints	ANSI/AWWA C111/A21.11
Restrained Push-on Joints Positive locking segments and/or rings (4 inch through 64 inch)	American “Flex-Ring”, or “Lok-Ring”; U.S. Pipe “TR Flex”; Clow Corp., “Super-Lock”, or equal
Restrained Push-on Joints, (field-cut spigot) locking wedge type	EBAA Iron “Megalug” Series 1700, or equal. Shall only be used in locations approved by the ENGINEER.
Restrained Mechanical Joints (Factory prepared spigot)	American “MJ coupled Joints”

(4 inch through 48 inch)

Restrained Mechanical Joints  
(field cut spigot)

EBAA Iron “Megalug” Series 1100, without exception. Shall only be used in locations approved by the ENGINEER.

Fittings

ANSI/AWWA C110/A21.1, or ANSI/AWWA C153/A21.53, all with minimum working pressure of 350 psi, and suitable for the test pressure based on the project design without leakage or damage.

Flanged Joints & Fittings

Ductile Iron, ANSI/AWWA C115/A21.5 suitable for the test pressure based on the project design without leakage or damage. Faced and drilled, ANSI B16.1 125-pound flat face. Threaded conforming to AWWA C115/A21.15.

Bolting

125-pound flat-faced flange: ASTM A 307, Grade A carbon steel hex head bolts and ASTM A563 Grade A carbon steel hex head nuts

Gaskets

Restrained Push-on and Mechanical Joints: Synthetic rubber conforming to AWWA



C111/A21.11. Natural rubber is not acceptable.

Flanged: 1/8 inch thick, red rubber (SBR), hardness 80 (Shore A), rated to 200 degrees F., conforming to ANSI B16.21, AWWA C207, and ASTM D1330, Grades 1 and 2. Full face for 125-pound flat-faced flanges, or specially designed gaskets with required properties per ANSI/AWWA C111/A21.11 to meet the test pressure rating. Blind flanges shall be gasketed covering the entire inside face with the gasket cemented to the blind flange.

Gasket pressure rating to equal or exceed the system hydrostatic test pressure.

Joint Lubricant

Manufacturer's standard

Tapping Sleeves

316 SS, with 316 SS body and bolting, and rubber sealing gasket, suitable for the test pressure specified herein. JCM Industries, Model JCM 452 or approved equal.

Polyethylene Encasement

Seamless, ANSI/AWWA C105/A21.5; LLD-8 mil or HDCL-4 mil

F. Lining and Coating Ductile Iron Pipe and Fittings (For Sanitary Sewers Only)

1. All buried ductile iron pipe and fittings shall have manufacturers outside standard asphaltic coating and ceramic epoxy lining inside, factory applied. Ceramic epoxy lining shall be Protecto 401 as manufactured by Vulcan Painters, Inc. of Birmingham, AL, or NovoCoat SP-2000W as manufactured by NovoCoat Protective Coatings, of Addison, Texas, or equal, and as specified herein. Flange faces shall be coated externally with a suitable manufacturer's standard rust-preventative compound.

2. Application of Lining:

The interior of the pipe exposed to liquids and gases shall be blasted and cleaned to remove all loose oxides and rust. After cleaning, the lining material shall be applied to yield 40 mils for the complete system using a centrifugal lance applicator. No lining shall take place over grease, oil, etc., that would be detrimental to the adhesion of the compound to the substrate. The compound shall not be applied when the substrate temperature is below 40 degrees F., or in adverse atmospheric conditions which will cause detrimental blistering, pinholing or porosity of the film.

3. Lining material

The material shall be a two component epoxy with the following minimum Requirements:

- a. A permeability rating of 0.0 perms when measured by ASTM E96-66, Procedure A. Duration of test - 6 weeks.
- b. A direct impact resistance of 125 inches-pounds with no cracking when measured by ASTM-D-2794.
- c. The ability to build at least 50 mils dry in one coat.
- d. The material shall be recoatable with itself for at least seven days with no additional surface preparation when exposed to direct summer sun and a temperature of 90 degrees F.
- e. The material shall contain at least 20% by volume of ceramic quartz pigment.
- f. A test and service history demonstrating the ability of the material to withstand the service expected.
- g. Each requirement of 2.2.F.3. above must be certified by the material supplier.

4. Field Cuts

- a. All manufacturer's procedures and recommendations shall be followed when making field cuts. Note proper field preparations and curing time of the coating.
  
- G. All items used for jointing pipe shall be furnished with the pipe and tested before shipment. The joints shall be made with tools and lubricant in strict conformity with the manufacturer's instructions. If requested, three (3) copies of such instructions shall be delivered to the ENGINEER at start of construction.
  
- H. Encasement
  - 1. Polyethylene encasement shall be provided for all buried ductile iron pipe, including all straight pipe, bends, tees, wyes, adapters, closure pieces, field restraint devices, valves and other fittings or specials, in accordance with ANSI/AWWA C105/A21.5, Method A. Preparation of the pipe shall include, but not be limited to: removing lumps of clay, mud, cinders, etc., prior to installation.
  - 2. Where ductile iron pipe is also embedded or encased in concrete the polyethylene encasement shall be installed over the ductile iron pipe prior to concrete placement. Polyethylene encasement is only required in a casing pipe, if grouting of the annular space is required.
  - 3. The pipe shall be wrapped with 8-mil thickness polyethylene tube wrap, using the recommended minimum flat tube widths for the specified pipe sizes. The polyethylene tube wrap shall be of virgin polyethylene as produced from DuPont Alathan resin or equal.
  - 4. The polyethylene tube seams and overlaps shall be wrapped and held in place by means of 2-inch wide plastic backed adhesive tape. The tape shall be Polyken Number 900, Scotchrap Number 50, or equal. The tape shall be such that the adhesive shall bond securely to both metal surfaces and polyethylene film.
  - 5. The polyethylene film supplied shall be clearly marked at a minimum of 2-ft along its length, containing the following information:
    - a. Manufacturer's name or trademark
    - b. Year of Manufacture
    - c. ANSI/AWWA C105/A21.5
    - d. Minimum film thickness and material type (LLDPE or HDCLPE)
    - e. Applicable range of nominal pipe diameter size(s)

f. Warning--Corrosion Protection--Repair any Damage

2.2 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS (GRAVITY LINES)

- A. Polyvinyl Chloride (PVC) and Chlorinated Polyvinyl Chloride (CPVC) Piping – Schedule Rated Pipe:
1. Pipe and Fitting Material:
    - a. Standard: ASTM D 1784.
    - b. Type: Type I, Grade 1, rigid (12454-B).
  2. Pipe:
    - a. PVC:
      - 1) Standard: ASTM D 1785.
      - 2) Designation: PVC 1120.
    - b. CPVC:
      - 1) Standard: ASTM F 441.
  3. Joints:
    - a. General: Connect pipe by solvent cementing except where flanged or threaded fittings are required at expansion joints, valves, flow meters, equipment connections or otherwise shown or directed.
    - b. Flanged Joints:
      - 1) Use flanges joined to pipe by solvent cementing.
      - 2) Flange Drilling and Dimensions: Comply with ANSI B16.1.
      - 3) Flange Gaskets: Viton full face.
      - 4) Bolts, Nuts and Washers: Type 316 stainless steel.
      - 5) Provide washers on each face of the bolted connection.
    - c. Threaded Joints:
      - 1) Taper Pipe Threads: ANSI B2.1.
      - 2) Joint Preparation: Teflon tape.
      - 3) Use PVC dies for taper pipe threads.
    - d. Primer and Solvent Cement:
      - 1) Standard:
        - a) PVC: ASTM D 2564.
        - b) CPVC: ASTM F 493.
  4. Fittings:
    - a. Socket-Type:
      - 1) PVC:
        - a) Standard: ASTM D 2467.
        - b) Designation: PVC I.

- 2) CPVC:
  - a) Standard: ASTM F 439.
  - b. Threaded Type:
    - 1) PVC:
      - a) Standard: ASTM D 2464.
      - b) Designation: PVC I.
    - 2) CPVC:
      - a) Standard: ASTM F 437.

B. Polyvinyl Chloride (PVC) Piping – Gravity Sewer Pipe and Fittings:

- 1. Pipe and Fitting Material:
  - a. Standard: ASTM D 1784.
- 2. Pipe and Fittings:
  - a. Standard:
    - 1) 4-inch through 15-inch diameter: ASTM D 3034.
    - 2) 18-inch through 27-inch diameter: ASTM F 679.
  - b. Thickness Class: As shown in item 1.1 this section.
- 3. Joints:
  - a. Push On Joints: Connect pipe with integral wall bell and spigot joints. The bell shall consist of an integral wall section with a solid cross section rubber gasket, factory assembled, securely locked in place to prevent displacement during assembly. Joints shall be assembled in accordance with the pipe manufacturer's recommendations and ASTM D 3212.
  - b. Gaskets: Rubber gaskets shall be in compliance with ASTM F 477 and shall be suitable for the service specified.

C. Profile Wall Polyvinyl Chloride (PVC) Piping (For Storm Sewers Only)

- 1. PVC open or closed profile pipe meeting the requirements of ASTM F 794, Standard Specification for Polyvinyl Chloride (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.
- 2. Joints for PVC pipe shall be gasket, bell and spigot, push-on types which meet the requirements of ASTM D 3212, Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals. Gaskets shall meet the requirements of ASTM F 477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

D. Corrugated Polyvinyl Chloride (PVC) Piping (For Storm Sewers Only)

1. Corrugated PVC pipe meeting the requirements of ASTM F 949, Latest Revision, "Polyvinyl Chloride (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings".
2. Joints for PVC pipe shall be gasket, bell and spigot, push-on types which meet the requirements of ASTM D 3212, Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals. Gaskets shall meet the requirements of ASTM F 477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

### 2.3 POLYVINYL CHLORIDE (PVC) PIPE – C900 PIPING (FORCE MAINS)

- A. This pipe shall meet the requirements of AWWA C900-75 for Polyvinyl Chloride (PVC) Pressure Pipe. The pipe shall be PVC 1120 pipe with cast iron pipe equivalent ODs. See Table 1 below for pipe material depth and pressure limitations.
- B. Provisions must be made for expansion and contraction at each joint with a rubber ring. The bell shall consist of an integral wall section with a solid cross-section rubber ring which meets the laboratory performance of ASTM D3139. The bell section shall be designed to be at least as strong as the pipe wall.
- C. Standard laying lengths shall be 20 feet  $\pm$  for all sizes. At least 85 percent of the total footage of pipe of any class and size shall be furnished in standard lengths, the remaining 15% in random lengths. Random lengths shall not be less than 10 feet long. Each standard and random length of pipe shall be tested to four times the class pressure. The integral bell shall be tested with the pipe.
- D. Fittings for all lines 4 inches in diameter or larger shall be restrained ductile iron and in accordance with AWWA C153 and have a body thickness and radii of curvature conforming to ANSI A21.10 or ANSI A21.53 for compact fittings.
- E. Fittings for all lines less than 4 inches in diameter shall be PVC gasketed push on type or socket glue-type manufactured specifically for the pipe class being utilized. All socket-glue type connections shall be joined with PVC solvent cement conforming to ASTM D2564. Product and viscosity shall be as recommended by the pipe and fitting manufacturer to assure compatibility.

Solvent cement joints shall be made up in accordance with the requirements of ASTM D2855.

F. Appropriate restraint shall be provided for all fittings. Fittings shall be restrained with EBAA Iron Mega-Lugs, or equal. Pipe joints on either side of the fittings shall also be restrained to the distance required by the restrained joint calculations with the appropriate EBAA Iron Mega- Lug. The appropriate restraints are listed below:

1. Series 2000SV & 2000PV: MEGALUG Restraint for existing C900 PVC Pipe at DIP
3. Series 2800: MEGALUG Restraint Harness for C900
4. Series 2200: MEGALUG Restraint for C900 at DIP Mechanical Joint fitting

G. Pipe material depth and pressure limitations (Table 1)

TABLE -1 Pipe Material Depth and Pressure Limitations

Pipe Material	Minimum Depth of Bury <sup>1, 2</sup>	Maximum Depth of Bury <sup>1, 2</sup>	Pressure Class / Rating	Maximum Surge Pressure Capacity
Pressure Class 350 – DIP	3 ft.	30 ft.	350 psi	450 psi
DR 25 – C900 PVC	3 ft.	10 ft.	165 psi. <sup>3</sup>	264 psi <sup>5</sup>
DR 18 – C900 PVC	3 ft.	20 ft.	235 psi. <sup>3</sup>	376 psi <sup>5</sup>
DR 14 – C900 PVC	3 ft.	30 ft.	305 psi. <sup>3</sup>	488 psi <sup>5</sup>

Table Notes:

<sup>1.</sup> Depth of bury limitations are provided as a general rule. At the discretion of SD1, greater depths may be allowed provided special pipe bedding is provided. Under some combinations of pipe material, soil type and bedding conditions, maximum acceptable depths may be reduced. For all applications where depth of bury is greater than or equal to thirty (30) feet, DIP shall be used.

