CONSTRUCTION PLANS FOR TULSA METROPOLITAN UTILITY AUTHORITY

2-INCH WATER LINE REPLACEMENT

PROJECT NO. TMUA-W 18-21

CITY OF TULSA, OKLAHOMA ENGINEERING SERVICES DEPARTMENT

SURVEY CONTROL DATA

1. HORIZONTAL DATUM IS TIED TO CITY OF TULSA SURVEY CONTROL MONUMENT # 72 WHICH IS ADJUSTED TO THE OKLAHOMA STATE PLANE NAD 83 (1993) COORDINATE SYSTEM, NORTH ZONE, PER MONUMENT #72 DATA SHEET.
2. BEARINGS:
THE BEARINGS SHOWN HEREIN OR HEREON ARE GRID BEARINGS DERIVED FROM THE USC & GS OKLAHOMA PLANE COORDINATE SYSTEM AND ARE NOT ASTRONOMICAL.
3. VERTICAL CONTROLS:
LEVEL DATUM IS NGS, NAVD 88, PER CITY OF TULSA SURVEY CONTROL MONUMENT # 72 AND ADJUSTED FROM PRIMARY CONTROL UTILIZING DIFFERENTIAL LEVELING TECHNIQUES.
4. ACCURACY - 3RD ORDER OR BETTER

GENERAL NOTES

1. BENCHMARK NORTHINGS AND EASTINGS ARE FOR LOCATION PURPOSES ONLY AND ARE NOT TO BE USED FOR HORIZONTAL CONTROL.
2. ROADWAY RIGHT OF WAY SHOWN IS BASED ON A ROADWAY RIGHT OF WAY AND EASEMENT INSTRUMENTS SEARCH CONDUCTED BY SMITH BROTHERS ABSTRACT OF TULSA & CREEK COUNTY ABSTRACT.
3. CEC CANNOT GUARANTEE THAT THE ENTIRETY OF ALL RIGHT OF WAY AND EASEMENTS WERE RESEARCHED WITHOUT THE BENEFIT OF A TITLE COMMITMENT.

TOPOGRAPHIC UTILITY NOTES

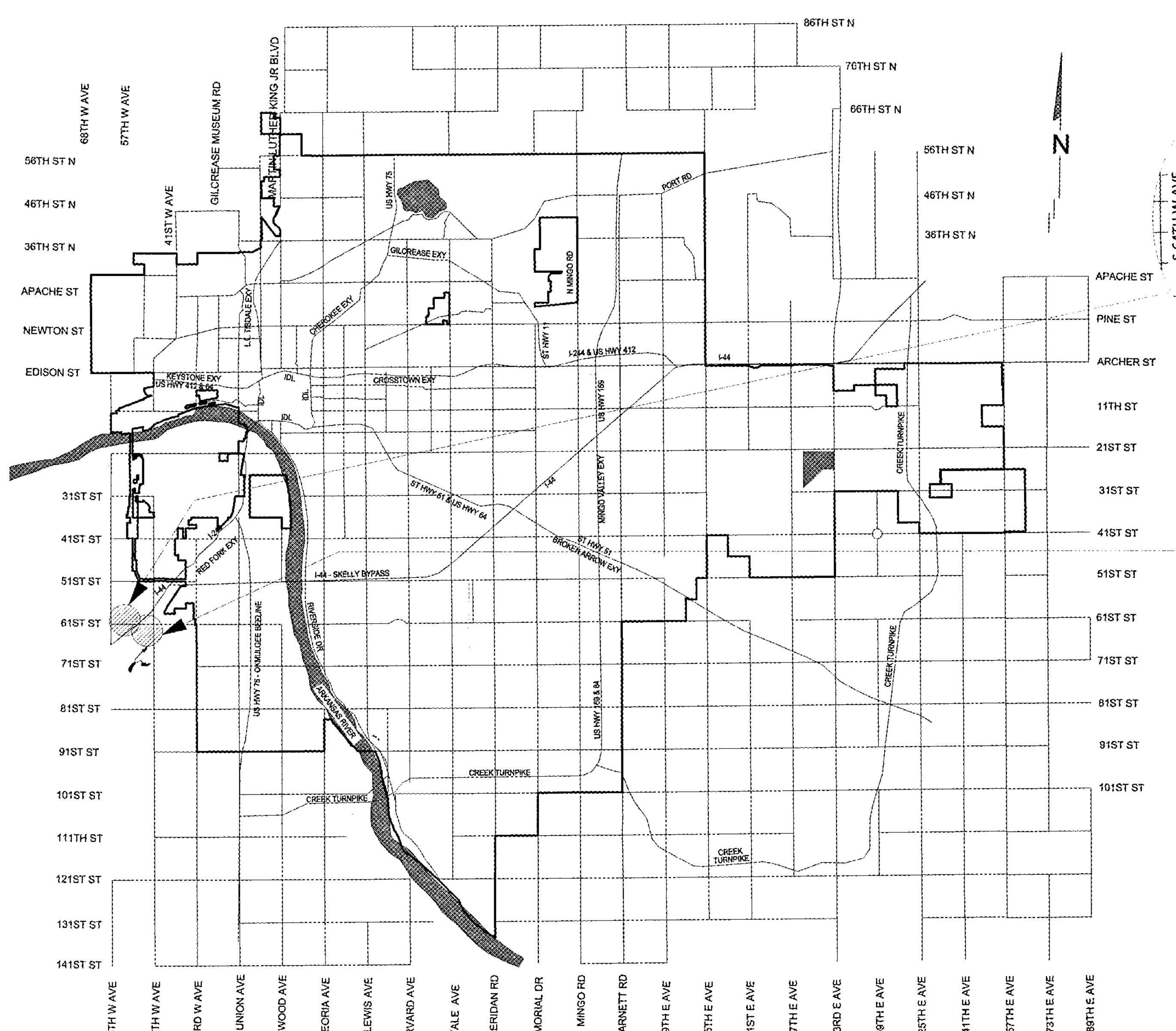
1. PRIOR TO THE FIELD SURVEY CALL OKIE 811 WAS CONTACTED TO MARK UTILITIES. ALL MARKED UTILITIES AND VISIBLE UTILITIES WERE LOCATED DURING THE SURVEY. HOWEVER, CEC ASSUMES NO LIABILITY FOR UTILITIES THAT WERE NOT MARKED OR INCORRECTLY MARKED. THE CONTRACTOR FOR CONSTRUCTION IS RESPONSIBLE FOR GETTING THE UTILITIES RE-MARKED BEFORE PERFORMING DIGGING OPERATIONS.
2. MULTIPLE ATTEMPTS WERE MADE TO HAVE UTILITY LINES MARKED AT THE PROJECT SITE HOWEVER SOME UTILITIES APPEAR TO HAVE NOT BEEN MARKED. ATTEMPTS WERE MADE TO OBTAIN UTILITY ATLASES OR DATA FROM THEIR RESPECTIVE UTILITY OWNERS. MULTIPLE UTILITY LINES SHOWN ON THIS SURVEY WERE DERIVED FROM A PROVIDED ATLAS. ATLAS DERIVED LINE LOCATIONS ARE APPROXIMATE. ADDITIONALLY, SOME UTILITY LINEWORK WAS DERIVED FROM .SHP FILES PROVIDED TO CEC BY THE CITY OF TULSA ENGINEERING DEPT. ATLAS DERIVED UTILITIES AND .SHP DERIVED UTILITIES ARE NOTED ACCORDINGLY AND ARE ALSO DIFFERENTIATED BY THEIR CAD LAYER NAMING CONVENTION.
3. THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION, .SHP FILES, AND EXISTING UTILITY ATLASES THAT WERE AVAILABLE. UNDERGROUND FEATURES ARE IDENTIFIED BY THEIR PERTINENT SURFACE MARKINGS. THERE IS NO WARRANTY MADE THAT THIS SURVEY REPRESENTS A COMPLETE INVENTORY OF UNDERGROUND UTILITIES, EITHER IN SERVICE OR ABANDONED ON OR NEAR THE PREMISES. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM THE INFORMATION AVAILABLE. THERE HAS BEEN NO UNDERGROUND
4. INVESTIGATION PERFORMED ON THE PREMISES IN CONJUNCTION WITH THIS SURVEY AND THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.

UTILITY COORDINATION

COMPANY	NUMBER	CONTACT
CITY OF TULSA	918-596-9649	CHRIS KOVAC
COX CUMMUNICATIONS	918-286-4716	BRANDON WADE
AEP/PUBLIC SERVICE CO.	918-250-6257	ADAM FIELDS
OKLAHOMA NATURAL GAS CO.	918-831-8261	CRAIG POWELL
AT&T	918-596-4237	AL NICHOLS
OKIE	811	

GOVERNING SPECIFICATIONS

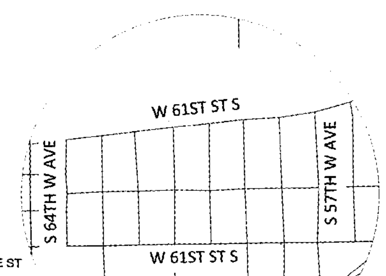
ROADWAY 2009 OKLAHOMA STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION-ENGLISH,APPROVED BY THE U.S. DEPARTMENT OF TRANSPORTATION,FEDERAL HIGHWAY ADMINISTRATION, JANUARY 1, 2010, SHALL GOVERN. WATER AND SEWER STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA PUBLIC WORKS DEPARTMENT SHALL GOVERN.



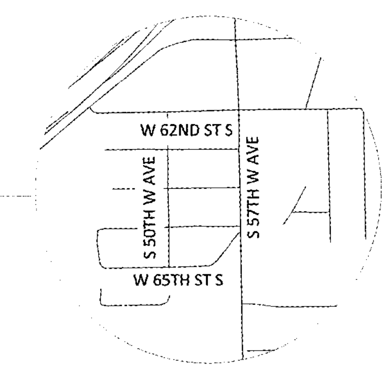
INDEX OF SHEETS

CITY OF TULSA STANDARDS

102. PROJECT SIGN
304. RIGID PIPE BEDDING
305. SEMI RIGID PIPE BEDDING
306. TRENCH DETAIL CONSTRUCTION ADJACENT TO ROADWAY
307. BORE & OPEN CUT CONDUIT
308. AIR RELIEF, CHECK VALVES & VAULTS
309. FIRE HYDRANT
313. VALVE BOX
315. THRUST BLOCK AND TRENCH CONDITION
327. STANDARD AIR VALVE ASSEMBLY
501. STANDARD METER SETTINGS FOR WATER SERVICE
608B. TRAFFIC SIGNS
713. PAVEMENT REMOVAL AND REPLACEMENT
714. PAVEMENT CUTS
730. STANDARD ASPHALT PAVEMENT CUT AND REPAIR



PROJECT SITE: SOUTH 65TH W AVE TO THE WEST, SOUTH 49TH W AVE TO THE EAST, SOUTHWEST BLVD TO THE NORTH, AND WEST 66TH ST TO THE SOUTH.
TOTAL LF OF WATERLINE: 7515



Know what's below. Call before you dig.

APPROVED:

Clayton Edwards — 4-30-20

DIRECTOR, WATER AND SEWER DEPT. — DATE

05.04.20

CITY ENGINEER — DATE

ADV. 05.15.20

ENGINEER'S CERTIFICATION

KEITH BEATTY, PE #29905 — DATE 4-8-2020

LICENSED PROFESSIONAL ENGINEER BEATTY 29905 OKLAHOMA

ENTIRE PROJECT IS **NOT** WITHIN THE CORPORATE LIMITS OF THE CITY OF TULSA (COT). THIS PROJECT COMPLIES WITH ALL OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY (ODEQ) REQUIREMENTS.

PLANS PREPARED BY FREESE AND NICHOLS, INC.
4200 EAST SKELLY DRIVE SUITE 410 TULSA, OK 74135
PHONE - (539) 444-8677 WEB - WWW.FREESE.COM
CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/20

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

PROJECT NO. TMUA-W 18-21 2-INCH WATER LINE REPLACEMENT

BASE BID

ITEM	SPEC. NO.	DESCRIPTION	PAY ITEM NOTE	UNIT	TOTAL	LINE A	LINE B	LINE C	LINE D	LINE E	LINE F	LINE G	LINE H	LINE I	LINE J	LINE K	LINE L	LINE M	LINE N
1	COT 301	RIGHT-OF-WAY CLEARING AND RESTORING, COMPLETE IN PLACE	4, 5, 6, 7, 22	SY	12720	1766	70	918	1191	2303	171	171	132	2326	158	57	717	1768	973
2	COT 302	EXCAVATION AND BACKFILL, UNCLASSIFIED	14	CY	3641	471	26	171	426	599	56	573	68	476	59	34	214	243	225
3	COT 303	MOBILIZATION		EA	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	COT 304	CONSTRUCTION STAKING		EA	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	COT 307	6 INCH DIP, CL51 POLYETHYLENE WRAPPED (RJ)	1, 2, 3, 8, 9, 11, 27	LF	195	0	0	0	49	65	0	37	0	44	0	0	0	0	0
6	COT 307	8 INCH DIP, CL51 POLYETHYLENE WRAPPED (RJ)	1, 2, 3, 8, 9, 11, 27	LF	51	51	0	0	0	0	0	0	0	0	0	0	0	0	0
7	COT 312	12 INCH DUCTILE IRON 45 DEGREE BEND (RJ)	2, 8	EA	20	4	0	0	4	4	0	4	0	4	0	0	0	0	0
8	COT 312	12 INCH X 8 INCH DUCTILE IRON TEE (RJ)	2, 8	EA	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
9	COT 312	12 INCH X 6 INCH DUCTILE IRON TEE (RJ)	2, 8	EA	6	0	0	0	2	2	0	1	0	1	0	0	0	0	0
10	COT 312	12 INCH DUCTILE IRON SLEEVE (RJ)	2, 8, 12	EA	10	2	0	0	2	2	0	2	0	2	0	0	0	0	0
11	COT 307	12 INCH DIP, CL50 POLYETHYLENE WRAPPED (RJ)	1, 2, 3, 8, 9, 11, 27	LF	188	32	0	0	40	44	0	36	0	36	0	0	0	0	0
12	COT 317	12 INCH GATE VALVE (RJ)	8	EA	7	1	0	0	2	2	0	1	0	1	0	0	0	0	0
13	COT 317	3-WAY FIRE HYDRANT, IN PLACE		EA	20	2	0	2	2	4	0	3	0	1	1	1	1	2	1
14	COT 317	6 INCH FIRE HYDRANT EXTENSION		EA	20	2	0	2	2	4	0	3	0	1	1	1	1	2	1
15	COT 318	VALVE BOX	21	EA	153	16	3	16	15	24	3	23	3	17	6	3	10	8	6
16	COT 318	VALVE BOX EXTENSION	21	VF	153	16	3	16	15	24	3	23	3	17	6	3	10	8	6
17	COT 325	SODDING AND SEEDING	23	SY	12720	1766	70	918	1191	2303	171	3339	132	2326	158	57	717	1768	973
18	COT 329	PAVEMENT, REMOVAL AND REPLACEMENT (ASPHALT)		SY	543	158	22	34	45	68	19	38	15	51	19	22	17	14	21
19	COT 329	SAWCUT		LF	1725	447	65	110	135	248	60	128	52	162	67	67	67	50	67
20	COT 308	2 INCH AIR RELIEF VALVE ASSEMBLY AND VAULT (STD 308), IN PLACE		EA	2	3000	6000	0	0	0	0	0	0	0	0	0	0	0	0
21	COT 608B	STOP SIGNS		EA	22	250	5500	3	1	2	0	1	2	1	1	2	1	1	3
22	COT 102	PROJECT SIGN		EA	1	1000	1000	0	0	0	0	0	0	0	0	0	0	0	0
23	SPECIAL -1	CONSTRUCTION AS-BUILT		EA	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

OPTION 3 - HDPE

ITEM	SPEC. NO.	DESCRIPTION	PAY ITEM NOTE	UNIT	TOTAL	LINE A	LINE B	LINE C	LINE D	LINE E	LINE F	LINE G	LINE H	LINE I	LINE J	LINE K	LINE L	LINE M	LINE N
71	COT 309A	8 INCH HDPE AWWA C906 PE4710 DR-11 (DIPS)	1, 2, 3, 8, 9, 10, 19, 27	LF	5753	32	0	486	396	1093	0	1120	0	1120	0	58	447	548	453
72	COT 309A	10 INCH HDPE AWWA C906 PE4710 DR-11 (DIPS)	1, 2, 3, 8, 9, 10, 19, 27	LF	1386	975	59	42	47	0	75	0	76	0	80	0	32	0	0
73	COT 312	6 INCH DUCTILE IRON PLUG (RJ)	2, 8	EA	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
74	COT 313	8 INCH X 6 INCH DUCTILE IRON REDUCER (RJ)	2, 9	EA	30	3	0	3	1	5	0	5	0	3	0	1	1	5	3
75	COT 312	10 INCH X 6 INCH DUCTILE IRON REDUCER (RJ)	2, 8	EA	5	2	0	1	1	0	0	0	0	0	0	0	1	0	0
76	COT 312	10 INCH X 8 INCH DUCTILE IRON REDUCER (RJ)	2, 8	EA	18	3	1	1	1	2	2	2	2	2	2	0	1	0	0
77	COT 312A	8 INCH HDPE 45 DEGREE BEND (DIPS)		EA	41	0	0	0	3	6	0	7	0	14	0	2	0	3	6
78	COT 312A	10 INCH HDPE 45 DEGREE BEND (DIPS)		EA	32	0	2	4	4	0	4	0	8	0	6	0	4	0	0
79	COT 312A	8 INCH X 8 INCH HDPE TEE (DIPS)	20	EA	22	0	0	0	1	4	0	4	0	2	1	2	2	3	3
80	COT 312A	10 INCH X 10 INCH HDPE TEE (DIPS)	20	EA	17	5	0	2	2	2	0	2	0	2	1	0	1	0	0
81	COT 312A	12 INCH X 8 INCH HDPE TEE (DIPS)	20	EA	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
82	COT 312A	8 INCH HDPE SLEEVE (DIPS)		EA	31	2	1	4	2	2	2	2	2	2	2	1	0	6	3
83	COT 312A	10 INCH HDPE SLEEVE (DIPS)		EA	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0
84	COT 312A	8 INCH HDPE PLUG (DIPS)		EA	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
85	COT 312A	8 INCH HDPE WALL ANCHOR (DIPS) (RJ)	26	EA	51	4	1	4	3	8	0	8	2	6	2	3	1	4	5
86	COT 312A	10 INCH HDPE WALL ANCHOR (DIPS) (RJ)	26	EA	20	4	1	3	2	0	2	0	2	0	3	0	3	0	0
87	COT 312A	8 INCH HDPE MJ ADAPTOR (DIPS) (RJ)		EA	114	6	0	8	7	24	0	24	0	18	0	5	5	8	9
88	COT 312A	10 INCH HDPE MJ ADAPTOR (DIPS) (RJ)		EA	51	16	3	7	5	0	4	0	4	0	7	0	5	0	0
89	COT 315	3/4 INCH WATER SERVICE CONNECTION (LONG)	15, 16	EA	31	3	0	2	2	4	0	6	0	8	0	0	3	3	0
90	COT 315	3/4 INCH WATER SERVICE CONNECTION (SHORT)	15, 16	EA	35	3	0	6	3	4	0	6	0	9	0	0	1	1	2
91	COT 317	8 INCH GATE VALVE (RJ)	8	EA	32	1	0	3	2	7	0	7	0	5	0	1	2	2	2
92	COT 317	10 INCH GATE VALVE (RJ)	8	EA	13	3	1	2	2	0	1	0	1	0	2	0	1	0	0
93	COT 318	VALVE BOX	21	EA	45	4	1	5	4	7	1	7	1	5	2	1	3	2	2
94	COT 328	8-INCH BORE		LF	1089	0	0	144	49	190	0	145	0	264	0	0	105	118	74
95	COT 328	10-INCH BORE		LF	245	245	0	0	0	0	0	0	0	0	0	0	0	0	0
96	COT 332	CONDUIT OPEN CUT 8 INCH		LF	617	24	0	38	95	144	0	81	0	108	0	48	0	33	46
97	COT 332	CONDUIT OPEN CUT 10 INCH		LF	563	343	48	25	0	0	43	0	32	0	42	0	30	0	0

OPTION 1 - DIP

ITEM	SPEC. NO.	DESCRIPTION	PAY ITEM NOTE	UNIT	TOTAL	LINE A	LINE B	LINE C	LINE D	LINE E	LINE F	LINE G	LINE H	LINE I	LINE J	LINE K	LINE L	LINE M	LINE N
24	COT 307	6 INCH DIP, CL51 POLYETHYLENE WRAPPED	1, 2, 3, 9, 11, 27	LF	2935	0	0	357	348	602	0	579	0	486	0	0	177	219	167
25	COT 307	6 INCH DIP, CL51 POLYETHYLENE WRAPPED (RJ)	1, 2, 3, 8, 9, 11, 27	LF	2818	32	0	129	194	426	0	504	0	590	0	58	270	329	286
26	COT 307	8 INCH DIP, CL51 POLYETHYLENE WRAPPED	1, 2, 3, 9, 11, 27	LF	471	463	0	0	0	0	0	0	8	0	0	0	0	0	0
27	COT 307	8 INCH DIP, CL51 POLYETHYLENE WRAPPED (RJ)	1, 2, 3, 8, 9, 11, 27	LF	864	461	59	42	47	0	75	0	68	0	80	0	32	0	0
28	COT 312	6 INCH DUCTILE IRON 11-1/4 DEGREE BEND (RJ)	2, 8	EA	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
29	COT 312	6 INCH DUCTILE IRON 22-1/2 DEGREE BEND (RJ)	2, 8	EA	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
30	COT 312	8 INCH DUCTILE IRON 22-1/2 DEGREE BEND (RJ)	2, 8	EA	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
31	COT 312	6 INCH DUCTILE IRON 45 DEGREE BEND (RJ)	2, 8	EA	49	4	0	4	3	6	0	7	0	14	0	2	0	3	6
32	COT 312	8 INCH DUCTILE IRON 45 DEGREE BEND (RJ)	2, 8	EA	32	0	2	4	4	0	4	0	8	0	6	0	4	0	0
33	COT 312	6 INCH X 6 INCH DUCTILE IRON TEE (RJ)	2, 8	EA	19	1	0	2	0	3	0	3	0	2	0	1	2	4	1
34	COT 312	8 INCH X 8 INCH DUCTILE IRON TEE (RJ)	2, 8	EA	17	4	0	2	2	2	0	2	0	2	1	0	1	0	1
35	COT 312	6 INCH DUCTILE IRON SLEEVE (RJ)	2, 8, 12	EA	20	2	0	4	0	2	0	2	0	2	0	1	0	6	1
36	COT 312	8 INCH DUCTILE IRON SLEEVE (RJ)	2, 8, 12	EA	13	2	1	0	2	0	2	0	2	0	2	0	0	0	2
37	COT 312	6 INCH DUCTILE IRON PLUG (RJ)	2, 8	EA	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
38	COT 312	8 INCH X 6 INCH DUCTILE IRON REDUCER (RJ)	2, 8	EA	17	3	0	2	2	2	0	2	0	2	1	0	1	0	2
39	COT 315	3/4 INCH WATER SERVICE CONNECTION (LONG)	15, 16	EA	31	3	0	2	2	4	0	6	0	8	0	0	3	3	0
40	COT 315	3/4 INCH WATER SERVICE CONNECTION (SHORT)	15, 16	EA	35	3	0	6	3	4	0	6	0	9	0	0	1	1	2
41	COT 317	6 INCH GATE VALVE (RJ)	8	EA	40	1	0	4	3	8	0	8	0	6	0	1	3	4	2
42	COT 317	8 INCH GATE VALVE (RJ)	8	EA	16	6	1	2	2	0	1	0	1	0	2	0	1	0	0
43	COT 317	12 INCH GATE VALVE (RJ)	8	EA	7	1	0	0	2	2	0	1	0	1	0	0	0	0	0
44	COT 328	6-INCH BORE		LF	1089	0	0	144	49	190	0	145	0	264	0	0	105	118	74
45	COT 328	8-INCH BORE		LF	245	245	0	0	0	0	0	0	0	0	0	0	0	0	0
46	COT 332	CONDUIT OPEN CUT 6 INCH		LF	617	24	0	38	95	144	0	81	0	108	0	48	0	33	46
47	COT 332	CONDUIT OPEN CUT 8 INCH		LF	563	343	48	25	0	0	43	0	32	0	42	0	30	0	0

OPTION 2 - PVC

ITEM	SPEC. NO.	DESCRIPTION	PAY ITEM NOTE	UNIT	TOTAL	LINE A	LINE B	LINE C	LINE D	LINE E	LINE F	LINE G	LINE H	LINE I	LINE J	LINE K	LINE L	LINE M	LINE N
48	COT 309	6 INCH PVC AWWA C900 CLASS 305 DR-14	1, 2, 3, 9, 10, 27	LF	2935	0	0	357	348	602	0	579	0	486	0	0	177	219	167
49	COT 309	6 INCH PVC AWWA C900 CLASS 305 DR-14 (RJ)	1, 2, 3, 8, 9, 10, 27	LF	3013	32	0	129	243	491	0	541	0	634	0	58	270	329	286
50	COT 309	8 INCH PVC AWWA C900 CLASS 305 DR-14	1, 2, 3, 9, 10, 27	LF	471	463	0	0	0	0	0	0	8	0	0	0	0	0	0
51	COT 309	8 INCH PVC AWWA C900 CLASS 305 DR-14 (RJ)	1, 2, 3, 8, 9, 10, 27	LF	864	461	59	42	47	0	75	0	68	0	80	0	32	0	0
52	COT 312	6 INCH DUCTILE IRON 11-1/4 DEGREE BEND (RJ)	2, 8	EA	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
53	COT 312	6 INCH DUCTILE IRON 22-1/2 DEGREE BEND (RJ)	2, 8	EA	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
54	COT 312	8 INCH DUCTILE IRON 22-1/2 DEGREE BEND (RJ)	2, 8	EA	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
55	COT 312	6 INCH DUCTILE IRON 45 DEGREE BEND (RJ)	2, 8	EA	49	4	0	4	3	6	0	7	0	14	0	2	0	3	6
56	COT 312	8 INCH DUCTILE IRON 45 DEGREE BEND (RJ)	2, 8	EA	32	0	2	4	4	0	4	0	8	0	6	0	4	0	0
57	COT 312	6 INCH X 6 INCH DUCTILE IRON TEE (RJ)	2, 8	EA	19	1	0	2	0	3	0	3	0	2	0	1	2	4	1
58	COT 312	8 INCH X 8 INCH DUCTILE IRON TEE (RJ)	2, 8	EA	17	4	0	2	2	2	0	2	0	2	1	0	1	0	1
59	COT 312	6 INCH DUCTILE IRON SLEEVE (RJ)	2, 8, 12	EA	20	2	0	4	0	2	0	2	0	2	0	1	0	6	1
60	COT 312	8 INCH DUCTILE IRON SLEEVE (RJ)	2, 8, 12	EA	13	2	1	0	2	0	2	0	2	0	2	0	0	0	2
61	COT 312	6 INCH DUCTILE IRON PLUG (RJ)	2, 8	EA	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
62	COT 312	8 INCH X 6 INCH DUCTILE IRON REDUCER (RJ)	2, 8	EA	17	3	0	2	2	2	0	2	0	2	1	0	1	0	2
63	COT 315	3/4 INCH WATER SERVICE CONNECTION (LONG)	15, 16	EA	31	3	0	2	2	4	0	6	0	8	0	0	3	3	0
64	COT 315	3/4 INCH WATER SERVICE CONNECTION (SHORT)	15, 16	EA	35	3	0	6	3	4	0	6	0	9	0	0	1	1	2
65	COT 317	6 INCH GATE VALVE (RJ)	8	EA	40	1	0	4	3	8	0	8	0	6	0	1	3	4	2
66	COT 317	8 INCH GATE VALVE (RJ)	8	EA	16	6	1	2	2	0	1	0	1	0	2	0	1	0	0
67	COT 328	6-INCH BORE		LF	1089	0	0	144	49	190	0	145	0	264	0	0	105	118	74
68	COT 328	8-INCH BORE		LF	245	245	0	0	0	0	0	0	0	0	0	0	0	0	0
69	COT 332	CONDUIT OPEN CUT 6 INCH		LF	617	24	0	38	95	144	0	81	0	108	0	48	0	33	46
70	COT 332	CONDUIT OPEN CUT 8 INCH		LF	563	343	48	25	0	0	43	0	32	0	42	0	30	0	0

OKIE 811
Know what's below. Call before you dig.

LICENSED PROFESSIONAL ENGINEER
KEITH BEATTY
29905
OKLAHOMA
4-28-20

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

PAY ITEMS

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:
FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1"=N/A	DRAWN	BHT	04/2020
	DESIGNED	KDB	04/2020
	SURVEY	SDC	07/2019
PROFILE SCALE:	PROJ. MGR.		
HORIZONTAL 1"=N/A	LEAD ENGR.		
	FIELD MGR.		
VERTICAL 1"=N/A	RECOMMENDED: HS 5/20 DESIGN MANAGER		

APPROVED:
CITY ENGINEER
DATE: 05.15.20

FILE: GN-WAT-CN-NOTES DRAWING:

ATLAS PAGE NO: 395 AND 478

PAY ITEM NOTES 9/24/2018

1. TESTING AND CHLORINATION OF WATER MAINS SHALL BE PERFORMED BY THE CITY OF TULSA. TESTING, CHLORINATION, AND FLUSHING SHALL BE DONE IN ACCORDANCE WITH SECTION 109.3 OF THE GENERAL SPECIFICATIONS.

   A. CONTRACTOR SHALL FURNISH AND INSTALL TEMPORARY PLUGS WITH ADEQUATE BLOCKING OR RESTRAINTS, PLUS CORPORATION STOPS, AS DIRECTED BY CITY TESTING PERSONNEL, THEN, ONCE TESTING, CHLORINATION AND FLUSHING BY CITY PERSONNEL IS COMPLETED, REMOVE TEMPORARY BLOCKING AND TIE INTO EXISTING SYSTEM, USING FITTINGS SWABBED INTERNALLY WITH 2% BLEACH SOLUTION.

   B. TESTING, CHLORINATION, AND FLUSHING OF NEW WATER MAIN SHALL BE PERFORMED BY CITY PERSONNEL ON MAINS WHICH ARE PHYSICALLY DISCONNECTED FROM THE EXISTING WATER SYSTEM. TESTING, CHLORINATION, AND FLUSHING OF NEW WATER MAINS SHALL NOT BE PERFORMED AGAINST VALVES WHICH ARE PHYSICALLY CONNECTED TO EXISTING SYSTEM.

   C. ALL COSTS FOR TEMPORARY PLUGS, BLOCKING, RESTRAINING, CORPORATION STOPS, TUBING, THREADED CONNECTIONS, BLEACH AND OTHER INCIDENTALS SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PIPE.

2. BURIED BOLTS, HARNESS LUGS, AND COUPLINGS SHALL BE GIVEN TWO COATS OF KOPPER'S BITUMASTIC 300-M (DRY MIL THICKNESS OF 16 MILS) OR EQUAL. COST TO BE INCLUDED IN UNIT PRICE BID FOR PIPE AND FITTINGS.

3. CONTRACTOR TO EXCAVATE ALL UTILITY CROSSINGS AHEAD OF PIPE LAYING SO THAT THE GRADES CAN BE ADJUSTED ON THE PROPOSED WATER MAIN TO AVOID UTILITY CONFLICTS. FAILURE TO DO SO SHALL NOT ENTITLE THE CONTRACTOR TO CLAIM EXTRA COMPENSATION FOR ADJUSTMENTS TO THE PROPOSED WATER MAIN. COST FOR EXCAVATING UTILITY CROSSINGS SHALL BE INCLUDED IN UNIT PRICE BID FOR PIPE.

4. CONTRACTOR SHALL INSURE ALL POLES WHICH ARE AFFECTED BY TRENCHING CONDITIONS ARE BRACED BY OWNERS. PAYMENT SHALL BE INCLUDED IN "RIGHT-OF-WAY CLEARING AND RESTORING". NO ADDITIONAL PAYMENT SHALL BE MADE.

5. ALL HYDRANTS, VALVES AND OTHER FITTINGS FROM ABANDONED WATER MAINS SHALL BE SALVAGED AND DELIVERED TO SOUTH YARD, 2317 S JACKSON. PAYMENT TO BE MADE UNDER RIGHT OF WAY CLEARING AND RESTORING. NO ADDITIONAL PAYMENT SHALL BE MADE.

6. CONTRACTOR SHALL REPAIR ANY IRRIGATION SYSTEMS, ROOF DRAINS, AND FENCING DAMAGED IN THE ZONE OF CONSTRUCTION DURING THE COURSE OF CONSTRUCTION TO SATISFACTION OF THE PROPERTY OWNER. PAYMENT SHALL BE INCLUDED IN RIGHT-OF-WAY CLEARING AND RESTORING. NO ADDITIONAL PAYMENT SHALL BE MADE.

7. COST OF ANY TEMPORARY LIVESTOCK FENCING AND POLES SHALL BE INCLUDED IN COST OF RIGHT OF WAY CLEARING AND RESTORING. NO ADDITIONAL PAYMENT SHALL BE MADE.

8. ALL COSTS FOR COMPONENTS NECESSARY TO RESTRAIN JOINTS FOR PIPE AND FITTINGS DESIGNATED RESTRAINED JOINT ("RJ") SHALL BE INCLUDED IN UNIT PRICE BID FOR PIPE OR FITTINGS.

   A. DUCTILE IRON PIPE RESTRAINED JOINT SYSTEMS: US PIPE TRFLEX, GRIFFIN SNAPLOK, MCWANE THRUSTLOCK, AMERICAN FLEXRING, EBAA MEGALUG, STAR STARGRIP, SMITH-BLAIR CAMLOCK, CLOW TUFGRIP OR EQUAL SHALL BE USED ON THIS PROJECT. SHOULD RJ PIPE BE SPECIFIED THROUGH UNCASED BORES, ONLY USPIPE TRFLEX, GRIFFIN SNAPLOK, MCWANE THRUSTLOCK, OR AMERICAN FLEXRING IS TO BE USED. LOCKING GASKETS NOT PERMITTED;

   B. POLYVINYL CHLORIDE (PVC) RESTRAINED JOINT SYSTEMS: EBAA MEGALUG, STAR STARGRIP OR EQUAL SHALL BE USED ON THIS PROJECT. LOCKING GASKETS NOT PERMITTED; SHOULD RJ PIPE BE SPECIFIED ON BORE CASING IS REQUIRED.

   C. HIGH DENSITY POLYETHYLENE (HDPE) RESTRAINED JOINT SYSTEMS: EBAA MEGALUG, STAR STARGRIP OR EQUAL SHALL BE USED ON THIS PROJECT.

   NO ADDITIONAL PAYMENT SHALL BE MADE.

9. ALL CUT ENDS AND WHERE SALVAGED FITTINGS HAVE BEEN REMOVED FROM ABANDONED WATER LINES LEFT IN PLACE, SHALL BE PLUGGED WITH 24-IN OF CONCRETE INSIDE THE PIPE. COST OF CONCRETE PLUGGING TO BE INCLUDED IN UNIT PRICE BID FOR PIPE. NO ADDITIONAL PAYMENT SHALL BE MADE.

10. TRACER WIRE AND DETECTABLE MYLAR MARKING TAPE SHALL BE INSTALLED ABOVE ALL PVC AND HDPE PIPE, TERMINATING ONLY ONTO HYDRANTS JUST ABOVE GROUND LEVEL AS PER CONST SPEC 310. COST OF TRACER WIRE AND DETECTABLE MYLAR TAPE SHALL BE INCLUDED IN UNIT PRICE BID FOR PVC AND HDPE PIPE. CONST SPEC 310.1 NOW ALLOWS #12 COPPER-CLAD STEEL (CCS) WIRE, 21% CONDUCTIVITY, IN LIEU OF #8 COPPER WIRE AS TRACER WIRE ATOP PVC AND HDPE PIPE.

11. DETECTABLE MYLAR MARKING TAPE SHALL BE INSTALLED OVER DUCTILE IRON PIPE AS PER CONST SPEC 307.3 AND 307.4. COST WILL BE INCLUDED IN COST OF DUCTILE IRON PIPE.

12. ALL LABOR, MATERIALS, AND EQUIPMENT TO CONNECT PROPOSED WATER MAINS TO EXISTING WATER MAINS ARE INCLUDED IN COST OF SLEEVES/ADAPTORS. CONTRACTOR TO EXCAVATE ALL EXISTING WATER MAINS AHEAD OF PIPE LAYING SO THAT THE GRADES CAN BE ADJUSTED ACCORDINGLY. FAILURE TO DO SO SHALL NOT ENTITLE THE CONTRACTOR TO CLAIM EXTRA COMPENSATION FOR ADJUSTMENTS TO THE PROPOSED WATER MAIN. COST FOR EXCAVATING EXISTING WATER MAINS SHALL BE INCLUDED IN UNIT PRICE BID FOR SLEEVES. NO ADDITIONAL PAYMENT SHALL BE MADE.

13. (OPTIONAL) AT THE DIRECTION OF THE ENGINEER, CONTRACTOR SHALL FURNISH A "LICENSED AND BONDED PLUMBER", WHICH SHALL INCLUDE ALL COSTS OF LABOR, TOOLS, PERMIT FEES, AND EQUIPMENT TO REROUTE THE EXISTING CUSTOMER SERVICE ON CUSTOMER PROPERTY TO THE PROPOSED CUSTOMER METER CAN. COST SHALL NOT EXCEED AN ALLOWANCE OF $1000 PER OCCURRENCE. MATERIALS SHALL BE PAID UNDER SEPARATE BID ITEMS. NO ADDITIONAL PAYMENT SHALL BE MADE.

14. CONTRACTOR IS REMINDED TO BACKFILL ALL TRENCHES EXCAVATED ACROSS ANY EXISTING OR PROPOSED DRIVING OR PARKING SURFACE WITH 1½ -IN TYPE A AGGREGATE BASE, PLACED IN 8-INCH MAXIMUM LIFTS AND COMPACTED TO 98% MODIFIED PROCTOR DENSITY. COST TO BE INCLUDED IN COST OF EXCAVATION AND BACKFILL. NO ADDITIONAL PAYMENT SHALL BE MADE.

15. WATER SERVICE CONNECTIONS SHALL INCLUDE COST OF MATERIAL, LABOR AND EQUIPMENT TO REMOVE AND INSTALL SADDLES, SERVICE CLAMPS, CORPORATION STOPS, BENDS, 3-PART UNIONS, COUPLINGS, SETTERS AND ANY OTHER INCIDENTALS REQUIRED FOR A COMPLETE WATER SERVICE CONNECTION WITH EXCEPTION OF METER CANS, RIMS AND LIDS. NO ADDITIONAL PAYMENT SHALL BE MADE. METER CANS, LIDS AND RIMS SHALL BE PAID AS A SEPARATE BID ITEM.