<sup>2.</sup> Design ENGINEER shall consult appropriate references to ensure selected pipe material is suitable for each application. Such references may include the DIPRA Design of Ductile Iron Pipe brochure, Uni-Bell Handbook of PVC Pipe Design and Construction, PWEagle Technical Bulletins TB-

*D5 and TB-D8 (for PVC pipe), or Performance Pipe Bulletin PP 503 and PP 508 (for HDPE pipe) or other appropriate sources.*

*3. Total System Pressure (i.e. maximum working pressure plus any routine pressure surge) shall be less than the Pressure Class, as defined by AWWA C900-07 (values given in the above table are at 73.4°F). "Maximum working pressure" is the maximum steady-state, sustained operating pressure applied to the pipe exclusive of transient pressures.*

*4. Maximum working pressure shall be less than the Pressure Class, and Total System Pressure (i.e. maximum working pressure plus any routine pressure surge) shall be less than 1.5 times the Pressure Class, as defined by AWWA C906-07 (values given in the above table are at 73.4°F). "Maximum working pressure" is the maximum steady-state, sustained operating pressure applied to the pipe exclusive of transient pressures.*

*5. For C900 PVC pipe, maximum working pressure plus occasional or "emergency" surges shall not be greater than the Maximum Surge Pressure Capacity (1.6 times the Pressure Class of the pipe) as defined by AWWA C900(2007).*

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## 2.4 HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS

### A. Smooth Wall

1. Qualification of Manufacturers: Qualified manufacturers shall be firms regularly engaged in the manufacture of HDPE pipe and pipe fittings of the same size, type, and joint configuration specified, and whose products have been in satisfactory use for not less than five (5) years.
2. Heat Fusion Training/Certification: The CONTRACTOR shall ensure and certify that persons making heat fusion joints have received training in the manufacturer's recommended procedure not more than 12 months prior to commencing construction.
  - a. An experienced, competent, and authorized field service representative shall be provided by the pipe manufacturer to perform all pipe manufacturer's field services specified herein. The field service representative's minimum required experience qualifications shall include 5 years of practical knowledge and experience in making heat fusion joints and installing HDPE pipe.
  - b. All HDPE pipe shall be installed in accordance with the pipe manufacturer's recommendations. The pipe manufacturer's field service representative shall visit the site and inspect, check, instruct, guide, and direct CONTRACTOR's procedures for pipe



- handling and installation at the start of the pipe installation. The fusion pipe manufacturer's field service representative shall coordinate his services with CONTRACTOR.
- c. Each joint shall be checked by CONTRACTOR as instructed by the pipe manufacturer's field service representative to determine that the pipe is properly fused.
  - d. As requested, the pipe manufacturer's field service representative shall furnish to SD1, through ENGINEER, a written report certifying that CONTRACTOR's installation personnel have been properly instructed and have demonstrated the proper pipe handling, fusion, and installation procedures. The pipe manufacturer's field service representative shall also furnish to SD1, through ENGINEER, a written report of each site visit. The pipe manufacturer's field service representative shall revisit the site as often as necessary until all trouble is corrected and the pipeline installation and operation are satisfactory in the opinion of the ENGINEER.
  - e. All costs for these services shall be included in the Contract Price.
3. Interchangeability of Pipe and Fittings: Within Contract limits, pipe and fittings from different approved manufacturers shall not be interchanged.
  4. HDPE shall be manufactured in accordance with ASTM F 714, Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter, and shall be so marked. Each production lot of pipe shall be tested for (from material or pipe) melt index, density, percent carbon, (from pipe) dimensions and ring tensile strength.
  5. Materials used for the manufacture of HDPE pipe and fittings shall be PE3408 HDPE, meeting cell classification 345434C or 345434E per ASTM D 3350 and meeting Type III, Class B or Class C, Category 5, Grade P34 per ASTM D 1248; and shall be listed in the name of the pipe and fitting manufacturer in Plastics Pipe Institute (PPI) TR-4, Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Pipe and Fittings Compounds, with a standard grade rating of 1,600 psi at 73° F. The manufacturer shall certify that the materials used to manufacture pipe and fittings meet those requirements.
  6. Fabricated fittings shall be made by heat fusion joining specially machined shapes cut from pipe, polyethylene sheet stock, or molded fittings. Fabricated fittings shall be rated for internal pressure service at

least equal to the full service pressure rating of the mating pipe. Directional fittings 16-inch IPS and larger such as elbows, tee, etc., shall have a plain end inlet for butt fusion and flanged directional outlets.

7. Molded fittings shall be manufactured in accordance with ASTM D 3261, Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE ) Plastic Pipe and Tubing, and shall be so marked. Each production lot of molded fittings shall be subjected to the test required under ASTM D 3261.
8. Flange adapters shall be made with sufficient through-bore length to be clamped in a butt fusion joining machine without the use of a stub-end holder. The sealing surface of the flange adapter shall be machined with a series of small V-shaped grooves to provide gasketless sealing, or to restrain the gasket against blow-out.
9. Flange adapters shall be fitted with back-up rings pressure rated equal to or greater than the mating pipe. The back-up ring bore shall be chamfered or radiused to provide clearance to the flange adapter radius. Flange bolts and nuts shall be Grade 2 or higher.
10. Joints between HDPE pipes and between HDPE fittings and pipes shall be fusion bonded as described in Section 3.5.
11. The exterior of the HDPE pipe shall be color coded and striped in a way to identify the difference in pipe service, size and application.
12. HDPE pipe shall be black.
13. All piping used for horizontal directional drilling shall be permanently striped.
14. Internal 316 stainless steel stiffeners as manufactured by JCM Industries, Inc., or approved equal shall be used at all locations where external connectors or restraint clamps are installed. MJ adapters as manufactured by Central Plastics Company or equal, with creation of positive restraint to the pipe from heat fusion of the adapter to the pipe, and creation of positive restraint at the connection through bolting of the backup ring to the MJ valve or fitting, can be used in lieu of the JCM internal stainless steel stiffeners and external restraint clamps.

15. Except as noted in item 14 above, all mechanical connections shall be stiffened and restrained. Restraints shall be as manufactured by JCM Industries, Inc., or approved equal.
16. External restraint clamps utilized for transition from ductile iron pipe to polyethylene pipe shall be as manufactured by JCM Industries, Inc., or approved equal. Restraints must be compatible with stiffeners and pipe. JCM restraints shall not be used with HDPE pipe in locations where test pressures will exceed 150 psi. In locations where HDPE pipe will have test pressures exceeding 150 psi, provide an MJ adapter as described in item 14 above.

17. The Dimension Ratios (DR's) are shown on the table (Table 2) below:

- a. Table 2 – Pipe Material Depth and Pressure Limitations

Table 2

<b>Pipe Material</b>	<b>Minimum Depth of Bury<sup>1,2</sup></b>	<b>Maximum Depth of Bury<sup>1,2</sup></b>	<b>Pressure Class / Rating</b>	<b>Maximum Surge Pressure Capacity</b>
DR 17 – HDPE	3 ft.	10 ft.	100 psi <sup>4</sup>	200 psi <sup>6</sup>
DR 13.5 – HDPE	3 ft.	15 ft.	128 psi <sup>4</sup>	256 psi <sup>6</sup>
DR 11 – HDPE	3 ft.	20 ft.	160 psi <sup>4</sup>	320 psi <sup>6</sup>
DR 9 – HDPE	3 ft.	25 ft.	200 psi <sup>4</sup>	400 psi <sup>6</sup>
DR 7.3 – HDPE	3 ft.	25 ft.	254 psi <sup>4</sup>	508 psi <sup>6</sup>

*Table Notes:*

1. *Depth of bury limitations are provided as a general rule. At the discretion of SD1, greater depths may be allowed provided special pipe bedding is provided. Under some combinations of pipe material, soil type and bedding conditions, maximum acceptable depths may be reduced. For all applications where depth of bury is greater than or equal to thirty (30) feet, DIP shall be used.*
2. *Design ENGINEER shall consult appropriate references to ensure selected pipe material is suitable for each application. Such references may include the DIPRA Design of Ductile Iron Pipe brochure, Uni-Bell Handbook of PVC Pipe Design and Construction, PWEagle Technical Bulletins TB-D5 and TB-D8 (for PVC pipe), or Performance Pipe Bulletin PP 503 and PP 508 (for HDPE pipe) or other appropriate sources.*
3. *Total System Pressure (i.e. maximum working pressure plus any routine pressure surge) shall be less than the Pressure Class, as defined by AWWA C900-07 (values given in the above table are at 73.4°F). “Maximum working pressure” is the maximum steady-state, sustained operating pressure applied to the pipe exclusive of transient pressures.*
4. *Maximum working pressure shall be less than the Pressure Class, and Total System Pressure (i.e. maximum working pressure plus any routine pressure surge) shall be less than 1.5 times the Pressure Class, as defined by AWWA C906-07 (values given in the above table are at 73.4°F). “Maximum working pressure” is the maximum steady-state, sustained operating pressure applied to the pipe exclusive of transient pressures.*
5. *For C906 HDPE pipe, maximum working pressure plus occasional or “emergency” surges shall not be greater than the Maximum Surge Pressure Capacity (2.0 times the Pressure Class of the pipe) as defined by AWWA C906(2007).*

- b. The DR’s shall be verified by the Design ENGINEER and the manufacturer for the laying and pressure conditions shown on the drawings, including full consideration of vacuum, with calculations submitted to SD1 for review. NOTE: Manufacturers who do not comply with this requirement will not be considered an equal. The CONTRACTOR shall be liable if the pipe fails or pulls apart. The minimum DR shown above shall be used unless a thicker wall DR is recommended by the manufacturer during his verification. For horizontal directional drilling (HDD), pipe installed at depths from 0’-15’ deep shall have a minimum DR 9 rating or manufacturer’s minimum recommended DR, whichever is more conservative. HDD pipe installed at depths greater than 15’ shall also have a minimum DR 9 rating or manufacturer’s minimum recommended DR, whichever is more conservative. **CONTRACTOR shall note that depending on the wall thickness of the pipe to be**

**furnished, an increase in pipe size may be required to provide comparable internal diameter to ductile iron pipe.**

18. Mechanical joint ductile iron fittings for DIP sized HDPE pipe meeting all requirements of ANSI A211.11 (AWWA C111) may be used in lieu of HDPE pipe fittings. Restraints shall be Sur-Grip as manufactured by JCM Industries, Inc., or approved equal.
19. Nuts, bolts, and tie -rods used on buried pressure pipe and fittings shall be low alloy steel T- bolts with Zinc anode caps for all T-bolts and rods. The entire installation shall be wrapped in two layers of polyethylene encasement. Nuts, bolts and stiffener plates which will be in contact with sewage shall be stainless steel Type 316.
20. HDPE pipe shall have OD of ductile iron pipe.
21. HDPE pipe shall be as manufactured by CP Performance Pipe, or equal.

**B. Corrugated HDPE (For Storm Sewer Only)**

1. Corrugated polyethylene pipe with an integrally formed smooth interior shall meet the requirements of AASHTO M 294, Standard Specification for Corrugated Polyethylene Pipe, 12 to 36 inch diameter, for Type S pipe. SD1 will consider the use of large diameter HDPE on a case-by-case basis; approval shall be at SD1's discretion
2. HDPE pipe shall be joined using an inline bell (IB) & spigot joint or fitting meeting AASHTO M294 or ASTM F2306. The joint or fitting shall be soil-tight and gaskets shall meet the requirements of ASTM F477.

**2.5 FIBERGLASS REINFORCED POLYMER MORTAR (FIBERGLASS) PIPE AND FITTINGS (GRAVITY LINES)**

- A. Fiberglass reinforced polymer mortar (fiberglass) pipe and fittings for gravity sewers shall conform to the requirements of ASTM D-3262, current approval, "Standard Specification for 'Fiberglass' (Glass-Fiber-Reinforced Thermosetting Resin) Sewer Pipe."

**B. Materials**

1. Resin Systems: The manufacturer shall use only polyester resin systems with a proven history of performance in this particular application. The historical data shall have been acquired from a composite material of similar construction and composition as the proposed product.
2. Glass Reinforcements: Chopped glass reinforcement fibers used to manufacture the components shall be of highest quality commercial grade E-glass filaments with binder and sizing compatible with impregnating resins. Continuous circumferential glass reinforcement fibers, where utilized, shall be of grade ECR-glass with binder and sizing compatible with impregnating resins.
3. Silica Sand: Sand shall be a minimum of 98% silica with a maximum moisture content of 0.2%.
4. Additives: Resin additives, such as curing agents, pigments, dyes, fillers, thixotropic agents, etc., when used, shall not detrimentally affect the performance of the product.
5. Elastomeric Gaskets: Gaskets shall be supplied by qualified gasket manufacturers and be suitable for the service intended.

C. Manufacture and Construction

1. Pipes: Manufacture pipe by a process that will result in a dense, non-porous, corrosion-resistant, consistent composite structure.
2. Joints: Unless otherwise specified, the pipe shall be field connected with fiberglass couplings that utilize elastomeric EPDM or REKA sealing gaskets as the sole means to maintain joint watertightness. The joints shall meet the performance requirements of ASTM D4161. Additionally, the joints shall be rated to a pressure of 80% of -14.7 psi as installed. Joints at tie-ins, when needed may utilize fiberglass, gasket-sealed closure couplings.
3. Fittings: Flanges, elbows, reducers, tees, wyes, laterals and other fittings shall be capable of withstanding all operating conditions when installed. They must be made and delivered from Manufacturer. All fittings and couplings shall be pressure rated for a minimum of 50 psi.

4. End Coating: Protective spigot end resin coating shall be applied at the time of manufacture. CONTRACTOR shall similarly coat the ends of all field cut pipes if the wall of the pipe is completely de-aerated during the production process and glass and sand are not impregnated with 100% pure resin to form a wall that cannot be penetrated by water.
5. Fiberglass pipe shall be as manufactured by: Hobas Pipe USA, Inc.,, or approved equal.
6. For bury depths greater than 20 feet, CONTRACTOR shall comply with special trench construction requirements recommended by the manufacturer.

D. Dimensions:

1. Diameters: The actual outside diameter of the pipe barrel shall be in accordance with ASTM D3262. The internal diameters of all pipes shall be as specified on the Contract Drawings for each pipe diameter.
2. Lengths: Pipe shall be supplied in nominal lengths of 20 feet. Actual laying length shall be nominal +1, -4 inches. At least 90% of the total footage of each size and class of pipe, excluding special order lengths, shall be furnished in nominal length sections.
3. Wall Thickness: The minimum wall thickness shall be the required design thickness for the laying conditions. Manufacturer shall provide information in writing to SD1 per the submittal requirements.
4. End Squareness: Pipe ends shall be square to the pipe axis with a maximum tolerance of 1/4".

E. Testing:

1. Pipes: Pipes shall be manufactured and tested in accordance with ASTM D3262.
2. Joints: Joints shall meet the requirements of ASTM D4161.
3. Stiffness: As tested in accordance with ASTM D2412. Any fiberglass pipe run that exceeds 20 feet, but less than 30 feet, in depth to invert anywhere along the run length from one manhole or structure to a second

manhole or structure shall be a minimum stiffness of 72 psi for the entire run.

F. Customer Inspection

1. SD1 or other designated representative shall be entitled to inspect pipes at the factory or witness the pipe manufacturing.
2. Manufacturers Notification to Customer: Should SD1 request to see specific pipes during any phase of the manufacturing process, the manufacture must provide SD1 with adequate advance notice of when and where the production of those pipes will take place.

- G. Packaging, Handling, and Shipping shall be done in accordance with the manufacturer's instructions.

## 2.6 REINFORCED CONCRETE PIPE (RCP)

- A. Circular reinforced concrete pipe shall meet the requirements of ASTM C 76, Standard Specification for Reinforced Concrete Culvert, Storm Drain and Storm Pipe. Elliptical reinforced concrete pipe shall meet the requirements of ASTM C 507, Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain and Sewer Pipe.
- B. Rubber and plastic joints, or approved equal, shall be the jointing method for RCP and shall meet the requirements of AASHTO M 315 / ASTM C 443. Other methods of joining RCP will only be allowed upon explicit approval from SD1.
- C. When RCP is used under pavement or driveways, a minimum of Class III RCP shall be required or higher class as noted on drawings.

## 2.7 CORRUGATED METAL PIPE (CMP) (FOR STORM SEWERS ONLY)

- A. Corrugated steel pipe shall meet the requirements of AASHTO M36. Corrosion protection shall be provided through an aluminized coating conforming to AASHTO M274. Aluminum alloy spiral pipe shall meet the requirements of AASHTO M196. Coating materials shall be evaluated on a per project basis. Asphalt coatings shall not be permitted for corrugated metal pipe.



- B. Joints for CMP shall be made using coupling bands and gaskets meeting the requirements of AASHTO M 36 and AASHTO M 274.

## 2.8 HIGH-PERFORMANCE POLYPROPYLENE PIPE

- A. For sanitary sewer applications, high-performance polypropylene pipe shall meet the requirements of ASTM F2736 for 12"-30" pipe, and ASTM F2764 for 30"-60" pipe.
- B. For sanitary sewer applications, pipe shall be joined with an extended reinforced integral bell & double gasketed spigot to provide a watertight seal in accordance with ASTM D3212.
- C. For storm sewer application, high-performance polypropylene pipe shall meet the requirements of ASTM F2881 and AASHTO M330.

For storm sewer application, pipe shall be joined with a extended reinforced integral bell & gasketed spigot in accordance with ASTM D32212.2.9 TRACER WIRE

- A. All pressure pipe shall have marking tape 6" wide. Marking tape for the manhole shall be green with the words "Sanitary Sewer" installed approximately twelve (12) inches above the pipe and shall continue for the length of the pipe installation.
- B. All pipe for sanitary force mains shall be installed with a twelve (12) gauge solid copper (PVC coated) tracing wire taped to the top of the pipe every five (5) feet. No tracing wire length shall exceed fifteen hundred (1500) feet between air release valves and/or discharge manhole, where system becomes gravity, without terminating in a curb stop box marked with "Sewer". Tracing wire must run continuously through air release valves and made accessible from ground level. Sanitary force mains that end in a discharge manhole, at which point system becomes gravity, shall terminate tracing wire in a curb stop box next to the discharge manhole. Curb stop boxes shall not be located in pavement areas. Splices in the tracing wire shall be kept to a minimum and approved by SD1. If splices are required, they shall be made with copper split bolt (Ilsco #1K-8 or approved equal) and taped with electrical tape. Tracer wire shall be tested to confirm it is functioning properly after installation.

## 2.10 PIPE COUPLINGS

- A. For new pipe installation, transition between two differing pipe materials must be done at manhole terminations, unless another method is approved by SD1. For connections to existing sewers of differing pipe material, Frengo “flexible couplings” or equal shall be used.
- B. For any other field cut connection, the pipe couplings shall be of a gasketed, sleeve-type with diameter to properly fit the pipe. Each coupling shall consist of one (1) stainless steel middle ring, of thickness and length specified, two (2) stainless steel followers, two (2) rubber-compounded wedge section gaskets and sufficient track-head steel bolts to properly compress the gaskets. The couplings shall be assembled on the job in a manner to insure permanently tight joints under all reasonable conditions of expansion, contraction, shifting and settlement, unavoidable variations in trench gradient, etc. The coupling shall be Dresser, Style 38, as manufactured by Dresser Manufacturing Division, Bradford, PA, or equal.

## 2.11 WYE BRANCH FITTINGS AND LATERALS FOR NEW CONSTRUCTION

- A. Tee or wye branch fittings shall be used for household or service connection lines to the sewer collector line. The fittings shall meet the requirements of the mainline pipe materials as specified herein. The wyes and tees shall be located as shown on the Contract Drawings or as directed by the ENGINEER. The wyes and tees shall be positioned as to require the least number of fittings per lateral connection. Regular wye connections shall be in accordance with Standard Drawing No. 120. Stack wye connections shall include vertical piping, elbows, wye, and concrete encasement in accordance with Standard Drawing No. 108. If a single sweep tee connection is used, the sweep must be in the direction of sanitary sewer main
- B. Inserta Tee pipe fittings are permitted as an alternate lateral tap connection in lieu of wye fittings when main pipe nominal diameter is greater than 12” or on a case by case basis for new construction. Inserta Tee type shall be compatible for the pipe type to be tapped. Contractor shall be responsible for supplying the proper Tee. Install Inserta Tees using procedures and equipment as referenced in the manufacturer’s written installation instructions and in accordance with standard drawing 102.
- C. Lateral extensions shall be installed from the end of the regular or stack wye connection to the limit of easement or public right-of-way in accordance with Standard Drawing No. 120.

## 2.12 CONNECTIONS TO EXISTING SEWERS

- A. Connections to existing public sewers shall be made at the nearest wye or tee available on the public sewer. Connections to existing sewers where wyes or tees are not available shall be made by one of the following methods:
  - 1. Install a wye or tee branch fitting per the manufacturer's recommendations or an approved method by SD1.
  - 2. Inserta Tee Pipe Fittings: Install Inserta Tees using procedures and equipment as referenced in the manufacturer's written installation instructions and in accordance with standard drawings 102.
  - 3. Tapping Saddles: Tapping saddles shall only be used with the explicit approval of SD1 on a case by case basis. If approved install per manufacturer's recommendations.

## 2.13 STORM LATERAL CONNECTIONS

- A. Roof downspouts, footing or foundation drains, and sump pumps shall discharge in accordance with the local governing subdivision regulations. All storm lateral connections (downspouts, footing or foundation drains, sump pumps, etc) to the storm sewer shall be prohibited unless explicitly reviewed and approved by SD1 due to uncommon circumstances (i.e. inadequate discharge distances from foundations, narrow side yards, etc).

## PART 3 EXECUTION

### 3.1 GENERAL

- A. Contractor shall refer to Section 02220 for all excavation, trench preparation, bedding and backfill requirements.
- B. After being delivered alongside the trench, the pipe, fittings, and specials shall be carefully examined for cracks, soundness, or damage, or other defects while suspended above the trench before installation. No piece of pipe or fitting which is known to be defective shall be laid or placed in the lines. If any defective pipe or fitting shall be discovered after the pipe is laid, it shall be removed and replaced with a satisfactory pipe or fitting without additional charge. Before each piece of pipe is lowered into the trench, it shall be thoroughly cleaned out. Each piece of pipe shall be lowered safely and separately in the trench. In case

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a length of pipe is cut to fit in a line, it shall be so cut as to leave a smooth end at right angles to the longitudinal axis of the pipe.

- C. The bell and spigot of the joint shall be thoroughly wire brushed and cleaned of dirt and foreign matter immediately prior to jointing. The contact surfaces shall be coated with the lubricant, primer or adhesive recommended by the manufacturer, and then the pipe shall be pushed together until the joint snaps distinctly in place. The pushing together of the pipe may be done by hand or by the use of a bar.
- D. Place pipe to the grades and alignment indicated, runs of pipe between manholes shall be within 95% of the slope shown on the plans unless otherwise directed by the ENGINEER. Remove and relay pipes that are not laid correctly. Slope piping uniformly between elevations shown.
- E. Trenches shall be kept dry during pipe laying. Before pipe laying is started, all water that may have collected in the trench shall be removed. Ensure that ground water level in trench is at least 12 inches below bottom of pipe before laying piping. Do not lay pipe in water. Maintain dry trench conditions until jointing and backfilling are complete and protect and keep clean water pipe interiors, fittings and valves.
- F. All pipe shall be laid starting at the lowest point and proceed towards the higher elevations, unless otherwise approved by ENGINEER. Place bell and spigot pipe so that bells face the direction of laying, unless otherwise approved by ENGINEER.
- G. When laying of the pipe is stopped, the end of the pipe shall be securely plugged or capped. Plugging shall prevent the entry of animals, liquids, or persons into the pipe or the entrance or insertion of deleterious material.
  - 1. Install standard plugs into all bells at dead ends, tees or crosses. Cap all spigot ends.
  - 2. Fully secure and block all plugs and caps installed for pressure testing to withstand the specified test pressure.
  - 3. Where plugging is required for phasing of the Work or for subsequent connection of piping, install watertight, permanent type plugs.

- H. As required by SD1, pipe manufacturer for each pipe type used shall be present and instruct CONTRACTOR on proper installation technique per shop drawings and manufacturer's recommended procedures prior to the start of the Work.
- I. Install piping as shown, specified and as recommended by the manufacturer. If there is a conflict between manufacturer's recommendations and the Drawings or Specifications, request instructions from SD1 before proceeding.
- J. Deflections at joints shall not exceed 75 percent of the amount allowed by the pipe manufacturer.
- K. Field cut pipe, where required, with a machine specially designed for cutting piping. Make cuts carefully, without damage to pipe or lining, and with a smooth end at right angles to the axis of pipe. Cut ends on push-on joint shall be tapered and sharp edges filed off smooth. Flame cutting will not be allowed.
- L. Touch up protective coatings in a satisfactory manner prior to backfilling. See pipe material section for specific requirements.
- M. Place concrete pipe containing elliptical reinforcement with the minor axis of the reinforcement in a vertical position.
- N. Laying Pipe and Service Laterals
  - 1. Conform to manufacturer's instructions and requirements of the standards listed below, where applicable:
    - a. Ductile Iron Pipe: AWWA C600, AWWA C105.
    - b. Concrete Pipe: AWWA M9, Concrete Pipe Handbook.
    - c. Thermoplastic Pipe: ASTM D 2774.
    - d. ASCE Manual of Practice No. 37.

### 3.2 PIPE INSTALLATION – GENERAL

- A. Excavation for Pipeline Trenches: Refer to Section 02220. Trenches in which pipes are to be laid shall be excavated to the depths shown on the Drawings or as specified by the ENGINEER. Minimum cover for all pipelines shall be 36 inches minimum cover as measured from top of pipe, unless otherwise shown on the Drawings or approved by the ENGINEER. Trench excavations maybe

inspected by ENGINEER prior to laying pipe. Notify SD1 48 hours in advance of all excavating, bedding and pipe laying operations.

B. Jointing: The types of joints described herein shall be made in accordance with the manufacturer's recommendations.

C. Separation of Sanitary Sewers and Potable Water Pipe Lines:

1. Horizontal Separation:

- a. Wherever possible, existing and proposed potable water mains and service lines, and sanitary and storm sewers and service lines shall be separated horizontally by a clear distance of not less than 10 feet.
- b. If local conditions preclude a clear horizontal separation of not less 10 feet, the installation will be permitted provided the potable water main is in a separate trench or on an undistributed earth shelf located on one side of the sewer and at an elevation so the bottom of the potable water main is at least 18 inches above the top of the sewer.
- c. Exception:
  - 1) Where it is not possible to provide the minimum horizontal separation described above, the potable water main must be constructed of cement lined ductile iron slip-on or mechanical joint pipe complying with the public water supply design standards of the governing agency. Sewer must be constructed of epoxy lined ductile iron slip-on or mechanical joint pipe complying with SD1's requirements.

2. Crossings:

- a. Provide a minimum vertical distance of 18 inches between the outsides of pipes.
- b. Center one full length section of potable water main over the sewer so that the sewer joints will be equidistant from the potable water main joints.
- c. Provide adequate structural support where a potable water main crosses under a sewer to maintain line and grade.
- d. Exceptions:
  - 1) See requirements in paragraph 3.2.C.1.c.(1) above.
  - 2) Concrete encase as directed by SD1.

E. Permanent slope anchors shall be installed on all pipe with slopes over twenty (20) percent. See the SD1's standard detail for Concrete Anchor Block. Consult with SD1 on spacing of the anchors.

G. Reaction Anchorage (Pressure Pipe Only):

1. All tees, Y-branches, bends deflecting 11-1/4 degrees or more, and plugs which are installed in buried piping shall be provided with proprietary restrained joint systems for preventing movement of the pipe and joints caused by the internal test pressure.

H. Thrust Restraint

1. Provide thrust restraint on pressure piping systems where shown and specified.
2. Thrust restraint for DIP shall be accomplished by means of restrained pipe joints.
3. Thrust restraints shall be designed for the axial thrust exerted by the system design pressures as specified by the Design ENGINEER.

I. Dewatering and Ground Water

1. Discharging of sediment laden groundwater or rainwater from excavations directly to watercourses or storm sewers is prohibited. Failure of the CONTRACTOR to comply with the requirements of this specification may result in SD1 issuing a stop work order or non-approval of pay estimates until the CONTRACTOR puts measures in place to comply with this specification. All costs associated with the stop work or non-approval of pay estimates shall be at the CONTRACTOR's sole expense.
2. Pipe trenches and excavations for appurtenances shall be kept free from water during trench bottom preparation, pipe laying and jointing, pipe embedment and building of appurtenances in an adequate and acceptable manner.
3. Where the trench or excavation bottom is mucky or otherwise unstable because of ground water, or where the ground water elevation is above the bottom of the trench or excavation, the ground water shall be lowered by means acceptable to the ENGINEER to the extent necessary to keep the trench or excavation free from water while the trench or excavation is in progress. The discharge of ground water

from the trench or excavation area shall be by the methods specified below to natural drainage channels, gutters, drains, or storm sewers which will conduct the water away from the trench or excavation area. Means of diverting any surface water away from the trench or excavation area shall be taken and surface water prevented from entering the trench or excavation area.