   A. SHORT SERVICE SHALL BE ANY SERVICE LINE THAT IS 25-FEET OR LESS IN LENGTH. SHORT SERVICES DO NOT INCLUDE PAVEMENT REPLACEMENT. I.E. ¾-INCH WATER SERVICE CONNECTIONS (SHORT SERVICE)

   B. LONG SERVICE SHALL BE ANY SERVICE LINE THAT IS GREATER THAN 25-FEET UP TO 80-FEET IN LENGTH. LONG SERVICES INCLUDE PAVEMENT REPLACEMENT AND/ OR COST TO BORE. EXAMPLE: ¾-IN WATER SERVICE CONNECTIONS (LONG SERVICE)

   C. SHORT AND LONG SERVICE LINES EXCEEDING THE ABOVE PARAMETERS WILL BE COMPENSATED FOR LINEAR FOOTAGE ABOVE AND BEYOND. COMPENSATION SHALL BE PAID AS "SERVICE LINES, EXTENSION", PER LF

16. SERVICE LINES ON NON-ARTERIALS SHALL BE EITHER COPPER TUBING (TYPE K SOFT ANNEALED CONFORMING TO ASTM B 88) OR PEX TUBING (UPONOR AQUA PEX 5206 BLUE CONFORMING TO ASTM F876/F877/F2023). PEX TUBING IS NOT PERMITTED WITHIN ARTERIAL RIGHT OF WAY. WHEN CONTRACTOR ELECTS TO USE PEX TUBING:

   A. ¾-INCH WATER SERVICE CONNECTION SHALL USE 1-INCH PEX TUBING MINIMUM
   B. 1-INCH WATER SERVICE CONNECTION SHALL USE 1¼-INCH PEX TUBING MINIMUM

17. ~~CONTRACTOR'S PLUMBER SHALL PROVIDE AN INFORMATIONAL BROCHURE TO THE PROPERTY OWNERS OUTLINING THE STEPS REQUIRED TO THOROUGHLY FLUSH THEIR WATERLINES AFTER CONNECTION TO THE NEW WATER MAIN. ALL COSTS TO PRODUCE AND DISTRIBUTE THE BROCHURE SHALL BE INCLUDED IN THE PRICE BID FOR THIS ITEM.~~

18. THE "OWNER ALLOWANCE" CAN BE USED FOR VARIOUS WORK AND MISCELLANEOUS ITEMS NOT IDENTIFIED IN THE CONTRACT DOCUMENTS WITH THE FOLLOWING PROVISIONS: THE ALLOWANCE SHALL BE USED FOR COST OF MATERIALS, LABOR, INSTALLATION AND OVERHEAD AND PROFIT FOR ADDITIONAL WORK AND MISCELLANEOUS ITEMS THAT ARE NOT IDENTIFIED IN THE CONSTRUCTION DOCUMENTS AND PLANS, AND NOT INCLUDED IN THE BID ITEMS OF THE CONTRACT.

   A. THE ALLOWANCE SHALL BE USED ONLY AT THE DISCRETION OF THE CITY. ANY ALLOWANCE BALANCE REMAINING AT THE COMPLETION OF THE PROJECT WILL BE CREDITED BACK TO THE CITY ON THE FINAL APPLICATION FOR PAYMENT SUBMITTED BY THE CONTRACTOR.

   B. THE CONTRACTOR SHALL PROVIDE, TO THE CITY, A WRITTEN REQUEST FOR THE USE OF ANY ALLOWANCE, WITH A SCHEDULE OF VALUES, AND ALL ASSOCIATED BACKUP INFORMATION, INCLUDING ANY TIME EXTENSIONS REQUIRED TO PERFORM THE WORK.

   C. THE CONTRACTOR SHALL PROCEED WITH THE WORK INCLUDED IN THE ALLOWANCE ONLY AFTER RECEIVING A WRITTEN ORDER, FROM THE ENGINEER AND CITY AUTHORIZING SUCH WORK. PROCEEDING WITH WORK IN THE ALLOWANCE WITHOUT A WRITTEN ORDER FROM THE CITY WILL BE AT THE CONTRACTOR'S EXPENSE.

19. WHERE PLANS IDENTIFY A 22.5-DEG OR 11.25-DEG VERTICAL OR HORIZONTAL BEND, HDPE WILL BE DEFLECTED PER MANUFACTURER'S MINIMUM ALLOWABLE BEND RADIUS.

20. WHERE PLANS IDENTIFY A CROSS, HDPE WILL USE TWO (2) TEE'S. NO ADDITIONAL PAYMENT SHALL BE MADE.

21. TOP OF VALVE BOX SHALL BE FLUSH WITH FINISHED GRADE.

22. THE CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS TO A CONDITION EQUAL TO OR BETTER THAN THE EXISTING IMPROVEMENTS. LIMITS OF DISTURBANCE SHALL NOT EXCEED 9-FEET CENTERED ON THE WATERLINE. ANY DISTURBANCE OUTSIDE OF THIS AREA SHALL BE RESTORED AT THE CONTRACTORS EXPENSE. STREETS, DRIVEWAYS AND ASSOCIATED ITEMS SHALL BE PAID FOR UNDER OTHER ITEMS OF WORK.

23. THE CONTRACTOR SHALL RESTORE ALL DISTURBED GRASS AREAS TO A CONDITION EQUAL TO OR BETTER THAN THE EXISTING CONDITION. THE CONTRACTOR SHALL REPLACE THE SOD TO MATCH IN-KIND AND QUALITY. LIMITS OF DISTURBANCE SHALL NOT EXCEED 9-FEET CENTERED ON THE WATERLINE. ANY DISTURBANCE OUTSIDE OF THIS AREA SHALL BE RESTORED AT THE CONTRACTORS EXPENSE.

24. SPOT ELEVATIONS ON THE MAIN WATER LINE RELATIVE TO FINISHED GRADE SHALL BE PROVIDED AT EACH 100-FT INTERVAL, COMPLETE WITH STATION AND OFFSET. IN ADDITION, ALL VALVES, FITTINGS, FIRE HYDRANTS (TOP OF NUT) AND OTHER MAJOR APPURTENANT ITEMS SHALL BE SHOWN WITH THE PROPER DESCRIPTION, STATION, OFFSET AND ELEVATION.

25. SPOT ELEVATIONS ON WATER METER CANS, VAULTS, SHALL BE SHOWN WITH THE PROPER DESCRIPTION (METER TYPE, METER SIZE, METER NUMBER, SERVICE MATERIAL, SERVICE SIZE), STATION, OFFSET AND ELEVATION PER PLAN SURVEY CONTROL DATUM.

26. WORK UNDER THIS ITEM SHALL INCLUDE FURNISHING AND INSTALLING HDPE WALL ANCHOR AS SHOWN ON DRAWINGS OR AS DIRECTED BY THE ENGINEER. THE UNIT PRICE SHALL INCLUDE THE COST OF ALL LABOR, EQUIPMENT AND MATERIALS REQUIRED. NO ADDITIONAL PAYMENT SHALL BE MADE FOR EXCAVATION, BACKFILLING, OR CONCRETE BLOCKING.

27. PRESSURE TESTING AND CHLORINATION OF WATER MAINS SHALL NOT BE PERFORMED UNTIL THE CITY INSPECTOR HAS RECEIVED REQUIRED CONSTRUCTION AS-BUILT RECORDS.

WATER CONSTRUCTION NOTES 9/24/2018

1. THE CITY OF TULSA FIELD ENGINEERING DEPARTMENT SHALL INSPECT ALL TRENCHING, BEDDING, PIPE INSTALLATION, BACKFILL AND COMPACTION.

2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.

3. EXISTING SERVICE CONNECTIONS ARE TO BE KEPT IN SERVICE UNTIL CONNECTIONS TO NEW MAIN ARE MADE. ALL SERVICE LINE RECONNECTIONS SHALL BE MADE BY THE CONTRACTOR. SERVICE RECONNECTIONS SHALL BE INSTALLED AS PER CITY OF TULSA STANDARD SPECIFICATIONS AND STANDARD DETAILS.

4. MINIMUM COVER OVER WATER LINES SHALL BE AS NOTED ON PLANS.

5. CONTRACTOR SHALL REPLACE EXISTING GRASS WITH SEED/SOD OF SAME TYPE AND VARIETY OR AS NOTED ON PLANS.

6. CONTRACTOR SHALL BORE EXISTING TREES UNDER DRIP LINE, UNLESS DIRECTED OTHERWISE BY ENGINEER.

7. CONTRACTOR SHALL BORE EXISTING DRIVEWAYS, UNLESS DIRECTED OTHERWISE BY ENGINEER.

8. WATER OPERATIONS SHALL OPERATE ALL VALVES ON TRANSMISSION MAINS (16" AND LARGER). CONTRACTOR SHALL OPERATE ALL VALVES ON DISTRIBUTION MAINS (SMALLER THAN 16") WITH THE COORDINATION OF FIELD ENGINEERING AND WATER OPERATIONS AND IN THE PRESENCE OF A FIELD ENGINEERING INSPECTOR.

   a. ATTEMPTS WILL BE MADE WITH ASSISTANCE FROM THE CONTRACTOR TO NOTIFY ALL AFFECTED CUSTOMERS 48-HOURS IN ADVANCE, PARTICULARLY IF COMMERCIAL OR INDUSTRIAL CUSTOMERS ARE INVOLVED. PRIOR TO SHUTDOWN, FIELD ENGINEERING WILL NOTIFY WATER OPERATIONS, AT 918-596-9488, GIVING AN ESTIMATED DOWNTIME. WATER OPERATIONS WILL NOTIFY THE FIRE DEPARTMENT OF ALL FIRE HYDRANTS OUT OF SERVICE AND WHEN THEY ARE BACK IN SERVICE, BY STREET ADDRESS OR INTERSECTION.

   b. WHERE COMMERCIAL, INDUSTRIAL, OR CRITICAL CUSTOMERS ARE AFFECTED, AND FOR ALL LINES 16-INCH AND LARGER IN SIZE, FIELD ENGINEERING WILL REQUEST WATER OPERATIONS TO SHUT DOWN THE MAIN. THERE WILL BE A MINIMUM OF 48-HOUR NOTICE TO WATER OPERATIONS.

9. CONTRACTOR SHALL PROVIDE AT LEAST 48 HOUR NOTICE TO ALL RESIDENTS OR BUSINESSES AFFECTED BEFORE TURNING OFF ANY WATER. CONTRACTOR SHALL BE RESPONSIBLE FOR PLACING DOOR HANGERS ON AFFECTED HOMES AND BUSINESSES.

10. CONTRACTOR SHALL GIVE THE NOTIFICATION CENTER OF THE OKLAHOMA ONE-CALL SYSTEM, INC, NOTICE OF ANY EXCAVATION NO SOONER THAN 48 HOURS OR LATER THAN 10 DAYS, EXCLUDING SATURDAYS, SUNDAYS, LEGAL HOLIDAYS PRIOR TO COMMENCEMENT OF WORK, PHONE 1-800-522-6543.

11. LOCAL AND THROUGH TRAFFIC SHALL BE MAINTAINED THROUGH PROJECT AT ALL TIMES. OPEN CUT STREET CROSSINGS REQUIRE AN APPROVED TRAFFIC CONTROL PLAN WITH TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH CURRENT MUTCD REQUIREMENTS.

12. ANY DAMAGE CAUSED BY CONTRACTOR TO ADJACENT TRAFFIC SIGNAL INFRASTRUCTURE SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE TRAFFIC ENGINEER.

13. PRIOR TO PAVEMENT SAWING AND EXCAVATION NEAR SIGNALIZED INTERSECTION, CONTRACTOR SHALL CONTACT ENGINEERING SERVICES, TRAFFIC OPERATIONS, 918-596-9766, FOR SITE SPECIFIC, UNDERGROUND TRAFFIC UTILITY LOCATES.

14. CONSTRUCTION FOR ALL ENGINEERING SERVICES FACILITIES SHALL BE IN COMPLIANCE WITH THE LATEST EDITION OF TITLE 252, DEPARTMENT OF ENVIRONMENTAL QUALITY, CHAPTER 626, PUBLIC WATER SUPPLY CONSTRUCTION STANDARDS, OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY (ODEQ).

15. ALL EXCAVATED MATERIAL NOT REQUIRED IN OTHER AREAS OF THE PROJECT SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF BY THE CONTRACTOR IN A MANNER ACCEPTABLE TO THE ENGINEER WITHOUT COST TO THE CITY. THE CONTRACTOR SHALL BE REQUIRED TO OBTAIN AN EARTH CHANGE PERMIT IF ANY EXCESS MATERIAL IS TO BE DISPOSED OF WITHIN THE CITY LIMITS OF TULSA.

16. ANY CHANGES FROM APPROVED PLANS SHALL BE SUBMITTED TO THE CITY OF TULSA FOR WRITTEN APPROVAL PRIOR TO INSTALLATION.

OKIE 811
know what's below. Call before you dig.

LICENSED PROFESSIONAL ENGINEER
KEITH BEATTY
29905
OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

NOTES

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE					
			PLAN SCALE: 1"=N/A	DRAWN	BHT	04/2020	APPROVED:
				DESIGNED	KDB	04/2020	
				SURVEY	SDC	07/2019	
			PROFILE SCALE:	PROJ. MGR.			
			HORIZONTAL 1"=N/A	LEAD ENGR.	CEW	4/20	
				FIELD MGR.	[illegible]	4/20	
			VERTICAL 1"=N/A	RECOMMENDED: HRS 4.20 DESIGN MANAGER			CITY ENGINEER
			FILE: GN-WAT-CN-NOTES	DRAWING:			DATE: 05.15.20
			ATLAS PAGE NO: 395 AND 478				SHEET 3 OF 51 SHEETS

WATER LINE FITTINGS TABLE

WATER LINE	FITTING TYPE	STATION	OFFSET	NORTHING	EASTING	ELEVATION
WL-A	VALVE	10+16.59	16.79' LT	397217.33	2540462.41	764.98
WL-A	TEE	10+16.60	14.28' LT	397217.37	2540464.92	764.98
WL-A	VALVE	10+21.62	14.27' LT	397222.40	2540464.85	764.41
WL-A	FIRE HYDRANT	10+31.31	9.28' LT	397232.16	2540469.69	770.07
WL-A	VALVE	13+19.31	19.81' LT	397519.97	2540454.76	774.45
WL-A	TEE	13+19.38	14.11' LT	397520.12	2540460.45	775.12
WL-A	VALVE	13+23.85	14.12' LT	397524.39	2540460.39	774.56
WL-A	VALVE	14+52.71	14.03' LT	397653.44	2540458.49	770.47
WL-A	TEE	14+55.72	14.05' LT	397656.45	2540458.43	771.01
WL-A	FIRE HYDRANT	14+96.23	20.76' LT	397696.85	2540451.10	774.71
WL-A	VALVE	14+98.21	14.01' LT	397698.93	2540457.82	768.49
WL-A	VALVE	19+87.87	13.73' LT	398188.35	2540450.61	748.65
WL-A	VALVE	19+90.43	16.22' LT	398191.07	2540448.08	748.56
WL-A	TEE	19+90.50	13.72' LT	398191.17	2540450.57	748.56

WATER LINE FITTINGS TABLE

WATER LINE	FITTING TYPE	STATION	OFFSET	NORTHING	EASTING	ELEVATION
WL-B	VALVE	1+18.51	32.38' RT	397656.44	2540461.42	770.39

WATER LINE FITTINGS TABLE

WATER LINE	FITTING TYPE	STATION	OFFSET	NORTHING	EASTING	ELEVATION
WL-C	VALVE	25+17.58	18.14' RT	397224.02	2540827.28	764.48
WL-C	TEE	25+17.58	20.64' RT	397224.06	2540829.78	764.48
WL-C	VALVE	25+23.59	20.66' RT	397230.07	2540829.70	764.26
WL-C	FIRE HYDRANT	25+30.54	26.63' RT	397237.11	2540835.57	769.23
WL-C	VALVE	29+66.25	16.50' RT	397672.62	2540818.78	774.97
WL-C	VALVE	29+66.25	35.16' RT	397672.90	2540837.43	775.36
WL-C	TEE	29+72.23	16.43' RT	397678.59	2540818.61	775.36
WL-C	VALVE	29+72.24	18.93' RT	397678.64	2540821.12	775.36
WL-C	FIRE HYDRANT	29+72.32	30.28' RT	397678.90	2540832.44	778.52

WATER LINE FITTINGS TABLE

WATER LINE	FITTING TYPE	STATION	OFFSET	NORTHING	EASTING	ELEVATION
WL-D	VALVE	35+03.96	17.43' RT	397671.78	2541149.76	767.09
WL-D	TEE	35+03.96	14.93' RT	397671.74	2541147.25	767.09
WL-D	VALVE	35+10.14	36.27' RT	397678.25	2541168.50	767.09
WL-D	FIRE HYDRANT	35+13.71	31.34' RT	397681.74	2541163.51	770.87
WL-D	VALVE	35+25.21	14.94' RT	397692.99	2541146.94	765.35
WL-D	FIRE HYDRANT	37+99.76	17.90' RT	397967.56	2541145.70	768.20
WL-D	VALVE	38+04.78	14.96' RT	397972.53	2541142.68	763.28
WL-D	VALVE	40+92.17	32.71' RT	398260.11	2541156.41	750.73
WL-D	VALVE	40+92.50	14.76' RT	398260.20	2541138.46	749.50
WL-D	FIRE HYDRANT	40+93.78	32.73' RT	398261.72	2541156.41	750.50
WL-D	VALVE	40+94.78	12.11' RT	398262.44	2541135.78	750.73
WL-D	TEE	40+94.96	14.61' RT	398262.65	2541138.27	750.73

WATER LINE FITTINGS TABLE

WATER LINE	FITTING TYPE	STATION	OFFSET	NORTHING	EASTING	ELEVATION
WL-E	VALVE	45+15.80	18.06' LT	397231.67	2541451.04	767.92
WL-E	TEE	45+15.81	15.55' LT	397231.71	2541453.54	767.92
WL-E	VALVE	45+21.79	15.56' LT	397237.70	2541453.44	767.51
WL-E	FIRE HYDRANT	46+61.27	17.07' LT	397377.14	2541449.80	771.00
WL-E	VALVE	46+85.72	14.63' LT	397401.62	2541451.87	770.35
WL-E	VALVE	49+65.90	13.03' LT	397681.79	2541449.18	768.47
WL-E	TEE	49+68.35	12.91' RT	397684.64	2541475.07	769.45
WL-E	TEE	49+68.39	13.01' LT	397684.29	2541449.16	768.92
WL-E	VALVE	49+70.85	12.91' RT	397687.14	2541475.04	768.94
WL-E	FIRE HYDRANT	50+29.08	16.46' RT	397745.42	2541477.70	774.42
WL-E	VALVE	50+33.47	12.93' RT	397749.75	2541474.10	769.42
WL-E	VALVE	54+23.04	12.92' RT	398139.27	2541468.13	754.62
WL-E	FIRE HYDRANT	54+28.02	16.83' RT	398144.31	2541471.96	755.49
WL-E	VALVE	55+74.58	12.55' RT	398290.76	2541465.81	747.64
WL-E	VALVE	55+76.51	4.44' RT	398292.59	2541457.68	750.56
WL-E	TEE	55+77.09	12.54' RT	398293.27	2541465.77	750.56
WL-E	VALVE	55+78.70	8.83' RT	398294.84	2541462.04	750.56
WL-E	FIRE HYDRANT	55+81.65	8.86' RT	398297.79	2541462.03	753.80

WATER LINE FITTINGS TABLE

WATER LINE	FITTING TYPE	STATION	OFFSET	NORTHING	EASTING	ELEVATION
WL-F	VALVE	2+60.19	22.97' RT	397684.77	2541484.36	769.45

WATER LINE FITTINGS TABLE

WATER LINE	FITTING TYPE	STATION	OFFSET	NORTHING	EASTING	ELEVATION
WL-G	VALVE	60+15.58	13.60' LT	397236.57	2541785.46	771.35
WL-G	TEE	60+15.59	11.10' LT	397236.61	2541787.96	771.35
WL-G	VALVE	60+21.57	11.08' LT	397242.60	2541787.88	770.90
WL-G	VALVE	61+34.31	11.10' LT	397355.32	2541786.15	772.39
WL-G	FIRE HYDRANT	61+39.40	17.15' LT	397360.32	2541780.02	772.43
WL-G	VALVE	64+52.82	11.10' LT	397673.80	2541781.27	770.15
WL-G	TEE	64+63.05	22.21' LT	397683.85	2541770.00	771.27
WL-G	TEE	64+63.06	11.10' LT	397684.03	2541781.12	771.19
WL-G	VALVE	64+69.83	22.11' LT	397690.64	2541770.00	770.68
WL-G	FIRE HYDRANT	65+25.56	15.19' LT	397746.45	2541776.06	777.13
WL-G	VALVE	65+29.83	21.18' LT	397750.64	2541770.00	772.67
WL-G	AIR RELEASE VALVE	65+80.01	20.39' LT	397800.82	2541770.01	777.13
WL-G	FIRE HYDRANT	68+29.32	7.71' LT	398050.30	2541778.79	762.06
WL-G	VALVE	68+33.52	11.21' LT	398054.44	2541775.23	762.82
WL-G	VALVE	71+01.79	10.83' LT	398322.69	2541771.43	747.00
WL-G	VALVE	71+10.19	12.52' LT	398331.06	2541769.60	750.48
WL-G	TEE	71+10.30	10.81' LT	398331.19	2541771.31	750.50

WATER LINE FITTINGS TABLE

WATER LINE	FITTING TYPE	STATION	OFFSET	NORTHING	EASTING	ELEVATION
WL-H	VALVE	3+29.11	25.77' RT	397683.80	2541767.57	771.27

WATER LINE FITTINGS TABLE

WATER LINE	FITTING TYPE	STATION	OFFSET	NORTHING	EASTING	ELEVATION
WL-I	TEE	75+14.48	25.00' RT	397241.11	2542154.03	785.26
WL-I	VALVE	75+14.49	27.50' RT	397241.15	2542156.54	785.26
WL-I	VALVE	75+20.46	25.00' RT	397247.09	2542153.94	784.97
WL-I	VALVE	79+69.25	17.92' RT	397695.71	2542139.99	768.86
WL-I	TEE	79+73.34	17.90' RT	397699.80	2542139.91	769.00
WL-I	TEE	79+73.37	16.10' LT	397699.31	2542105.92	768.73
WL-I	VALVE	79+77.91	16.10' LT	397703.85	2542105.85	768.18
WL-I	FIRE HYDRANT	83+04.74	22.18' LT	398030.55	2542094.80	767.80
WL-I	VALVE	83+08.83	16.12' LT	398034.73	2542100.79	761.92
WL-I	VALVE	86+34.40	16.16' LT	398360.26	2542095.81	748.89
WL-I	VALVE	86+36.80	18.73' LT	398362.63	2542093.19	772.00
WL-I	TEE	86+36.97	16.24' LT	398362.84	2542095.69	772.00

WATER LINE FITTINGS TABLE

WATER LINE	FITTING TYPE	STATION	OFFSET	NORTHING	EASTING	ELEVATION
WL-J	VALVE	5+23.58	18.35' RT	397699.28	2542103.42	768.76
WL-J	FIRE HYDRANT	5+63.29	22.15' RT	397696.01	2542143.18	774.83
WL-J	VALVE	5+77.32	18.32' RT	397700.02	2542157.16	772.31

WATER LINE FITTINGS TABLE

WATER LINE	FITTING TYPE	STATION	OFFSET	NORTHING	EASTING	ELEVATION
WL-K	VALVE	6+33.51	23.27' LT	397259.47	2542764.58	785.52
WL-K	FIRE HYDRANT	6+35.90	29.29' LT	397265.52	2542766.90	790.43

WATER LINE FITTINGS TABLE

WATER LINE	FITTING TYPE	STATION	OFFSET	NORTHING	EASTING	ELEVATION
WL-L	VALVE	90+16.58	12.41' RT	397263.27	2542801.18	785.18
WL-L	FIRE HYDRANT	94+55.59	19.70' RT	397702.34	2542801.78	788.45
WL-L	VALVE	94+64.98	14.60' RT	397711.65	2542796.51	784.28
WL-L	TEE	94+71.05	14.57' RT	397717.72	2542796.39	784.78
WL-L	VALVE	94+71.06	17.08' RT	397717.77	2542798.90	784.78

WATER LINE FITTINGS TABLE

WATER LINE	FITTING TYPE	STATION	OFFSET	NORTHING	EASTING	ELEVATION
WL-M	TEE	111+10.07	19.76' RT	395811.47	2544789.93	795.18
WL-M	VALVE	111+10.15	15.62' RT	395815.60	2544789.96	795.18
WL-M	VALVE	111+12.22	19.78' RT	395811.47	2544792.08	795.65
WL-M	FIRE HYDRANT	113+89.51	19.38' RT	395815.21	2545069.34	786.57
WL-M	VALVE	113+95.44	22.56' RT	395812.10	2545075.32	786.57
WL-M	VALVE	119+26.26	22.57' LT	396164.83	2545440.32	795.28
WL-M	TEE	119+28.10	24.16' LT	396167.26	2545440.27	795.84
WL-M	FIRE HYDRANT	119+36.37	4.79' LT	396158.98	2545434.28	799.26

WATER LINE FITTINGS TABLE

WATER LINE	FITTING TYPE	STATION	OFFSET	NORTHING	EASTING	ELEVATION
WL-N	VALVE	100+83.28	13.25' RT	396902.63	2545073.71	787.31
WL-N	FIRE HYDRANT	101+26.99	19.73' RT	396896.57	2545117.49	791.52
WL-N	AIR RELEASE VALVE	102+87.53	15.24' RT	396902.62	2545277.97	791.52
WL-N	FIRE HYDRANT	104+45.15	18.86' RT	396900.54	2545435.63	785.43
WL-N	VALVE	104+63.93	16.97' RT	396902.62	2545454.38	778.77
WL-N	TEE	104+71.94	17.05' RT	396902.62	2545462.40	780.29

SUMMARY OF WATER METERS

WATER LINE	ADDRESS	STATION	OFFSET	SERVICE TYPE
A	6020 S 64TH W AVE	10+29.97	28.00' LT	SHORT
A	6075 S 64TH W AVE	11+50.91	22.65' RT	LONG
A	6004 S 64TH W AVE	11+80.45	16.60' LT	SHORT
A	6003 S 64TH W AVE	12+99.71	16.64' RT	LONG
A	5802 S 64TH W AVE	16+79.62	32.45' LT	SHORT
A	5807 S 64TH W AVE	17+37.42	18.30' RT	LONG

SUMMARY OF WATER METERS

WATER LINE	ADDRESS	STATION	OFFSET	SERVICE TYPE
C	6031 S 63RD W AVE	25+25.87	30.00' RT	SHORT
C	6025 S 63RD W AVE (2)	26+24.27	24.56' RT	SHORT
C	6024 S 63RD W AVE	26+56.54	19.01' LT	LONG
C	6025 S 63RD W AVE (1)	26+71.91	27.13' RT	SHORT
C	6021 S 63RD W AVE	26+84.03	29.56' RT	SHORT
C	6012 S 63RD W AVE (2)	27+56.38	26.38' RT	SHORT
C	6012 S 63RD W AVE (1)	27+76.09	17.99' RT	SHORT
C	6012 S 63RD W AVE	27+85.64	23.42' LT	LONG

SUMMARY OF WATER METERS

WATER LINE	ADDRESS	STATION	OFFSET	SERVICE TYPE
D	5915 S 62ND W AVE	37+25.19	19.87' RT	SHORT
D	5920 S 62ND W AVE	37+29.79	27.99' LT	LONG
D	5907 S 62ND W AVE	38+75.03	19.29' RT	SHORT
D	5906 S 62ND W AVE	38+79.09	18.57' LT	LONG
D	5903 S 62ND W AVE	38+90.37	18.89' RT	SHORT

SUMMARY OF WATER METERS

WATER LINE	ADDRESS	STATION	OFFSET	SERVICE TYPE
E	6030 S 61ST W AVE	45+96.79	19.82' LT	SHORT
E	6030 S 61ST W AVE (1)	46+17.30	27.81' RT	SHORT
E	6025 S 61ST W AVE	46+59.48	29.00' RT	LONG
E	6013 S 61ST W AVE	50+52.19	22.82' RT	SHORT
E	5920 S 61ST W AVE	51+90.65	20.40' LT	LONG
E	5845 S 61ST W AVE	51+96.15	19.78' RT	SHORT
E	6040 S 61ST W AVE	52+73.09	24.28' RT	SHORT
E	5908 S 61ST W AVE	52+86.66	19.33' LT	LONG

SUMMARY OF WATER METERS

WATER LINE	ADDRESS	STATION	OFFSET	SERVICE TYPE
G	6033 S 60TH W AVE	60+80.15	20.00' RT	LONG
G	6024 S 60TH W AVE (2)	60+83.29	18.99' LT	SHORT
G	6024 S 60TH W AVE	61+16.72	30.00' LT	SHORT
G	6022 S 60TH W AVE	61+80.40	15.84' LT	SHORT
G	6030 S 60TH W AVE	62+40.28	14.75' LT	SHORT
G	6013 S 60TH W AVE	62+41.65	19.94' RT	LONG
G	6002 S 60TH W AVE	64+58.07	12.01' LT	SHORT
G	5915 S 60TH W AVE	67+54.96	25.61' RT	LONG
G	5905 S 60TH W AVE	67+87.72	25.96' RT	LONG
G	5901 S 60TH W AVE	68+91.43	26.28' RT	LONG
G	5820 S 60TH W AVE	69+35.05	23.27' LT	SHORT
G	5817 S 60TH W AVE	69+55.13	21.14' RT	LONG

SUMMARY OF WATER METERS

WATER LINE	ADDRESS	STATION	OFFSET	SERVICE TYPE
I	5915 S 59TH W AVE	76+13.05	10.63' LT	LONG
I	6020 S 59TH W AVE	77+04.33	16.58' LT	LONG
I	6055 S 59TH W AVE	77+40.09	14.55' RT	SHORT
I	6055 S 59TH W AVE (1)	77+85.86	13.85' RT	SHORT
I	6006 S 59TH W AVE	78+19.56	20.46' LT	LONG
I	5952 S 59TH W AVE	81+53.12	21.98' LT	SHORT
I	5935 S 59TH W AVE	82+37.56	20.29' RT	LONG
I	5938 S 59TH W AVE	82+48.54	20.43' LT	SHORT
I	5932 S 59TH W AVE	82+97.19	20.08' LT	SHORT
I	5904 S 59TH W AVE (1)	83+48.77	19.98' LT	SHORT
I	5907 S 59TH W AVE	83+93.81	18.76' RT	LONG
I	5904 S 59TH W AVE (2)	83+94.01	21.34' LT	SHORT
I	5817 S 59TH W AVE	84+09.43	18.24' RT	LONG
I	5801 S 59TH W AVE (2)	85+25.82	15.71' RT	LONG
I	5802 S 59TH W AVE	85+28.07	21.24' LT	SHORT
I	5801 S 59TH W AVE (1)	85+41.22	17.81' RT	LONG
I	6055 S 59TH W AVE (2)	85+91.61	29.97' LT	SHORT

SUMMARY OF WATER METERS

WATER LINE	ADDRESS	STATION	OFFSET	SERVICE TYPE
L	6022 S 57TH W AVE	91+72.09	28.20' LT	LONG
L	6014 S 57TH W AVE	92+14.43	28.44' LT	LONG
L	5704 S 57TH W AVE	92+98.59	27.35' LT	LONG
L	6009 S 57TH W AVE	94+40.56	21.00' RT	SHORT

SUMMARY OF WATER METERS

WATER LINE	ADDRESS	STATION	OFFSET	SERVICE TYPE
N	4940 W 62ND ST	101+11.41	24.44' RT	SHORT

SUMMARY OF WATER METERS

WATER LINE	ADDRESS	STATION	OFFSET	SERVICE TYPE
M	4910 W 65TH ST (1)	114+01.37	25.43' RT	SHORT
M	4910 W 65TH ST (2)	114+24.88	25.30' RT	SHORT
M	4901 W 65TH ST	117+17.89	24.55' LT	SHORT

OKIE 811
Know what's below. Call before you dig.

LICENSED PROFESSIONAL ENGINEER
KEITH BEATTY
29905
OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

SUMMARY TABLES

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:
FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1"=N/A	DRAWN	BHT	04/2020
	DESIGNED	KDB	04/2020
	SURVEY	SDC	07/2019
PROFILE SCALE:	PROJ. MGR.		
HORIZONTAL 1"=N/A	LEAD ENGR.	CEW	4/20
	FIELD MGR.		4/20
VERTICAL 1"=N/A	RECOMMENDED: AAS 4.20 DESIGN MANAGER		

APPROVED:
CITY ENGINEER
DATE: 05.15.20

FILE: CV-WAT-SM-TABLES DRAWING:
ATLAS PAGE NO: 395 AND 478
SHEET 4 OF 51 SHEETS

LEGEND

- PROPOSED WATERLINE
- EXISTING WATERLINE
- CL Alignment

WATER LINE SUMMARY			
LINE	STREET	FROM	TO
LINE A	S 64TH W AVE	W 61ST ST	SOUTHWEST BLVD
LINE B	W 60TH ST S	S 64TH W AVE	
LINE C	S 63RD W AVE	W 61ST ST	W 60TH ST S
LINE D	S 62ND W AVE	W 60TH ST S	SOUTHWEST BLVD
LINE E	S 61ST W AVE	W 61ST ST	SOUTHWEST BLVD
LINE F	W 60TH ST S	S 61ST W AVE	
LINE G	S 60TH W AVE	W 61ST ST	SOUTHWEST BLVD
LINE H	W 60TH ST S	S 60TH W AVE	
LINE I	S 59TH W AVE	W 61ST ST	SOUTHWEST BLVD
LINE J	W 60TH ST S	S 59TH W AVE	
LINE K	W 61ST ST	S 57TH W AVE	
LINE L	S 57TH W AVE	W 61ST ST	W 60TH ST S
LINE M	W 65TH ST	S 50TH W AVE	W 64TH ST
LINE N	W 62ND ST	S 50TH W AVE	S 49TH W AVE

OKIE 811
Know what's below. Call before you dig.

LICENSED PROFESSIONAL ENGINEER
KEITH BEATTY
29905
OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

KEYMAP (SHEET 1 OF 2)

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

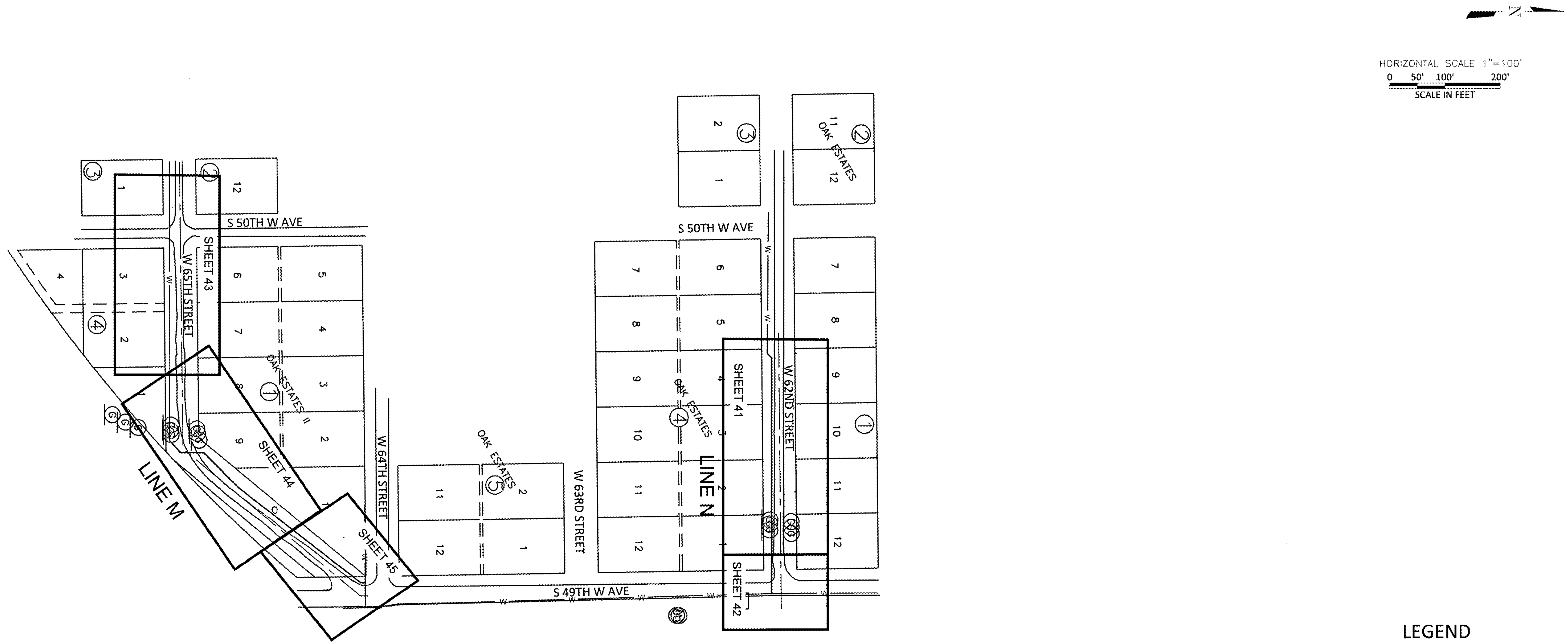
REVISION	BY	DATE

PLAN SCALE: 1"=N/A	DRAWN	BHT	04/2020
	DESIGNED	KDB	04/2020
	SURVEY	SDC	07/2019
PROFILE SCALE:	PROJ. MGR.		
HORIZONTAL 1"=N/A	LEAD ENGR.	LEW	4/20
	FIELD MGR.	[illegible]	4/20
VERTICAL 1"=N/A	RECOMMENDED: DESIGN MANAGER	HAS	4.20

APPROVED:
CITY ENGINEER

FILE: CV-WAT-PL-KEYMAP DRAWING:
ATLAS PAGE NO: 395 AND 478

DATE: 05.15.20



LEGEND

- PROPOSED WATERLINE
- EXISTING WATERLINE
- CL Alignment

WATER LINE SUMMARY			
LINE	STREET	FROM	TO
LINE A	S 64TH W AVE	W 61ST ST	SOUTHWEST BLVD
LINE B	W 60TH ST S	S 64TH W AVE	
LINE C	S 63RD W AVE	W 61ST ST	W 60TH ST S
LINE D	S 62ND W AVE	W 60TH ST S	SOUTHWEST BLVD
LINE E	S 61ST W AVE	W 61ST ST	SOUTHWEST BLVD
LINE F	W 60TH ST S	S 61ST W AVE	
LINE G	S 60TH W AVE	W 61ST ST	SOUTHWEST BLVD
LINE H	W 60TH ST S	S 60TH W AVE	
LINE I	S 59TH W AVE	W 61ST ST	SOUTHWEST BLVD
LINE J	W 60TH ST S	S 59TH W AVE	
LINE K	W 61ST ST	S 57TH W AVE	
LINE L	S 57TH W AVE	W 61ST ST	W 60TH ST S
LINE M	W 65TH ST	S 50TH W AVE	W 64TH ST
LINE N	W 62ND ST	S 50TH W AVE	S 49TH W AVE

OKIE 811
Know what's below. Call before you dig.