4. Dewatering equipment shall be provided to remove and dispose of all surface water and groundwater entering excavations, trenches, or other parts of the work. Each excavation shall be kept dry during sub grade preparation and continually thereafter until the structure to be built, or the pipe to be installed therein, is completed to the extent that no damage from hydrostatic pressure, flotation, or other cause will result.
5. All excavations for concrete structures or trenches which extend down to or below groundwater shall be dewatered by lowering and keeping the groundwater level beneath such excavations a minimum of 6 inches or more below the bottom of the excavation.
6. Surface water shall be diverted or otherwise prevented from entering excavations or trenches to the greatest extent possible without causing damage to adjacent property.
7. Groundwater and rainwater removed during dewatering shall be discharged onto undisturbed ground where vegetative cover exists or through sediment and erosion controls and allowed to flow overland to filter out any sediments before discharging to any drain, storm sewer, or watercourse specified above. No such flows are permitted onto exposed soils, stream banks, or other areas subject to erosion.
8. Where overland flow on existing undisturbed ground is not sufficient to adequately remove all sediment from dewatering operations prior to discharge to any drain, storm sewer, or watercourse, or other erosion control measure acceptable to SD1 or ENGINEER shall be used to remove the sediment from the water prior to discharge. The method of discharging ground water or rain water from the trench or excavation area shall be such as to not create any erosion of existing ground.
9. All discharge locations shall be approved prior to construction by the ENGINEER and SD1.



10. CONTRACTOR shall take measures to prevent damage to properties, structures, sewers, and other utility installations and other work.
11. CONTRACTOR shall repair all damage, disruption, or interference resulting directly or indirectly from groundwater control system operations at no additional cost to SD1.
12. The CONTRACTOR shall maintain the components of the dewatering system and surface water erosion and sediment controls within the project site. Deficiencies identified during visual inspection by SD1, SD1 's representatives, or the governing regulatory authority shall be remedied by the CONTRACTOR at no additional cost to SD1.
13. Dewatering system components shall be located where they will not interfere with construction activities adjacent to the work area.
14. The CONTRACTOR shall be responsible for the condition of any pipe or conduit which he may use for drainage purposes, and all such pipe or conduit shall be left clean and free of sediment.

J. Ground Water Barriers:

1. Where specified, continuity of bedding material shall be interrupted by low permeability groundwater barriers to impede passage of water through the bedding. Groundwater barriers for all pipelines shall be soil plugs of 3 feet in thickness, extending the full depth and width of the pipe bedding material in the trench, and spaced not more than 400 feet apart. The soil plugs shall be constructed from soil meeting ASTM D2487 classification GC, SC, CL, or ML, and compacted to 95 percent of maximum density at or near the optimum moisture content (ASTM D698).

K. Pipe Encasements:

1. Concrete Encasement
  - a. Wherever pipe encasement is called for on the plans or ordered in by SD1, the CONTRACTOR shall construct the encasement as shown on the drawings or in accordance with SD1's standard drawings.
  - b. Support the pipe sections on solid concrete blocks, being sure to keep the pipe sections on line and grade and then pour concrete, completely under each section, along each side and up to a point at least twelve (12) inches above the top of each section, making

sure that all voids are filled. In lieu of blocks, the CONTRACTOR may use a bed of concrete, to initially support the pipe sections.

- c. The minimum dimension of concrete under the pipe sections shall be six (6) inches and on each side of the sections shall be twelve (12) inches. This encasement shall be reinforced around the top and sides of the pipe as shown on the Contract Drawings for creek crossings and other locations. If the trench walls are nearly vertical from the bottom of the trench up to a point to which the encasement is to be poured, forms for forming the encasement may be omitted and the concrete poured to and against the trench walls. Where trench walls are not nearly vertical, proper forms shall be set for forming the encasement, unless otherwise called for by SD1. The space between the trench walls and any formed encasement shall be filled and compacted with approved pipe bedding or backfilling material.
- d. Care shall be taken to assure that the pipe sections remain on line and grade during the placing of concrete and that the joints are not disturbed. Backfill shall not be placed for a minimum of six (6) hours after encasement is completed, unless otherwise approved by SD1.
- e. Exercise care to avoid flotation when installing pipe in cast-in-place concrete.

## 2. Casing Pipe

- a. Whenever casing pipe is called for on the plans, the CONTRACTOR shall install a casing pipe of the size and of the material called for on the plans by means of jacking, boring, or trenching.
- b. When the casing pipe is to be installed under a highway or railroad, and at other locations specifically designated on the Drawings, the method of installation shall be jacking or boring as specified in Section 02400, unless trenching is specifically allowed.
  - 1) For force mains inside casing pipe all pipe joints shall be restrained joint connections. Casing spacers shall be used to center the pipe in the casing. The annular space between the force main and casing pipe shall be completely filled with 500 psi or higher compressive strength grout.

- 2) For gravity pipe inside casing pipe, casing spacers shall be used to center the pipe within the casing. The annular space does not have to be filled.
- c. Casing Spacers- Include in casing pipe. Centered/Restrained Casing spacers shall be installed to position the carrier pipe within the center of the casing pipe. The required spacing and installation shall be per the manufacturer's recommendation, except that for PVC carrier pipe, a minimum of 3 spacers shall be installed on each length of pipe with a maximum 6 feet spacing between spacers. All spacers shall be 316 stainless steel as manufactured by Cascade Waterworks MFG Co., Advance Products and Systems (APS) or other approved equal. Casing spacers shall also be provided with height field-adjustment capability for installation of gravity sewer on a constant slope.
- d. Casing pipe end seals shall be installed at each end of the casing pipe and shall consist of a proper sized rubber seal and attached to the carrier and casing pipe with stainless steel bands per the manufacturers recommendation. Casing pipe end seals shall be manufactured by Cascade Waterworks MFG Co., Advanced Products and Systems (APS) or other approved equal.

L. Work Affecting Existing Piping

1. Location of Existing Piping:

- a. Locations of existing piping shown should be considered approximate.
- b. CONTRACTOR shall determine the true location of existing piping to which connections are to be made, and location of other facilities which could be disturbed during earthwork operations, or which may be affected by CONTRACTOR'S Work in any way.
- c. Conform to applicable requirements of Division 1 pertaining to cutting and patching, and connections to existing facilities.

2. Taking Existing Pipelines Out of Service:

- a. Do not take pipelines out of service unless specifically noted on the Drawings, or approved by SD1.

3. Work on Existing Pipelines:

- a. Cut or tap pipes as shown or required with machines specifically designed for this work.

- b. Install temporary plugs to prevent entry of mud, dirt, water and debris.
  - c. Provide all necessary adapters, fittings, pipe and appurtenances required to complete the Work.
- M. Install service laterals per SD1's standard details and per the requirements specified in this specification,.
- N. Bedding and backfilling of pipeline trenches shall be in accordance with the requirements set forth in Section 02220 and as shown on SD1's trench compaction detail.
- O. Before final acceptance, the CONTRACTOR will be required to level all trenches or to bring the trench up to grade. The CONTRACTOR shall also remove from roadways, rights-of-way and/or private property all excess earth or other materials resulting from construction.

### 3.3 DUCTILE IRON PIPE INSTALLATION REQUIREMENTS

- A. Jointing Pipe:
- 1. Ductile Iron Mechanical Joint Pipe:
    - a. Wipe clean the socket, plain end and adjacent areas immediately before making joint. Make certain that cut ends are tapered and sharp edges are filed off smooth.
    - b. Lubricate the plain ends and gasket with soapy water or an approved pipe lubricant, in accordance with AWWA C111, just prior to slipping the gasket onto the plain end of the joint assembly.
    - c. Place the gland on the plain end with the lip extension toward the plain end, followed by the gasket with the narrow edge of the gasket toward the plain end.
    - d. Insert the pipe into the socket and press the gasket firmly and evenly into the gasket recess. Keep the joint straight during assembly.
    - e. Push gland toward socket and center it around pipe with the gland lip against the gasket.
    - f. Insert bolts and hand tighten nuts.
    - g. Make deflection after joint assembly, if required, but prior to tightening bolts. Alternately tighten bolts 180 degrees apart to seat the gasket evenly. The bolt torque shall be as follows:

Pipe Size	Bolt Size	Range of Torque
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<u>(inches)</u>	<u>(inches)</u>	<u>(ft-lbs)</u>
3	5/8	45-60
4-24	3/4	75-90
30-36	1	100-120
42-48	1-1/4	120-150

2. Ductile Iron Push-On Joint Pipe:
  - a. Prior to assembling the joints, the last 8 inches of the exterior surface of the spigot and the interior surface of the bell shall be thoroughly cleaned and all mud, debris, etc. removed and joint recesses wiped clean.
  - b. Rubber gaskets shall be wiped clean and flexed until resilient. Refer to manufacturer's instructions for procedures to ensure gasket resiliency when assembling joints in cold weather.
  - c. Insert gasket into joint recess and smooth out the entire circumference of the gasket to remove bulges and to prevent interference with the proper entry of the spigot of the entering pipe.
  - d. Immediately prior to joint assembly, apply a thin film of approved lubricant to the surface of the gasket which will come in contact with the entering spigot end of pipe. CONTRACTOR may, at his option, apply a thin film of lubricant to the outside of the spigot of the entering pipe.
  - e. For assembly, center spigot in the pipe bell and push pipe forward until it just makes contact with the rubber gasket. After gasket is compressed and before pipe is pushed or pulled all the way home, carefully check the gasket for proper position around the full circumference of the joint. Final assembly shall be made by forcing the spigot end of the entering pipe past the rubber gasket until it makes contact with the base of the bell. When more than a reasonable amount of force is required to assemble the joint, the spigot end of the pipe shall be removed to verify the proper positioning of the rubber gasket. Gaskets which have been scoured or otherwise damaged shall not be used.
  - f. Maintain an adequate supply of gaskets and joint lubricant at the site at all times when pipe jointing operations are in progress.
  
3. Proprietary Joints:
  - a. Pipe which utilizes proprietary joints such as Fastite, by American Cast Iron Pipe Company, Tyton by U.S. Pipe

Incorporated, restrained joints, or other such joints shall be installed in strict accordance with the manufacturer's instructions.

B. Polyethylene Tube Wrap Installation

The polyethylene tube wrap shall be installed on ductile iron pipe in accordance with AWWA C105 and the following:

1. Pick up the pipe by a crane at the side of the trench using either a sling or pipe tongs, and raise the pipe about three feet off the ground. Slip a section of the polyethylene tubing over the spigot end of the pipe and bunch up, accordion fashion, between the end of the pipe and the sling. The tubing should be cut to a length approximately 4 feet longer than the length of the pipe.
2. Lower the pipe into the trench, seat the spigot end in the bell of the adjacent installed pipe and then lower the pipe to the trench bottom. A shallow bell hole shall be provided in the trench bottom to facilitate the wrapping of the joint.
3. Make up the pipe joint in the normal fashion.
4. Remove the sling from the center of the pipe and hook into the bell cavity and raise the bell end 3 or 4 inches to permit the polyethylene tubing to be slipped along the full length of the barrel. Enough of the tubing should be left bunched up, accordion fashion, at each end of the pipe to overlap the adjoining pipe approximately 2 feet.
5. To make the overlap joint, pull the tubing over the bell of the pipe, fold around the adjacent spigot and wrap with approximately three (3) circumferential turns of the 2-inch wide plastic adhesive tape to seal the tubing to the pipe.
6. The tubing on the adjacent pipe shall then be pulled over the first wrap on the pipe bell and sealed in place behind the bell using approximately three circumferential turns of the 2-inch plastic adhesive tape.
7. The resulting wrap on the barrel of the pipe will be loose, and it should be pulled snugly around the barrel of the pipe and the excess material folded over at the top, and held in place by means of 6-inch strips of the 2-inch wide plastic adhesive tape at intervals of approximately 3 feet along the pipe barrel.

8. Fittings, valves, hydrants, etc., shall be hand wrapped, using polyethylene film that is held in place with the plastic adhesive tape.
  - a. Bends, reducers, and offsets can be wrapped with the polyethylene tubing in the same manner as pipe.
  - b. Valves can be wrapped by bringing the tube wrap on the adjacent pipe over the bells or flanges of the valve and sealing with a flat sheet of the polyethylene passed under the valve bottom and brought up around the body to the stem and fastened in place with the adhesive tape.
  - c. Hydrants can be wrapped with polyethylene tubing slipped over the hydrant to encase the hydrant from the lead-in valve to the ground level of the hydrant. To provide drainage of the hydrant, it is necessary to cut a small hole in the film and insert a short pipe nipple to drain the water to the soil outside the film wrap.
  - d. All fittings that require concrete backing should be completely wrapped prior to pouring the concrete backing block.

### 3.4 HDPE INSTALLATION REQUIREMENTS

#### A. Pipe Joining

1. Joints between plain end pipes and fittings shall be made by butt fusion, and joints between the main and saddle branch fittings shall be made using saddle fusion using only procedures that are recommended by the pipe and fittings manufacturer.
2. Butt fusion shall be performed between pipe ends, or pipe ends and fitting outlets, of like outside diameter and wall thickness (SDR or DR). Butt fusion jointing between like diameters, but unlike wall thickness, shall not be permitted. Transitions between unlike wall thicknesses shall be made with a transition nipple (a short length of the heavier wall pipe with one end machined to the lighter wall) or by mechanical means.
3. Heat-joining of HDPE pipe shall conform to applicable portions of AWWA C-906.
4. HDPE pipe and fittings shall be joined together or to other materials by means of flanged connections (flange adapters and back-up rings) or mechanical couplings designed for joining HDPE pipe or for joining HDPE pipe to another material. Mechanical couplings shall be fully pressure-rated and fully thrust restrained such that when installed in accordance with manufacturer's recommendations, a longitudinal load

applied to the mechanical coupling will cause the pipe to yield before the mechanical coupling disjoins. External joint restraints shall be used in lieu of fully restrained mechanical couplings.