LICENSED PROFESSIONAL ENGINEER
KEITH BEATTY
29905
OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

KEYMAP (SHEET 2 of 2)

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:
FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

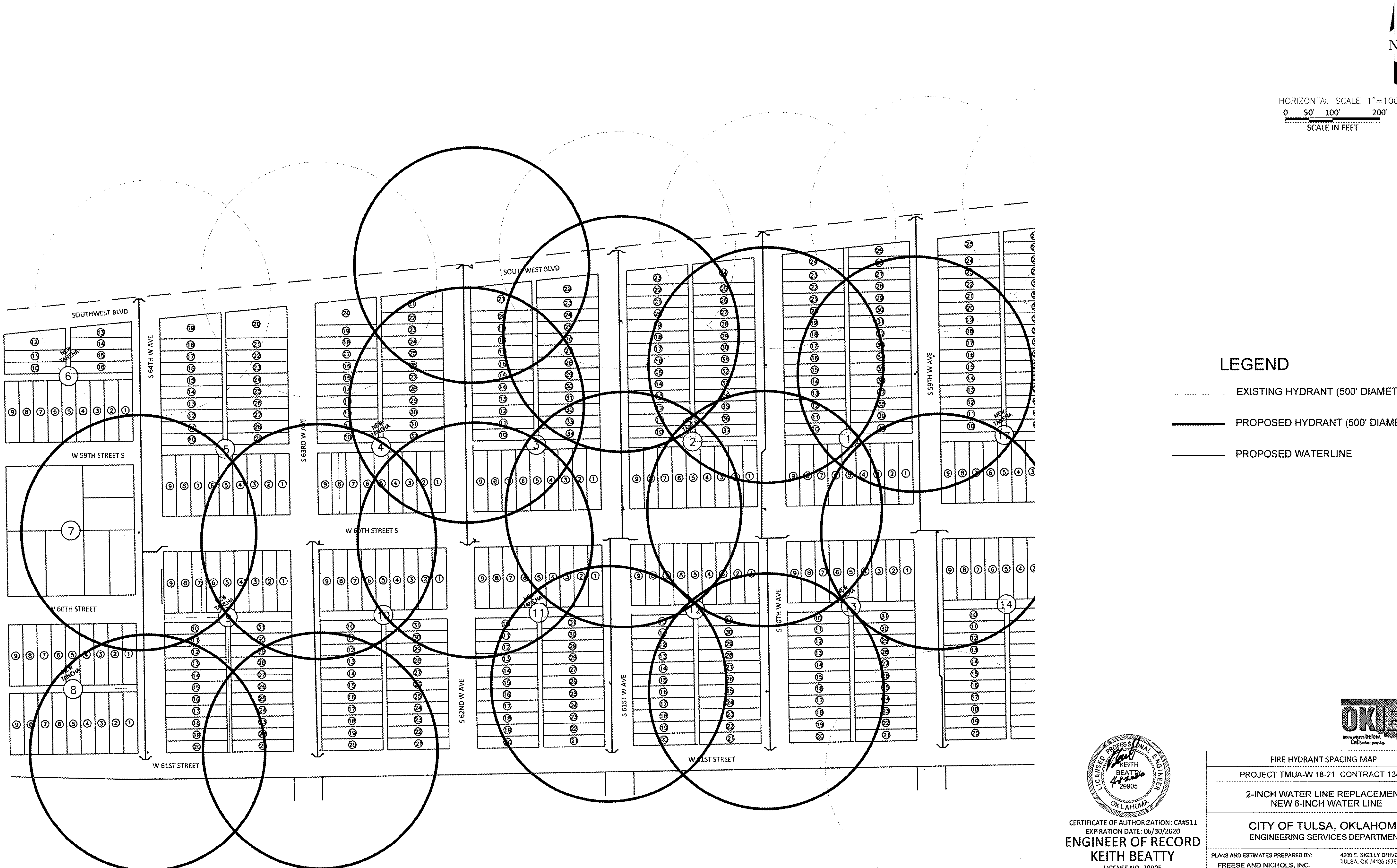
PLAN SCALE: 1"=N/A	DRAWN	BHT	04/2020
	DESIGNED	KDB	04/2020
	SURVEY	SDC	07/2019
PROFILE SCALE:	PROJ. MGR.		
HORIZONTAL 1"=N/A	LEAD ENGR.	CEW	4/20
	FIELD MGR.	ZEM	4/20
VERTICAL 1"=N/A	RECOMMENDED: DESIGN MANAGER	HAS	4.20

APPROVED:
CITY ENGINEER
DATE: 05.15.20

FILE: CV-WAT-PL-KEYMAP DRAWING:

ATLAS PAGE NO: 395 AND 478

SHEET 6 OF 51 SHEETS



LEGEND

EXISTING HYDRANT (500' DIAMETER)

PROPOSED HYDRANT (500' DIAMETER)

PROPOSED WATERLINE

LICENSED PROFESSIONAL ENGINEER
KEITH BEATTY
29905
OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

FIRE HYDRANT SPACING MAP

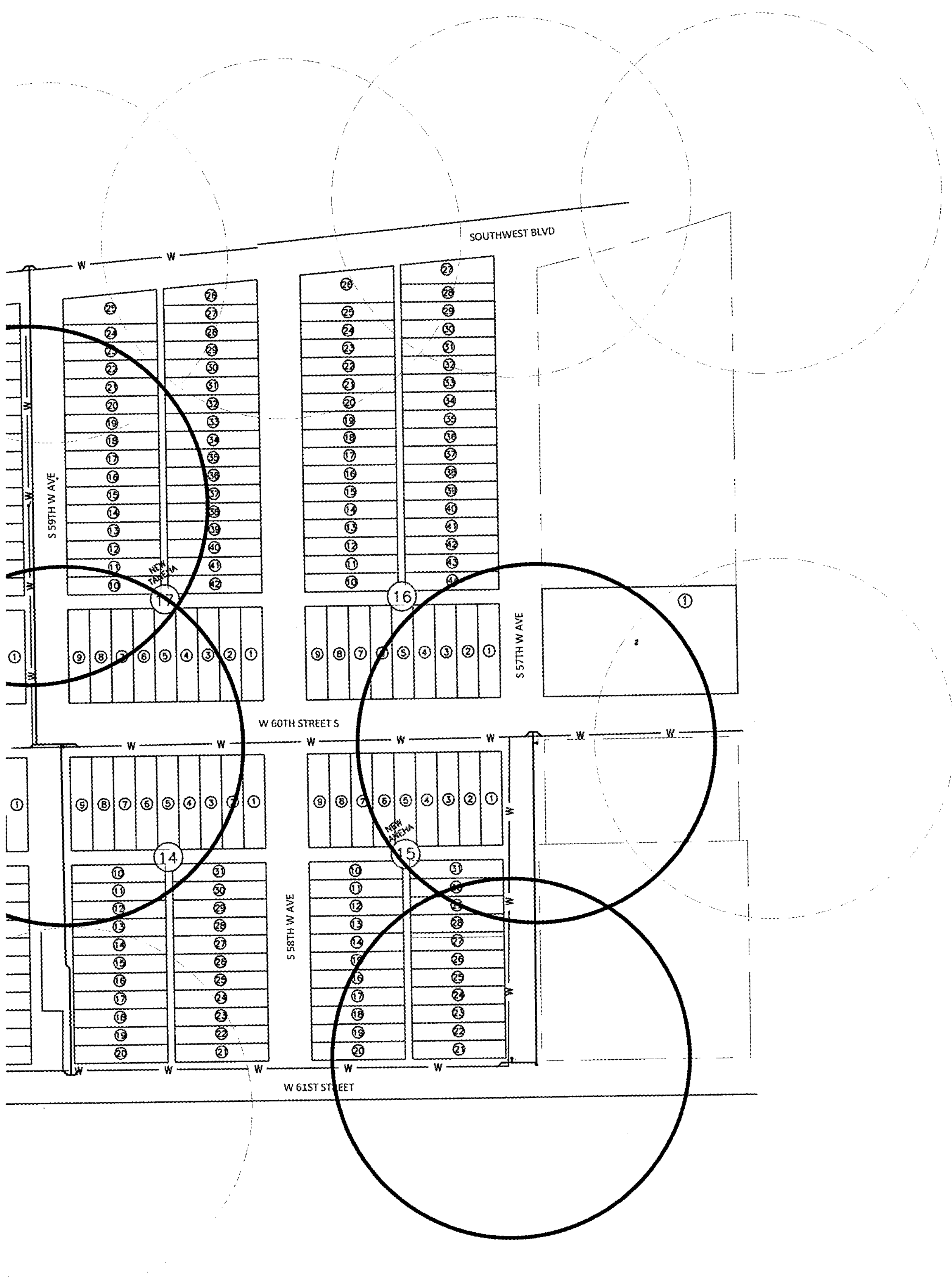
PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE	PLAN SCALE: 1"=100'	DRAWN	BHT	04/2020	APPROVED:
				DESIGNED	KDB	04/2020	
				SURVEY	SDC	07/2019	
			PROFILE SCALE:	PROJ. MGR.			
			HORIZONTAL 1"=N/A	LEAD ENGR.	CEW	4/20	
				FIELD MGR.		4/20	
			VERTICAL 1"=N/A	RECOMMENDED: HAS 4·20 DESIGN MANAGER			CITY ENGINEER
			FILE: CV-WAT-PL-FH	DRAWING:			DATE: 05.15.20
			ATLAS PAGE NO: 395 AND 478				SHEET 7 OF 51 SHEETS



N

HORIZONTAL SCALE 1"=100'
0 50' 100' 200'
SCALE IN FEET

LEGEND

EXISTING HYDRANT (500' DIAMETER)

PROPOSED HYDRANT (500' DIAMETER)

PROPOSED WATERLINE

OKIE 811
Know what's below. Call before you dig.

LICENSED PROFESSIONAL ENGINEER
KEITH BEATTY
29905
OKLAHOMA
4-?-20

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

FIRE HYDRANT SPACING MAP

PROJECT TMUA-W 18-21 CONTRACT 134789

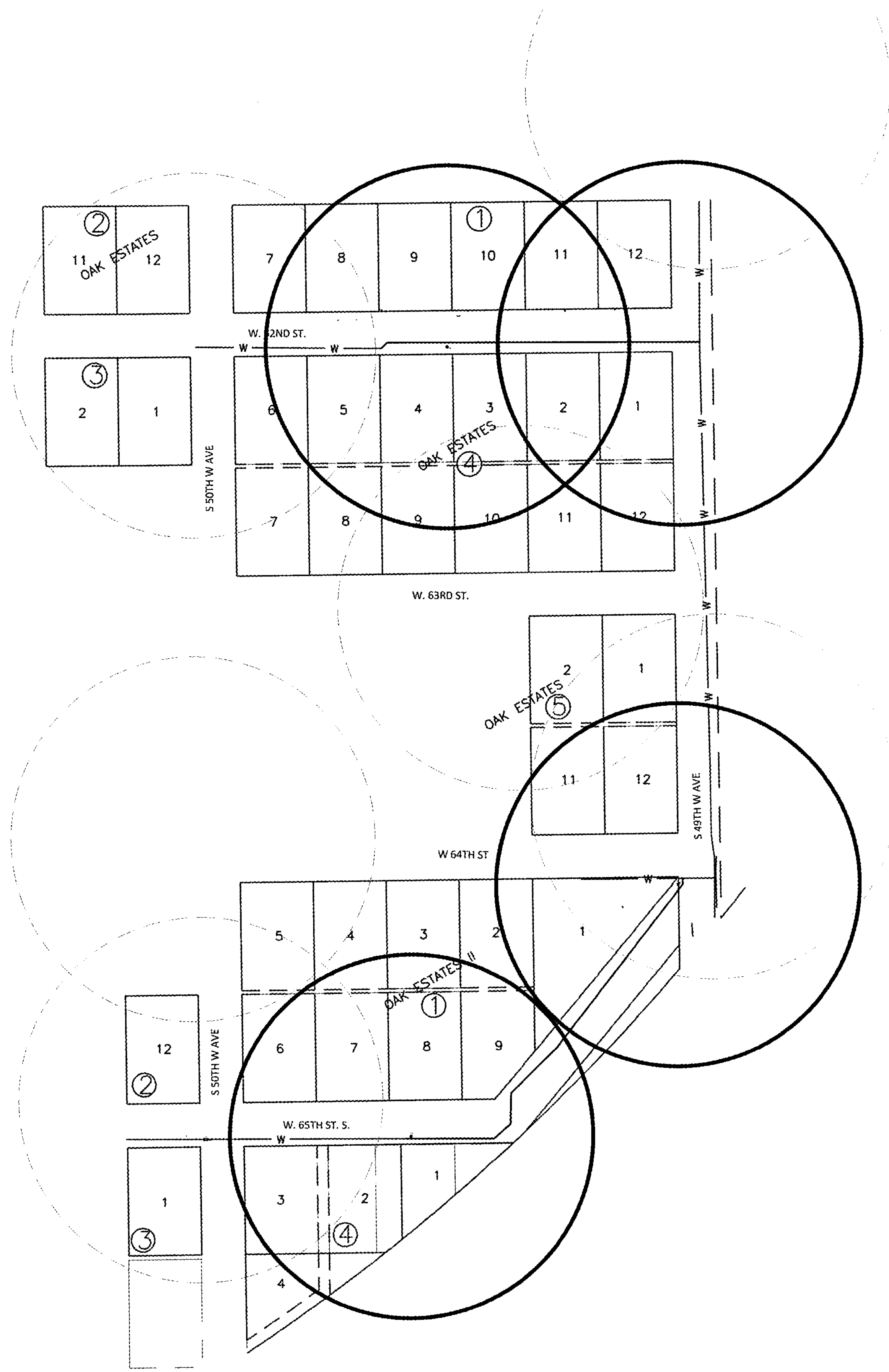
2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:
FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1"=100'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1"=N/A	LEAD ENGR.	CEW	4/20	
	FIELD MGR.	ZMM	4/20	
VERTICAL 1"=N/A	RECOMMENDED: DESIGN MANAGER	HAS	4.20	CITY ENGINEER
FILE: CV-WAT-PL-FH	DRAWING:			DATE: 05.15.20
ATLAS PAGE NO: 395 AND 478				SHEET 8 OF 51 SHEETS



N

HORIZONTAL SCALE 1"=100'
0 50' 100' 200'
SCALE IN FEET

LEGEND

EXISTING HYDRANT (500' DIAMETER)

PROPOSED HYDRANT (500' DIAMETER)

PROPOSED WATERLINE

LICENSED PROFESSIONAL ENGINEER
KEITH BEATTY
29905
OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

Know what's below. Call before you dig.

FIRE HYDRANT SPACING MAP

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:
FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1"=100'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1"=N/A	LEAD ENGR.	CEW	4/20	
	FIELD MGR.	[illegible]	4/20	
VERTICAL 1"=N/A	RECOMMENDED: HAS 4·20 DESIGN MANAGER			CITY ENGINEER
FILE: CV-WAT-PL-FH	DRAWING:			DATE: 05.15.20
ATLAS PAGE NO: 395 AND 478				SHEET 9 OF 51 SHEETS

Control Point Table				
Point #	Description	Northing	Easting	Elevation
CP 1	SET 5/8IN IP W/ CEC CP CAP	396739.0520	2545510.3727	783.50'
CP 2	SET 5/8IN IP W/ CEC CP CAP	395791.4165	2544827.0164	793.02'
CP 3	SET 5/8IN IP W/ CEC CP CAP	397183.0101	2540496.9740	768.18'
CP 4	SET 5/8IN IP W/ CEC CP CAP	397205.6056	2542766.9501	791.72'
CP 72	CITY OF TULSA CP # 72	397173.230	2546035.664	768.187'

HORIZONTAL SCALE 1"=60'

0 20' 40' 60' 120'

SCALE IN FEET

N

WATERLINE DATA				
LINE	START STATION	END STATION	START N&E	END N&E
A	10+00	19+96	N:397201.00 E:2540479.45	N:398196.40 E:2540464.22
B	1+00	1+70	N:397688.54 E:2540442.46	N:397689.60 E:2540512.68
C	25+00	30+00	N:397206.17 E:2540809.41	N:397706.06 E:2540801.76
D	35+00	40+96	N:397667.60 E:2541132.39	N:398263.65 E:2541123.65
E	45+00	55+81	N:397216.19 E:2541469.33	N:398297.29 E:2541453.18
F	2+00	2+96	N:397707.51 E:2541424.09	N:397707.87 E:2541520.15
G	60+00	71+15	N:397221.19 E:2541799.30	N:398336.17 E:2541782.05
H	3+00	4+00	N:397709.15 E:2541738.13	N:397710.62 E:2541838.01
I	75+00	86+38	N:397226.24 E:2542129.26	N:398364.51 E:2542111.90
J	5+00	5+93	N:397717.31 E:2542079.60	N:397718.55 E:2542172.32
K	6+00	6+82	N:397235.78 E:2542731.40	N:397236.81 E:2542813.81
L	90+00	94+90	N:397246.55 E:2542789.02	N:397736.22 E:2542781.53
M	110+00	19+50	N:395829.90 E:2544679.67	N:396171.70 E:2545464.4
M-PI1	115+18.71	-	N:395836.14 E:2545198.30	-
M-PI2	119+37.04	-	N:396158.78 E:2545464.89	-
N	100+00	105+00	N:396915.06 E:2544990.34	N:396919.94 E:2545490.26

Benchmark Table				
Point #	Description	Northing	Easting	Elevation
BM 201	SET 5/8IN IP	395810.6	2544371.4	817.13'
BM 202	SET 5/8IN IP	395855.1	2544147.3	824.22'
BM 203	SET 5/8IN IP	396162.6	2544420.9	823.70'
BM 204	SET 5/8IN IP	396173.2	2544147.6	820.40'
BM 205	SET 5/8IN IP	396476.9	2544538.2	810.53'
BM 206	SET 5/8IN IP	396525.1	2544250.1	805.99'
BM 207	SET CUT X TOC	396952.4	2545485.1	782.08'
BM 208	SET 5/8 INCH IP	396944.3	2545190.7	793.52'
BM 209	SET 5/8 INCH IP	396879.5	2544748.6	794.75'
BM 210	SET 5/8 IN IP	396097.2	2545449.4	802.37'
BM 211	SET 5/8 IN IP	395803.6	2545145.5	789.07'
BM 212	SET 5/8IN IP	397232.5	2540847.6	769.50'
BM 213	SET 5/8IN IP	397189.1	2541153.6	762.32'
BM 214	SET 5/8IN IP	397243.6	2541434.9	772.26'
BM 215	SET 5/8IN IP	397249.6	2541838.8	779.11'
BM 216	SET 5/8IN IP	397254.1	2542101.7	787.49'
BM 217	SET 5/8IN IP	397192.5	2542459.0	792.92'
BM 218	SET 5/8IN IP	397529.1	2542762.4	787.95'
BM 219	SET 5/8IN IP	397778.4	2542806.1	786.30'
BM 220	SET 5/8IN IP	397680.8	2542144.3	775.99'
BM 221	SET 5/8IN IP	398357.5	2542067.2	754.86
BM 222	SET 5/8IN IP	397768.5	2541778.7	776.08
BM 223	SET 5/8IN IP	398271.4	2541811.4	755.31
BM 224	SET 5/8IN IP	397732.3	2541440.6	773.77
BM 225	SET 5/8IN IP	398291.6	2541443.9	753.27
BM 226	SET 5/8IN IP	397638.7	2541162.6	769.85
BM 227	SET 5/8IN IP	398257.5	2541112.5	754.63
BM 228	SET 5/8IN IP	397736.5	2540837.4	776.46
BM 229	SET 5/8IN IP	397508.6	2540434.3	779.40
BM 230	SET 5/8IN IP	397690.7	2540450.3	774.51
BM 231	SET 5/8IN IP	398125.0	2540358.0	755.16

LEGEND

- LOT LINES
- ALIGNMENT
- RIGHT OF WAY WIDTH
- LOT NUMBERS
- CONTROL POINT
- BENCHMARKS

OKIE 811 Know what's below. Call before you dig.

SURVEY CONTROL DATA

1. HORIZONTAL DATUM IS TIED TO CITY OF TULSA SURVEY CONTROL MONUMENT # 72 WHICH IS ADJUSTED TO THE OKLAHOMA STATE PLANE NAD 83 (1993) COORDINATE SYSTEM, NORTH ZONE, PER MONUMENT #72 DATA SHEET.

2. BEARINGS:

THE BEARINGS SHOWN HEREIN OR HEREON ARE GRID BEARINGS DERIVED FROM THE USC & GS OKLAHOMA PLANE COORDINATE SYSTEM AND ARE NOT ASTRONOMICAL.

3. VERTICAL CONTROLS:

A. LEVEL DATUM IS NGS, NAVD 88, PER CITY OF TULSA SURVEY CONTROL MONUMENT # 72 AND ADJUSTED FROM PRIMARY CONTROL UTILIZING DIFFERENTIAL LEVELING TECHNIQUES.

B. ACCURACY - 3RD ORDER OR BETTER

LICENSED PROFESSIONAL LAND SURVEYOR SHANE D. CARROLL 1981 OKLAHOMA 09-22-20

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

SURVEY CONTROL & RIGHT OF WAY (SHEET 1 OF 5)

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-6677

REVISION	BY	DATE

PLAN SCALE: 1"=60'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1"=N/A	LEAD ENGR.	CEW	4/20	
	FIELD MGR.		4/20	
VERTICAL 1"=N/A	RECOMMENDED: HAS 4·20 DESIGN MANAGER			CITY ENGINEER
FILE: CV-SVR-EX-TOPO1	DRAWING:			DATE: 05.15.20
ATLAS PAGE NO: 395 AND 478				SHEET 10 OF 51 SHEETS

N

HORIZONTAL SCALE 1"=60'
0 20' 40' 60' 120'
SCALE IN FEET

Control Point Table				
Point #	Description	Northing	Easting	Elevation
CP 1	SET 5/8IN IP W/ CEC CP CAP	396739.0520	2545510.3727	783.50'
CP 2	SET 5/8IN IP W/ CEC CP CAP	395791.4165	2544827.0164	793.02'
CP 3	SET 5/8IN IP W/ CEC CP CAP	397183.0101	2540496.9740	768.18'
CP 4	SET 5/8IN IP W/ CEC CP CAP	397205.6056	2542766.9501	791.72'
CP 72	CITY OF TULSA CP # 72	397173.230	2546035.664	768.187'

WATERLINE DATA				
LINE	START STATION	END STATION	START N&E	END N&E
A	10+00	19+96	N:397201.00 E:2540479.45	N:398196.40 E:2540464.22
B	1+00	1+70	N:397688.54 E:2540442.46	N:397689.60 E:2540512.68
C	25+00	30+00	N:397206.17 E:2540809.41	N:397706.06 E:2540801.76
D	35+00	40+96	N:397667.60 E:2541132.39	N:398263.65 E:2541123.65
E	45+00	55+81	N:397216.19 E:2541469.33	N:398297.29 E:2541453.18
F	2+00	2+96	N:397707.51 E:2541424.09	N:397707.87 E:2541520.15
G	60+00	71+15	N:397221.19 E:2541799.30	N:398336.17 E:2541782.05
H	3+00	4+00	N:397709.15 E:2541738.13	N:397710.62 E:2541838.01
I	75+00	86+38	N:397226.24 E:2542129.26	N:398364.51 E:2542111.90
J	5+00	5+93	N:397717.31 E:2542079.60	N:397718.55 E:2542172.32
K	6+00	6+82	N:397235.78 E:2542731.40	N:397236.81 E:2542813.81
L	90+00	94+90	N:397246.55 E:2542789.02	N:397736.22 E:2542781.53
M	110+00	19+50	N:395829.90 E:2544679.67	N:396171.70 E:2545464.4
M-PI1	115+18.71	-	N:395836.14 E:2545198.30	-
M-PI2	119+37.04	-	N:396158.78 E:2545464.89	-
N	100+00	105+00	N:396915.06 E:2544990.34	N:396919.94 E:2545490.26

Benchmark Table				
Point #	Description	Northing	Easting	Elevation
BM 201	SET 5/8IN IP	395810.6	2544371.4	817.13'
BM 202	SET 5/8IN IP	395855.1	2544147.3	824.22'
BM 203	SET 5/8IN IP	396162.6	2544420.9	823.70'
BM 204	SET 5/8IN IP	396173.2	2544147.6	820.40'
BM 205	SET 5/8IN IP	396476.9	2544538.2	810.53'
BM 206	SET 5/8IN IP	396525.1	2544250.1	805.99'
BM 207	SET CUT X TOC	396952.4	2545485.1	782.08'
BM 208	SET 5/8 INCH IP	396944.3	2545190.7	793.52'
BM 209	SET 5/8 INCH IP	396879.5	2544748.6	794.75'
BM 210	SET 5/8 IN IP	396097.2	2545449.4	802.37'
BM 211	SET 5/8 IN IP	395803.6	2545145.5	789.07'
BM 212	SET 5/8IN IP	397232.5	2540847.6	769.50'
BM 213	SET 5/8IN IP	397189.1	2541153.6	762.32'
BM 214	SET 5/8IN IP	397243.6	2541434.9	772.26'
BM 215	SET 5/8IN IP	397249.6	2541838.8	779.11'
BM 216	SET 5/8IN IP	397254.1	2542101.7	787.49'
BM 217	SET 5/8IN IP	397192.5	2542459.0	792.92'
BM 218	SET 5/8IN IP	397529.1	2542762.4	787.95'
BM 219	SET 5/8IN IP	397778.4	2542806.1	786.30'
BM 220	SET 5/8IN IP	397680.8	2542144.3	775.99'
BM 221	SET 5/8IN IP	398357.5	2542067.2	754.86
BM 222	SET 5/8IN IP	397768.5	2541778.7	776.08
BM 223	SET 5/8IN IP	398271.4	2541811.4	755.31
BM 224	SET 5/8IN IP	397732.3	2541440.6	773.77
BM 225	SET 5/8IN IP	398291.6	2541443.9	753.27
BM 226	SET 5/8IN IP	397638.7	2541162.6	769.85
BM 227	SET 5/8IN IP	398257.5	2541112.5	754.63
BM 228	SET 5/8IN IP	397736.5	2540837.4	776.46
BM 229	SET 5/8IN IP	397508.6	2540434.3	779.40
BM 230	SET 5/8IN IP	397690.7	2540450.3	774.51
BM 231	SET 5/8IN IP	398125.0	2540358.0	755.16

LEGEND

- LOT LINES
- ALIGNMENT
- RIGHT OF WAY WIDTH
- LOT NUMBERS
- CONTROL POINT
- BENCHMARKS

OKIE 811
Know what's below. Call before you dig.

SHANE D. CARROLL 1981 LICENSED PROFESSIONAL LAND SURVEYOR OKLAHOMA 04-16-20

SURVEY CONTROL DATA

1. HORIZONTAL DATUM IS TIED TO CITY OF TULSA SURVEY CONTROL MONUMENT # 72 WHICH IS ADJUSTED TO THE OKLAHOMA STATE PLANE NAD 83 (1993) COORDINATE SYSTEM, NORTH ZONE, PER MONUMENT #72 DATA SHEET.

2. BEARINGS:

THE BEARINGS SHOWN HEREIN OR HEREON ARE GRID BEARINGS DERIVED FROM THE USC & GS OKLAHOMA PLANE COORDINATE SYSTEM AND ARE NOT ASTRONOMICAL.

3. VERTICAL CONTROLS:

A. LEVEL DATUM IS NGS, NAVD 88, PER CITY OF TULSA SURVEY CONTROL MONUMENT # 72 AND ADJUSTED FROM PRIMARY CONTROL UTILIZING DIFFERENTIAL LEVELING TECHNIQUES.

B. ACCURACY - 3RD ORDER OR BETTER

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA 4-8-20

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

SURVEY CONTROL & RIGHT OF WAY (SHEET 2 OF 5)

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410 TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1"=60'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1"=N/A	LEAD ENGR.	CEW	4/20	
	FIELD MGR.		4/20	
VERTICAL 1"=N/A	RECOMMENDED: HAS 4.20 DESIGN MANAGER			CITY ENGINEER
FILE: CV-SVR-EX-TOPO1	DRAWING:			DATE: 05.15.20
ATLAS PAGE NO: 395 AND 478				SHEET 11 OF 51 SHEETS

Control Point Table				
Point #	Description	Northing	Easting	Elevation
CP 1	SET 5/8IN IP W/ CEC CP CAP	396739.0520	2545510.3727	783.50'
CP 2	SET 5/8IN IP W/ CEC CP CAP	395791.4165	2544827.0164	793.02'
CP 3	SET 5/8IN IP W/ CEC CP CAP	397183.0101	2540496.9740	768.18'
CP 4	SET 5/8IN IP W/ CEC CP CAP	397205.6056	2542766.9501	791.72'
CP 72	CITY OF TULSA CP # 72	397173.230	2546035.664	768.187'

N

HORIZONTAL SCALE 1"=60'
0 20' 40' 60' 120'
SCALE IN FEET

WATERLINE DATA				
LINE	START STATION	END STATION	START N&E	END N&E
A	10+00	19+96	N:397201.00 E:2540479.45	N:398196.40 E:2540464.22
B	1+00	1+70	N:397688.54 E:2540442.46	N:397689.60 E:2540512.68
C	25+00	30+00	N:397206.17 E:2540809.41	N:397706.06 E:2540801.76
D	35+00	40+96	N:397667.60 E:2541132.39	N:398263.65 E:2541123.65
E	45+00	55+81	N:397216.19 E:2541469.33	N:398297.29 E:2541453.18
F	2+00	2+96	N:397707.51 E:2541424.09	N:397707.87 E:2541520.15
G	60+00	71+15	N:397221.19 E:2541799.30	N:398336.17 E:2541782.05
H	3+00	4+00	N:397709.15 E:2541738.13	N:397710.62 E:2541838.01
I	75+00	86+38	N:397226.24 E:2542129.26	N:398364.51 E:2542111.90
J	5+00	5+93	N:397717.31 E:2542079.60	N:397718.55 E:2542172.32
K	6+00	6+82	N:397235.78 E:2542731.40	N:397236.81 E:2542813.81
L	90+00	94+90	N:397246.55 E:2542789.02	N:397736.22 E:2542781.53
M	110+00	19+50	N:395829.90 E:2544679.67	N:396171.70 E:2545464.4
M-PI1	115+18.71	-	N:395836.14 E:2545198.30	-
M-PI2	119+37.04	-	N:396158.78 E:2545464.89	-
N	100+00	105+00	N:396915.06 E:2544990.34	N:396919.94 E:2545490.26

Benchmark Table				
Point #	Description	Northing	Easting	Elevation
BM 201	SET 5/8IN IP	395810.6	2544371.4	817.13'
BM 202	SET 5/8IN IP	395855.1	2544147.3	824.22'
BM 203	SET 5/8IN IP	396162.6	2544420.9	823.70'
BM 204	SET 5/8IN IP	396173.2	2544147.6	820.40'
BM 205	SET 5/8IN IP	396476.9	2544538.2	810.53'
BM 206	SET 5/8IN IP	396525.1	2544250.1	805.99'
BM 207	SET CUT X TOC	396952.4	2545485.1	782.08'
BM 208	SET 5/8 INCH IP	396944.3	2545190.7	793.52'
BM 209	SET 5/8 INCH IP	396879.5	2544748.6	794.75'
BM 210	SET 5/8 IN IP	396097.2	2545449.4	802.37'
BM 211	SET 5/8 IN IP	395803.6	2545145.5	789.07'
BM 212	SET 5/8IN IP	397232.5	2540847.6	769.50'
BM 213	SET 5/8IN IP	397189.1	2541153.6	762.32'
BM 214	SET 5/8IN IP	397243.6	2541434.9	772.26'
BM 215	SET 5/8IN IP	397249.6	2541838.8	779.11'
BM 216	SET 5/8IN IP	397254.1	2542101.7	787.49'
BM 217	SET 5/8IN IP	397192.5	2542459.0	792.92'
BM 218	SET 5/8IN IP	397529.1	2542762.4	787.95'
BM 219	SET 5/8IN IP	397778.4	2542806.1	786.30'
BM 220	SET 5/8IN IP	397680.8	2542144.3	775.99'
BM 221	SET 5/8IN IP	398357.5	2542067.2	754.86
BM 222	SET 5/8IN IP	397768.5	2541776.7	776.08
BM 223	SET 5/8IN IP	398271.4	2541811.4	755.31
BM 224	SET 5/8IN IP	397732.3	2541440.6	773.77
BM 225	SET 5/8IN IP	398291.6	2541443.9	753.27
BM 226	SET 5/8IN IP	397638.7	2541162.6	769.85
BM 227	SET 5/8IN IP	398257.5	2541112.5	754.63
BM 228	SET 5/8IN IP	397736.5	2540837.4	776.46
BM 229	SET 5/8IN IP	397508.6	2540434.3	779.40
BM 230	SET 5/8IN IP	397690.7	2540450.3	774.51
BM 231	SET 5/8IN IP	398125.0	2540358.0	755.16

LEGEND

LOT LINES
ALIGNMENT
60' R/W RIGHT OF WAY WIDTH
9 LOT NUMBERS
CONTROL POINT
BENCHMARKS

OKIE 811
Know what's below. Call before you dig.

LICENSED PROFESSIONAL LAND SURVEYOR
SHANE D. CARROLL
1981
OKLAHOMA

SURVEY CONTROL DATA

1. HORIZONTAL DATUM IS TIED TO CITY OF TULSA SURVEY CONTROL MONUMENT # 72 WHICH IS ADJUSTED TO THE OKLAHOMA STATE PLANE NAD 83 (1993) COORDINATE SYSTEM, NORTH ZONE, PER MONUMENT #72 DATA SHEET.

2. BEARINGS:

THE BEARINGS SHOWN HEREIN OR HEREON ARE GRID BEARINGS DERIVED FROM THE USC & GS OKLAHOMA PLANE COORDINATE SYSTEM AND ARE NOT ASTRONOMICAL.

3. VERTICAL CONTROLS:

A. LEVEL DATUM IS NGS, NAVD 88, PER CITY OF TULSA SURVEY CONTROL MONUMENT # 72 AND ADJUSTED FROM PRIMARY CONTROL UTILIZING DIFFERENTIAL LEVELING TECHNIQUES.

B. ACCURACY - 3RD ORDER OR BETTER

LICENSED PROFESSIONAL ENGINEER
KEITH BEATTY
29905
OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

REVISION	BY	DATE

SURVEY CONTROL & RIGHT OF WAY (SHEET 3 OF 5)

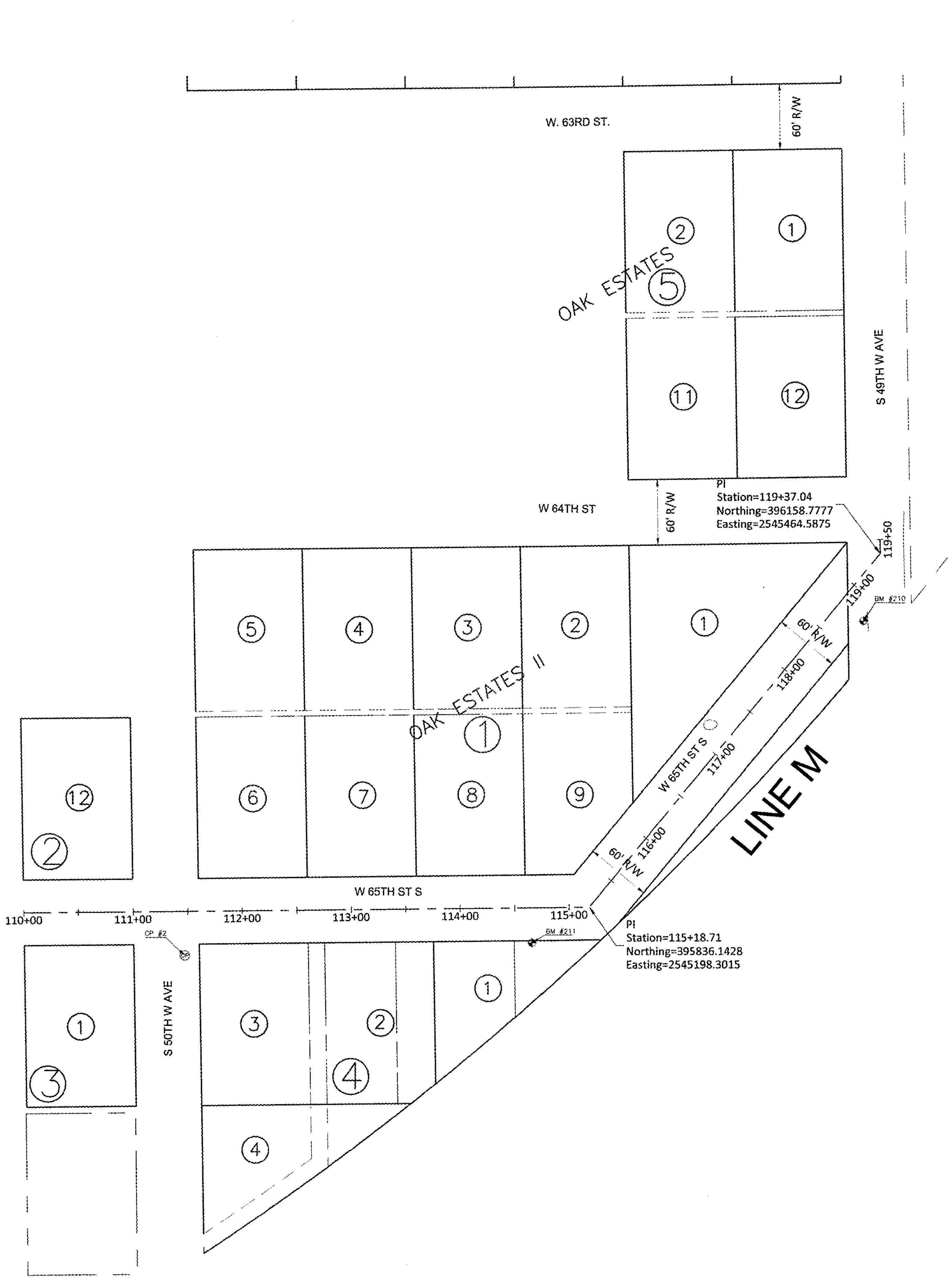
PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:
FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

PLAN SCALE: 1"=60'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1"=N/A	LEAD ENGR.	CEW	4/20	
	FIELD MGR.		4/20	
VERTICAL 1"=N/A	RECOMMENDED: HAS 4.20 DESIGN MANAGER			CITY ENGINEER
FILE: CV-SVR-EX-TOPO1	DRAWING:			DATE: 05.15.20
ATLAS PAGE NO: 395 AND 478				SHEET 12 OF 51 SHEETS



N

HORIZONTAL SCALE 1"=60'
0 20' 40' 60' 120'
SCALE IN FEET

Control Point Table				
Point #	Description	Northing	Easting	Elevation
CP 1	SET 5/8IN IP W/ CEC CP CAP	396739.0520	2545510.3727	783.50'
CP 2	SET 5/8IN IP W/ CEC CP CAP	395791.4165	2544827.0164	793.02'
CP 3	SET 5/8IN IP W/ CEC CP CAP	397183.0101	2540496.9740	768.18'
CP 4	SET 5/8IN IP W/ CEC CP CAP	397205.6056	2542766.9501	791.72'
CP 72	CITY OF TULSA CP # 72	397173.230	2546035.664	768.187'

WATERLINE DATA				
LINE	START STATION	END STATION	START N&E	END N&E
A	10+00	19+96	N:397201.00 E:2540479.45	N:398196.40 E:2540464.22
B	1+00	1+70	N:397688.54 E:2540442.46	N:397689.60 E:2540512.68
C	25+00	30+00	N:397206.17 E:2540809.41	N:397706.06 E:2540801.76
D	35+00	40+96	N:397667.60 E:2541132.39	N:398263.65 E:2541123.65
E	45+00	55+81	N:397216.19 E:2541469.33	N:398297.29 E:2541453.18
F	2+00	2+96	N:397707.51 E:2541424.09	N:397707.87 E:2541520.15
G	60+00	71+15	N:397221.19 E:2541799.30	N:398336.17 E:2541782.05
H	3+00	4+00	N:397709.15 E:2541738.13	N:397710.62 E:2541838.01
I	75+00	86+38	N:397226.24 E:2542129.26	N:398364.51 E:2542111.90
J	5+00	5+93	N:397717.31 E:2542079.60	N:397718.55 E:2542172.32
K	6+00	6+82	N:397235.78 E:2542731.40	N:397236.81 E:2542813.81
L	90+00	94+90	N:397246.55 E:2542789.02	N:397736.22 E:2542781.53
M	110+00	19+50	N:395829.90 E:2544679.67	N:396171.70 E:2545464.4
M-PI1	115+18.71	-	N:395836.14 E:2545198.30	-
M-PI2	119+37.04	-	N:396158.78 E:2545464.89	-
N	100+00	105+00	N:396915.06 E:2544990.34	N:396919.94 E:2545490.26

Benchmark Table				
Point #	Description	Northing	Easting	Elevation
BM 201	SET 5/8IN IP	395810.6	2544371.4	817.13'
BM 202	SET 5/8IN IP	395855.1	2544147.3	824.22'
BM 203	SET 5/8IN IP	396162.6	2544420.9	823.70'
BM 204	SET 5/8IN IP	396173.2	2544147.6	820.40'
BM 205	SET 5/8IN IP	396476.9	2544538.2	810.53'
BM 206	SET 5/8IN IP	396525.1	2544250.1	805.99'
BM 207	SET CUT X TOC	396952.4	2545485.1	782.08'
BM 208	SET 5/8 INCH IP	396944.3	2545190.7	793.52'
BM 209	SET 5/8 INCH IP	396879.5	2544748.6	794.75'
BM 210	SET 5/8 IN IP	396097.2	2545449.4	802.37'
BM 211	SET 5/8 IN IP	395803.6	2545145.5	789.07'
BM 212	SET 5/8IN IP	397232.5	2540847.6	769.50'
BM 213	SET 5/8IN IP	397189.1	2541153.6	762.32'
BM 214	SET 5/8IN IP	397243.6	2541434.9	772.26'
BM 215	SET 5/8IN IP	397249.6	2541838.8	779.11'
BM 216	SET 5/8IN IP	397254.1	2542101.7	787.49'
BM 217	SET 5/8IN IP	397192.5	2542459.0	792.92'
BM 218	SET 5/8IN IP	397529.1	2542762.4	787.95'
BM 219	SET 5/8IN IP	397778.4	2542806.1	786.30'
BM 220	SET 5/8IN IP	397680.8	2542144.3	775.99'
BM 221	SET 5/8IN IP	398357.5	2542067.2	754.86
BM 222	SET 5/8IN IP	397768.5	2541778.7	776.08
BM 223	SET 5/8IN IP	398271.4	2541811.4	755.31
BM 224	SET 5/8IN IP	397732.3	2541440.6	773.77
BM 225	SET 5/8IN IP	398291.6	2541443.9	753.27
BM 226	SET 5/8IN IP	397638.7	2541162.6	769.85
BM 227	SET 5/8IN IP	398257.5	2541112.5	754.63
BM 228	SET 5/8IN IP	397736.5	2540837.4	776.46
BM 229	SET 5/8IN IP	397508.6	2540434.3	779.40
BM 230	SET 5/8IN IP	397690.7	2540450.3	774.51
BM 231	SET 5/8IN IP	398125.0	2540358.0	755.16

LEGEND

- LOT LINES
- ALIGNMENT
- 60' R/W RIGHT OF WAY WIDTH
- 9 LOT NUMBERS
- CP #1 CONTROL POINT
- BM #210 BENCHMARKS

SURVEY CONTROL DATA

1. HORIZONTAL DATUM IS TIED TO CITY OF TULSA SURVEY CONTROL MONUMENT # 72 WHICH IS ADJUSTED TO THE OKLAHOMA STATE PLANE NAD 83 (1993) COORDINATE SYSTEM, NORTH ZONE, PER MONUMENT #72 DATA SHEET.

2. BEARINGS:

THE BEARINGS SHOWN HEREIN OR HEREON ARE GRID BEARINGS DERIVED FROM THE USC & GS OKLAHOMA PLANE COORDINATE SYSTEM AND ARE NOT ASTRONOMICAL.

3. VERTICAL CONTROLS:

A. LEVEL DATUM IS NGS, NAVD 88, PER CITY OF TULSA SURVEY CONTROL MONUMENT # 72 AND ADJUSTED FROM PRIMARY CONTROL UTILIZING DIFFERENTIAL LEVELING TECHNIQUES.

B. ACCURACY - 3RD ORDER OR BETTER

LICENSED PROFESSIONAL LAND SURVEYOR
SHANE D. CARROLL
1981
OKLAHOMA

LICENSED PROFESSIONAL ENGINEER
KEITH BEATTY
29905
OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

OKIE 811
Know what's below. Call before you dig.

SURVEY CONTROL & RIGHT OF WAY (SHEET 4 OF 5)

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:
FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1"=60'	DRAWN	SHT	04/2020
	DESIGNED	KOB	04/2020
	SURVEY	SDC	07/2019
PROFILE SCALE:	PROJ. MGR.		
HORIZONTAL 1"=N/A	LEAD ENGR.	CEW	4/20
	FIELD MGR.	ZCM	4/20
VERTICAL 1"=N/A	RECOMMENDED: HAS 4·20 DESIGN MANAGER		

APPROVED:
CITY ENGINEER
DATE: 05.15.20

FILE: CV-SVR-EX-TOPO1 DRAWING:

ATLAS PAGE NO: 395 AND 478

Control Point Table				
Point #	Description	Northing	Easting	Elevation
CP 1	SET 5/8IN IP W/ CEC CP CAP	396739.0520	2545510.3727	783.50'
CP 2	SET 5/8IN IP W/ CEC CP CAP	395791.4165	2544827.0164	793.02'
CP 3	SET 5/8IN IP W/ CEC CP CAP	397183.0101	2540496.9740	768.18'
CP 4	SET 5/8IN IP W/ CEC CP CAP	397205.6056	2542766.9501	791.72'
CP 72	CITY OF TULSA CP # 72	397173.230	2546035.664	768.187'

N

HORIZONTAL SCALE 1"=60'

0 20' 40' 60' 120'

SCALE IN FEET

WATERLINE DATA				
LINE	START STATION	END STATION	START N&E	END N&E
A	10+00	19+96	N:397201.00 E:2540479.45	N:398196.40 E:2540464.22
B	1+00	1+70	N:397688.54 E:2540442.46	N:397689.60 E:2540512.68
C	25+00	30+00	N:397206.17 E:2540809.41	N:397706.06 E:2540801.76
D	35+00	40+96	N:397667.60 E:2541132.39	N:398263.65 E:2541123.65
E	45+00	55+81	N:397216.19 E:2541469.33	N:398297.29 E:2541453.18
F	2+00	2+96	N:397707.51 E:2541424.09	N:397707.87 E:2541520.15
G	60+00	71+15	N:397221.19 E:2541799.30	N:398336.17 E:2541782.05
H	3+00	4+00	N:397709.15 E:2541738.13	N:397710.62 E:2541838.01
I	75+00	86+38	N:397226.24 E:2542129.26	N:398364.51 E:2542111.90
J	5+00	5+93	N:397717.31 E:2542079.60	N:397718.55 E:2542172.32
K	6+00	6+82	N:397235.78 E:2542731.40	N:397236.81 E:2542813.81
L	90+00	94+90	N:397246.55 E:2542789.02	N:397736.22 E:2542781.53
M	110+00	19+50	N:395829.90 E:2544679.67	N:396171.70 E:2545464.4
M-PI1	115+18.71	-	N:395836.14 E:2545198.30	-
M-PI2	119+37.04	-	N:396158.78 E:2545464.89	-
N	100+00	105+00	N:396915.06 E:2544990.34	N:396919.94 E:2545490.26

Benchmark Table				
Point #	Description	Northing	Easting	Elevation
BM 201	SET 5/8IN IP	395810.6	2544371.4	817.13'
BM 202	SET 5/8IN IP	395855.1	2544147.3	824.22'
BM 203	SET 5/8IN IP	396162.6	2544420.9	823.70'
BM 204	SET 5/8IN IP	396173.2	2544147.6	820.40'
BM 205	SET 5/8IN IP	396476.9	2544538.2	810.53'
BM 206	SET 5/8IN IP	396525.1	2544250.1	805.99'
BM 207	SET CUT X TOC	396952.4	2545485.1	782.08'
BM 208	SET 5/8 INCH IP	396944.3	2545190.7	793.52'
BM 209	SET 5/8 INCH IP	396879.5	2544748.6	794.75'
BM 210	SET 5/8 IN IP	396097.2	2545449.4	802.37'
BM 211	SET 5/8 IN IP	395803.6	2545145.5	789.07'
BM 212	SET 5/8IN IP	397232.5	2540847.6	769.50'
BM 213	SET 5/8IN IP	397189.1	2541153.6	762.32'
BM 214	SET 5/8IN IP	397243.6	2541434.9	772.26'
BM 215	SET 5/8IN IP	397249.6	2541838.8	779.11'
BM 216	SET 5/8IN IP	397254.1	2542101.7	787.49'
BM 217	SET 5/8IN IP	397192.5	2542459.0	792.92'
BM 218	SET 5/8IN IP	397529.1	2542762.4	787.95'
BM 219	SET 5/8IN IP	397778.4	2542806.1	786.30'
BM 220	SET 5/8IN IP	397680.8	2542144.3	775.99'
BM 221	SET 5/8IN IP	398357.5	2542067.2	754.86
BM 222	SET 5/8IN IP	397768.5	2541778.7	776.08
BM 223	SET 5/8IN IP	398271.4	2541811.4	755.31
BM 224	SET 5/8IN IP	397732.3	2541440.6	773.77
BM 225	SET 5/8IN IP	398291.6	2541443.9	753.27
BM 226	SET 5/8IN IP	397638.7	2541162.6	769.85
BM 227	SET 5/8IN IP	398257.5	2541112.5	754.63
BM 228	SET 5/8IN IP	397736.5	2540837.4	776.46
BM 229	SET 5/8IN IP	397508.6	2540434.3	779.40
BM 230	SET 5/8IN IP	397690.7	2540450.3	774.51
BM 231	SET 5/8IN IP	398125.0	2540358.0	755.16

LEGEND

- LOT LINES
- ALIGNMENT
- RIGHT OF WAY WIDTH
- 9 LOT NUMBERS
- CONTROL POINT
- BENCHMARKS

OKIE 811 Know what's below. Call before you dig.

LICENSED PROFESSIONAL LAND SURVEYOR SHANE D. CARROLL 1981 OKLAHOMA

SURVEY CONTROL DATA

1. HORIZONTAL DATUM IS TIED TO CITY OF TULSA SURVEY CONTROL MONUMENT # 72 WHICH IS ADJUSTED TO THE OKLAHOMA STATE PLANE NAD 83 (1993) COORDINATE SYSTEM, NORTH ZONE, PER MONUMENT #72 DATA SHEET.

2. BEARINGS:

THE BEARINGS SHOWN HEREIN OR HEREON ARE GRID BEARINGS DERIVED FROM THE USC & GS OKLAHOMA PLANE COORDINATE SYSTEM AND ARE NOT ASTRONOMICAL.

3. VERTICAL CONTROLS:

A. LEVEL DATUM IS NGS, NAVD 88, PER CITY OF TULSA SURVEY CONTROL MONUMENT # 72 AND ADJUSTED FROM PRIMARY CONTROL UTILIZING DIFFERENTIAL LEVELING TECHNIQUES.

B. ACCURACY - 3RD ORDER OR BETTER

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

SURVEY CONTROL & RIGHT OF WAY (SHEET 5 OF 5)

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC. 4200 E. SKELLY DRIVE SUITE 410 TULSA, OK 74135 (539) 444-8677

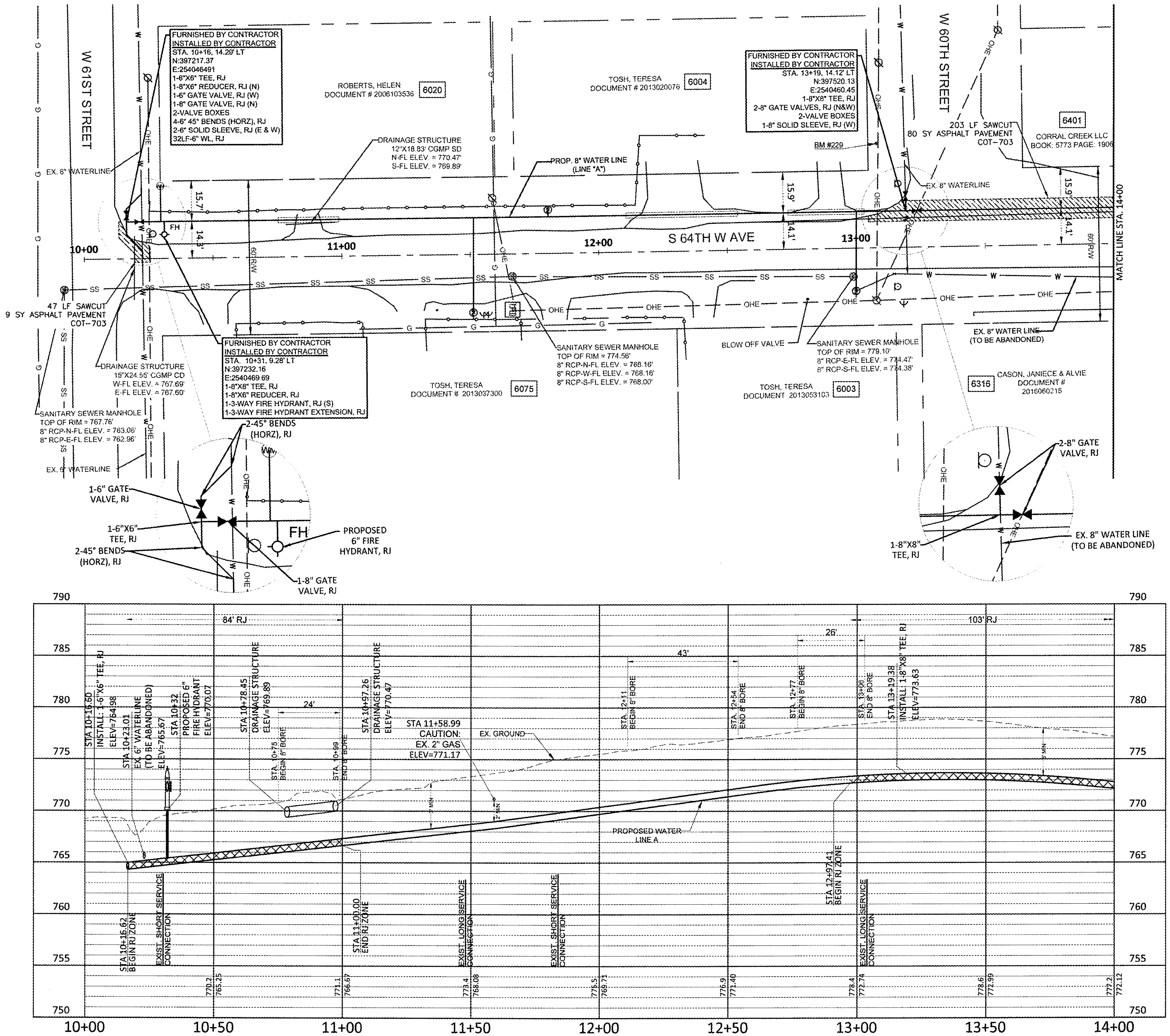
REVISION	BY	DATE

PLAN SCALE: 1"=60'	DRAWN	BHT	04/2020
	DESIGNED	KDB	04/2020
	SURVEY	SDC	07/2019
PROFILE SCALE:	PROJ. MGR.		
HORIZONTAL 1"=N/A	LEAD ENGR.	CGW	4/20
	FIELD MGR.	ZM	4/20
VERTICAL 1"=N/A	RECOMMENDED: HAS 4·20 DESIGN MANAGER		
FILE: CV-SVR-EX-TOPO1	DRAWING:		
ATLAS PAGE NO: 395 AND 478			

APPROVED:

CITY ENGINEER

DATE: 05.15.20



SERVICE CONNECTIONS	
LONG SERVICE	2 EA.
SHORT SERVICE	2 EA.

HORIZONTAL SCALE 1"=20'
0 10' 20' 40'
SCALE IN FEET

VERTICAL SCALE 1"=5'
0 5' 10'
SCALE IN FEET

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE: https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND – PLAN

- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND – PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.

OKIE 811 Know what's below. Call before you dig.

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

S 64TH W AVE

PLAN AND PROFILE WEST (SHEET 1 of 26)

PROJECT TMUA-W 18-21 CONTRACT 134789

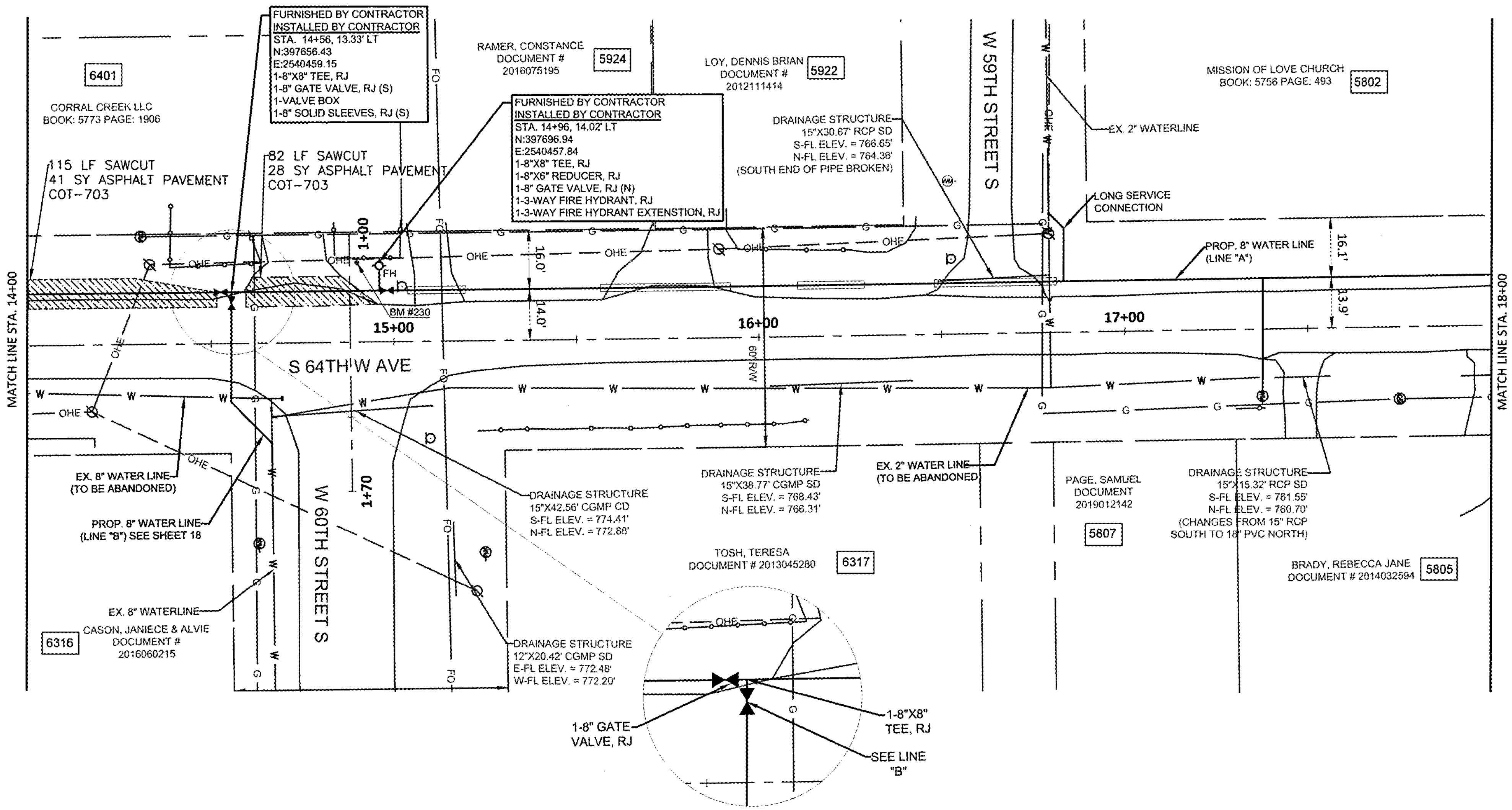
2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1" = 20'	LEAD ENGR.	CEW	4/20	
	FIELD MGR.	ZEA	4/20	
VERTICAL 1" = 5'	RECOMMENDED: HAS 4.20 DESIGN MANAGER			CITY ENGINEER
FILE: CV-WAT-PP-WTRL	DRAWING:			DATE: 05.15.20
ATLAS PAGE NO: 395 AND 478				SHEET 15 OF 51 SHEETS



SERVICE CONNECTIONS	
LONG SERVICE	2 EA.
SHORT SERVICE	0 EA.

HORIZONTAL SCALE 1"=20'

0 10' 20' 40'

SCALE IN FEET

VERTICAL SCALE 1"=5'

0 5' 10'

SCALE IN FEET

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6
CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE: https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe			
INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED			

LEGEND - PLAN

EXISTING SS

EXISTING GAS

EXISTING OHE

PROPOSED WATERLINE

BORE

PROPOSED WATER METER

ASPHALT PATCHING

5802 HOUSE NUMBER

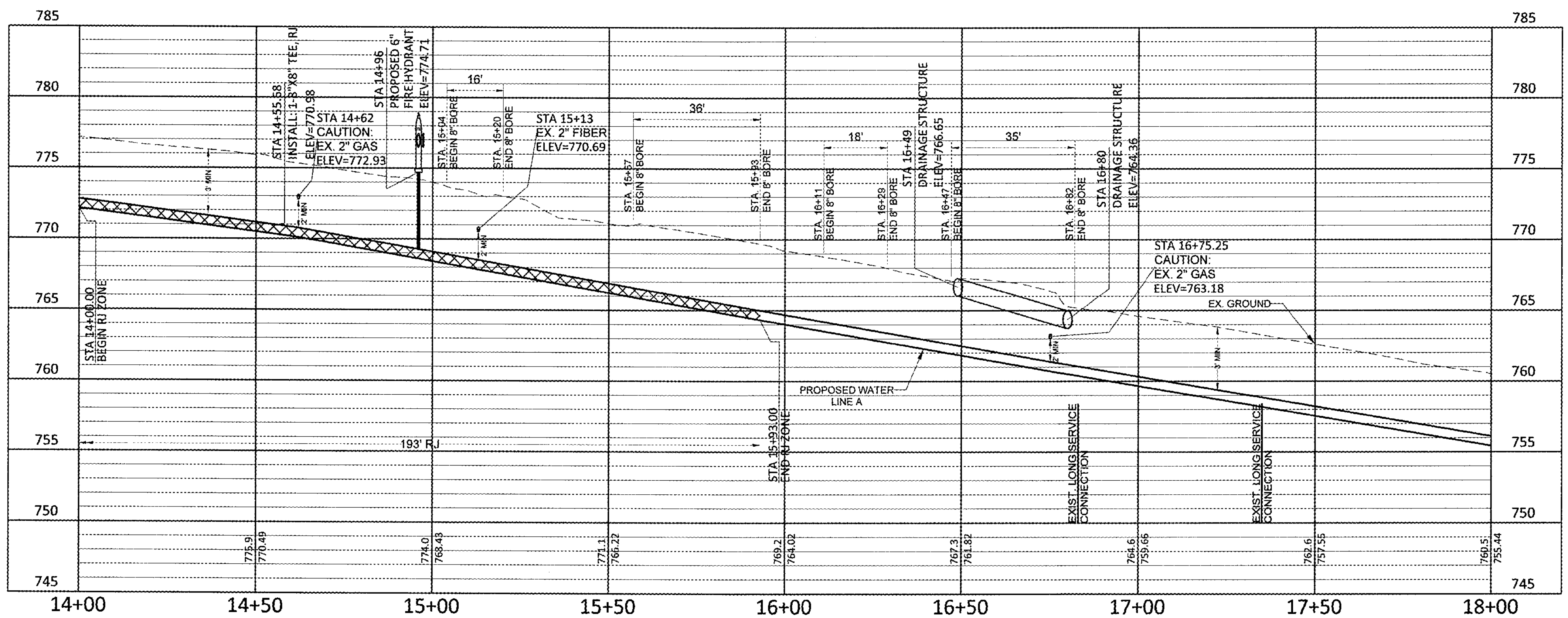
LEGEND - PROFILE

PROPOSED WATERLINE

RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.



S 64TH W AVE

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA

PLAN AND PROFILE WEST (SHEET 2 of 26)

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

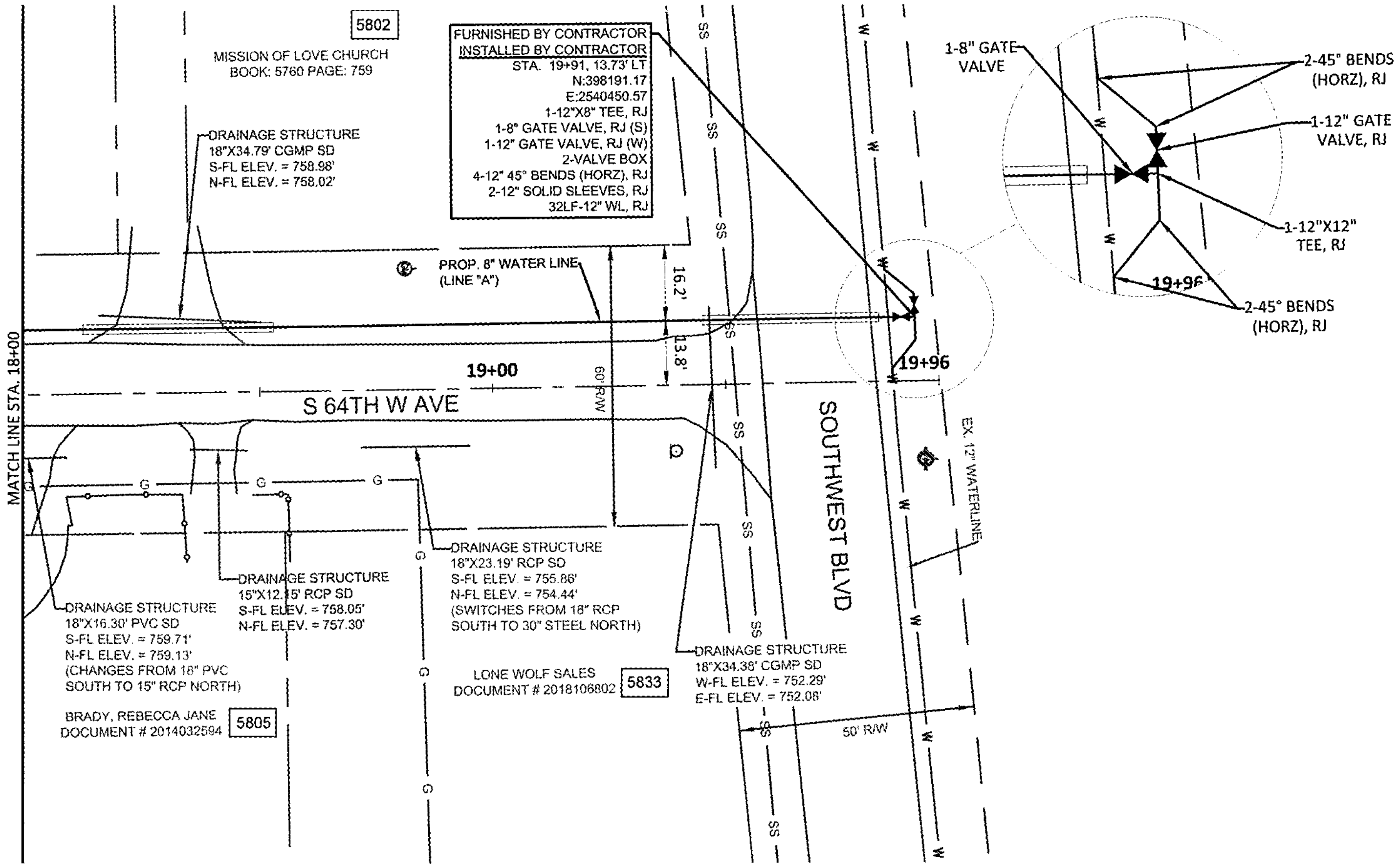
PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020
	DESIGNED	KDB	04/2020
	SURVEY	SDC	07/2019
PROFILE SCALE: HORIZONTAL 1" = 20' VERTICAL 1" = 5'	PROJ. MGR.		
	LEAD ENGR.	CEW 4/20	
	FIELD MGR.	4/20	
	RECOMMENDED: HAS 4.20 DESIGN MANAGER		

APPROVED: CITY ENGINEER

FILE: CV-WAT-PP-WTRL DRAWING:

DATE: 05.15.20

ATLAS PAGE NO: 395 AND 478



SERVICE CONNECTIONS	
LONG SERVICE	0 EA.
SHORT SERVICE	0 EA.

HORIZONTAL SCALE 1"=20'
0 10' 20' 40'
SCALE IN FEET

VERTICAL SCALE 1"=5'
0 5' 10'
SCALE IN FEET

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE:
https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND – PLAN

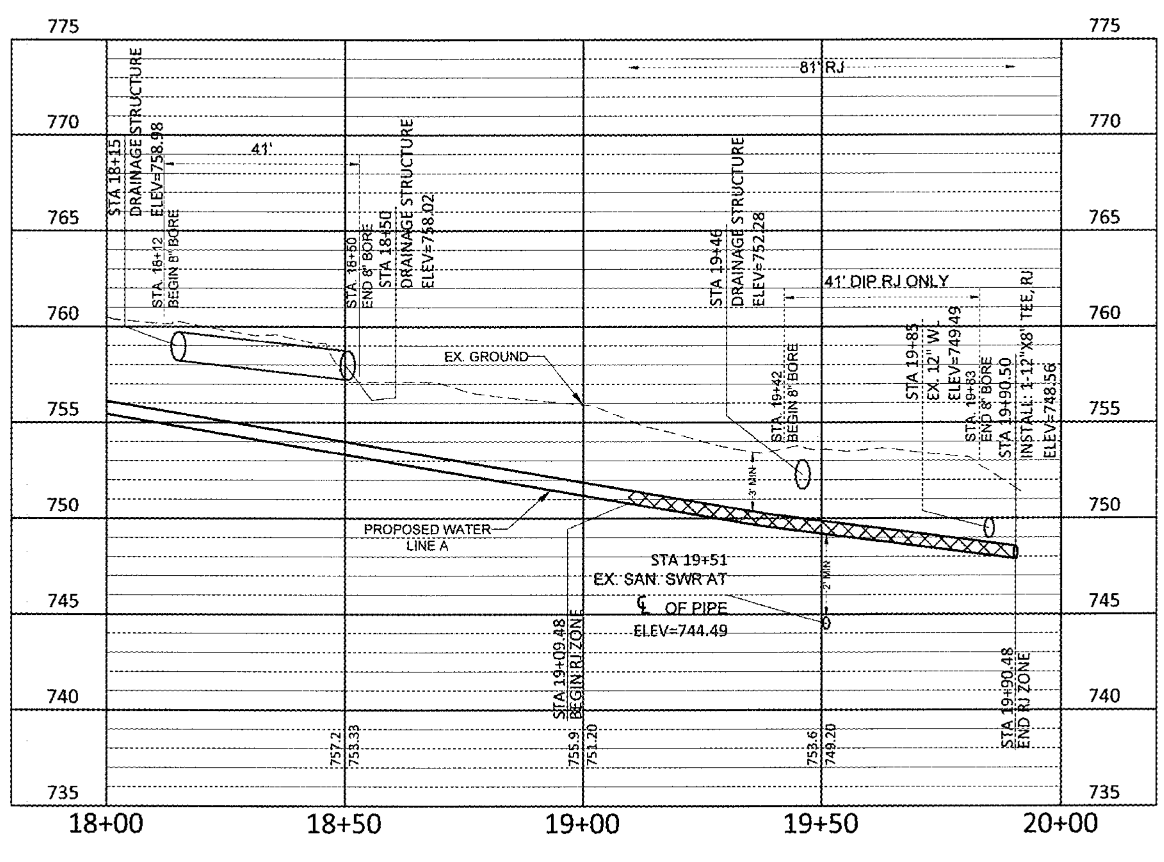
- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND – PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.



CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA

OKIE 811 Know what's below. Call before you dig.

S 64TH W AVE

PLAN AND PROFILE WEST (SHEET 3 of 26)

PROJECT TMUA-W 18-21 CONTRACT 134789

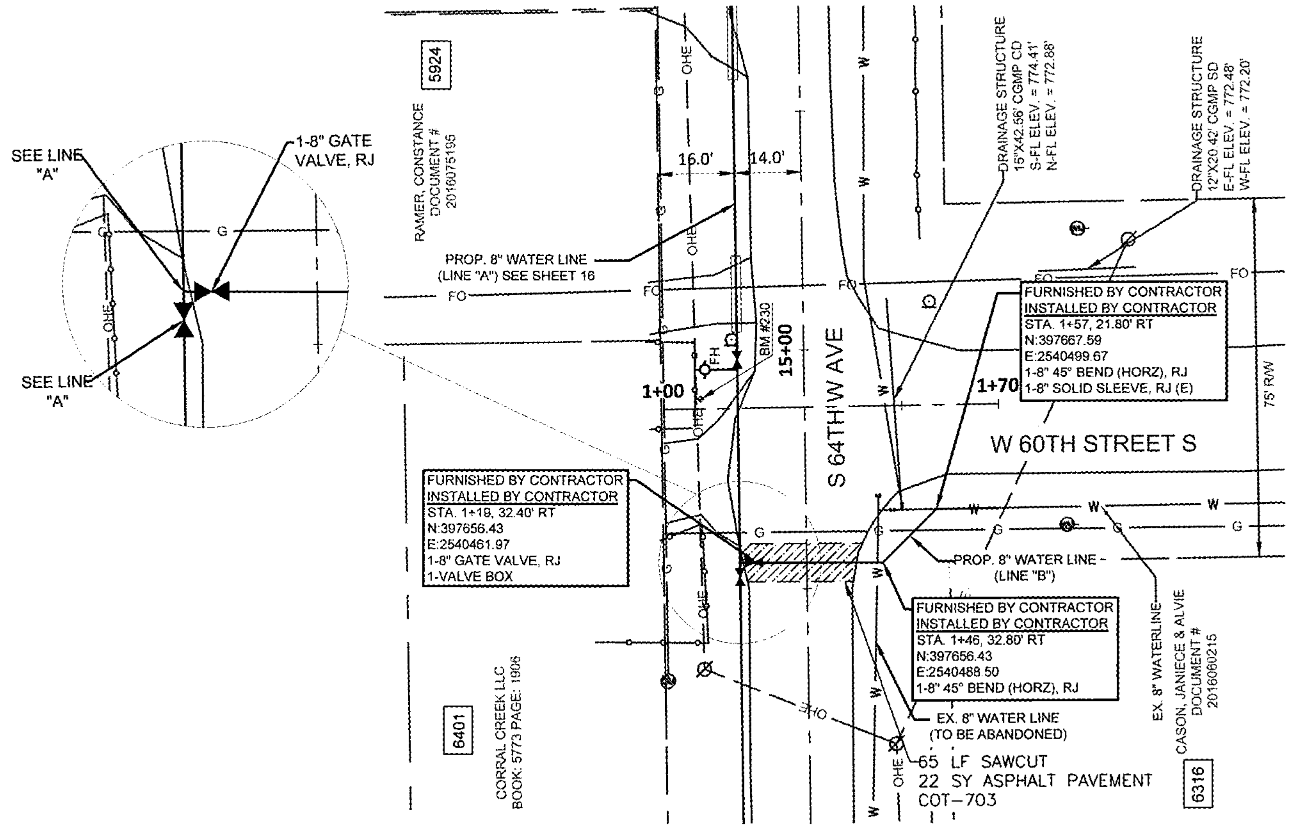
2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1" = 20'	LEAD ENGR.		CEW 4/20	
	FIELD MGR.		4/20	
VERTICAL 1" = 5'	RECOMMENDED: DESIGN MANAGER		HAS 4-20	CITY ENGINEER
FILE: CV-WAT-PP-WTRL	DRAWING:			DATE: 05.15.20
ATLAS PAGE NO: 395 AND 478				SHEET 17 OF 51 SHEETS



SERVICE CONNECTIONS	
LONG SERVICE	0 EA.
SHORT SERVICE	0 EA.

N

HORIZONTAL SCALE 1"=20'

0 10' 20' 40'

SCALE IN FEET

VERTICAL SCALE 1"=5'

0 5' 10'

SCALE IN FEET

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE:
https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND – PLAN

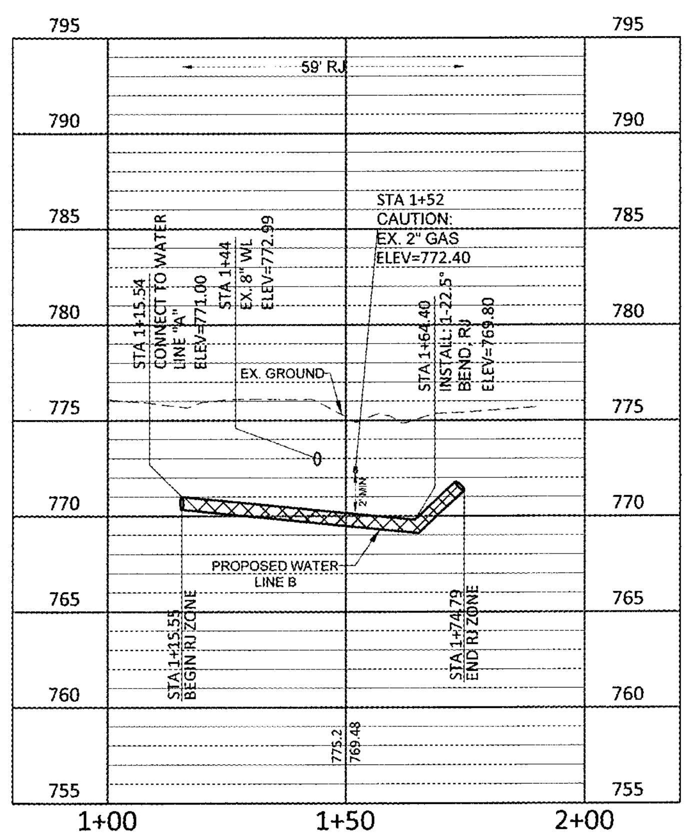
- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND – PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.