B. Installation

1. Installation shall be in accordance with ASTM D 2321, manufacturer's recommendations, and this specification. All necessary precautions shall be taken to ensure a safe working environment in accordance with all applicable safety codes and standards.
2. Mechanical joints and flange connections shall be installed in accordance with the manufacturer's recommended procedure. Flange faces shall be centered and aligned to each other before assembling and tightening bolts. In no case shall the flanged bolts be used to draw the flanges into alignment. Bolt threads shall be lubricated and flat washers shall be fitted under the flange nuts. Bolts shall be evenly tightened according to the tightening pattern and torque step recommendations of the manufacturer. At least one (1) hour after initial assembly, flange connections shall be re-tightened following the tightening pattern and torque step recommendations of the manufacturer. The final tightening torque shall be 100 ft.-lbs. or as recommended by the manufacturer.
3. Pipe shall be laid on grade and on a stable foundation in accordance with Section 02220.
4. When lifting with slings, only wide fabric choker slings shall be used to lift, move, or lower pipe and fittings. Wire rope or chain shall not be used.
5. CONTRACTOR shall be liable to correct any pipe installed off line or grade (whether by horizontal directional drilling or other means).

3.5 POLYVINYL CHLORIDE (PVC) GRAVITY PIPE INSTALLATION REQUIREMENTS

A. Push-on Joints

1. Bevel all field-cut pipe, remove all burrs and provide a reference mark the correct distance from the pipe end.
2. Clean the pipe end and the bell thoroughly before making the joint. Insert the O-ring gasket, making certain it is properly oriented. Lubricate the spigot well with an approved lubricant; do not lubricate the bell or



O-ring. Insert the spigot end of the pipe carefully into the bell until the reference mark on the spigot is flush with the bell.

### 3.6 FIBERGLASS PIPE INSTALLATION REQUIREMENTS

- A. Pipe Handling: Use textile slings, other suitable materials or a forklift. Use of chains or cables is not permitted.
  
- B. Jointing:
  - 1. Clean ends of pipe and coupling components.
  - 2. Apply joint lubricant to pipe ends and elastomeric seals of coupling. Use only lubricants approved by the pipe manufacturer.
  
  - 3. Use suitable equipment and end protection to push or pull the pipes together.
  
  - 4. Do not exceed forces recommended by the manufacturer for coupling pipe.
  
  - 5. Join pipes in straight alignment then deflect to required angle. Do not allow the deflection angle to exceed the deflection permitted by the manufacturer.

### 3.7 SANITARY SEWER TESTING REQUIREMENTS

- A. General:
  - 1. Test all piping.
  
  - 2. All piping shall be tested prior to post-construction CCTV operations.
  
  - 3. Notify SD1 at least 48 hours in advance of testing.
  
  - 4. Conduct all tests in the presence of SD1.
  
  - 5. Remove or protect any pipeline-mounted devices which may be damaged by the test pressure.
  
  - 6. Provide all apparatus and services required for testing, including but not limited to, the following:

- a. Test pumps, bypass pumps, hoses, calibrated gauges, meters, test containers, valves and fittings.
    - b. Temporary bulkheads, bracing, blocking and thrust restraints.
  - 7. Provide air if an air test is required and power if pumping is required.
  - 8. CONTRACTOR shall provide fluid required for testing.
- B. Force Mains Test Schedule:
- 1. The required hydrostatic test pressures shall be as specified by the Design ENGINEER and approved by SD1.
  - 2. Unless otherwise specified, the required hydrostatic test pressures are at the lowest elevation of the pipeline.
- C. Pressure Test Procedure for Force Mains:
- 1. Complete backfill and compaction of entire pipe before testing, unless otherwise required or approved by ENGINEER.
  - 2. Fill section to be tested slowly with water and expel all air. Install corporation cocks, if necessary, to remove all air.
  - 3. Apply specified test pressure for two hours and observe pressure gage. Check carefully for leaks while test pressure is being maintained.
  - 4. A successful test shall be defined as zero drop in the specified test pressure during the two hour testing period.
- D. Displacement of Pipe
- 1. The sewer pipe sections may be checked by SD1 to determine if any displacement of the pipe sections from alignment and grade have occurred as each portion of the sewer is completed between manhole locations. When the test is required by SD1, it shall be as follows:
    - a. Flashing a light beam by means of a strong flashlight or reflecting sunlight through the portion of the sewer between manhole locations or by utilizing a laser beam.
    - b. When viewed from the opposite end of the portion of the sewer from the light location, the light beam should be full throughout the sections, but not less than two-thirds full under any circumstances. There shall be no "dips" in the grade of the pipe invert.

- c. If the pipe sections show any misalignment, displacement or any other defects in the sections or joints, the CONTRACTOR shall remedy the defect to the satisfaction of SD1.
- d. This test may be done after the pipe sections have been laid, the joints completed and the bedding completed to twelve (12) inches above the pipe sections, or after completion of the sewer and all backfilling has been undertaken or both.

E. Deflection of Pipe

1. A deflection test shall be performed on all gravity sanitary sewers using flexible pipe. The test shall be conducted after the final backfill has been in place at least thirty (30) days. No pipe shall exceed a deflection of five percent (5%). The deflection test is to be run by using a rigid mandrel, or equal means approved by SD1, and shall have a diameter equal to ninety-five percent (95%) of the inside diameter of the pipe, including the pipe manufacturer's tolerances. The test shall be performed without mechanical pulling devices. All tests must be witnessed and approved by a representative of SD1.

F. Air Test for Gravity Sewers 42" and Smaller

1. The CONTRACTOR shall test the tightness of the pipe sections, joints and appurtenances of all gravity sewers by means of the low pressure air test.
2. No tests shall be made until the backfill is consolidated over the pipe and all service lines in the section to be tested have been connected and plugged.
3. The low pressure air test shall be conducted in accordance with procedures outlined in UNIBELL Specification UNI B-6. If the section of sewer being tested is below the elevation of ground water in the trench, the test pressure shall be 0.5 psi for each foot of ground water above the invert of the pipe.
4. All tests must be witnessed and approved by a representative of SD1.
5. Any leaks determined from the air test shall be fixed by the CONTRACTOR using an SD1 approved method.

6. The minimum air test pressure for all gravity sewers shall be 4 psi.

G. Individual Pipe Joint Testing for Gravity Sewers 48” and Greater.

1. The CONTRACTOR shall test each individual joint of the gravity sewers using the following procedure:
  - a. Center the joint tester over the joint. Using the manufacturers approved testing apparatus and other recommendations, Inflate the outer element filling the center of the joint tester cavity with water or air, dependent upon test used, until it flows evenly from the bleed off valve, which removes air from the outer cavity. The bleed off valve shall be located at the top of the joint tester assembly. Close the bleed –off valve and pressurize the cavity to 3.5 to 5.5 psig depending on groundwater back pressure. Allow pressure to stabilize for 10 to 15 seconds and turn off pressure source. If pressure holds or drops less than 1 psi for 1 minute the joint is acceptable. The pressure gage used shall read in one (1) psi increments.

### 3.8 STORM SEWER TESTING REQUIREMENTS

- A. Pipe shall be fully backfilled and compacted at least 30 days prior to testing.
- B. Deflection: Under normal circumstances, the CONTRACTOR shall test approximately 20% of all flexible storm sewer piping, as determined and at locations directed by SD1, by use of a calibrated mandrel or other device/method approved by SD1, to ensure that no pipe deflection has occurred greater than five (5) percent of the inside diameter of the pipe. If, however, SD1 determines additional deflection testing is required based on the condition of the system or other circumstances, SD1 reserves the right to require such testing at no additional cost to SD1. The CONTRACTOR shall test the entire length of the sewer installed from structure to structure. Any pipe section exhibiting greater than 5 percent deflection shall be repaired in a manner approved and acceptable to SD1 and retested, at no additional cost to SD1. If the pipe fails a second deflection test, the pipe shall be replaced and retested at no additional cost to SD1.

- C. Displacement: Storm sewer pipe sections may be checked by SD1 to determine if any displacement of the pipe sections from alignment and grade has occurred as each portion of the sewer is completed between structure locations. When the test is performed, it shall be as follows:
1. Flashing a light beam by means of a strong flashlight or reflecting sunlight through the portion of the sewer between structure locations or by utilizing a laser beam.
  2. When viewed from the opposite end of the portion of the sewer from the light location, the light beam should be full throughout the sections, but not less than two-thirds full under any circumstances. There shall be no "dips" in the grade of the pipe invert.
  3. If the pipe sections show any misalignment, displacement or any other defects in the sections or joints, the CONTRACTOR shall remedy the defect, at the CONTRACTOR'S sole cost, to the satisfaction of SD1.

### 3.9 REPAIR OF FAILED PIPE SECTIONS

- A. If a pipe section failed testing as outlined in Paragraphs 3.7 & 3.8 herein. Contractor shall repair the failed pipe sections as follows:
1. Contact SD1 24 hours prior to making any repairs to failed pipe sections. SD1 shall be present during the entire duration of time repairs are being made to failed sections of pipe.
  2. The CONTRACTOR shall remove and replace, at no extra cost to SD1 all sections of pipe which fail any of the tests specified in this section in accordance with the following procedures:
    - a. Excavate failed sections of pipe in accordance with Section 02220.
    - b. Cut out and/or remove failed sections and relay new pipe beginning at nearest joint.
    - c. Close pipe with pipe coupling per manufacturer's recommendation and approval of SD1.
  3. The CONTRACTOR shall provide all material, labor, and equipment necessary to remove and replace the failed pipe section.
  4. Retest the replaced sewer sections to meet the applicable requirements listed in Paragraphs 3.7 & 3.8 herein.

### 3.10 PIPE ABANDONMENT

#### A. Pipe abandonment in non-paved roadway:

1. Pipe abandonment under non-paved roadways shall be as outlined in SD1 Standard Detail No. 107 (SD-107). Ends of pipe shall be filled with minimum of 1' of concrete.

#### B. Pipe abandonment in paved roadway:

1. Pipe abandonment under paved roadways shall consist of completely filling the designated pipes with controlled density fill (CDF), grout or other approved materials. Appreciable deposits of debris shall be removed from other pipes prior to placement of CDF, grout or other approved materials. Pipes under roadways shall be filled completely

C. On Pipe abandonment in for manholes that remain, re-work bench to eliminate invert.

### 3.11 CLEANING FOR SEWERS

#### A. Cleaning:

1. Thoroughly clean all piping and flush in a manner approved by ENGINEER, prior to placing in service.
- 2.

### 3.8 CLEAN-UP

- A. Upon completion of the installation of the piping and appurtenances, the CONTRACTOR shall remove all debris and surplus construction materials resulting from the work. The CONTRACTOR shall grade the ground along each side of pipe trenches in a uniform and neat manner leaving the construction area in a shape as near as possible to the original ground line. Refer to Section 02900, Landscaping, for restoration.

# Standard Sanitary Sewer Bid Item Descriptions

**S BYPASS PUMPING** This item shall include all labor, equipment, and materials needed to complete a bypass pumping and/or hauling operation for diversion of sewage during sanitary sewer construction. Examples of such operations when bypass pumping and/or hauling may be necessary is during force main tie-ins, manhole invert reconstruction, insertion of new manholes into existing mains, or other similar construction. There may be more than one bypass pumping/hauling operation on a project. This item shall be paid for each separate bypass pumping/hauling operation occurrence as called out on the plans or directed by the engineer and actually performed. There will be no separate bid items defined for length, duration, or volume of sewage pumped or hauled in each occurrence. If a bypass pumping/hauling operation is called out on the plans; but, conditions are such that the bypass pumping/hauling operation is not needed or utilized, no payment will be made under this item. The contractor shall draw his own conclusions as to what labor, equipment, and materials may be needed for each bypass pumping/hauling occurrence. The contractor should be prepared to handle the maximum volume of the sewer being bypassed, even during a storm event. This item shall not be paid separately, but shall be considered incidental, when bypass pumping and/or hauling is needed during cast-in-place-pipe (CIPP) and/or point repair operations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA).

**S CIPP LATERAL SERVICE INVESTIGATION** This item shall include all equipment, materials, labor and incidentals necessary to enter the sewer in compliance with all safety/confined space requirements and perform the identification, assessment and pre-measurement of all existing and abandoned laterals for the placement of Cured-In-Place-Pipe lining. This item shall be in payment for all lateral service investigation for all sewer segments to be lined as a part of this contract. This bid item shall include bypass pumping when required. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. Payment for this item shall be LUMP SUM (LS).

**S CIPP LATERAL REINSTATEMENT** This item is to pay for installing a Cured-In-Place-Pipe liner in service laterals and service/mainline connections to stabilize structural defects and construction inadequacies. This bid item shall include all labor, equipment, materials and incidentals necessary to perform the service lateral reinstatement in accordance with the plans and specifications. Work under this item shall include bypass pumping, sewer flow control, pre-installation cleaning, sealing connections to existing sewer main, pre- and post- construction CCTV inspection and final testing of the CIPP system. This item shall also include the "top hat" required by the specifications. All CIPP lateral reinstatements shall be paid under this item regardless of the size or length of reinstatement. No separate bid items of varying sizes or length of CIPP lateral reinstatement will be provided in the contract. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. Payment for this item shall be EACH (EA) for each CIPP lateral reinstatement complete and ready for use.

**S CIPP LINER** This bid Item is to pay for rehabilitation of existing sanitary sewers using the Cured-In-Place-Pipe method. This bid item description applies to all CIPP sizes included in the contract.

All CIPP Liner items of all varying sizes shall include all labor, materials, customer notification, testing, necessary permits, ingress and egress procedures, bypass pumping, pre-construction video, sediment and root removal, dewatering, traffic control, erosion and sediment control, excavation pits, removal and replacement of manhole frames and covers as necessary to facilitate the lining work, sealing at manholes and service connections, clearing and grubbing, pipeline cleaning, re-cleaning and video inspection as many times as necessary, debris collection and disposal, root removal, pre- and post-construction video inspection, all digital inspection footage, final report preparation and approval, the cost of potable water from the Owner, required compliance tests, site restoration, site cleanup, sealing of liner at manholes, acceptance testing and all other rehabilitation work and incidentals not included under other pay items necessary to complete the rehabilitation per the plans and specifications. There will be no separate payment for acceptance testing of the lined pipe; but shall be considered incidental to this item. Pay under this item shall be by each size bid in the contract. Pay measurement shall be from center of manhole to center of manhole. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

**S CIPP PROTRUDING LATERAL REMOVAL** This item includes all equipment, materials, labor and incidentals necessary to enter the sewer in compliance with all safety/confined space requirements, remove a sufficient amount of the protruding tap to insure a proper and safe Cured-In-Place-Pipe lining insertion and perform pre-installation CCTV. This bid item shall include bypass pumping when required. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. Payment for this item shall be EACH (EA) for each protruding lateral removed.

**S CONCRETE PIPE ANCHOR** This item shall be constructed on the sewer pipe at the locations shown on the plans in accordance with sanitary sewer specifications and standard drawings. Payment for concrete anchors will be made at the contract unit price each in place complete and ready for use. Each concrete anchor of sewer pipe or force main shall be paid under one bid item per contract regardless of the sizes of carrier pipe being anchored in the contract. No separate bid items will be established for size variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**S DIRECTIONAL BORE** Payment under this item is made whenever the plans or specifications specifically show directional boring is to be utilized in order to minimize the impact of open cut for the installation of force main or gravity sewer under streets, creeks, and etc. Payment under this item shall include the specified bore pipe, labor, and equipment. No separate payment shall be made for bore pipe installed in the bore whether used as a carrier pipe or an encasement of a separate carrier pipe. This item shall also include pipe anchors at each end of the bore when specified to prevent the creep or contraction of the bore pipe. Carrier pipe installed within a bore pipe shall be paid separately under pipe items. Payment under this item shall not be size specific and no separate bid items will be established for size variations. The bore pipe sizes to be included under this item shall be as shown on the plans and/or in the specifications. Any and all directional bores in each contract shall be paid under one directional bore bid item included in the contract regardless of size. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

**S ENCASEMENT CONCRETE** Includes all labor, equipment, excavation, concrete, reinforcing



steel, backfill, restoration, and etc., to construct the concrete encasement of the sewer or force main as shown on the plans, and in accordance with the specifications and standard drawings. Payment under this item shall be in addition to the carrier pipe as paid under separate bid items. Carrier pipe is not included in this bid item. Any and all concrete encasement shall be paid under one bid item included in the contract regardless of the size of the carrier pipe or the volume of concrete or steel reinforcement as specified in the plans and specifications. No separate bid items will be established for size variations. Measurement of pay quantity shall be from end of concrete to end of concrete. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

**S ENCASEMENT STEEL BORED** This item shall include the steel encasement pipe size as specified on the plans and in the specifications, casing spacers, end seals, labor, and equipment to bore and install the encasement in accordance with the plans and specifications, complete and ready for use. The size shall be the measured internal diameter of the encasement pipe. The sizes of encasement to be paid under the size ranges specified in the bid items shall be as follows:

- Range 1 = All encasement sizes greater than 2 inches to and including 6 inches
- Range 2 = All encasement sizes greater than 6 inches to and including 10 inches
- Range 3 = All encasement sizes greater than 10 inches to and including 14 inches
- Range 4 = All encasement sizes greater than 14 inches to and including 18 inches
- Range 5 = All encasement sizes greater than 18 inches to and including 24 inches
- Range 6 = All encasement sizes greater than 24 inches

*(Encasement sizes of 2 inches internal diameter or less shall not be paid separately; but, shall be considered incidental to the carrier pipe.)* Payment under this bid item shall not include the carrier pipe. Carrier pipe shall be paid under a separate bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

**S ENCASEMENT STEEL OPEN CUT** This item shall include the steel encasement pipe size as specified on the plans and in the specifications, casing spacers, end seals, labor, and equipment to open cut install the encasement in accordance with the plans and specifications, complete and ready for use. The size shall be the measured internal diameter of the encasement pipe. The size encasement to be paid under the size ranges specified in the bid items shall be as follows:

- Range 1 = All encasement sizes greater than 2 inches to and including 6 inches
- Range 2 = All encasement sizes greater than 6 inches to and including 10 inches
- Range 3 = All encasement sizes greater than 10 inches to and including 14 inches
- Range 4 = All encasement sizes greater than 14 inches to and including 18 inches
- Range 5 = All encasement sizes greater than 18 inches to and including 24 inches
- Range 6 = All encasement sizes greater than 24 inches

*(Encasement sizes of 2 inches internal diameter or less shall not be paid separately; but, shall be considered incidental to the carrier pipe.)* Payment under this bid item shall not include the carrier pipe. Carrier pipe shall be paid under a separate bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

**S FORCE MAIN** This description shall apply to all PVC and ductile iron and polyethylene/plastic pipe bid items of every size and type, except those bid items defined as “Special”. This item includes the pipe specified by the plans and specifications, all fittings (including, but not limited to, bends, tees, reducers, plugs, and caps), tracing wire with test boxes (if required by specification), polyethylene wrap (when specified), labor, equipment, excavation, bedding, restoration, testing, backfill, and etc., required to install the specified new pipe and new fittings at the locations shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. No additional payment will be made for rock excavation. This bid item includes material and placement of flowable fill under existing and proposed pavement, and wherever else specified on the plans or in the specifications. This item shall also include pipe anchors on polyethylene pipe runs as shown on the plans or required by the specifications to prevent the creep or contraction of the pipe. Measurement of quantities under this item shall be through fittings, encasements, and directional bores (only when a separate carrier pipe is specified within the directional bore pipe). No separate payment will be made under pipe items when the directional bore pipe is the carrier pipe. Measurements shall be further defined to be to the center of tie-in where new pipe contacts existing pipe at the center of connecting fittings, to the outside face of vault or structure walls, or to the point of main termination at dead ends. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

**S FORCE MAIN AIR RLS/VAC VLV** This bid item description shall apply to all force main air release/vacuum valve installations of every size except those defined as “Special”. This item shall include the air release/vacuum valve, main to valve connecting line or piping, manhole/vault/structure, access casting or doors, tapping the main, labor, equipment, excavation, proper backfill and restoration required to install the air release/vacuum valve at the location shown on the plans or as directed in accordance with the specifications and standard drawings complete and ready for use. All air release/vacuum valves on a project shall be paid under one bid item regardless of size. No separate pay items will be established for size variations. Only in the case of the uniqueness of a particular air release/vacuum valve would a separate bid item be established. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**S FORCE MAIN DIRECTIONAL BORE** Payment under this item is made whenever the plans or specifications specifically show directional boring is to be utilized in order to minimize the impact of open cut for the installation of sewer or force main under streets, buildings, creeks, and etc. Payment under this item shall include the specified bore pipe, labor, and equipment. No separate payment shall be made for bore pipe installed in the bore whether used as a carrier pipe or an encasement of a separate carrier pipe. This item shall also include pipe anchors at each end of the bore when specified to prevent the creep or contraction of the bore pipe. Carrier pipe installed within a bore pipe shall be paid separately under pipe items. Payment under this item shall not be size specific and no separate bid items will be established for size variations. The bore pipe sizes to be included under this item shall be as shown on the plans and/or in the specifications. Any and all directional bores in each contract shall be paid under one directional bore bid item included in the contract regardless of size. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

**S FORCE MAIN POINT RELOCATE** This item is intended for payment for horizontal and/or vertical relocation of a short length of an existing main at the locations shown on the plans. This bid item is to be used to relocate an existing force main at point locations such as to clear a conflict at a

proposed drainage structure, pipe or any other similar short relocation situation, and where the existing pipe material is to be reused. The contractor shall provide any additional pipe or fitting material needed to complete the work as shown on the plans and specifications. The materials provided shall be of the same type and specification as those that exist. Substitution of alternative materials shall be approved by the engineer in advance on a case by case basis. New polyethylene wrap is to be provided (if wrap exists or is specified in the specifications to be used). If it is necessary that the pipe be disassembled for relay, payment under this item shall also include replacement of joint gaskets as needed. Bedding and backfill shall be provided and performed the same as with any other pipe installation as detailed in the plans and specifications. Payment under this item shall be for each location requiring an existing main to be relocated horizontally or vertically regardless of pipe size or relocation length. No separate pay items will be established for pipe size variations or relocation segment length variations. Force Main Relocate shall not be paid on a linear feet basis; but shall be shall be paid EACH (EA) at each location when complete and placed in service. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced.

**S FORCE MAIN TAP SLEVE/VALVE RANGE 1 OR 2** This item shall include the specified tapping sleeve, valve, valve box, concrete pad around valve box (when required in specifications or plans), labor, and equipment to install the specified tapping sleeve and valve, complete and ready for use in accordance with the plans and specifications. The size shall be the measured internal diameter of the live pipe to be tapped. The size tapping sleeve and valve to be paid under sizes 1 or 2 shall be as follows:

Range 1 = All live tapped main sizes up to and including 8 inches

Range 2 = All live tapped main sizes greater than 8 inches

Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**S FORCE MAIN TIE-IN** This bid description shall be used for all force main tie-in bid items of every size except those defined as "Special". This item includes all labor, equipment, excavation, fittings, sleeves, reducers, couplings, blocking, anchoring, restoration, testing and backfill required to make the force main tie-in as shown on the plans and in accordance with the specifications complete and ready for use. This bid item shall include purge and sanitary disposal of any sewage from any abandoned segments of force main. Pipe for tie-ins shall be paid under separate bid items. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**S FORCE MAIN VALVE** This description shall apply to all force main valves of every size required in the plans and specifications, except those bid items defined as "Special". Payment under this description is to be for gate or butterfly force main valves being installed with new force main. This item includes the valve as specified in the plans and specifications, polyethylene wrap (if required by specification), labor, equipment, excavation, anchoring (if any), valve box and valve stem extensions, backfill, concrete pad around valve box (if required by specification), restoration, testing, and etc., required to install the specified valve at the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. If required on plans and/or proposed adjoining DIP is restrained, force main valves shall be restrained. Force main valve restraint shall be considered incidental to the force main valve and adjoining pipe. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be

referenced. This item shall be paid EACH (EA) when complete.

**S FORCE MAIN VALVE BOX ADJUST** Includes all labor, equipment, valve box and valve stem extensions (if required), excavation, backfill, concrete pad around valve box (when specified in specifications or plans), restoration, and etc., to adjust the top of the force main valve box to finished grade complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**S LATERAL CLEANOUT** This item shall be for payment for installation of a cleanout in a service lateral line. This item shall include furnishing and installation of a tee, vertical pipe of whatever length required, and threaded cap. The cleanout shall extend from the lateral to final grade elevation. The size of the cleanout shall be equivalent to the size of the lateral. The cleanout materials shall meet the same specification as those for the lateral. The cleanout shall be installed at the locations shown on the plans or as directed by the engineer. Only one pay item shall be established for cleanout installation. No separate pay items shall be established for size or height variances. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**S LATERAL LOCATE** This bid item is to pay for all labor, equipment, and materials needed in locating an existing sanitary sewer service lateral for tie-in of the lateral to new mainline sewers and/or for the relocation of a lateral. This bid item shall be inclusive of any and all methods and efforts required to locate the lateral for tie-in or relocation of the lateral. Locating methods to be included under this items shall include, but are not limited to, those efforts employing the use of video cameras from within an existing sanitary sewer main or lateral, electronic locating beacons and/or tracers inserted into the sanitary sewer main or lateral, careful excavation as a separate operation from mainline sewer or lateral excavation, the use of dyes to trace the flow of a lateral, or any combination of methods required to accurately locate the lateral. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA).

**S LATERAL LONG SIDE** This bid item description shall apply to all service lateral installations of every size up to and including 6 inch internal diameter, except those lateral bid items defined as "Special". This item includes the specified piping material, main tap, bends, clean outs, labor, equipment, excavation, backfill, testing, and restoration, at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready for use. This bid item is to pay for service lateral installations where the ends of the lateral connection are on opposite sides of the public roadway. The new lateral must cross the centerline of the public roadway to qualify for payment as a long side lateral. The length of the service lateral is not to be specified. Payment under this item shall not be restricted by a minimum or maximum length. The contractor shall draw his own conclusions as to the length of piping that may be needed. Payment under this item shall include boring, jacking, or excavating across the public roadway for placement. Placement of a service lateral across a private residential or commercial entrance alone shall not be reason to make payment under this item. Private or commercial entrances shall not be considered a public roadway in defining payment under this item. No additional payment will be made for rock excavation or for bedding required in rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**S LATERAL SHORT SIDE** This bid item description shall apply to all service lateral installations of every size up to and including 6 inch, except those lateral bid items defined as “Special”. This item includes the specified piping material, main tap tee, bends, clean outs, labor, equipment, excavation, backfill, testing, and restoration, at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready for use. This bid item is to pay for lateral installations where both ends of the lateral connection are on the same side of the public roadway, or when an existing lateral crossing a public roadway will remain and is being extended, reconnected, or relocated with all work on one side of the public roadway centerline as shown on the plans. The length of the service lateral is not to be specified and shall not be restricted to any minimum or maximum length. Payment shall be made under this item even if the lateral crosses a private residential or commercial entrance; but, not a public roadway. Private or commercial entrances shall not be considered a public roadway in defining payment under this item. The contractor shall draw his own conclusions as to the length of piping that may be needed. No additional payment will be made for rock excavation or for bedding required in rock excavation. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**S LINE MARKER** This item is for payment for furnishing and installing a sewer utility line marker as specified by the utility owner specifications and plans. A line marker may consist of a post or monument of whatever materials specified and shall include markings and/or signage on same as specified by plans or specifications. This item shall include all labor, equipment, and materials needed for complete installation of the marker. This item shall be paid EACH (EA) when complete.