OKIE 811

S 64TH W AVE

PLAN AND PROFILE WEST (SHEET 4 of 26)

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA

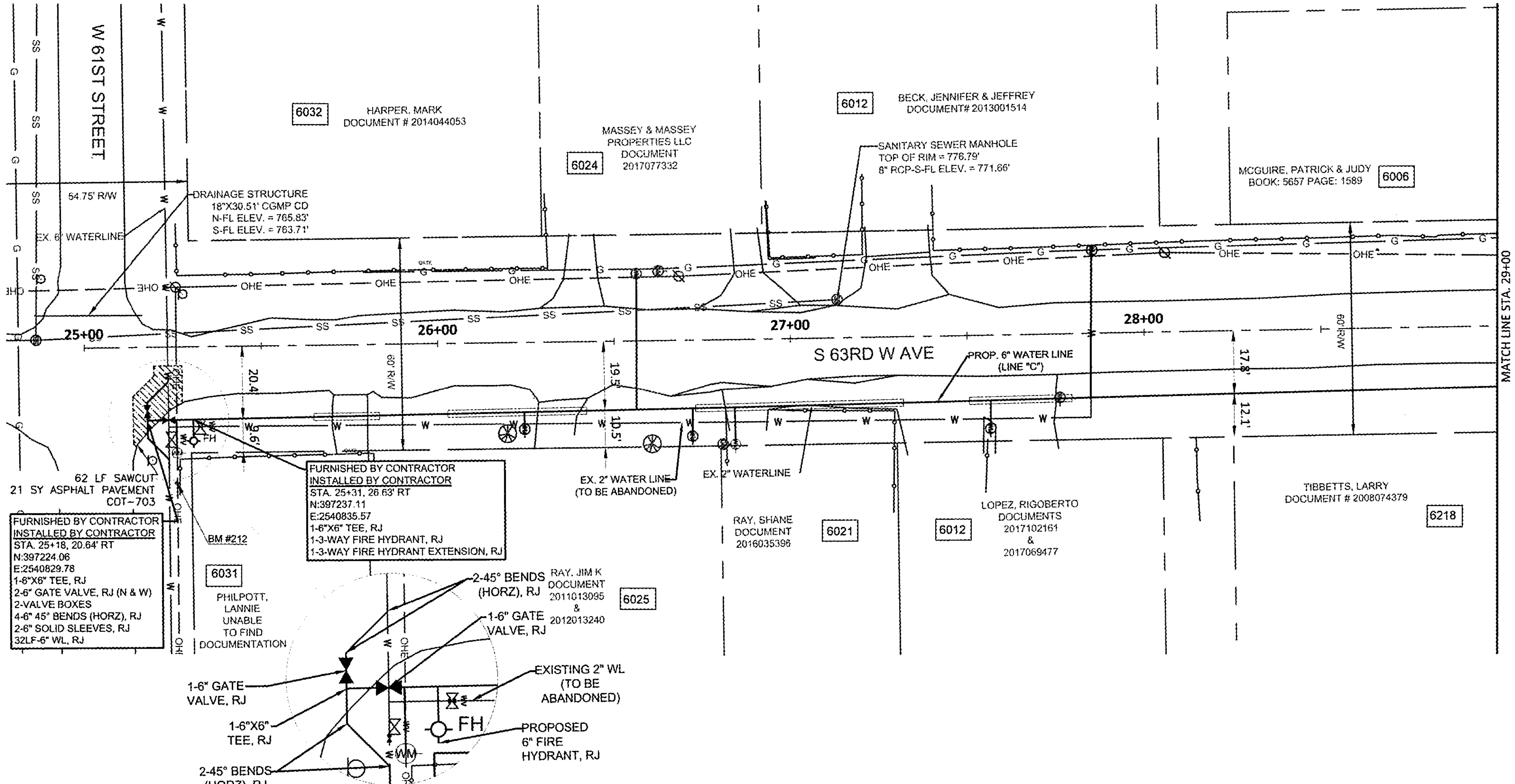
CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

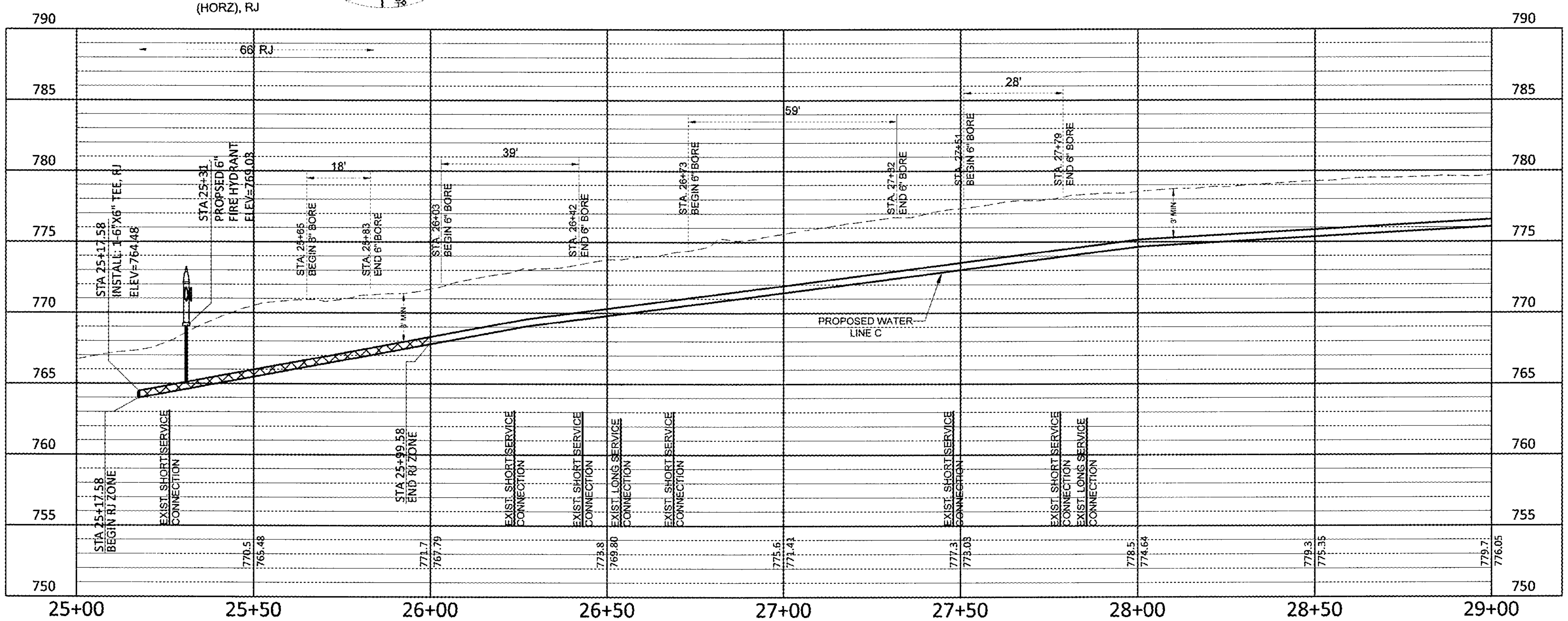
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC. 4200 E. SKELLY DRIVE SUITE 410 TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1" = 20'	LEAD ENGR.	CEW 4/20		
	FIELD MGR.	[illegible] 4/20		
VERTICAL 1" = 5'	RECOMMENDED: DESIGN MANAGER	HAS 4-20		CITY ENGINEER
FILE: CV-WAT-PP-WTRL	DRAWING:			DATE: 05.15.20
ATLAS PAGE NO: 395 AND 478				SHEET 18 OF 51 SHEETS





SERVICE CONNECTIONS	
LONG SERVICE	2 EA.
SHORT SERVICE	6 EA.

HORIZONTAL SCALE 1"=20'
0 10' 20' 40'
SCALE IN FEET

VERTICAL SCALE 1"=5'
0 5' 10'
SCALE IN FEET

REQUIRED RESTRAINED LENGTH

FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE:
https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND – PLAN

- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND – PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.

OKIE811 Know what's below. Call before you dig.

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA 4-8-20

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

S 63RD W AVE

PLAN AND PROFILE WEST (SHEET 5 of 26)

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

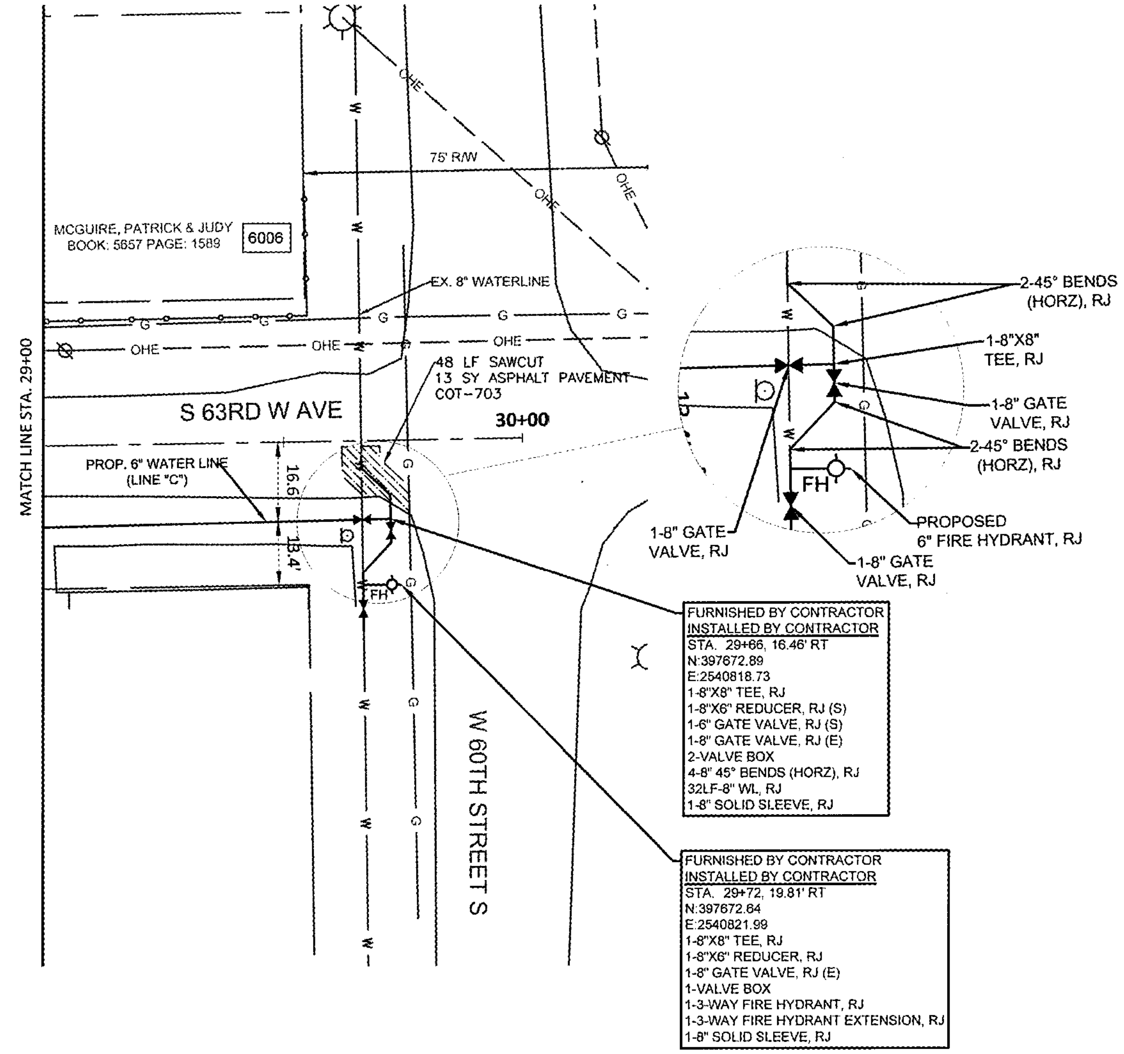
CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

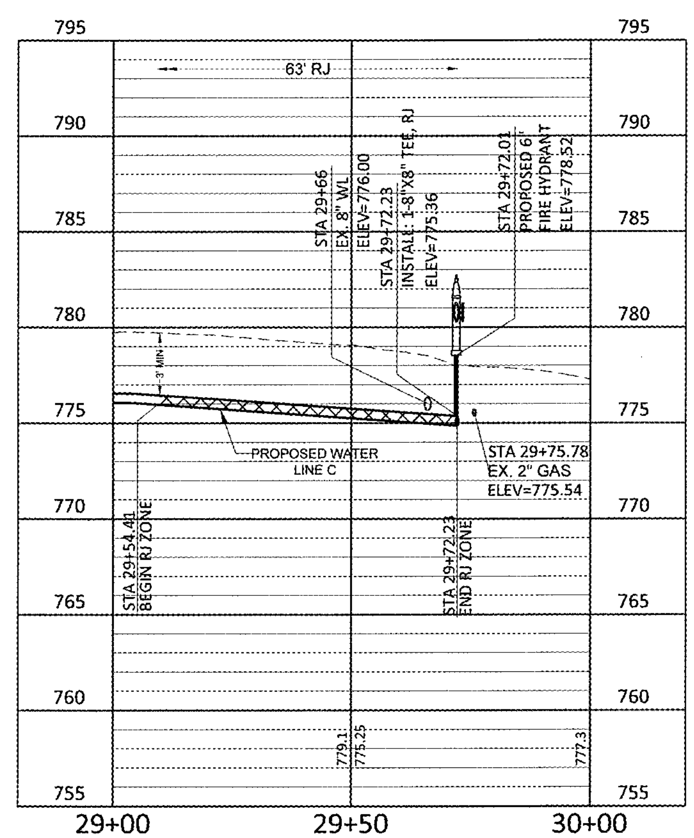
PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC. 4200 E. SKELLY DRIVE SUITE 410 TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1" = 20'	LEAD ENGR.	CEW 4/20		
	FIELD MGR.	FOW 4/20		
VERTICAL 1" = 5'	RECOMMENDED: DESIGN MANAGER	HAS 4-20		CITY ENGINEER
FILE: CV-WAT-PP-WTRL	DRAWING:			DATE:
ATLAS PAGE NO: 395 AND 476				SHEET 19 OF 51 SHEETS

PATH NAME: ...\CV-WAT-PP-WTRL WEST01.dwg BHT 4/7/20





SERVICE CONNECTIONS	
LONG SERVICE	0 EA.
SHORT SERVICE	0 EA.

HORIZONTAL SCALE 1"=20'

0 10' 20' 40'

SCALE IN FEET

VERTICAL SCALE 1"=5'

0 5' 10'

SCALE IN FEET

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE:
https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND - PLAN

- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND - PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.

OKIE 811 Know what's below. Call before you dig.

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA 4-8-2020

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

S 63RD W AVE

PLAN AND PROFILE WEST (SHEET 6 of 26)

PROJECT TMUA-W 18-21 CONTRACT 134789

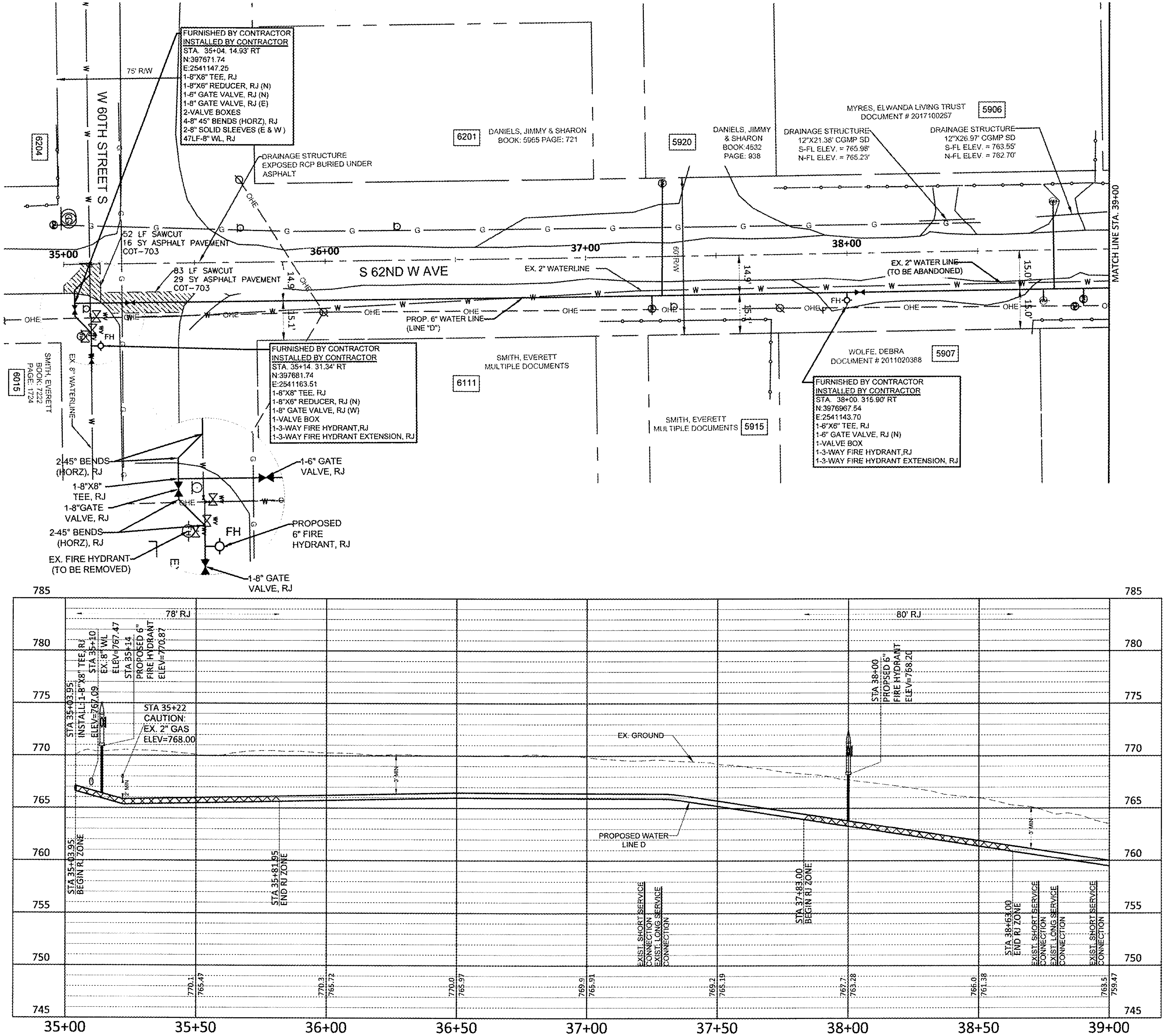
2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC. 4200 E. SKELLY DRIVE SUITE 410 TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1" = 20'	LEAD ENGR.	CBW	4/20	
	FIELD MGR.		4/20	
VERTICAL 1" = 5'	RECOMMENDED: DESIGN MANAGER	HAS	4-20	CITY ENGINEER
FILE: CV-WAT-PP-WTRL	DRAWING:			DATE: 05-15-20
ATLAS PAGE NO: 395 AND 478				SHEET 20 OF 51 SHEETS



SERVICE CONNECTIONS	
LONG SERVICE	2 EA.
SHORT SERVICE	3 EA.

HORIZONTAL SCALE 1"=20'
0 10' 20' 40'
SCALE IN FEET

VERTICAL SCALE 1"=5'
0 5' 10'
SCALE IN FEET

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE:
https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND - PLAN

- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND - PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.

OKIE811 Know what's below. Call before you dig.

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

S 62ND W AVE

PLAN AND PROFILE WEST (SHEET 7 of 26)

PROJECT TMUA-W 18-21 CONTRACT 134789

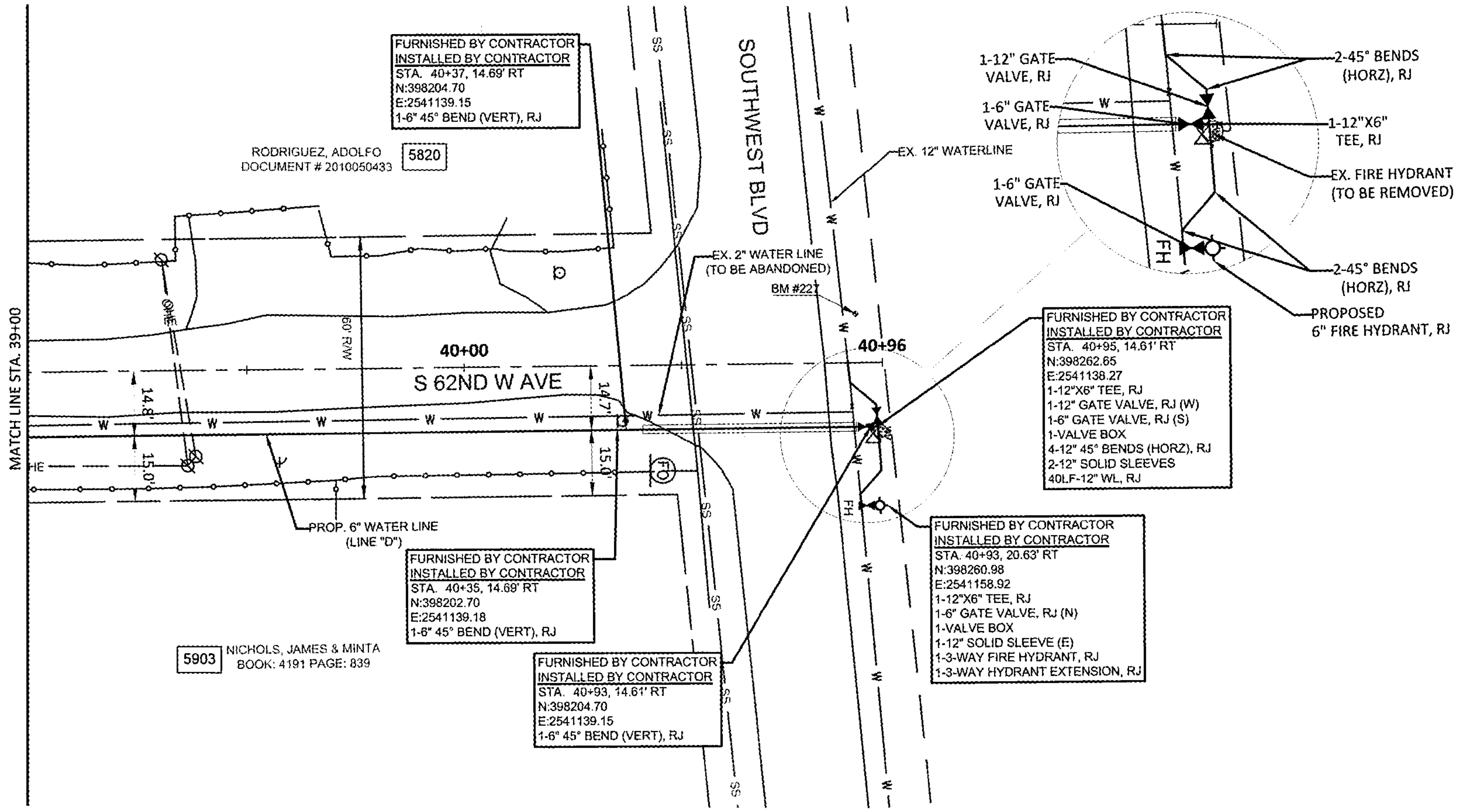
2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410 TULSA, OK 74135 (539) 444-8877

REVISION	BY	DATE

PLAN SCALE:	DRAWN	BHT	04/2020	APPROVED:
1" = 20'	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1" = 20'	LEAD ENGR.	CEW 4/20		
	FIELD MGR.	4/20		
VERTICAL 1" = 5'	RECOMMENDED: HAS 4-20 DESIGN MANAGER			CITY ENGINEER
FILE: CV-WAT-PP-WTRL	DRAWING:			DATE: 05.15.20
ATLAS PAGE NO: 395 AND 478				SHEET 21 OF 51 SHEETS



SERVICE CONNECTIONS	
LONG SERVICE	0 EA.
SHORT SERVICE	0 EA.

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE: https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

HORIZONTAL SCALE 1"=20'
0 10' 20' 40'
SCALE IN FEET

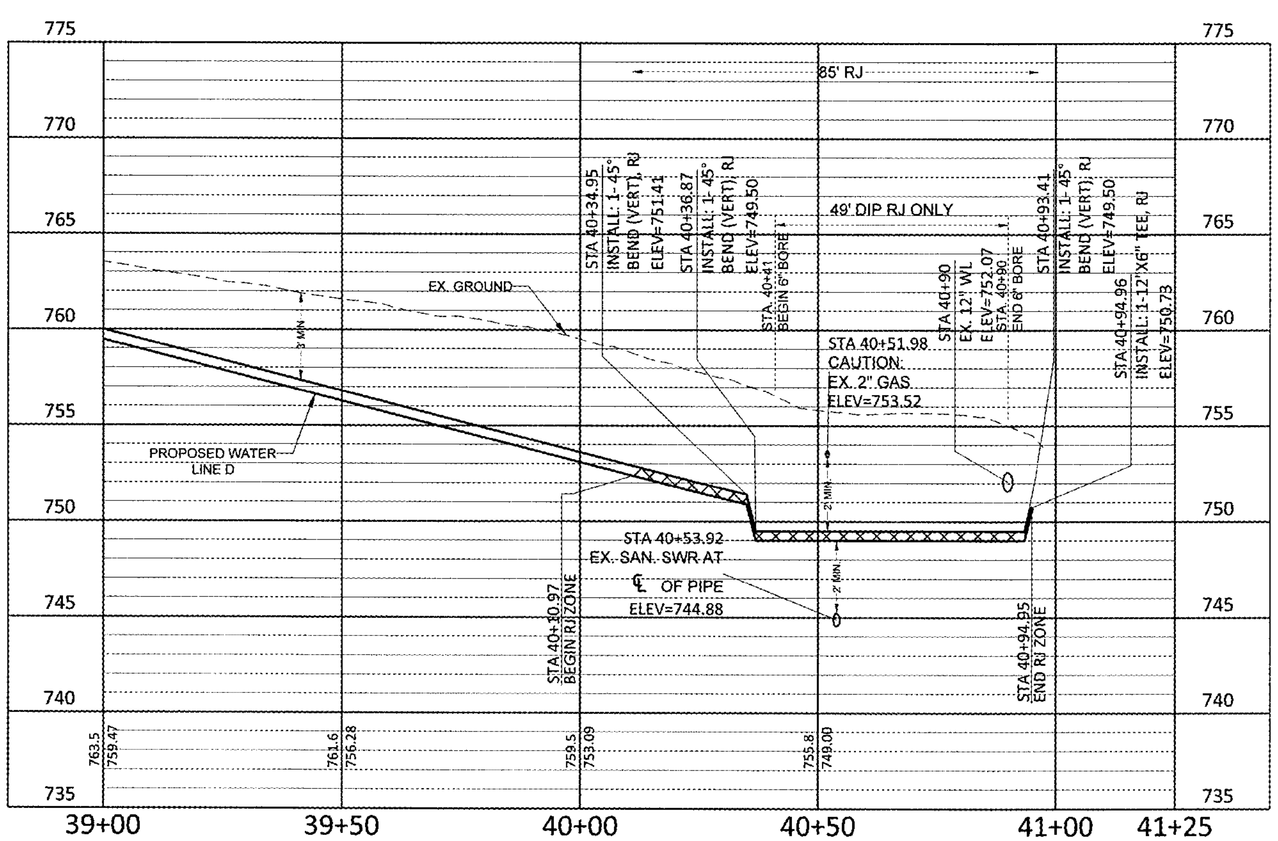
VERTICAL SCALE 1"=5'
0 5' 10'
SCALE IN FEET

LEGEND - PLAN

- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND - PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS



NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.

OKIE 811 Know what's below. Call before you dig.

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

S 62ND W AVE

PLAN AND PROFILE WEST (SHEET 8 of 26)

PROJECT TMUA-W 18-21 CONTRACT 134789

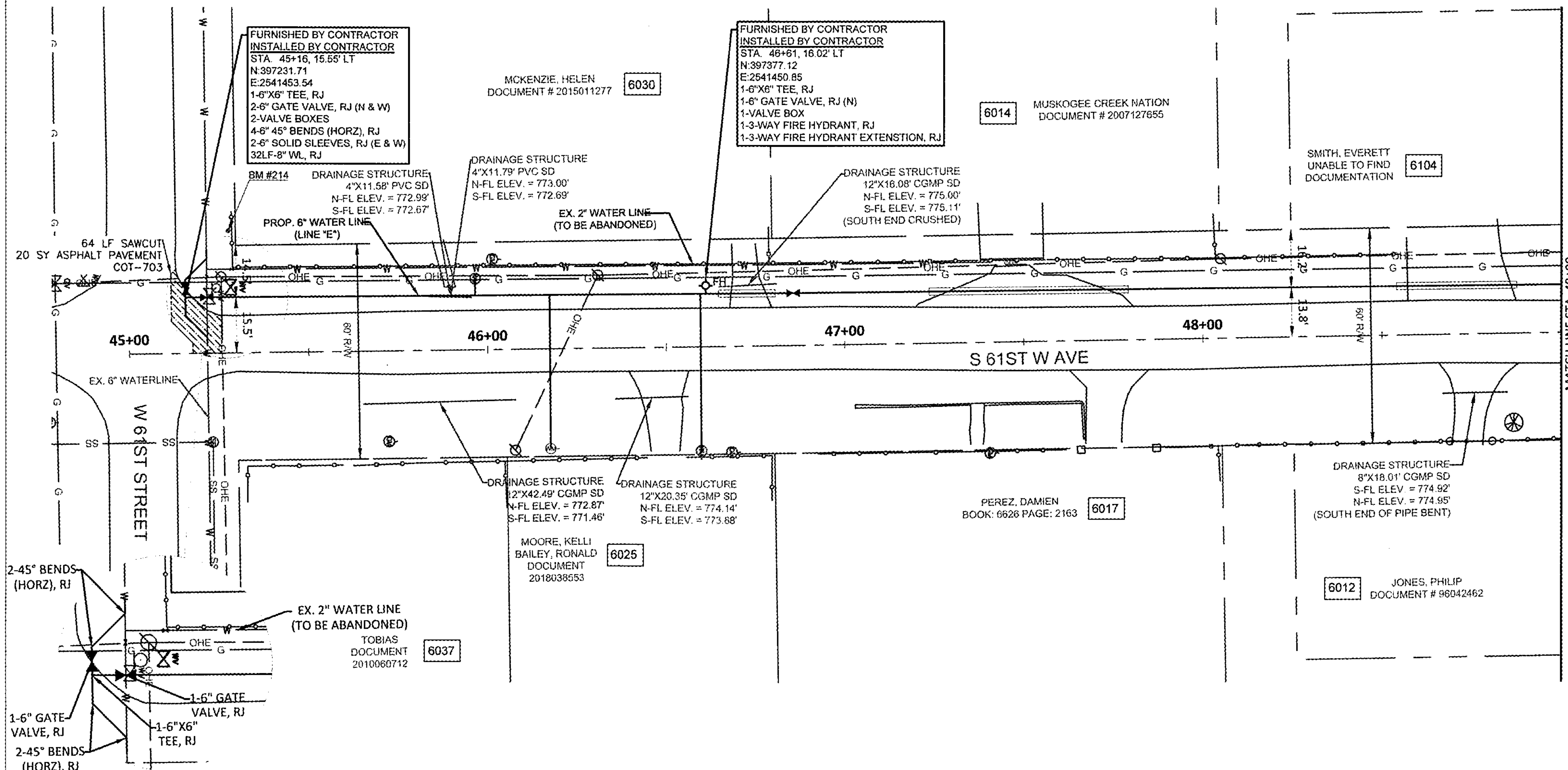
2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC. 4200 E. SKELLY DRIVE SUITE 410 TULSA, OK 74135 (539) 444-8877

REVISION	BY	DATE

PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1" = 20'	LEAD ENGR.	CEW 4/20		
	FIELD MGR.	ZCW 4/20		
VERTICAL 1" = 5'	RECOMMENDED: HAS 4-20 DESIGN MANAGER			CITY ENGINEER
FILE: CV-WAT-PP-WTRL	DRAWING:			DATE: 05.15.20
ATLAS PAGE NO. 395 AND 478				SHEET 22 OF 51 SHEETS



SERVICE CONNECTIONS	
LONG SERVICE	2 EA.
SHORT SERVICE	1 EA.

HORIZONTAL SCALE 1"=20'

0 10' 20' 40'

SCALE IN FEET

VERTICAL SCALE 1"=5'

0 5' 10'

SCALE IN FEET

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE:
https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND – PLAN

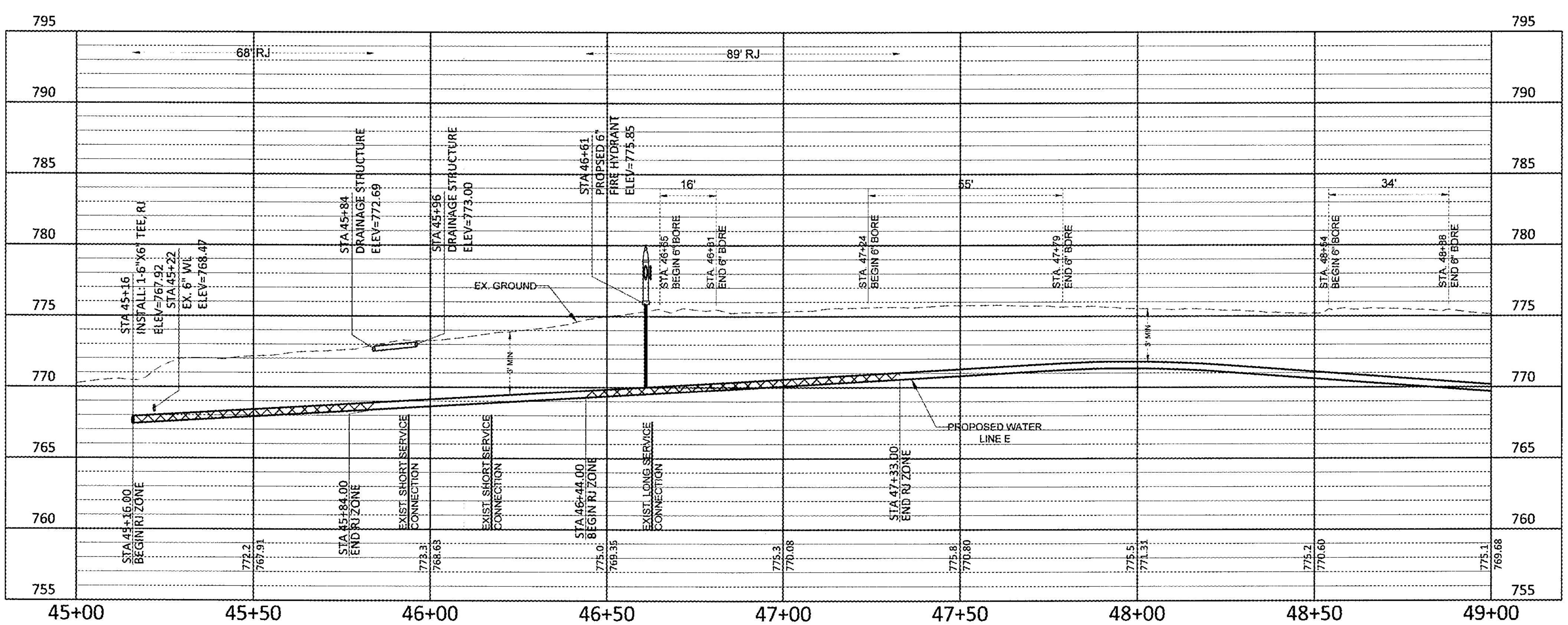
- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND – PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.



CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

S 61ST W AVE

PLAN AND PROFILE WEST (SHEET 9 of 26)

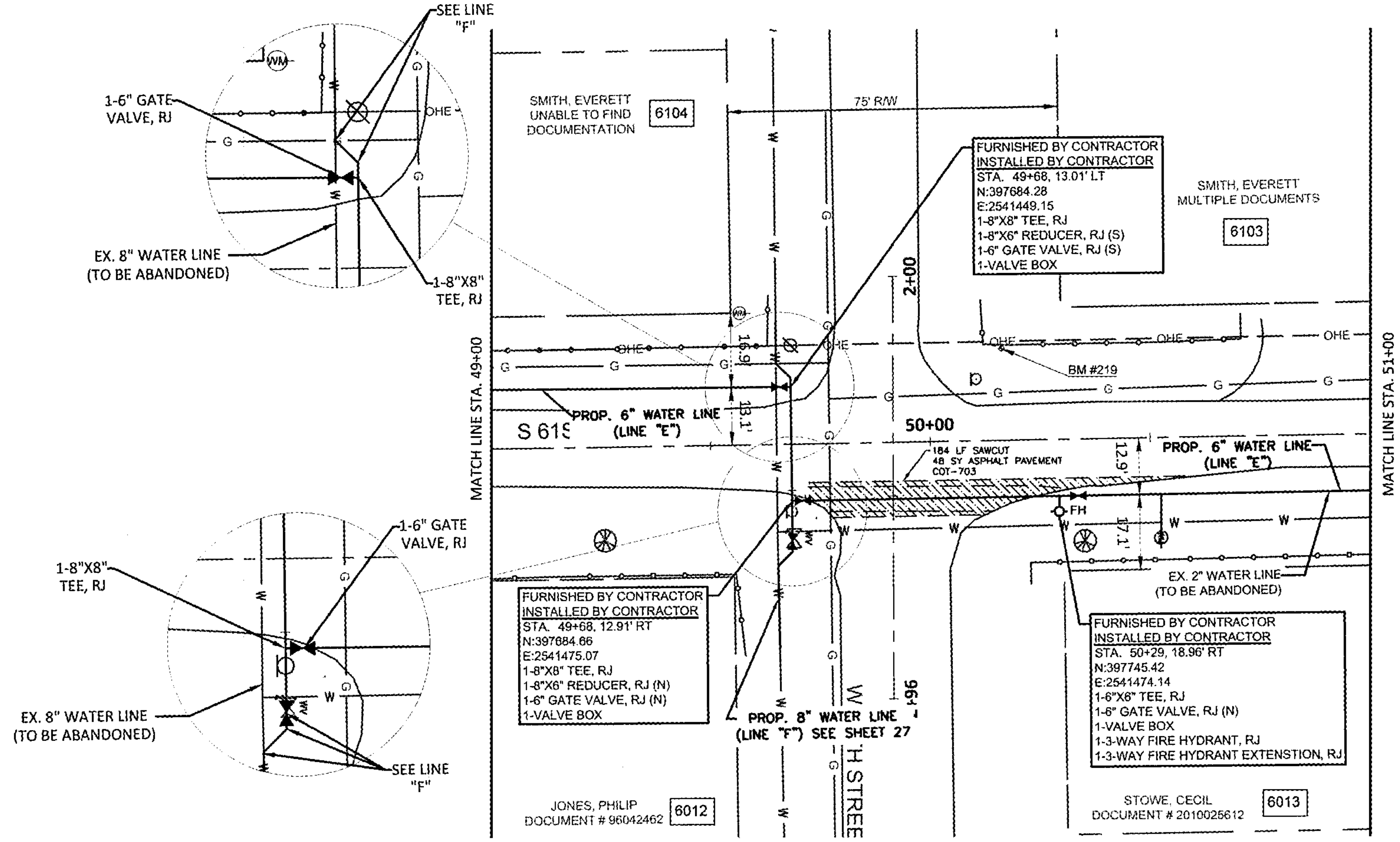
PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE	PLAN SCALE:				APPROVED:
			1" = 20'	DRAWN	BHT	04/2020	
				DESIGNED	KDB	04/2020	
				SURVEY	SDC	07/2019	
			PROFILE SCALE:	PROJ MGR.			
			HORIZONTAL 1" = 20'	LEAD ENGR.	CBO 4/20		
				FIELD MGR.	ZCW 4/20		
			VERTICAL 1" = 5'	RECOMMENDED	HAS 4-20		
				DESIGN MANAGER			CITY ENGINEER
			FILE: CV-WAT-PP-WTRL	DRAWING:			DATE: 05.06.20
			ATLAS PAGE NO: 395 AND 476				SHEET 23 OF 51 SHEETS



SERVICE CONNECTIONS	
LONG SERVICE	0 EA.
SHORT SERVICE	1 EA.

HORIZONTAL SCALE 1"=20'
0 10' 20' 40'
SCALE IN FEET
VERTICAL SCALE 1"=5'
0 5' 10'
SCALE IN FEET

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE:
https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND - PLAN

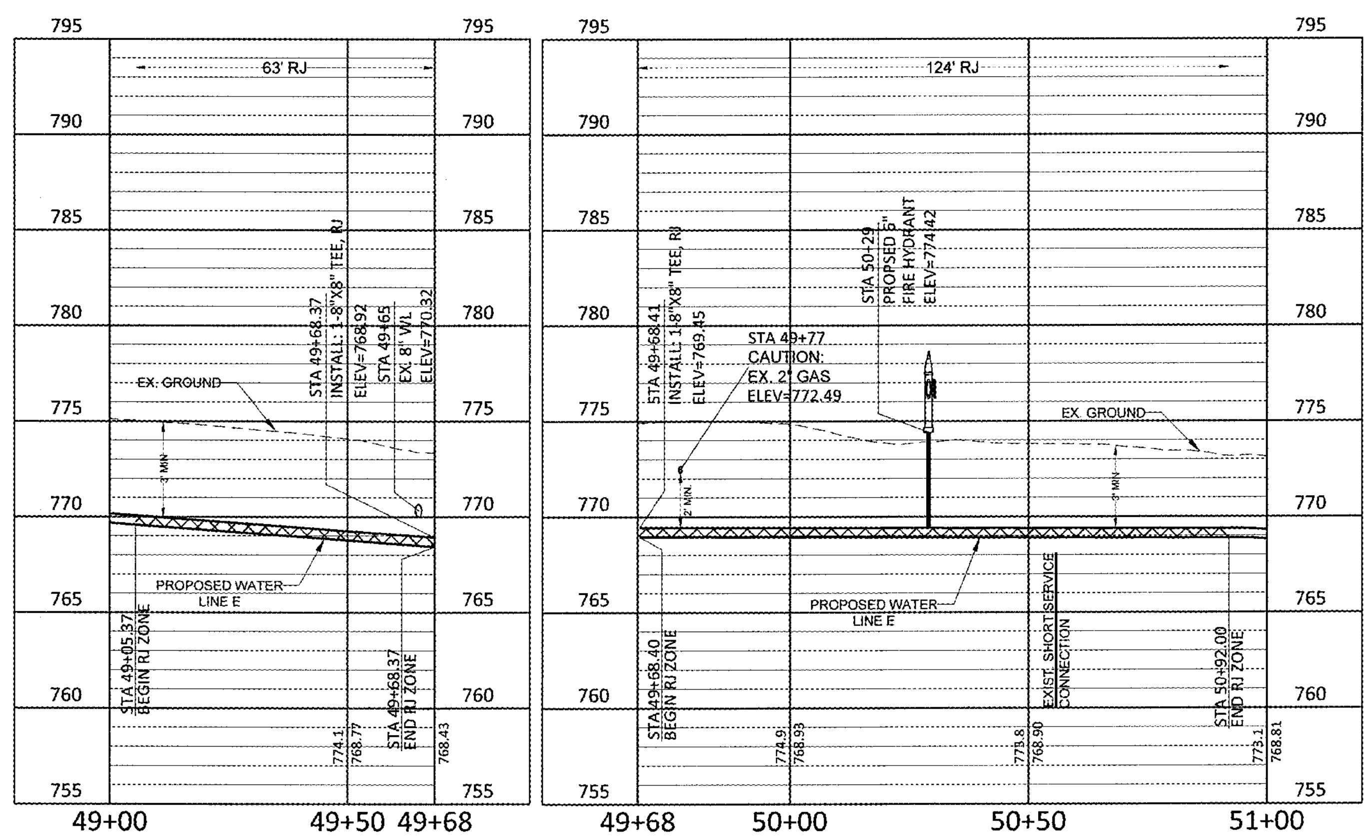
- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND - PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.



OKIE 811 Know what's below. Call before you dig.

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA 4-8-20

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

S 61ST W AVE

PLAN AND PROFILE WEST (SHEET 10 of 26)

PROJECT TMUA-W 18-21 CONTRACT 134789

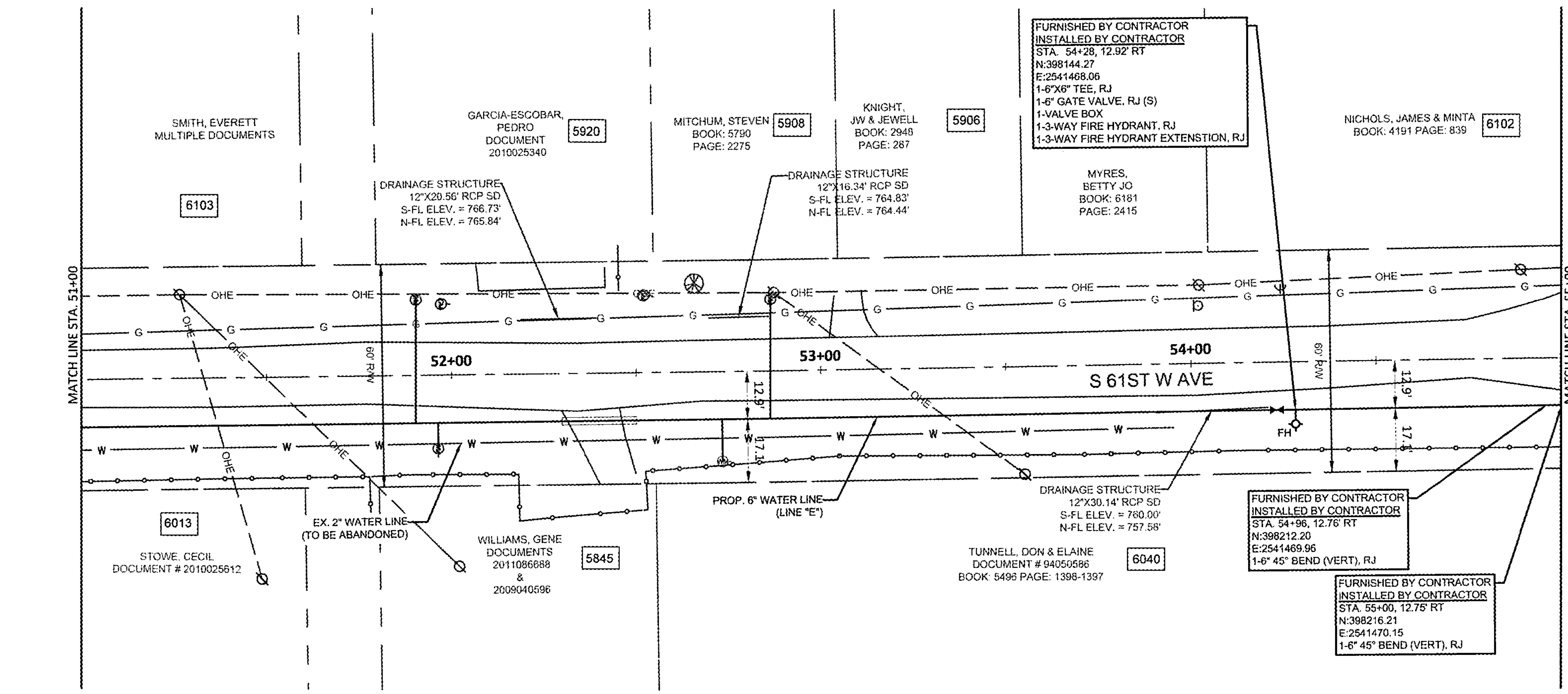
2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC. 4200 E. SKELLY DRIVE SUITE 410 TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1" = 20'	LEAD ENGR.	OEW 4/20		
	FIELD MGR.	ZCW 4/20		
VERTICAL 1" = 5'	RECOMMENDED:	HAS 4.20		CITY ENGINEER
	DESIGN MANAGER			DATE: 05.15.20
FILE: CV-WAT-PP-WTRL	DRAWING:			
ATLAS PAGE NO: 395 AND 478				SHEET 24 OF 51 SHEETS



SERVICE CONNECTIONS	
LONG SERVICE	2 EA.
SHORT SERVICE	2 EA.

HORIZONTAL SCALE 1"=20'
0 10' 20' 40'
SCALE IN FEET

VERTICAL SCALE 1"=5'
0 5' 10'
SCALE IN FEET

REQUIRED RESTRAINED LENGTH

FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE:
https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND - PLAN

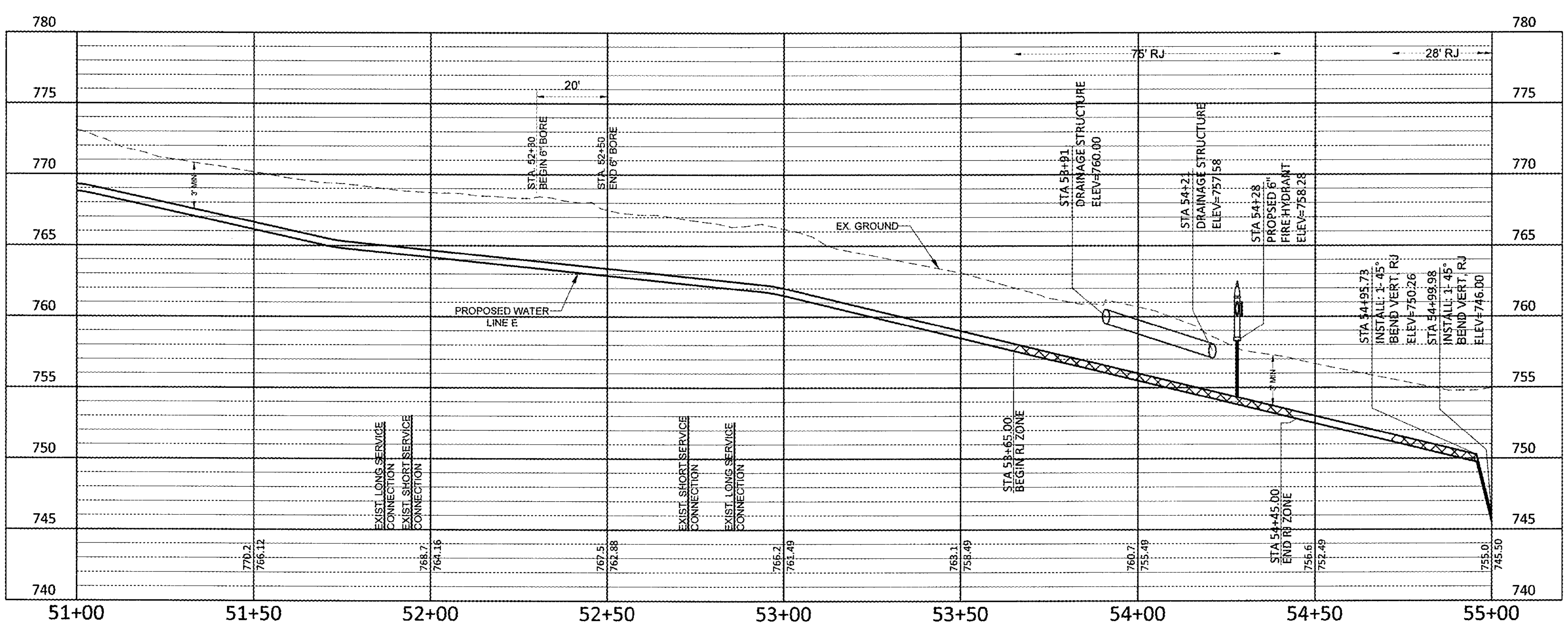
- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND - PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.



CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA

S 61ST W AVE

OKIE 811 Know what's below. Call before you dig.

PLAN AND PROFILE WEST (SHEET 11 of 26)

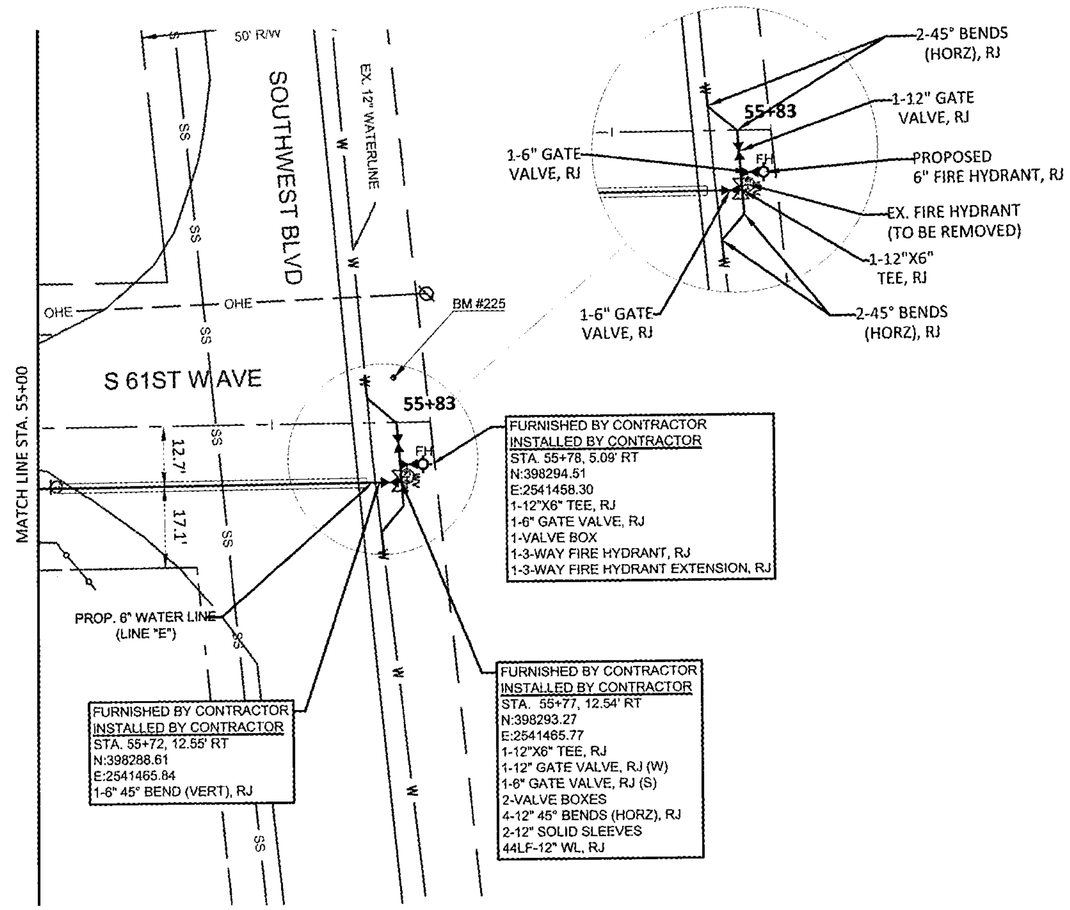
PROJECT TMUA-W 18-21 CONTRACT 134789

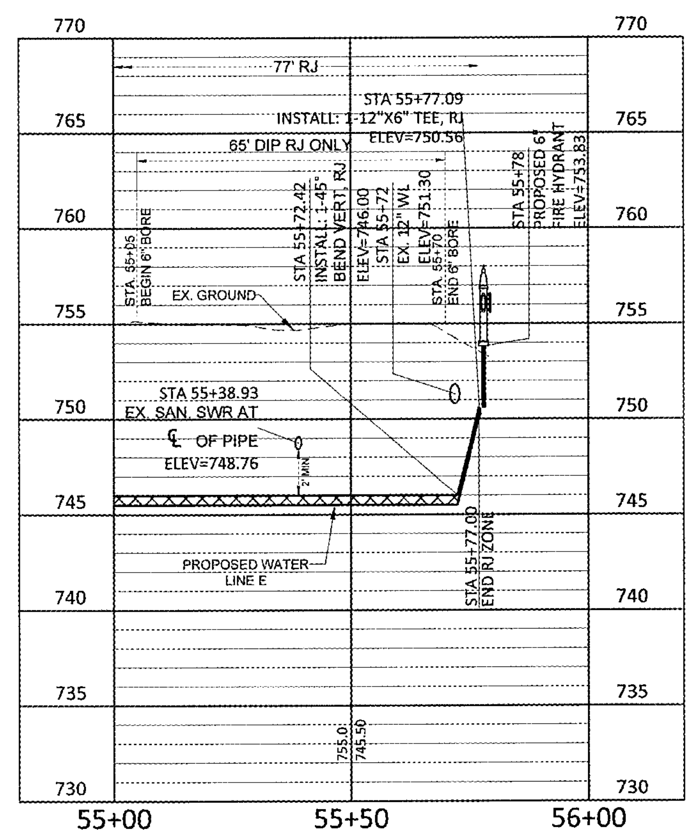
2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:
FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE					
			PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020	APPROVED:
				DESIGNED	KDB	04/2020	
				SURVEY	SDC	07/2019	
			PROFILE SCALE:	PROJ. MGR.			
			HORIZONTAL 1" = 20'	LEAD ENGR.	CEW	4/20	
				FIELD MGR.	ZEW	4/20	
			VERTICAL 1" = 5'	RECOMMENDED: HAS 4.20 DESIGN MANAGER			CITY ENGINEER
			FILE: CV-WAT-PP-WTRL	DRAWING:			DATE: 05.15.20
			ATLAS PAGE NO: 395 AND 478				SHEET 25 OF 51 SHEETS





SERVICE CONNECTIONS	
LONG SERVICE	0 EA.
SHORT SERVICE	0 EA.

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE: https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

N

HORIZONTAL SCALE 1"=20'
0 10' 20' 40'
SCALE IN FEET

VERTICAL SCALE 1"=5'
0 5' 10'
SCALE IN FEET

LEGEND – PLAN

- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND – PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

OKIE811 Know what's below. Call before you dig.

S 61ST W AVE

PLAN AND PROFILE WEST (SHEET 12 of 26)

PROJECT TMUA-W 18-21 CONTRACT 134789

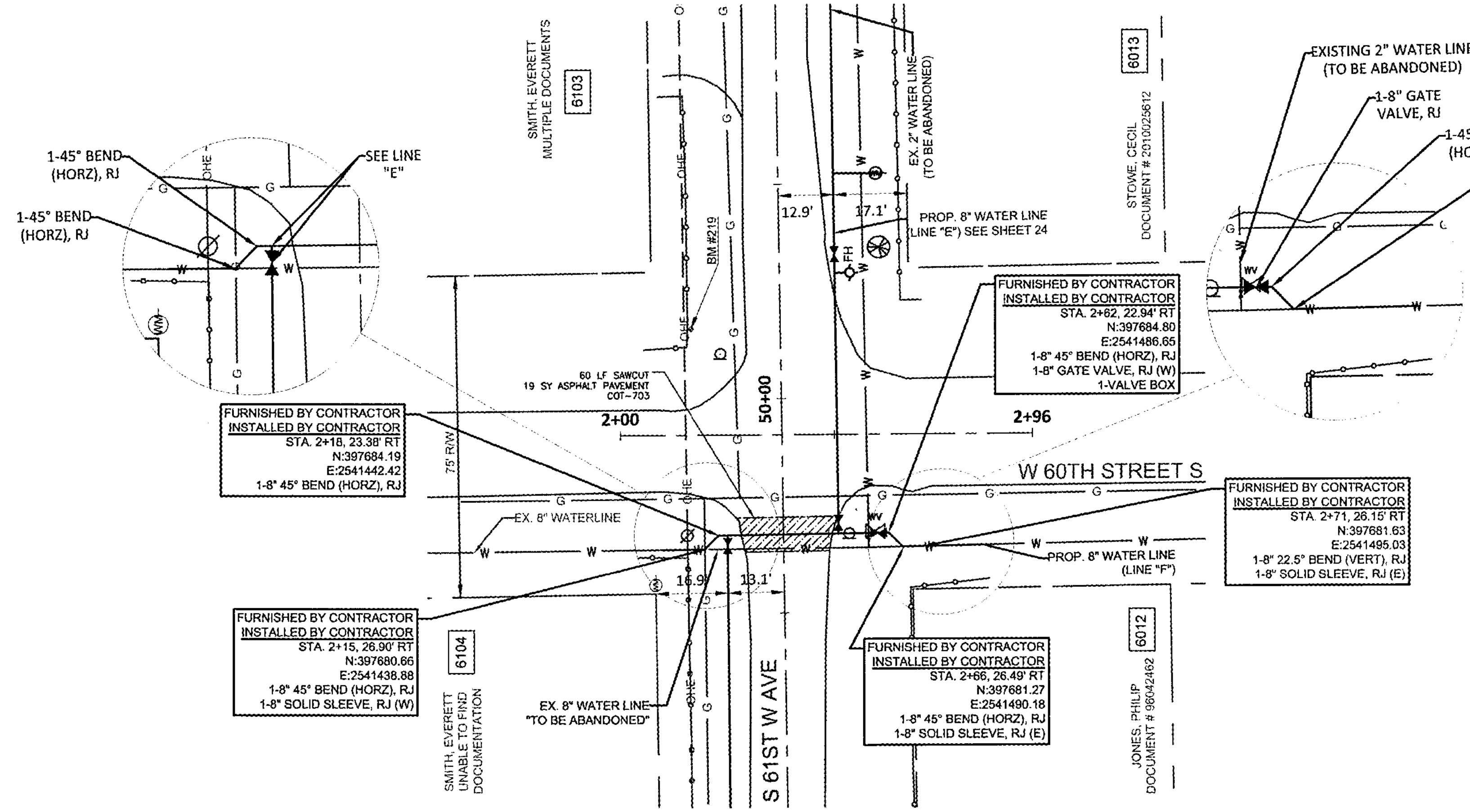
2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC. 4200 E. SKELLY DRIVE SUITE 410 TULSA, OK 74135 (539) 444-8877

REVISION	BY	DATE

PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1" = 20'	LEAD ENGR.	CEW 4/20		
	FIELD MGR.	ZBM 4/20		
VERTICAL 1" = 5'	RECOMMENDED HAS 4-20			
	DESIGN MANAGER			CITY ENGINEER
FILE: CV-WAT-PP-WTRL	DRAWING:			DATE: 05.15.20
ATLAS PAGE NO. 395 AND 478				SHEET 28 OF 51 SHEETS



SERVICE CONNECTIONS	
LONG SERVICE	0 EA.
SHORT SERVICE	0 EA.

N

HORIZONTAL SCALE 1"=20'
0 10' 20' 40'
SCALE IN FEET
VERTICAL SCALE 1"=5'
0 5' 10'
SCALE IN FEET

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE:
https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND – PLAN

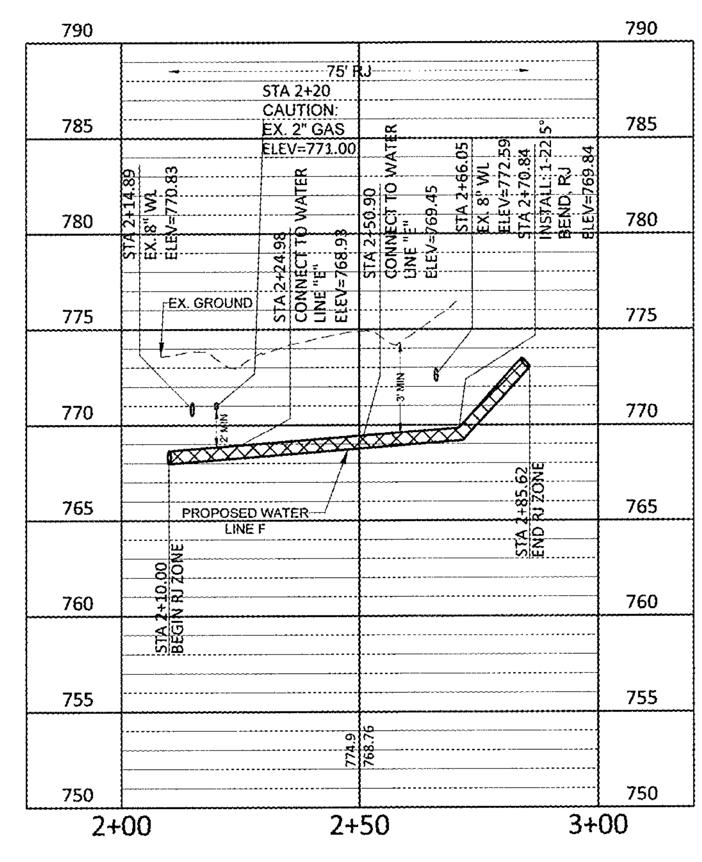
- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND – PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHALL BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.



OKIE811

S 61ST W AVE

PLAN AND PROFILE WEST (SHEET 13 of 26)

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

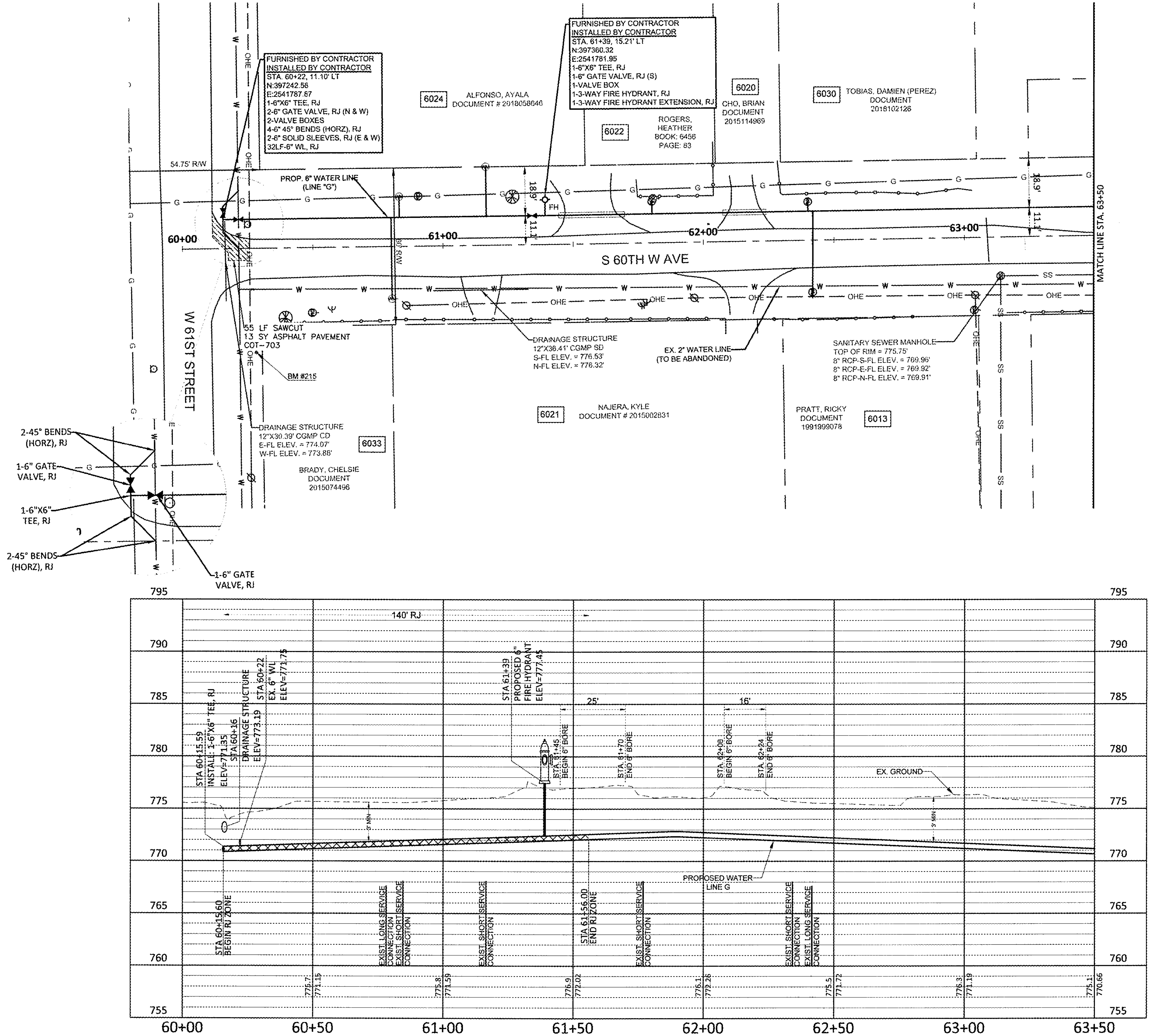
LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1" = 20'	LEAD ENGR.	CEW	4/20	
	FIELD MGR.	ZCW	4/20	
VERTICAL 1" = 5'	RECOMMENDED: DESIGN MANAGER	HAS	4/20	CITY ENGINEER
FILE: CV-WAT-PP-WTRL	DRAWING:			DATE: 05.15.20
ATLAS PAGE NO: 395 AND 478				SHEET 27 OF 51 SHEETS



SERVICE CONNECTIONS	
LONG SERVICE	2 EA.
SHORT SERVICE	4 EA.

HORIZONTAL SCALE 1"=20'
0 10' 20' 40'
SCALE IN FEET

VERTICAL SCALE 1"=5'
0 5' 10'
SCALE IN FEET

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE:
https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND - PLAN

- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND - PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.

OKIE 811 Know what's below. Call before you dig.

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA 4-8-2020

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

S 60TH W AVE

PLAN AND PROFILE WEST (SHEET 14 of 26)

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:
FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

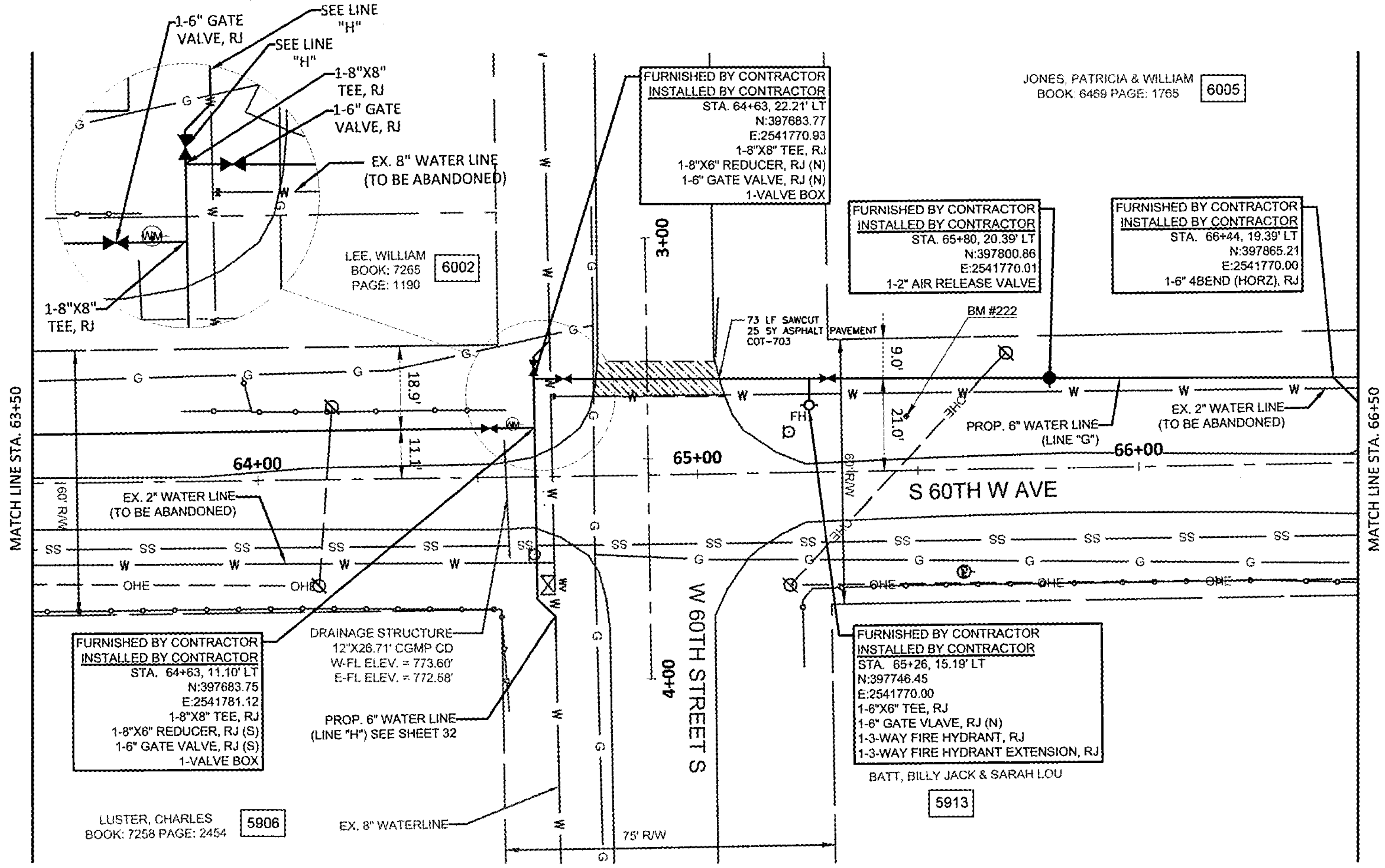
PLAN SCALE: 1" = 20'
PROFILE SCALE: HORIZONTAL 1" = 20' VERTICAL 1" = 5'

DRAWN	BHT	04/2020
DESIGNED	KDB	04/2020
SURVEY	SDC	07/2019
PROJ. MGR.		
LEAD ENGR.	OEW 4/20	
FIELD MGR.	ZEW 4/20	
RECOMMENDED:	HAS 4-20	
DESIGN MANAGER		

APPROVED:
CITY ENGINEER
DATE: 05.15.20

FILE: CV-WAT-PP-WTRL DRAWING:
ATLAS PAGE NO: 395 AND 478

SHEET 28 OF 51 SHEETS



SERVICE CONNECTIONS	
LONG SERVICE	0 EA.
SHORT SERVICE	1 EA.

HORIZONTAL SCALE 1"=20'

0 10' 20' 40'

SCALE IN FEET

VERTICAL SCALE 1"=5'

0 5' 10'

SCALE IN FEET

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE: https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND - PLAN

EXISTING SS

EXISTING GAS

EXISTING OHE

PROPOSED WATERLINE

BORE

PROPOSED WATER METER

ASPHALT PATCHING

5802 HOUSE NUMBER

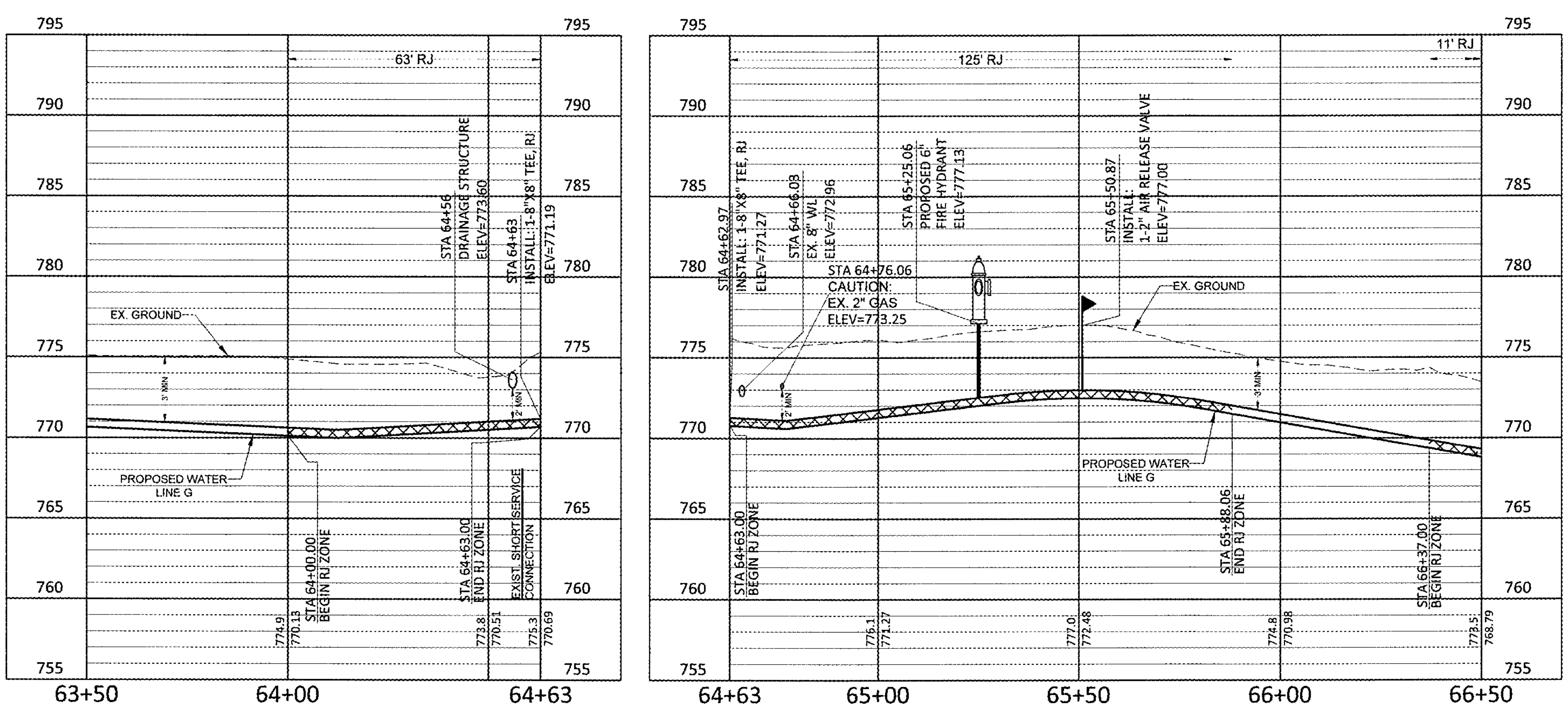
LEGEND - PROFILE

PROPOSED WATERLINE

RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.



S 60TH W AVE

Know what's below. Call before you dig.

PLAN AND PROFILE WEST (SHEET 15 of 26)

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA

4-22-20

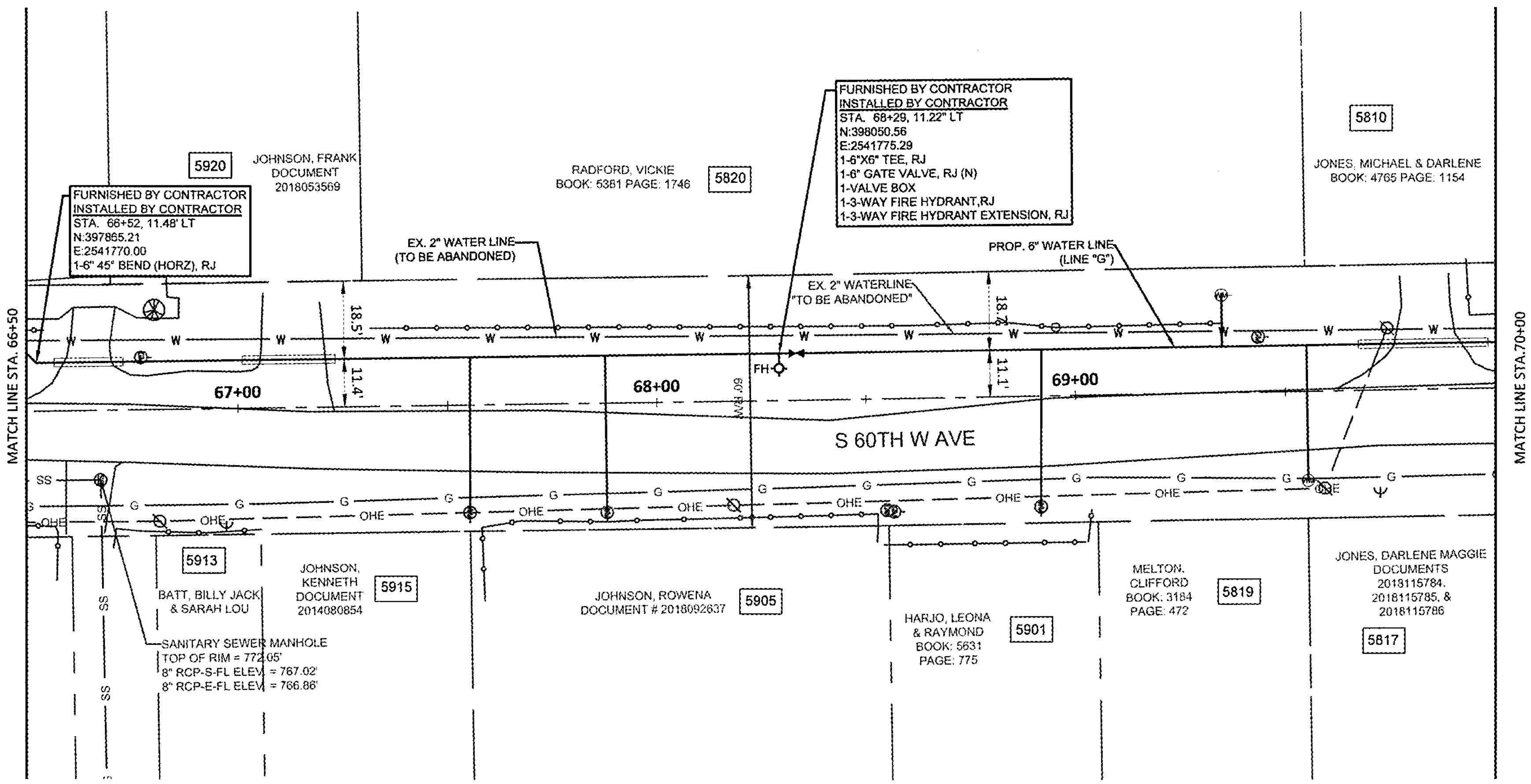
CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1" = 20'	LEAD ENGR.	CEW	4/20	
	FIELD MGR.	RCM	4/20	
VERTICAL 1" = 5'	RECOMMENDED: DESIGN MANAGER	HAS	4-20	CITY ENGINEER
FILE: CV-WAT-PP-WTRL	DRAWING:			DATE: 05.15.20
ATLAS PAGE NO. 395 AND 478				SHEET 29 OF 51 SHEETS



SERVICE CONNECTIONS	
LONG SERVICE	4 EA.
SHORT SERVICE	1 EA.