**S MANHOLE** Payment under this item is for the installation of new 4 foot interior diameter sanitary sewer manhole. Payment for manholes will be made at the contract unit price each in place complete and ready for use at the locations shown on plans in accordance with specifications and standard drawings. Manholes shall include concrete base, barrel sections, cone section or slab top, steps, excavation, backfilling, air testing, restoration, and cleanup in accordance with the specifications and standard drawings. Payment shall be made under this item regardless of whether the base is to be precast or cast-in-place (doghouse). All materials, except casting, shall be new and unused. An existing casting from an existing abandoned or removed manhole is to be reused and shall be considered incidental to this item. When a new casting is specified, or an existing casting is unavailable, it shall be paid as a separate bid item. Anchoring of casting, new or used, shall be considered incidental to this bid item. No additional compensation will be paid for manhole height variations. No additional payment will be made for rock excavation. Please refer to the Utility Company’s Specifications. If the Company does not have specifications, KYTC’s Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**S MANHOLE ABANDON/REMOVE** Payment under this item is for the partial removal and/or filling of any sanitary sewer manhole regardless of size or depth that no longer serves any purpose. Payment shall be made regardless of whether the manhole is or is not in conflict with other work. Any manhole requiring partial removal, but not total removal, in order to clear a conflict with other work shall be paid under this item. All manholes partially removed shall be removed to a point at least one foot below final grade, one foot below roadway subgrade, or one foot clear of any other underground infrastructure, whichever is lowest. If partial removal of an abandoned manhole is elected by the contractor, the remaining manhole structure shall be refilled with flowable fill. Payment for disposal of a sanitary sewer manhole will be made under this item only. Please refer to the Utility Company’s

Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**S MANHOLE ADJUST TO GRADE** Payment under this item is for the adjustment of sanitary sewer casting elevation on all sizes of existing sanitary manholes. This work shall be performed in accordance with the sanitary sewer specifications. Payment shall be made under this bid item regardless of the amount of adjustment necessary to a sanitary sewer manhole casting or diameter of the manhole. Work under this pay item may be as simple as placing a bed of mortar under a casting; but, shall also be inclusive of installation of adjusting rings, and /or addition, removal, or replacement of barrel sections. The existing casting is to be reused unless a new casting is specified on the plans. New casting, when specified, shall be paid as a separate bid item. Anchoring of the casting shall be incidental to this item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**S MANHOLE CASTING STANDARD** Payment under this bid items is for furnishing of a new standard traffic baring casting for sanitary manholes meeting the requirements of the sanitary sewer specifications and standard drawings. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when installed.

**S MANHOLE CASTING WATERTIGHT** Payment under this bid item is for furnishing of a new watertight traffic baring casting for sanitary manholes meeting the requirements of the sanitary sewer specifications and standard drawings. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when installed.

**S MANHOLE RECONSTRUCT INVERT** This bid item is to pay for all labor, equipment, and material for rework of the manhole bench to redirect or eliminate flow, such as when the flow of a pipe or pipes are being removed or redirected. This work will be as specified in the plans, specifications, or directed by the engineer. This work may consist of, but is not limited to, removal of concrete and/or placement of concrete in elimination or redirect of flow. This item shall also include providing and placement of a rubber seal or boot as required by utility specification, standard drawing or plan. The contractor shall draw his own conclusions as to the effort and scope of work needed to comply with the specifications, standard drawings, and plans. No payment shall be made under this bid when MANHOLE TAP EXISTING, or MANHOLE TAP EXISTING ADD DROP are being paid at the same location, as this type of work is included in those items. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**S MANHOLE TAP EXISTING** This bid item is to pay for all labor, equipment, and material for coring one opening in an existing manhole base, addition of a rubber seal as specified, and rework of the manhole bench to direct the additional pipe flow. The bid item shall be paid for each core opening added to a single manhole. This bid item shall also include any rework of the existing manhole bench due to the elimination of other existing pipes and flow. This work will be as specified in the plans, specifications, or directed by the engineer. This work may consist of, but is not limited to, removal of concrete and/or placement of concrete in the addition, elimination, or redirect of flow. The contractor shall draw his own conclusions as to the effort and scope of work needed to comply with the

specifications, standard drawings, and plans. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**S MANHOLE TAP EXISTING ADD DROP** This bid item is to pay for all labor, equipment, and material for coring one opening in an existing manhole base, addition of a rubber seal as specified, addition of a vertical drop pipe to the outside of the manhole, placement of reinforcing steel and concrete to encase vertical pipe, and rework of the manhole bench to direct the additional pipe flow. The bid item shall be paid for each drop added to a single manhole. This bid item shall also include any rework of the existing manhole bench due to the elimination of other existing pipes and flow. This work will be as specified in the plans, specifications, or directed by the engineer. This work may consist of, but is not limited to, removal of concrete and/or placement of concrete in the addition, elimination, or redirect of flow. The contractor shall draw his own conclusions as to the effort and scope of work needed to comply with the specifications, standard drawings, and plans. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**S MANHOLE WITH DROP** Payment under this item is for the installation of new 4 foot interior diameter sanitary sewer manhole with drop. Payment for drop manholes will be made at the contract unit price each in place complete and ready for use at the locations shown on plans in accordance with specifications and standard drawings. Drop manholes shall include concrete base, barrel sections, drop materials, cone section or slab top, steps, excavation, backfilling, air testing, restoration, and cleanup. Payment shall be made under this item regardless of whether the base is to be precast or cast-in-place (doghouse). All materials, except casting, shall be new and unused. An existing casting from an existing abandoned or removed manhole is to be reused and shall be considered incidental to this item. When a new casting is specified, or an existing casting is unavailable, it shall be paid as a separate bid item. Anchoring of casting, new or used, shall be considered incidental to this bid item. No additional compensation will be paid for manhole height variations. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**S MANHOLE WITH LINING** Payment under this item is for the installation of new 4 foot interior diameter sanitary sewer manhole with corrosion resistant lining. Payment for manholes will be made at the contract unit price each in place complete and ready for use at the locations shown on plans in accordance with specifications and standard drawings. Manholes shall include concrete base, barrel sections, cone section or slab top, steps, lining, excavation, backfilling, air testing, restoration, and cleanup in accordance with the standard drawings. Payment shall be made under this item regardless of whether the base is to be precast or cast-in-place (doghouse). All materials, except casting, shall be new and unused. An existing casting from an existing abandoned or removed manhole is to be reused and shall be considered incidental to this item. When a new casting is specified, or an existing casting is unavailable, it shall be paid as a separate bid item. Anchoring of casting, new or used, shall be considered incidental to this bid item. No additional compensation will be paid for manhole height variations. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**S MANHOLE WITH TRAP** Payment under this item is for the installation of a new manhole with

trap. Payment for trap manholes will be made at the contract unit price each in place complete and ready for use at the locations shown on plans in accordance with specifications and standard drawings. Trap manholes shall include concrete base, manhole structure and trap materials, cone section or slab top, steps, excavation, backfilling, air testing, restoration, and cleanup. All materials, except casting, shall be new and unused. Payment shall be made under this item regardless of whether the base is to be precast or cast-in-place (doghouse). An existing casting from an existing abandoned or removed manhole is to be reused and shall be considered incidental to this item. When a new casting is specified, or an existing casting is unavailable, it shall be paid as a separate bid item. Anchoring of casting, new or used, shall be considered incidental to this bid item. No additional compensation will be paid for manhole height variations. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**S PIPE** This description shall apply to all PVC and ductile iron gravity sewer pipe bid items of every size and type 8 inches internal diameter and larger, except those bid items defined as "Special". This item includes the pipe specified by the plans and specifications, all fittings (including, but not limited to, tap tees and couplings for joining to existing similar or dissimilar pipes), polyethylene wrap (if required by specification), labor, equipment, excavation, bedding, restoration, pressure or vacuum testing, temporary testing materials, video inspection, backfill, and etc., required to install the specified new pipe and new fittings at the locations shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. This bid item shall include material and placement of flowable fill under existing and proposed pavement, and wherever specified on the plans or in the specifications. No additional payment will be made for rock excavation. Measurement of quantities under this item shall be through fittings and encasements to a point at the outside face of manhole barrels, or to the point of main termination at dead ends or lamp holes. Carrier pipe placed within an encasement shall be paid under this item and shall include casing spacers and end seals. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

**S PIPE POINT REPAIR** This item is to be used to pay for repair of short lengths of existing sanitary sewer pipe that, through prior video inspection or other means, are known to have pre-existing failure. Pipe Point Repair may be needed in preparation for installation of cured-in-place-pipe (CIPP) lining or other instances where failure is known and repair is prudent. The size of pipe shall not be defined in separate bid items. All diameter sizes of point repair shall be paid under this one item. The materials to be used to make the repair shall be as defined on the plans or in the specifications. This bid item shall include all excavation, pipe materials, joining materials to connect old and new pipe, bedding, and backfill to complete the repair at the locations shown on the plans or as directed by the engineer, complete and ready for use. This bid item shall include bypass pumping when required. Measurement shall be from contact point to contact point of old and new pipe. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

**S PUMP STATION** This item is for payment for installation of sanitary pump stations including above or below ground structure for housing of the pumps. This item shall include all pumps, piping, fittings, valves, electrical components, building materials, concrete, any other appurtenances, labor, equipment, excavation, and backfill, to complete the pump station installation as required by the plans, standard drawings, and specifications, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall



be referenced. This item shall be paid LUMP SUM (LS) for each when complete.

**S STRUCTURE ABANDON** This item is to be used to pay for abandonment of larger above or below ground sewer structures such as air release/vacuum valve vaults, pump stations, tanks, etc. Payment under this time shall not be limited to size or scope; however structures with connecting pipes of 2 inches or less shall not be paid under this item; but, shall be considered incidental to sewer construction, (i.e., abandonment of standard air release/vacuum valves up to and including 2 inches would not be paid under this item). Payment under this item shall include all labor, equipment, and compacted fill or flowable fill for abandonment of the structure in place and restoration complete. No separate bid items will be established for size or structure variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**S STRUCTURE REMOVAL** This item is to be used to pay for removal of larger above or below ground sewer structures such as air release/vacuum valve vaults, pump stations, tanks, and etc. Payment under this time shall not be limited to size or scope; however, structures with connecting pipes of 2 inches or less shall not be paid under this item; but, shall be considered incidental to sewer construction, (i.e., removal of standard air release/vacuum valves and their structure up to and including 2 inches would not be paid under this item). Payment under this item shall include all labor, equipment, and compacted backfill for removal of the structure and restoration complete. No separate bid items will be established for size or structure variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

# Special Sanitary Sewer Bid Item Descriptions

**S MANHOLE SPECIAL** Payment under this item is for the installation of new 5 foot interior diameter sanitary sewer manhole. Payment for 5 foot interior diameter manholes will be made under this bid item at the contract unit price each in place complete and ready for use at the locations shown on plans in accordance with specifications and standard drawings. Manholes shall include concrete base, barrel sections, cone section or slab top, steps, excavation, backfilling, air testing, restoration, and cleanup in accordance with the specifications and standard drawings. Payment shall be made under this item regardless of whether the base is to be precast or cast-in-place (doghouse). All materials, except casting, shall be new and unused. An existing casting from an existing abandoned or removed manhole is to be reused and shall be considered incidental to this item. When a new casting is specified, or an existing casting is unavailable, it shall be paid as a separate bid item. Anchoring of casting, new or used, shall be considered incidental to this bid item. No additional compensation will be paid for manhole height variations. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**S LATERAL SPECIAL** Payment under this item is for the installation of new reinforced lateral cleanout at the location specified and as detailed in sanitary sewer plans and specifications. A special detail for this item is shown on Sheet 16 of 23 of the sanitary sewer plans. Payment for reinforced lateral cleanout will be made under this bid item at the contract unit price each in place complete and ready for use. All materials shall be new and unused. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**Appendix F7 -- Utility Agreements**  
*(Pending)*

## **Appendix F8 -- Electric and Communications Ducts**

# Standard Electric and Communications Bid Item Descriptions

**BOLLARDS** This item is for payment for furnishing and installing protective guard posts at above ground utility installations. A bollard may consist of, but not limited to, a steel post set in concrete or any other substantial post material. This item shall include all labor, equipment, and materials needed for complete installation of the bollard as specified by the utility owner specifications and plans. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item paid EACH (EA) when complete.

*NOTE: A bid code for this item has been established in standard roadway bid items and shall be used for payment of this item. The bid code is 2134IND.*

**EC DIRECTIONAL BORE** Payment under this item is made whenever the plans or specifications specifically show directional boring is to be utilized in order to minimize the impact of open cut for the installation of conduit under streets, creeks, etc. Payment under this item shall include the specified encasement pipe, conduit(s), void filler material (including grout, aggregate, bentonite, or other material as specified), casing spacers (as specified), labor, and equipment. No separate payment will be made for encasement pipe and/or conduits used within the limits of the directional bore. Payment under this item shall not be size specific and no separate bid items will be established for size or number of conduit variations to be installed. The encasement pipe, conduit sizes, and conduit numbers to be included under this item shall be as shown on the plans and/or in the specifications. Any and all directional bores in each contract shall be paid under one directional bore bid item included in the contract regardless of bore size, encasement size, conduit size, or number of conduits. Some bores may not require the use of an encasement; but, may only require pulling the conduit directly into the bore. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

**EC DUCT** These items shall include all labor, equipment, and material to excavate, install, and backfill the specified bank of duct at locations shown in the plans in accordance with the specifications and standard drawings complete and ready for use. These bid items shall include all necessary appurtenances, connections, fittings, plugs, tees, bends, collars, racks or spacers, pull string, granular or concrete encasement, compacted earth or flowable fill backfill, and etc. Flowable fill, where specified on the plans and specifications, shall be considered incidental to the duct items. No separate payment will be made for flowable fill, unless directed to be used contrary to plans and specifications. All excavation shall be unclassified. No additional payment will be made for rock excavation. Duct shall be measured as the horizontal distance from outside face of structure to outside face of structure; or, to the point of duct termination at dead ends or poles. No additional payment will be made for vertical conduit. No separate bid items will be provided due to varying duct sizes. Any and all duct sizes and configurations shall be paid under these items. The only variations in bid items shall be in the number of duct in a bank and if the duct is or is not to be concrete encased. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

**EC ELECTRIC MANHOLE, ELECTRIC PIT, ELECTRIC PULL BOX, COMMUNICATIONS MANHOLE, COMMUNICATIONS PULL BOX** These items shall include all labor, equipment, excavation, materials, and backfill to install the specified manhole, pit, or pull box at the locations as shown on the plans in accordance with the specifications and standard drawings complete and ready for use. No separate bid items will be provided for varying sizes of structures. All structures shall be paid under the appropriate bid item regardless of size. Where structures are specified to be backfilled with flowable fill, the cost of the flowable fill shall be considered incidental to the bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**EC LINE MARKER** This item is for payment for furnishing and installing an electric or communications utility line marker as specified by the utility owner specifications and plans. A line marker may consist of a post or monument of whatever materials specified and shall include markings and/or signage on same as specified by plans or specifications. This item shall include all labor, equipment, and materials needed for complete installation of the marker. This item shall be paid EACH (EA) when complete.