HORIZONTAL SCALE 1"=20'

0 10' 20' 40'

SCALE IN FEET

VERTICAL SCALE 1"=5'

0 5' 10'

SCALE IN FEET

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE: https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND – PLAN

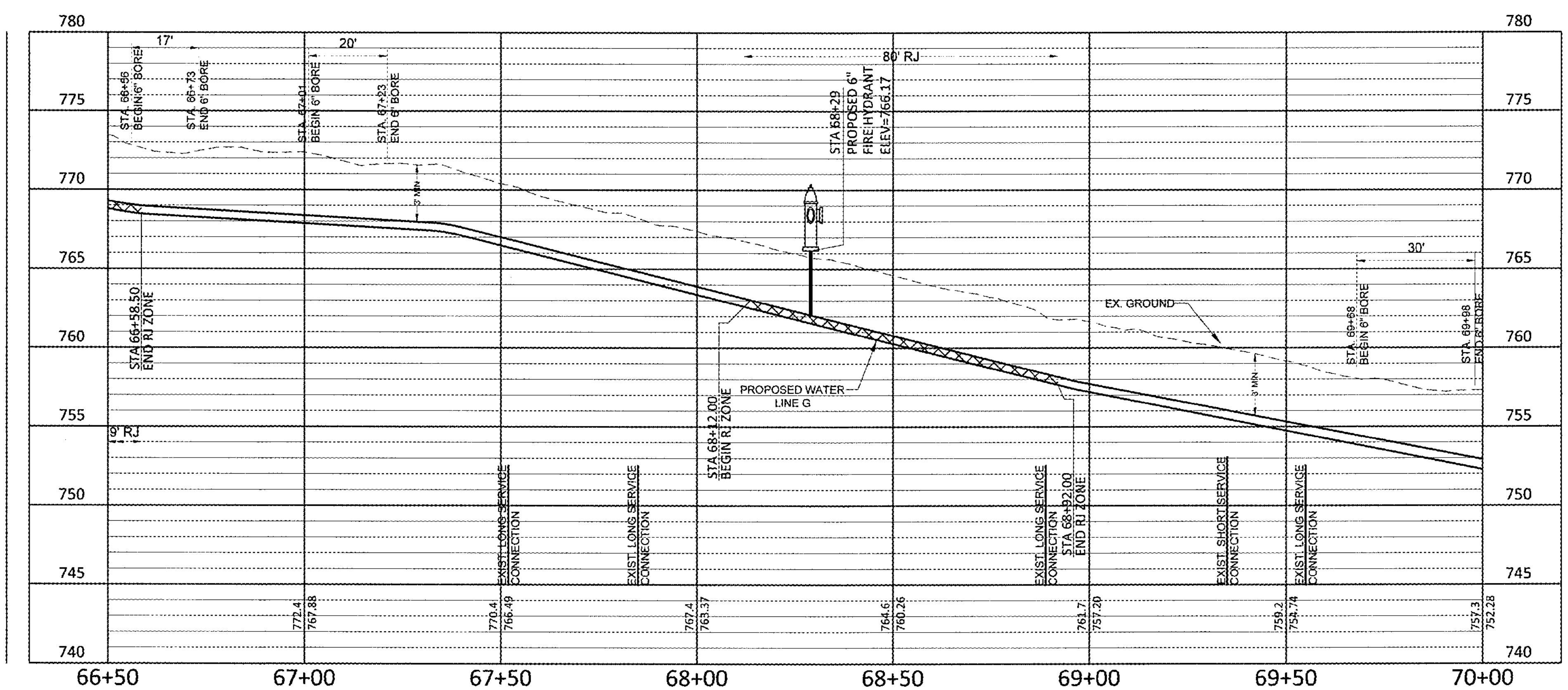
- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND – PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.



OKIE811

S 60TH W AVE

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA 4-8-2020

PLAN AND PROFILE WEST (SHEET 16 of 26)
PROJECT TMUA-W 18-21 CONTRACT 134789
2-INCH WATER LINE REPLACEMENT NEW 6-INCH WATER LINE
CITY OF TULSA, OKLAHOMA ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC. 4200 E. SKELLY DRIVE SUITE 410 TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020
	DESIGNED	KDB	04/2020
	SURVEY	SDC	07/2019
PROFILE SCALE:	PROJ. MGR.		
HORIZONTAL 1" = 20'	LEAD ENGR.	CEW	4/20
	FIELD MGR.	JCM	4/20
VERTICAL 1" = 5'	RECOMMENDED: DESIGN MANAGER	HAS	4-20

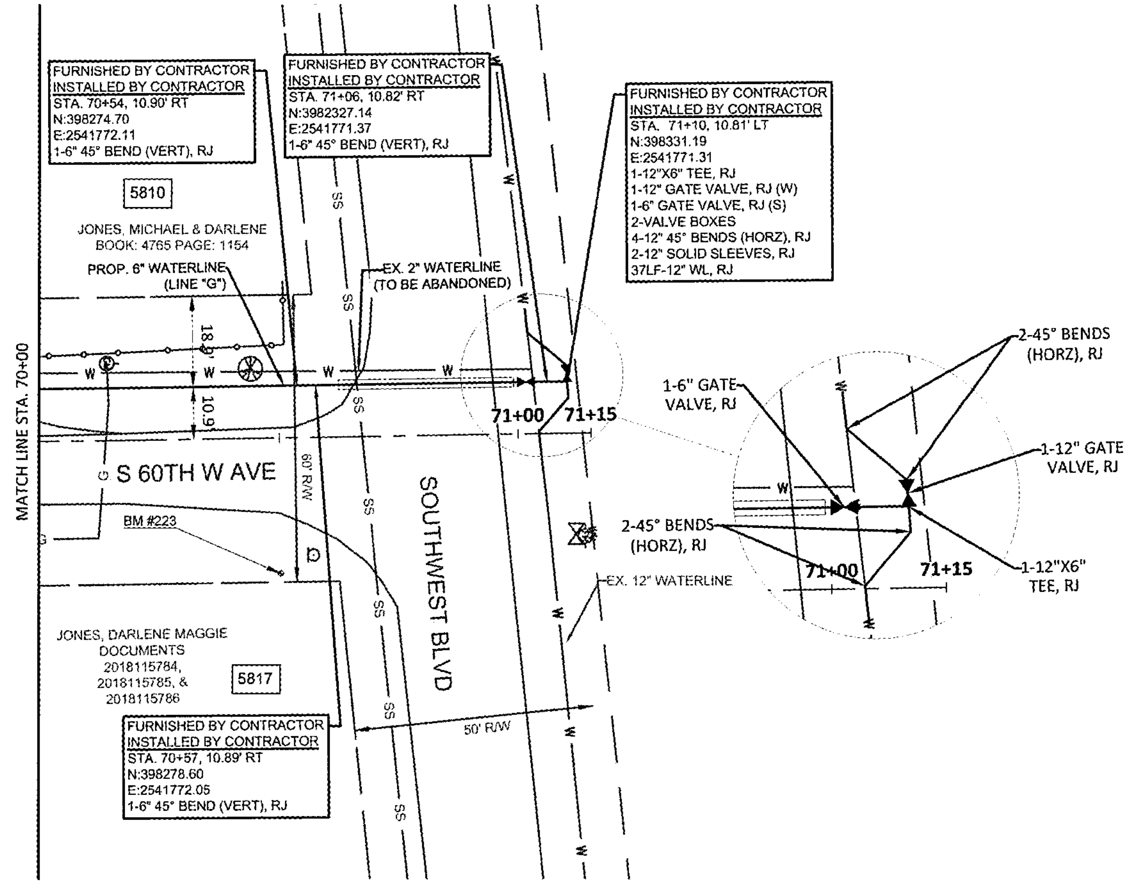
APPROVED: CITY ENGINEER

FILE: CV-WAT-PP-WTRL DRAWING:

DATE: 05.15.20

ATLAS PAGE NO: 395 AND 478

SHEET 30 OF 51 SHEETS



SERVICE CONNECTIONS	
LONG SERVICE	0 EA.
SHORT SERVICE	0 EA.

HORIZONTAL SCALE 1"=20'
0 10' 20' 40'
SCALE IN FEET

VERTICAL SCALE 1"=5'
0 5' 10'
SCALE IN FEET

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE:
https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND - PLAN

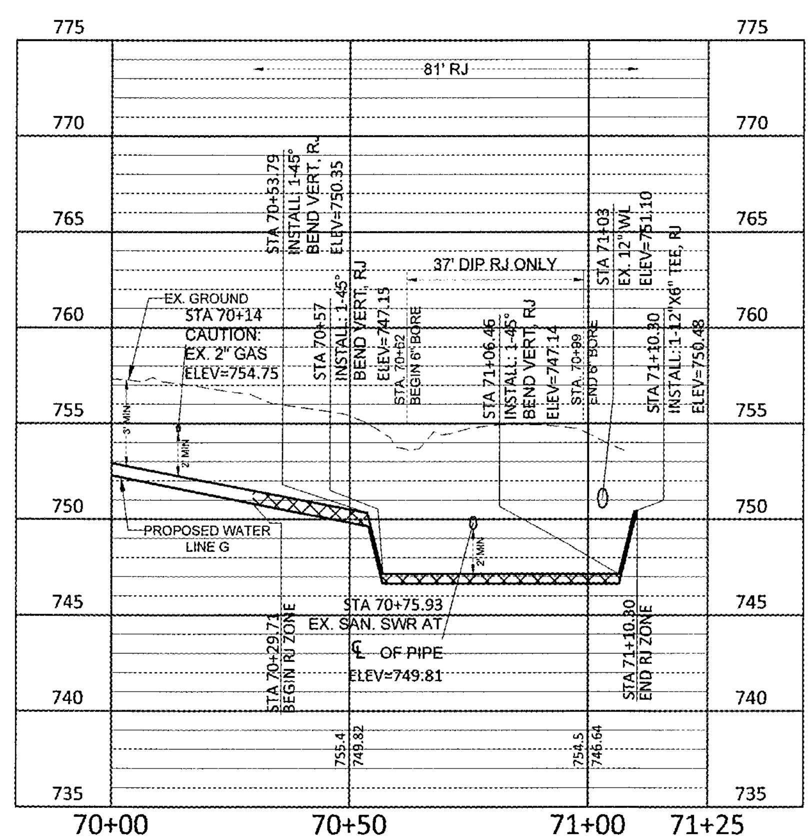
- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND - PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.



KEITH BEATTY 29905 LICENSED PROFESSIONAL ENGINEER OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

OKIE811 Know what's below. Call before you dig.

S 60TH W AVE

PLAN AND PROFILE WEST (SHEET 17 of 26)

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8877

REVISION	BY	DATE

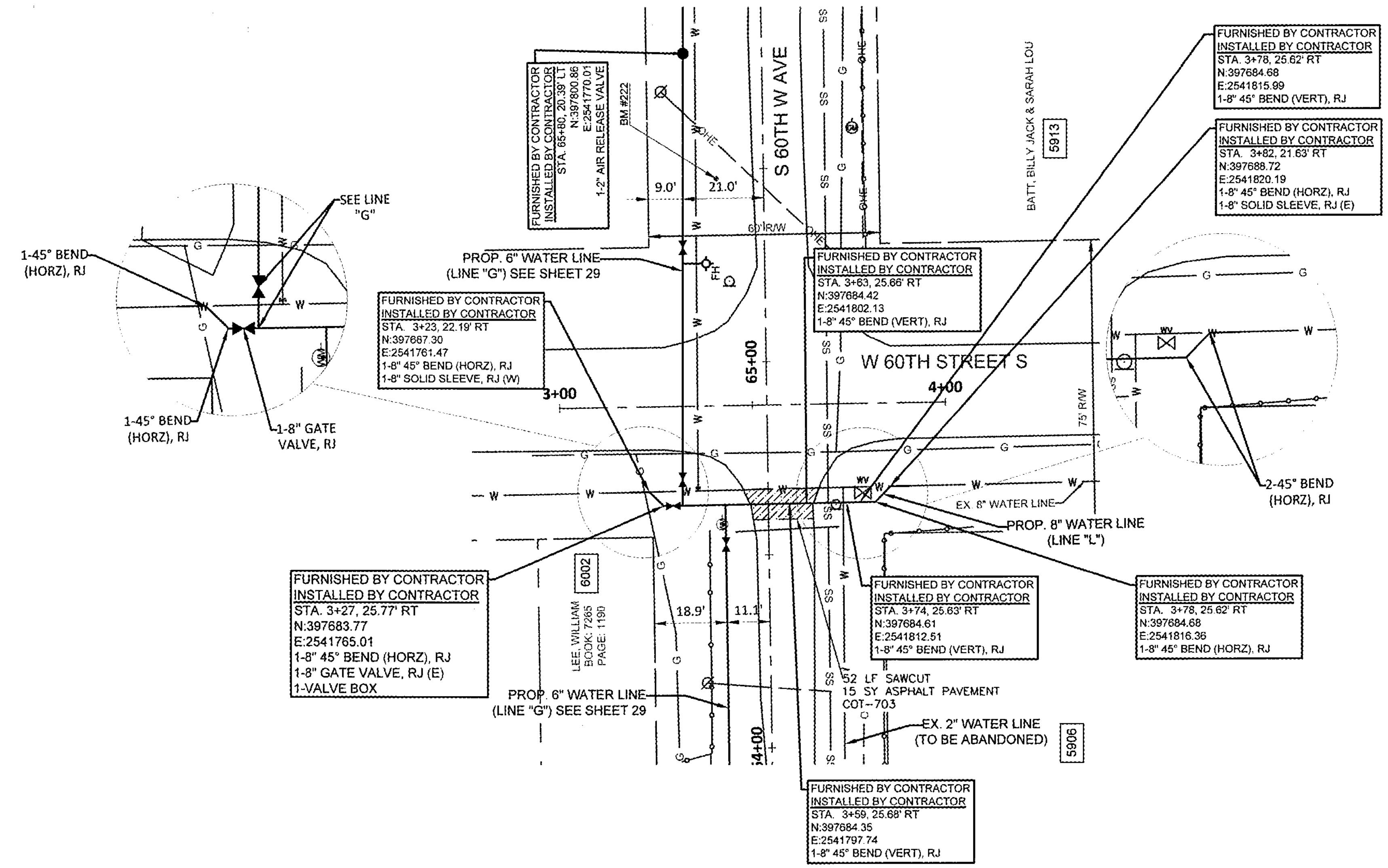
PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020
	DESIGNED	KDB	04/2020
	SURVEY	SDC	07/2019
PROFILE SCALE:	PROJ. MGR.		
HORIZONTAL 1" = 20'	LEAD ENGR.	CEW 4/20	
	FIELD MGR.	BCW 4/20	
VERTICAL 1" = 5'	RECOMMENDED: HAS 4-20 DESIGN MANAGER		

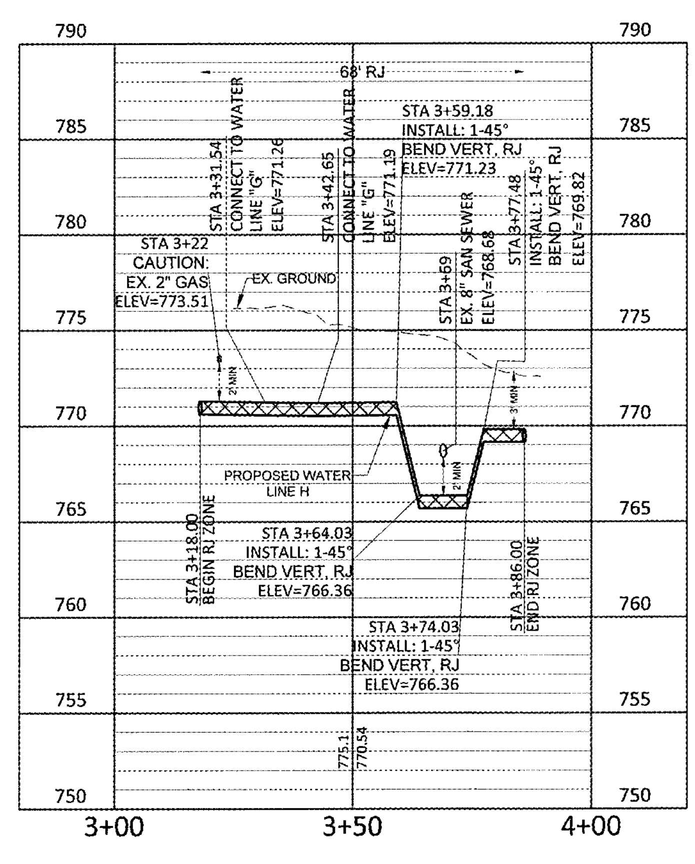
APPROVED:
CITY ENGINEER
DATE: 05.15.20

FILE: CV-WAT-PP-WTRL DRAWING:
ATLAS PAGE NO: 395 AND 478

SHEET 31 OF 51 SHEETS

PATHNAME: ...\WATER\Drawings\Utilities\CV-WAT-PP-WTRL WEST01.dwg BHT 4/1/20





SERVICE CONNECTIONS	
LONG SERVICE	0 EA.
SHORT SERVICE	0 EA.

HORIZONTAL SCALE 1"=20'
0 10' 20' 40'
SCALE IN FEET

VERTICAL SCALE 1"=5'
0 5' 10'
SCALE IN FEET

N

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE:
https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND – PLAN

- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND – PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.

LICENSED PROFESSIONAL ENGINEER
KEITH BEATTY
29905
OKLAHOMA
4-8-2020

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

OKIE811 Know what's below. Call before you dig.

S 60TH W AVE

PLAN AND PROFILE WEST (SHEET 18 of 26)

PROJECT TMUA-W 18-21 CONTRACT 134789

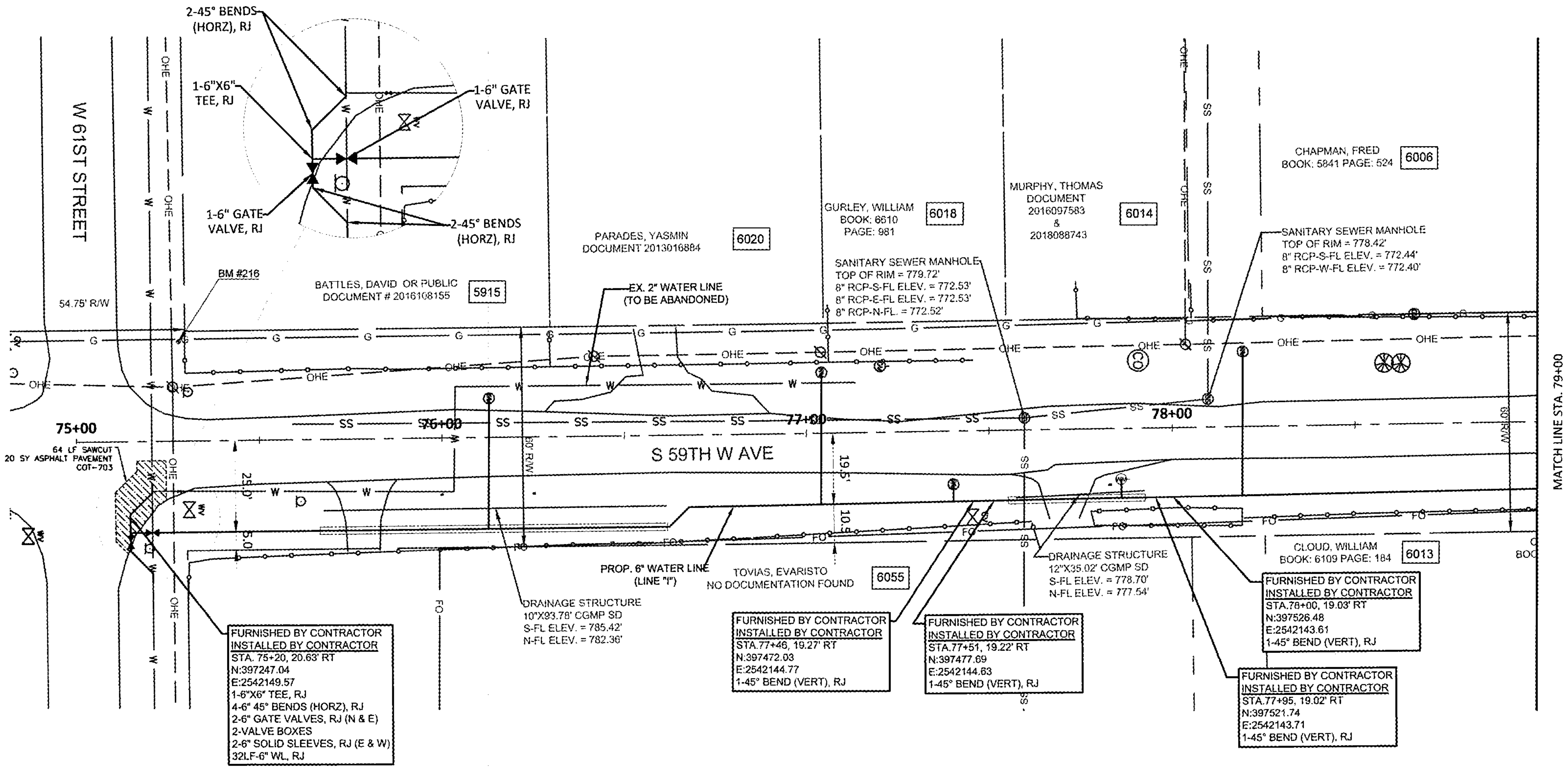
2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:
FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1" = 20'	LEAD ENGR.	CEW 4/20		
	FIELD MGR.	TMW 4/20		
VERTICAL 1" = 5'	RECOMMENDED: DESIGN MANAGER	HAS 4.20		CITY ENGINEER
FILE: CV-WAT-PP-WTRL	DRAWING:			DATE: 05.15.20
ATLAS PAGE NO. 395 AND 476				SHEET 32 OF 51 SHEETS



SERVICE CONNECTIONS	
LONG SERVICE	3 EA.
SHORT SERVICE	2 EA.

HORIZONTAL SCALE 1"=20'
0 10' 20' 40'
SCALE IN FEET

VERTICAL SCALE 1"=5'
0 5' 10'
SCALE IN FEET

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25' HORZ.	2	3	3
22.50'	4	5	6
45'	7	9	13
90'	17	22	30
45' VERT. DOWN	24	32	45
45' UP	7	9	13
22.5' UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE: https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND - PLAN

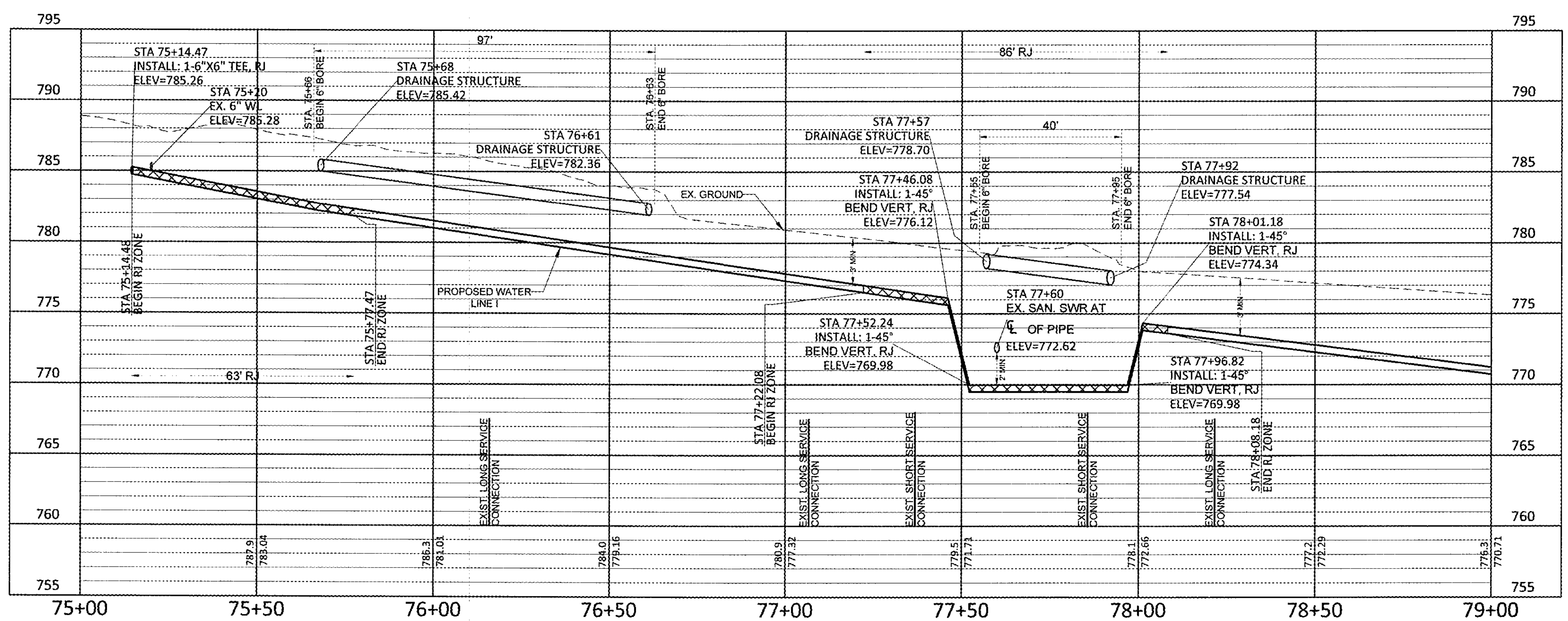
- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND - PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.



S 59TH W AVE

OKIE 811

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

PLAN AND PROFILE WEST (SHEET 19 of 26)

PROJECT TMUA-W 18-21 CONTRACT 134789

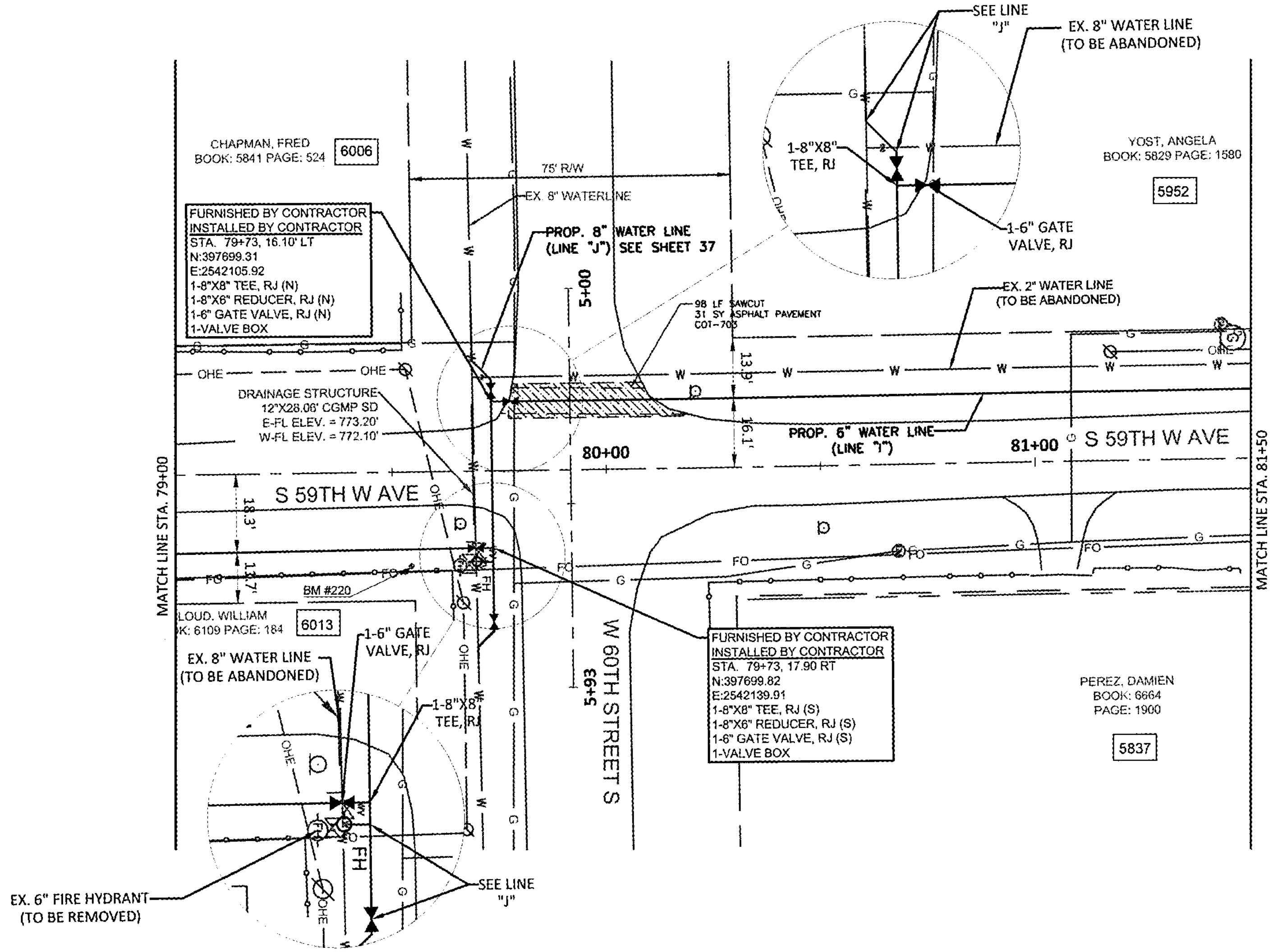
2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC. 4200 E. SKELLY DRIVE SUITE 410 TULSA, OK 74135 (539) 444-9677

REVISION	BY	DATE

PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1" = 20'	LEAD ENGR.	CEW 4/20		
	FIELD MGR.	[illegible] 4/20		
VERTICAL 1" = 5'	RECOMMENDED: HAS 4.20			CITY ENGINEER
	DESIGN MANAGER			DATE: 05.15.20
FILE: CV-WAT-PP-WTRL	DRAWING:			
ATLAS PAGE NO: 395 AND 478				SHEET 33 OF 51 SHEETS



SERVICE CONNECTIONS	
LONG SERVICE	0 EA.
SHORT SERVICE	0 EA.

HORIZONTAL SCALE 1"=20'
0 10' 20' 40'
SCALE IN FEET

VERTICAL SCALE 1"=5'
0 5' 10'
SCALE IN FEET

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE: https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND – PLAN

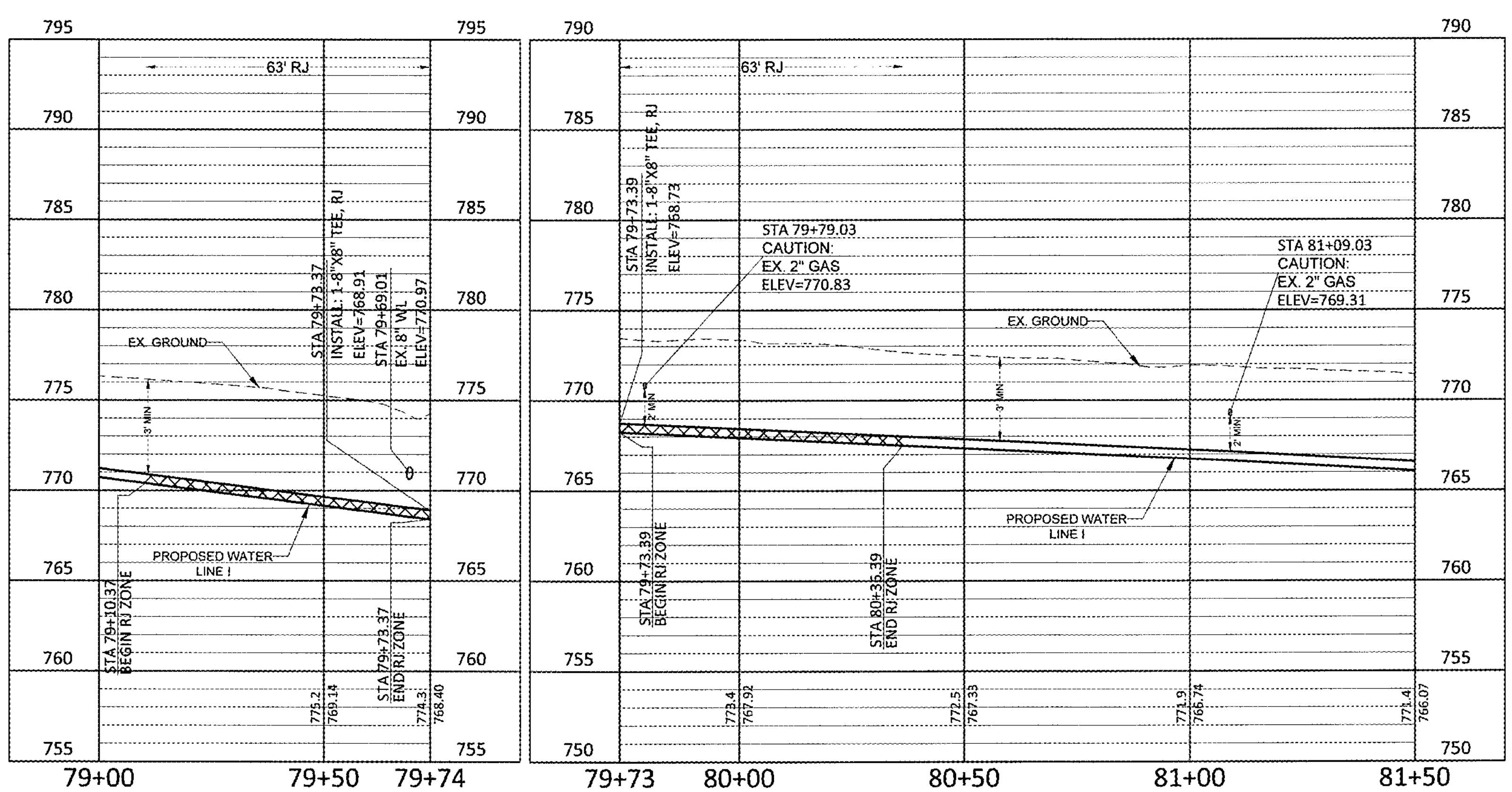
- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND – PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.



LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

OKIE811 Know what's below. Call before you dig.

S 59TH W AVE

PLAN AND PROFILE WEST (SHEET 20 of 26)

PROJECT TMUA-W 18-21 CONTRACT 134789

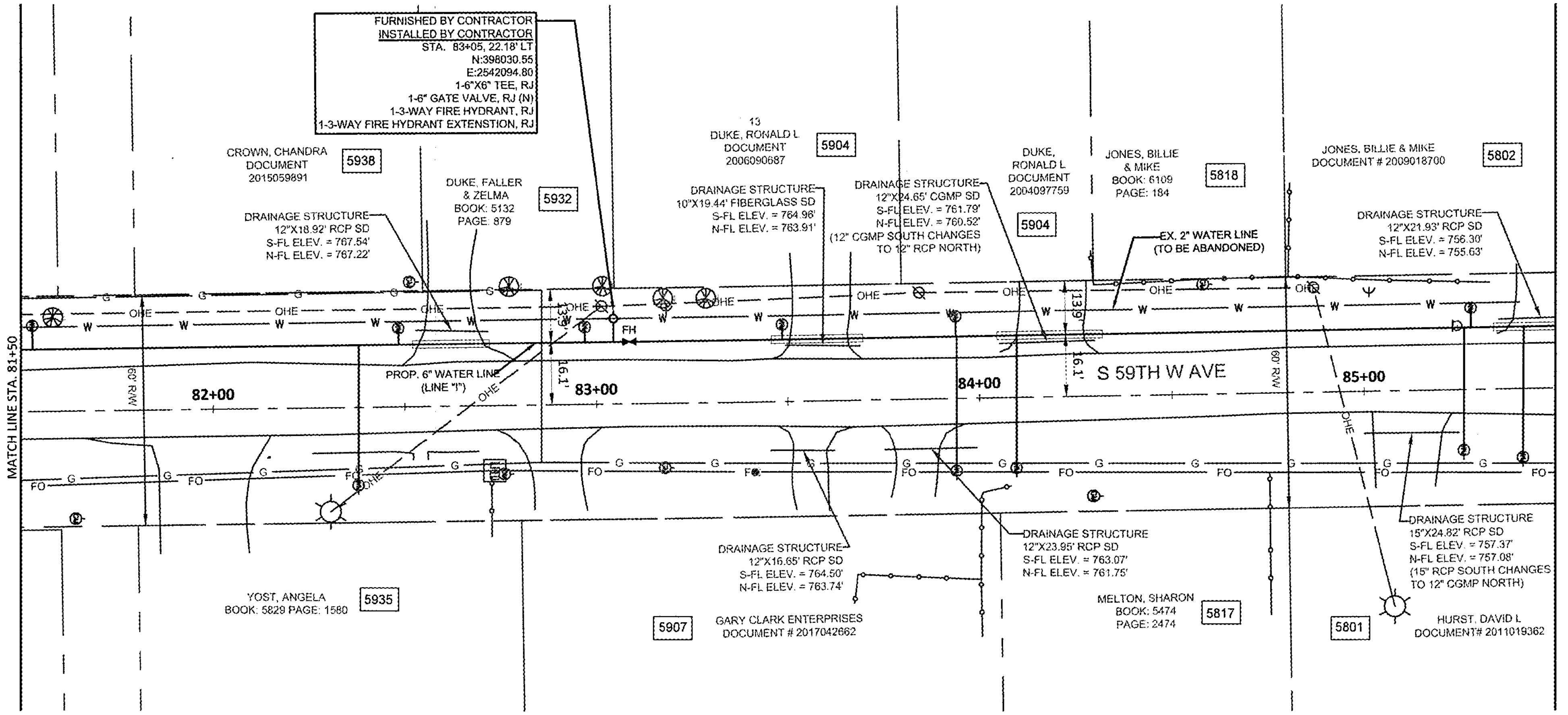
2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC. 4200 E. SKELLY DRIVE SUITE 410 TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2018	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1" = 20'	LEAD ENGR.	CEW 4/20		
	FIELD MGR.	ETW 4/20		
VERTICAL 1" = 5'	RECOMMENDED DESIGN MANAGER	HAS 4-20		CITY ENGINEER
FILE: CV-WAT-PP-WTRL	DRAWING:			DATE: 05.15.20
ATLAS PAGE NO: 395 AND 478				SHEET 34 OF 51 SHEETS



SERVICE CONNECTIONS	
LONG SERVICE	5 EA.
SHORT SERVICE	6 EA.

HORIZONTAL SCALE 1"=20'

0 10' 20' 40'

SCALE IN FEET

VERTICAL SCALE 1"=5'

0 5' 10'

SCALE IN FEET

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE: https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND - PLAN

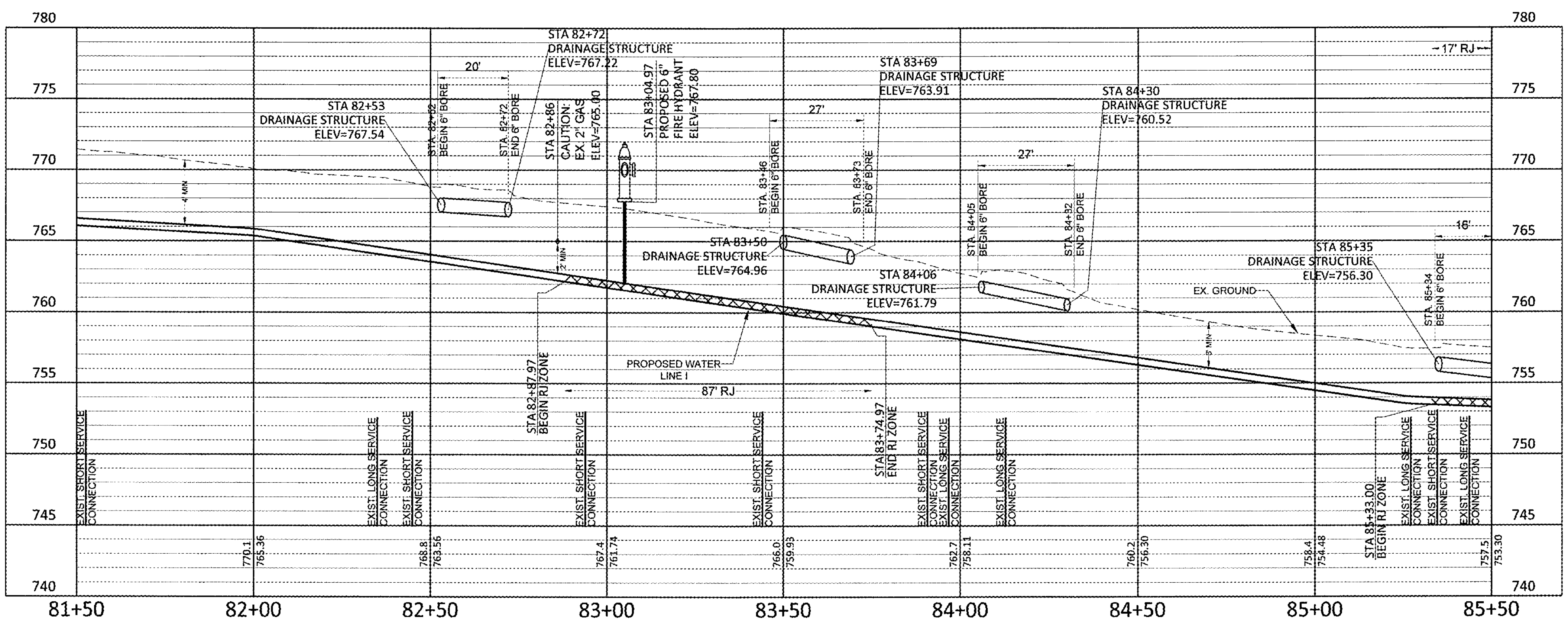
- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND - PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.