**EC POLE REMOVE AND STOCKPILE** This item shall include all labor and equipment required in the removal of a wood, steel, or other type utility pole regardless of material or size. No separate pole removal bid items will be provided for pole material type or size variations. This item also includes removal of any associated attachments to the pole including, but not limited to, cross-arms, hangers, brackets, insulators, downguys, etc. All removed materials shall be stockpiled on site at a location or locations previously agreed to between the utility owner and contractor for pickup and disposal by the utility owner. Stockpile locations shall be accessible to the utility owner's road vehicles. Any pole removed that still has cross-arms, protruding insulators and/or protruding brackets attached shall have such items removed by the contractor so poles can be stacked neatly for pickup. Removed cross-arms, insulators and brackets shall be stacked separately for pickup. This item shall be paid EACH (EA) when the poles and attachments are stockpiled and ready for pickup.

# Standard Electric and Communications Bid Item Descriptions

**BOLLARDS** This item is for payment for furnishing and installing protective guard posts at above ground utility installations. A bollard may consist of, but not limited to, a steel post set in concrete or any other substantial post material. This item shall include all labor, equipment, and materials needed for complete installation of the bollard as specified by the utility owner specifications and plans. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item paid EACH (EA) when complete.

*NOTE: A bid code for this item has been established in standard roadway bid items and shall be used for payment of this item. The bid code is 2134IND.*

**EC DIRECTIONAL BORE** Payment under this item is made whenever the plans or specifications specifically show directional boring is to be utilized in order to minimize the impact of open cut for the installation of conduit under streets, creeks, etc. Payment under this item shall include the specified encasement pipe, conduit(s), void filler material (including grout, aggregate, bentonite, or other material as specified), casing spacers (as specified), labor, and equipment. No separate payment will be made for encasement pipe and/or conduits used within the limits of the directional bore. Payment under this item shall not be size specific and no separate bid items will be established for size or number of conduit variations to be installed. The encasement pipe, conduit sizes, and conduit numbers to be included under this item shall be as shown on the plans and/or in the specifications. Any and all directional bores in each contract shall be paid under one directional bore bid item included in the contract regardless of bore size, encasement size, conduit size, or number of conduits. Some bores may not require the use of an encasement; but, may only require pulling the conduit directly into the bore. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

**EC DUCT** These items shall include all labor, equipment, and material to excavate, install, and backfill the specified bank of duct at locations shown in the plans in accordance with the specifications and standard drawings complete and ready for use. These bid items shall include all necessary appurtenances, connections, fittings, plugs, tees, bends, collars, racks or spacers, pull string, granular or concrete encasement, compacted earth or flowable fill backfill, and etc. Flowable fill, where specified on the plans and specifications, shall be considered incidental to the duct items. No separate payment will be made for flowable fill, unless directed to be used contrary to plans and specifications. All excavation shall be unclassified. No additional payment will be made for rock excavation. Duct shall be measured as the horizontal distance from outside face of structure to outside face of structure; or, to the point of duct termination at dead ends or poles. No additional payment will be made for vertical conduit. No separate bid items will be provided due to varying duct sizes. Any and all duct sizes and configurations shall be paid under these items. The only variations in bid items shall be in the number of duct in a bank and if the duct is or is not to be concrete encased. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

**EC ELECTRIC MANHOLE, ELECTRIC PIT, ELECTRIC PULL BOX, COMMUNICATIONS MANHOLE, COMMUNICATIONS PULL BOX** These items shall include all labor, equipment, excavation, materials, and backfill to install the specified manhole, pit, or pull box at the locations as shown on the plans in accordance with the specifications and standard drawings complete and ready for use. No separate bid items will be provided for varying sizes of structures. All structures shall be paid under the appropriate bid item regardless of size. Where structures are specified to be backfilled with flowable fill, the cost of the flowable fill shall be considered incidental to the bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

**EC LINE MARKER** This item is for payment for furnishing and installing an electric or communications utility line marker as specified by the utility owner specifications and plans. A line marker may consist of a post or monument of whatever materials specified and shall include markings and/or signage on same as specified by plans or specifications. This item shall include all labor, equipment, and materials needed for complete installation of the marker. This item shall be paid EACH (EA) when complete.

**EC POLE REMOVE AND STOCKPILE** This item shall include all labor and equipment required in the removal of a wood, steel, or other type utility pole regardless of material or size. No separate pole removal bid items will be provided for pole material type or size variations. This item also includes removal of any associated attachments to the pole including, but not limited to, cross-arms, hangers, brackets, insulators, downguys, etc. All removed materials shall be stockpiled on site at a location or locations previously agreed to between the utility owner and contractor for pickup and disposal by the utility owner. Stockpile locations shall be accessible to the utility owner's road vehicles. Any pole removed that still has cross-arms, protruding insulators and/or protruding brackets attached shall have such items removed by the contractor so poles can be stacked neatly for pickup. Removed cross-arms, insulators and brackets shall be stacked separately for pickup. This item shall be paid EACH (EA) when the poles and attachments are stockpiled and ready for pickup.



Appendix		SPECIAL NOTES	6-14 Mt. Zion Road	6-18 Richwood Road	6-20002 I-75 Rehab	Comments
I1	1-125	National Highway	x	x	x	
I1	1-126	Significant Project	x	x	x	
I1	1-132	Asphalt Mixtures	x	x	x	
I1	1-134	DGA Base	x	x	x	
I1	1-126	DGA Base for shoulders	x	x	x	
I1	1-160	Compaction Option A	x	x	x	
I5	1-175	Critical Path Method (CPM)	Use alt note	Use alt note	Use alt note	
I1	1-296	Waste and Borrow Sites	x	x	x	
F4	1-732	Standard Gas Bid item descriptions	x	x		
F5	1-734	Standard Water Bid item descriptions	x	x		
F6	1-736	Standard Sewer Bid item descriptions	x	x		
I1		Special Note for Erosion Control	x	x	x	
I1	1-943	BMP-KPDES Special Note-Draft NOI	x	x	x	
I1	1-3050	Pipeline Inspection	x	x	x	
I1	1-3060	Intelligent Compaction of Asphalt Mixtures	x	x	x	
I1	1-3061	Intelligent Compaction of Aggregate Bases & Soils	x	x	x	
I1	1-3062	Paver Mounted Temperature Profiles	x	x	x	
I1	1-98312	Guardrail Delivery Verification Sheet	x	x	x	
B2	4-100	Insurance (included in Appendix B2)	x	x	x	
I1	1I	Portable Changeable Message Signs	x	x	x	
I1	11C	Drilled Shafts	x	x	x	
I1	11F	Turf Reinforcing Mat	x	x	x	
I1	11N	Longitudinal Pavement Joint Adhesive	x	x	x	
I1		Barcodes on Permanent Signs	x	x	x	
I4		SN for Non-tracking Tack Cost	x	x	x	
I1		Special Provision 69 Embankment at Bridge End Structures	x	x	x	
I1		Before You Dig	x	x	x	
I4		Asphalt Milling & Texturing			x	
I1		Inlaid Pavement Markers	x	x	x	
I4		Fine Milling			x	
I1		HMA Electronic Delivery Management System	x	x	x	
I4		Typical Sections Dimensions			x	

Appendix	SPECIAL NOTES	6-14 Mt. Zion Road	6-18 Richwood Road	6-20002 I-75 Rehab	Comments
I3	Building Removal	in plans	x		
I3	Railroad Construction (aggregate note)		x		
I3	Repairs for I-71/I-75 Bridge		x		Updated
I3	Traffic Data Station Relocation			x	Included in Proposal Plans
I3	Sound Barrier Walls	x	x		
I3	Centrifugally Cast Concrete Pipe Liner		x		Includes specs
I3	Construction for Fire Station		x		Consent & Release
I3	Lighting and Temporary Lighting		x		
I1	No Blasting	x	x	x	
I3	Stormwater Basins		x		
F1	General Utility Notes and Instructions	x	x		
F4	Gasline Relocations Specifications	x	x		
F5	Waterline Relocations Specifications	x	x		
F6	Sewer Relocations Specifications		x		
F8	Electric and Communications Ducts	x	x		
I3	Accelerated Cement Subgrade Stabilization	x	x		
I3	Cellular Concrete Fill		x		
I3	Colored Concrete		x		Finalize locations
I3	EPS Foam Block Embankment		x		
I3	MSE Retaining Walls		x		
I3	Soil Nail Wall QC Inspection		x		
I3	Spot Subgrade Stabilization	x	x		
I4	Fiber Reinforcement of HMA			x	
I4	PVC Liner			x	
I4	Traffic Signal Loop Detectors			x	
I4	Replacing Expansion Dams and/or Installing Armored Edges for Concrete on Bridges			x	
I3	Special Note for Crushed Stone Base - Modified		x		
I3	Special Note for Alternates to Crushed Stone Base - Modified		x		
I3	Special Note for Innovative Intersection Openings	x	x		

### Special Note for Crushed Stone Base - Modified

This Special Note will apply where indicated on the plans or in the proposal. Section reference herein are to the Department's Standard Specifications for Road and Bridge Construction, current edition.

1.0 DESCRIPTION: Follow the Standard Specifications for Crushed Stone Base, sections 302 and 805, except the gradation and any payment reductions shall follow the table below. Contractor must remove and replace any material falling outside the reduction chart values.

GRADATION - CRUSHED STONE BASE - MODIFIED (1)							
Payment Reduction	Sieve Size-Percent passing						
	2 1/2 inch	1 1/2 inch	3/4 inch	3/8 inch	No. 4	No. 30	No. 200
0%	100	90-100	60-95	30-70	15-45	5-20	0-5
10%		88-99	58-59	28-29		3-4	
10%	98-99		96-97	71-72		21-22	
20%		86-87	56-57	26-27	14	1-2	
20%	96-97		98	73	46	23	
30%		84-85	54-55	24-25	13	0	
30%	95		99	74	47	24	
50%		83	53	23	12		
50%	94		100	75	48	25	6

(1) Gradation to be performed by wet sieve KM 64-620 or AASHTO T 11/T 27.

December 12, 2017

## Special Note for Alternates to Crushed Stone Base - Modified

This Special Note may apply anywhere the plans or proposal indicate the used of Crushed Stone Base - Modified.

At the discretion of the DBT, alternate materials may be used in lieu of Crushed Stone Base - Modified. All alternate materials shall follow the applicable sections of the 2019 KY Standard Specifications for Road and Bridge Construction.

- If the typical sections within the plans indicate Crushed Stone Base-Modified over a chemically stabilized subgrade with edge drains, then:
  - 6 inches of Crushed Stone Base – Modified may be replaced by 4 inches of Asphalt Treated Drainage Blanket directly over the chemically stabilized roadbed with edge drains;
  - 8 inches of Crushed Stone Base – Modified may be replaced by 5.5 inches of Asphalt Treated Drainage Blanket directly over the chemically stabilized roadbed with edge drains.
- If the typical sections within the plans indicate Crushed Stone Base-Modified over a chemically stabilized subgrade with the Crushed Stone Base Modified “daylighted” for drainage, then:
  - Crushed Stone Base – Modified may be replaced by typical Crushed Stone Base at the same depth.
- If the typical sections within the plans indicate Crushed Stone Base-Modified over a NON-chemically stabilized subgrade, then:
  - 6 inches of Crushed Stone Base – Modified may be replaced by 4 inches of Asphalt Treated Drainage Blanket directly over 4 inches of DGA directly over the NON-chemically stabilized roadbed with edge drains;
  - 8 inches of Crushed Stone Base – Modified may be replaced by 4 inches of Asphalt Treated Drainage Blanket directly over 4 inches of DGA directly over the NON-chemically stabilized roadbed with edge drains;
  - The use of typical Crushed Stone Base will not be permitted over a NON-chemically stabilized subgrade under any circumstance
- For the shared use paths, Crushed Stone Base – Modified may be replaced by typical Crushed Stone Base.

The DBT shall be responsible for creation of new typical sections to reflect the changes in the pavement designs. The DBT shall be permitted to adjust subgrade elevations to account for differences in total pavement thickness. The DBT shall be responsible for adjustment of quantities for all items of work that may be affected by any substitutions. During the design process, the DBT may only substitute alternate materials for the Crushed Stone Base – Modified layer of the typical section, any other proposed changes to the typical section shall follow the rules established by the Instructions to Proposers.

## Special Note for Innovative Intersection Openings

When preparing to partially or fully open either a DCD or the SPUI, the DBT should schedule the opening such that the innovative intersection is open to the driving public by 2:00 pm of the Sunday, allowing traffic to be exposed to the traffic prior to the Monday morning peak.

When preparing to partially or fully open a DCD or the SPUI, the preceding week the DBT shall hold a coordination meeting with KYTC. The meeting shall be held a minimum of four (4) days prior to the closure. Coordination items shall address, but not be limited to, the following:

- adjustments to temporary/permanent signing
- adjustments to temporary/permanent striping
- temporary/permanent lighting is operational
- message boards
- proper MUTCD determination of barriers/barricades to identify lane closures & construction zones in post-closure situation
- verification of electrical wiring (including loop detection, signals, cabinet controls)
- verification of electrical power to all signals' related equipment (including poles, cables, wires, loops, etc.)
- indicate overseeing electrical supervisor for DBT
- determination of sequence of which signals/legs are activated
- confirmation of appropriate KYTC staff (construction / traffic) to be oversee a weekend closure
- media messaging

If coordination plan is deemed inadequate KYTC may direct the DBT to delay for a week until sufficient preparation is confirmed.