S 59TH W AVE

PLAN AND PROFILE WEST (SHEET 21 of 26)

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA

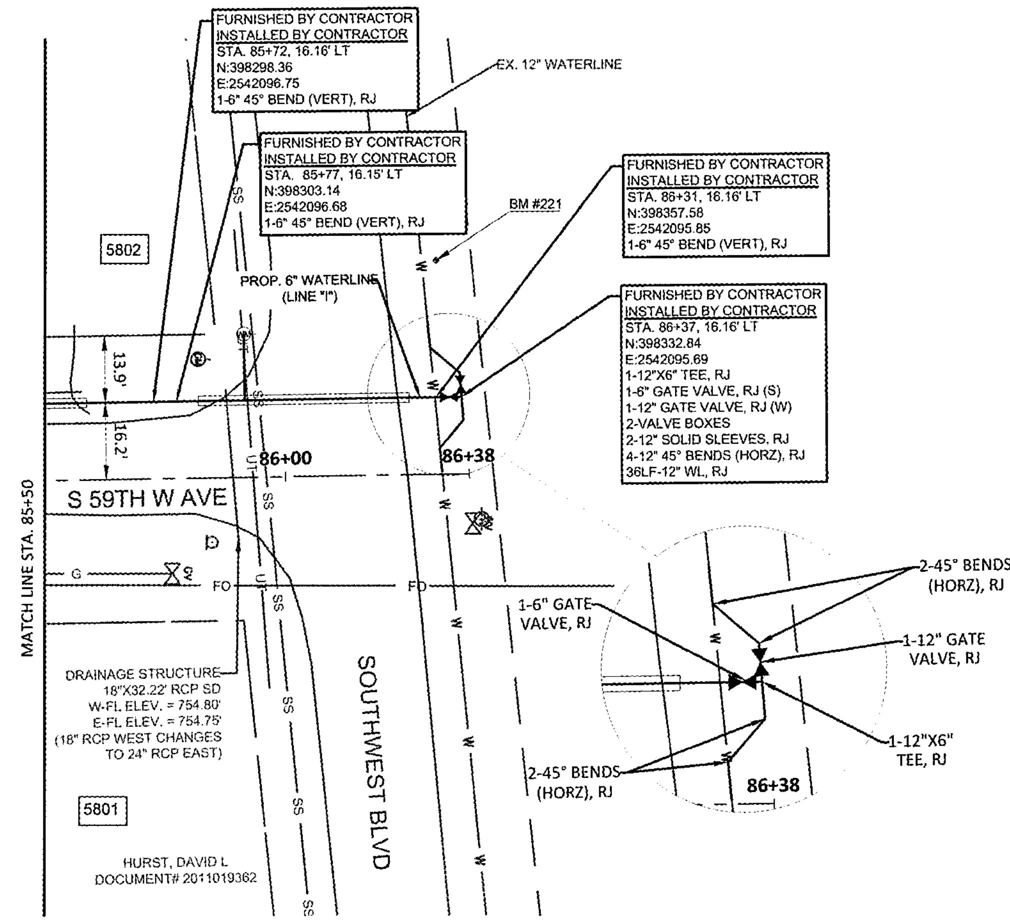
CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410 TULSA, OK 74135 (539) 444-8877

REVISION	BY	DATE

PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1" = 20'	LEAD ENGR.	KEW 4/20		
	FIELD MGR.	[illegible] 4/20		
VERTICAL 1" = 5'	RECOMMENDED: HAS 4·20			CITY ENGINEER
	DESIGN MANAGER			DATE: 05.15.20
FILE: CV-WAT-PP-WTRL	DRAWING:			
ATLAS PAGE NO: 385 AND 478				SHEET 35 OF 51 SHEETS



SERVICE CONNECTIONS	
LONG SERVICE	0 EA.
SHORT SERVICE	1 EA.

HORIZONTAL SCALE 1"=20'
0 10' 20' 40'
SCALE IN FEET

VERTICAL SCALE 1"=5'
0 5' 10'
SCALE IN FEET

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE: https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND - PLAN

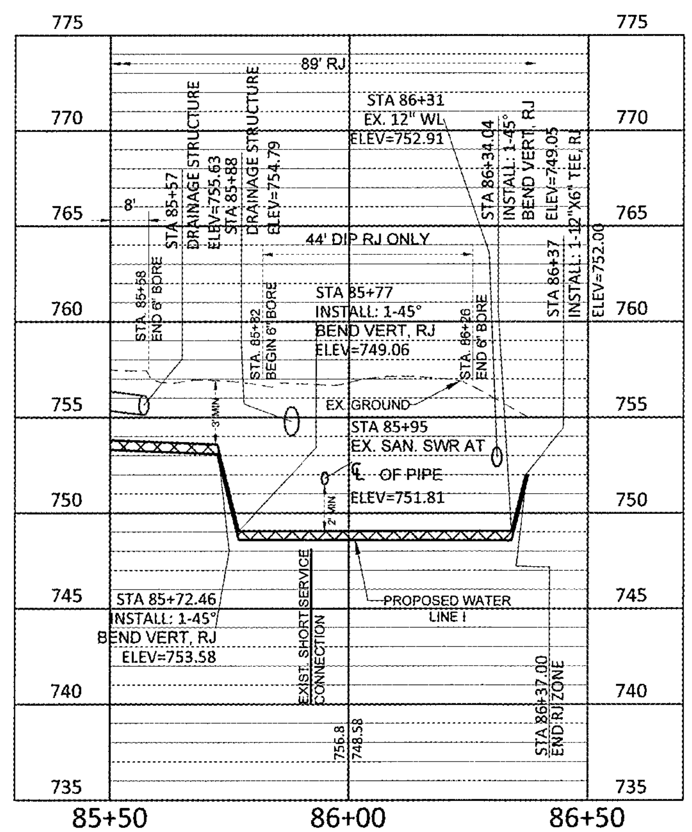
- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND - PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.



OKIE 811 Know what's below. Call before you dig.

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA 4-8-20

S 59TH W AVE

PLAN AND PROFILE WEST (SHEET 22 of 26)

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

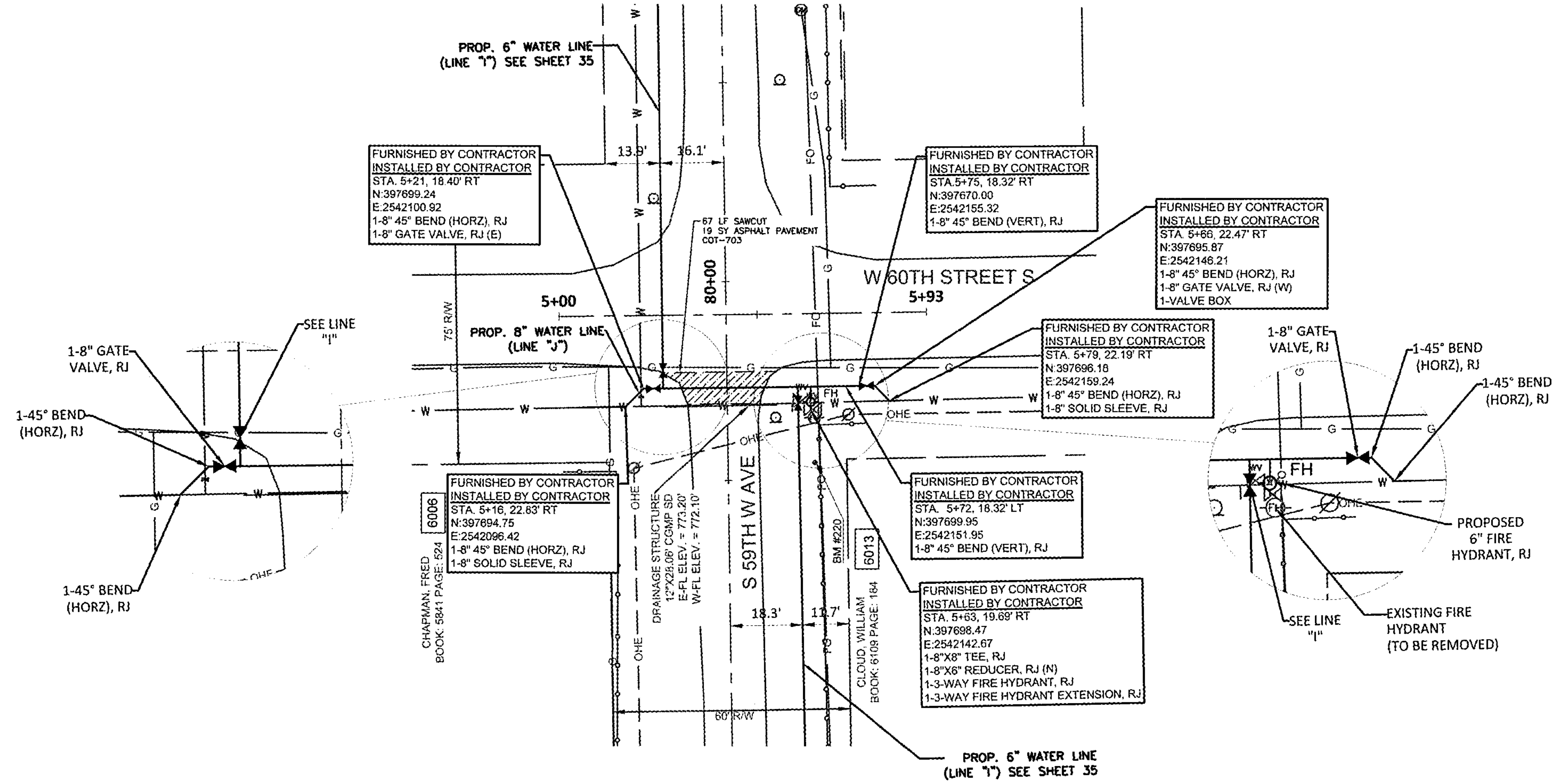
PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC. 4200 E. SKELLY DRIVE SUITE 410 TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020
	DESIGNED	KDB	04/2020
	SURVEY	SDC	07/2019
PROFILE SCALE:	PROJ. MGR.		
HORIZONTAL 1" = 20'	LEAD ENGR.	KEW 4/20	
	FIELD MGR.	4/20	
VERTICAL 1" = 5'	RECOMMENDED: DESIGN MANAGER	HAS 4.20	

APPROVED: CITY ENGINEER
DATE: 05.15.20

FILE: CV-WAT-PP-WTRL DRAWING:
ATLAS PAGE NO. 395 AND 478
SHEET 36 OF 51 SHEETS



SERVICE CONNECTIONS	
LONG SERVICE	0 EA.
SHORT SERVICE	0 EA.

HORIZONTAL SCALE 1"=20'
0 10' 20' 40'
SCALE IN FEET

VERTICAL SCALE 1"=5'
0 5' 10'
SCALE IN FEET

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE:
https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND - PLAN

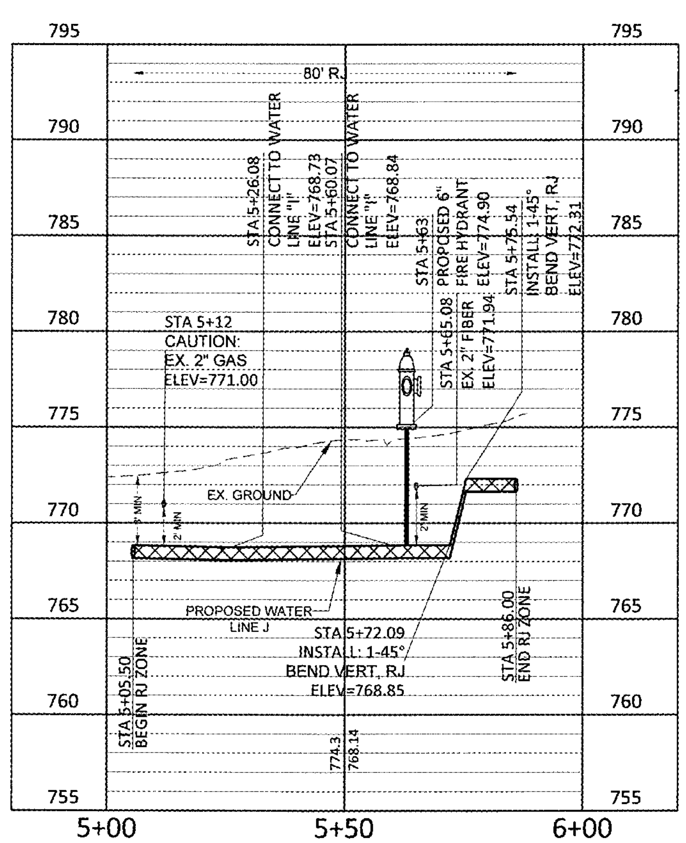
- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND - PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.



CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA

OKIE811 Know what's below. Call before you dig.

S 59TH W AVE

PLAN AND PROFILE WEST (SHEET 23 of 26)

PROJECT TMUA-W 18-21 CONTRACT 134789

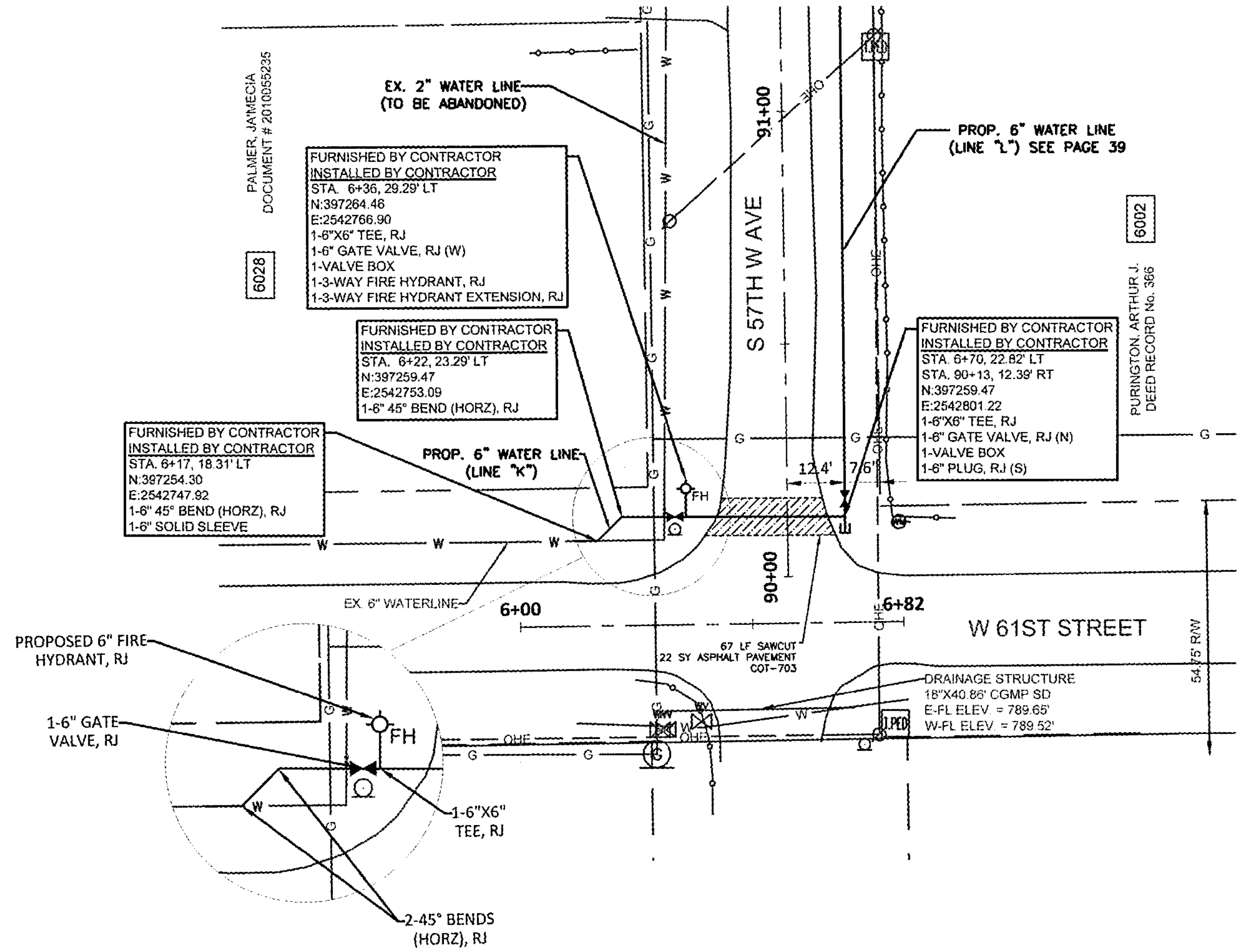
2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

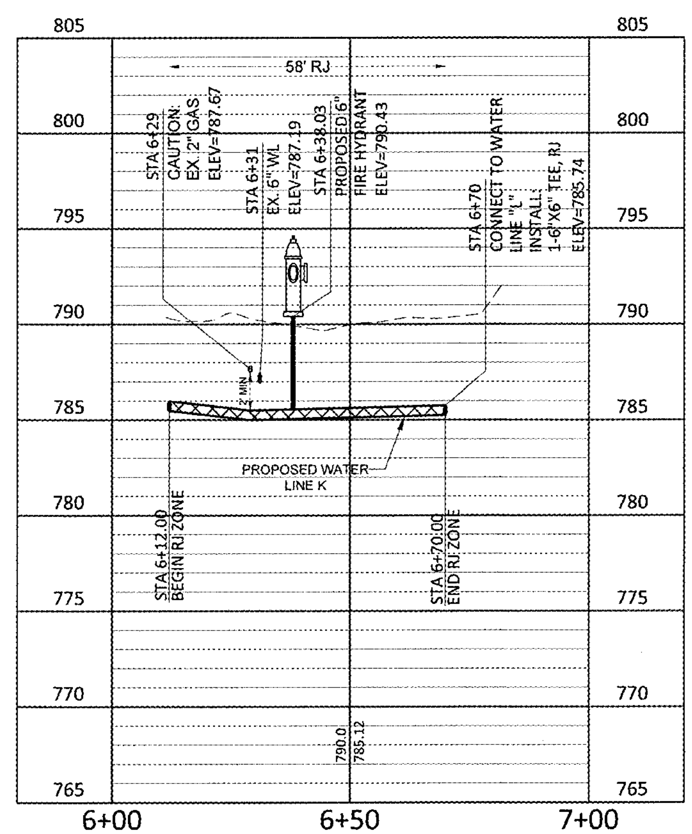
CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC. 4200 E. SKELLY DRIVE SUITE 410 TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1" = 20'	LEAD ENGR.	CEW 4/20		
	FIELD MGR.	ZCW 4/20		
VERTICAL 1" = 5'	RECOMMENDED: HAS 4.20			CITY ENGINEER
	DESIGN MANAGER			
FILE: CV-WAT-PP-WTRL	DRAWING:			DATE: 05.15.20
ATLAS PAGE NO: 395 AND 478				SHEET 37 OF 51 SHEETS





SERVICE CONNECTIONS	
LONG SERVICE	0 EA.
SHORT SERVICE	0 EA.

N

HORIZONTAL SCALE 1"=20'
0 10' 20' 40'
SCALE IN FEET

VERTICAL SCALE 1"=5'
0 5' 10'
SCALE IN FEET

REQUIRED RESTRAINED LENGTH

FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE: https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND – PLAN

- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND – PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.

OKIE 811

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

S 57TH W AVE

PLAN AND PROFILE WEST (SHEET 26 of 26)

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410 TULSA, OK 74135 (539) 444-8677

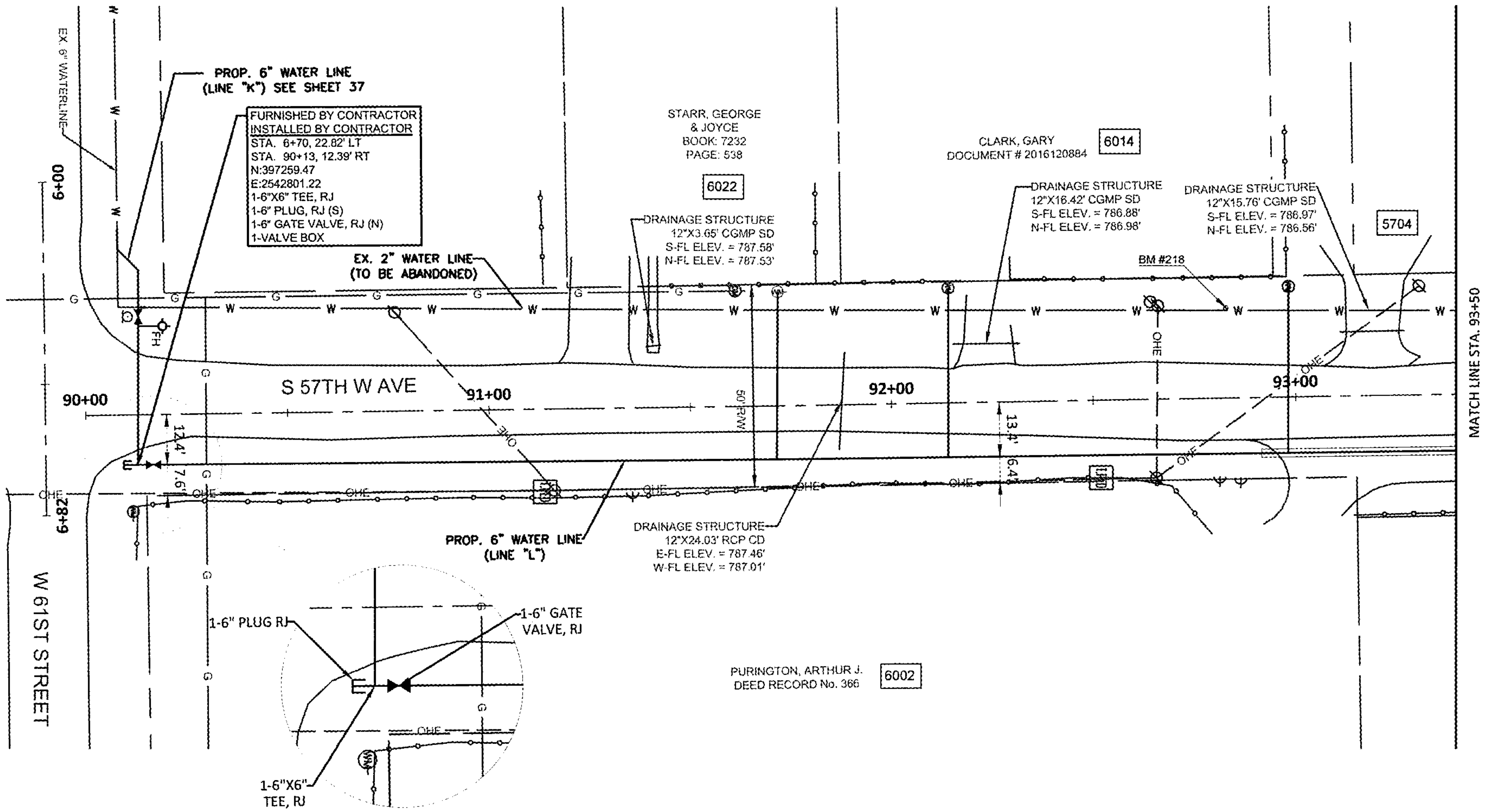
REVISION	BY	DATE

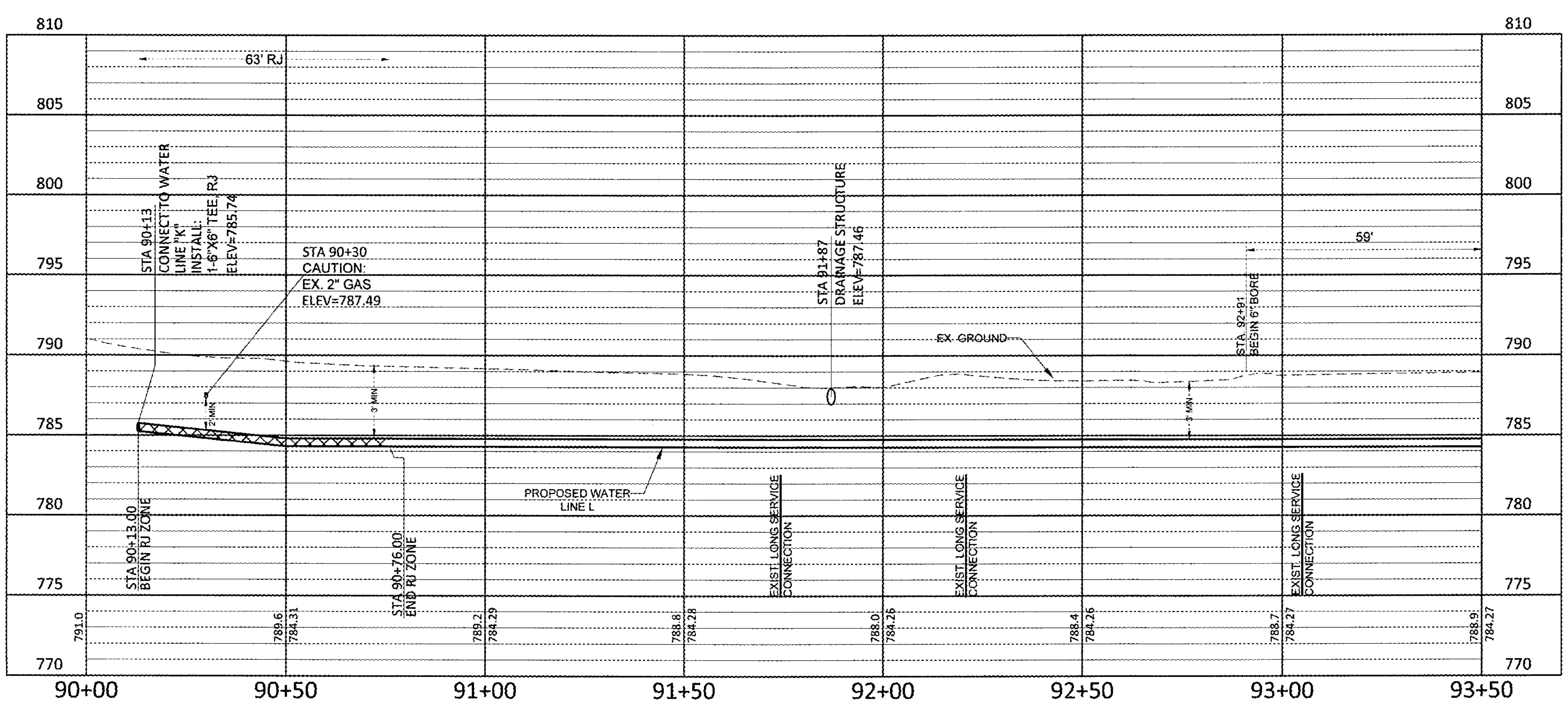
PLAN SCALE: 1" = 20'
PROFILE SCALE: HORIZONTAL 1" = 20' VERTICAL 1" = 5'

DRAWN	BHT	04/2020
DESIGNED	KDB	04/2020
SURVEY	SDC	07/2019
PROJ. MGR.		
LEAD ENGR.	CEW	4/20
FIELD MGR.		4/20
RECOMMENDED	HAS	4-20
DESIGN MANAGER		

APPROVED:
CITY ENGINEER
DATE: 05.15.20

FILE: CV-WAT-PP-WTRL DRAWING:
ATLAS PAGE NO: 385 AND 478





SERVICE CONNECTIONS	
LONG SERVICE	3 EA.
SHORT SERVICE	0 EA.

HORIZONTAL SCALE 1"=20'

0 10' 20' 40'

SCALE IN FEET

VERTICAL SCALE 1"=5'

0 5' 10'

SCALE IN FEET

REQUIRED RESTRAINED LENGTH

FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE:
https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND - PLAN

- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND - PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.

OKIE 811 Know what's below. Call before you dig.

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

S 57TH W AVE

PLAN AND PROFILE WEST (SHEET 24 of 26)

PROJECT TMUA-W 18-21 CONTRACT 134789

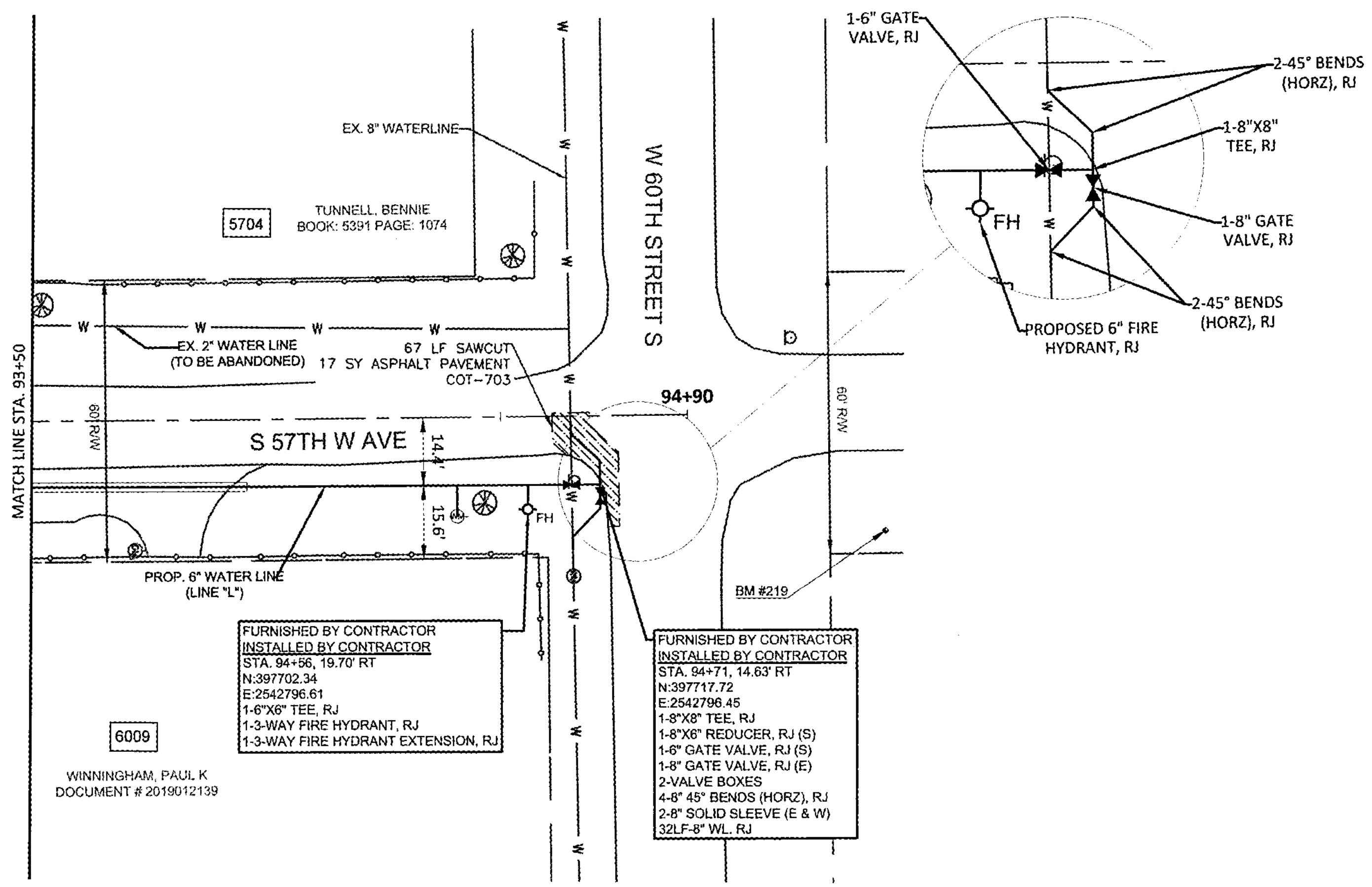
2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC. 4200 E. SKELLY DRIVE SUITE 410 TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1" = 20'	LEAD ENGR.	CEW 4/20		
	FIELD MGR.	4/20		
VERTICAL 1" = 5'	RECOMMENDED	HAS 4-20		CITY ENGINEER
	DESIGN MANAGER			DATE: 05.15.20
FILE: CV-WAT-PP-WTRL	DRAWING:			
ATLAS PAGE NO: 395 AND 478				SHEET 39 OF 51 SHEETS



N

SERVICE CONNECTIONS	
LONG SERVICE	0 EA.
SHORT SERVICE	1 EA.

HORIZONTAL SCALE 1"=20'

0 10' 20' 40'

SCALE IN FEET

VERTICAL SCALE 1"=5'

0 5' 10'

SCALE IN FEET

REQUIRED RESTRAINED LENGTH

FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE: https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

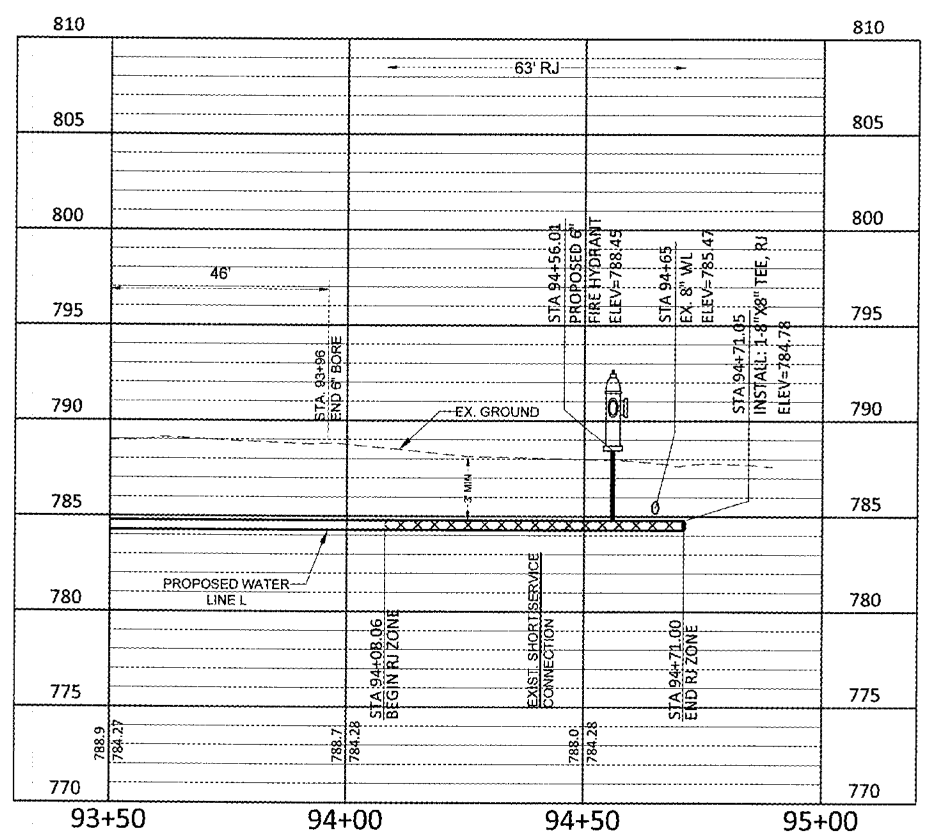
INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND - PLAN

- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND - PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS



NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.

OKIE 811 Know what's below. Call before you dig.

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

S 57TH W AVE

PLAN AND PROFILE WEST (SHEET 25 of 26)

PROJECT TMUA-W 18-21 CONTRACT 134789

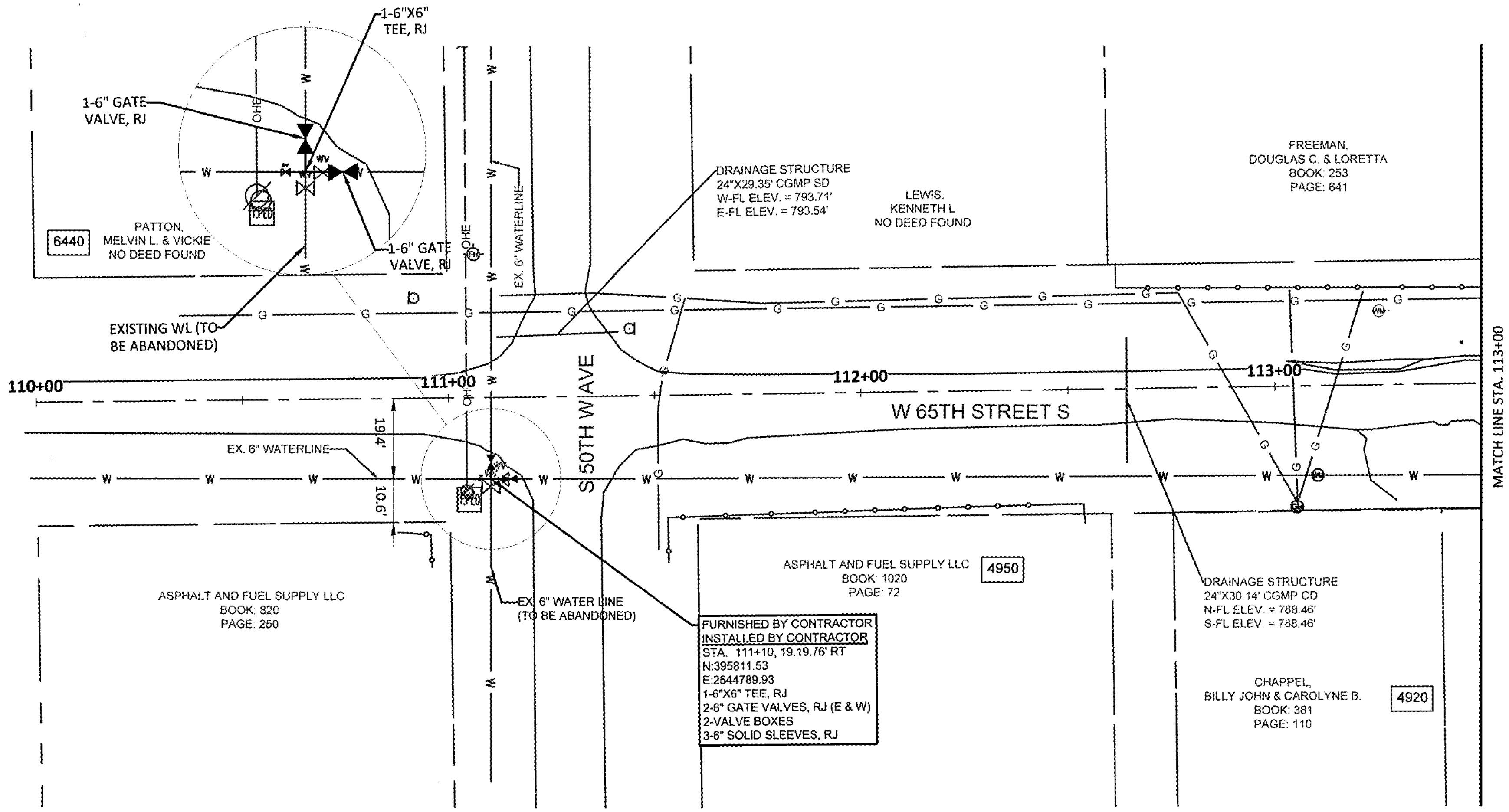
2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1" = 20'	LEAD ENGR.	CEW	4/20	
	FIELD MGR.		4/20	
VERTICAL 1" = 5'	RECOMMENDED:	HAS	4-20	CITY ENGINEER
	DESIGN MANAGER			
FILE: CV-WAT-PP-WTRL	DRAWING:			DATE: 05.15.20
ATLAS PAGE NO: 395 AND 478				SHEET 40 OF 51 SHEETS



SERVICE CONNECTIONS	
LONG SERVICE	0 EA.
SHORT SERVICE	0 EA.

N

HORIZONTAL SCALE 1"=20'
0 10' 20' 40'
SCALE IN FEET

VERTICAL SCALE 1"=5'
0 5' 10'
SCALE IN FEET

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE: https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND – PLAN

- SS EXISTING SS
- G EXISTING GAS
- OHE EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND – PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.

OKIE811 Know what's below. Call before you dig.

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

W 65TH ST S

PLAN AND PROFILE EAST (SHEET 3 of 5)

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

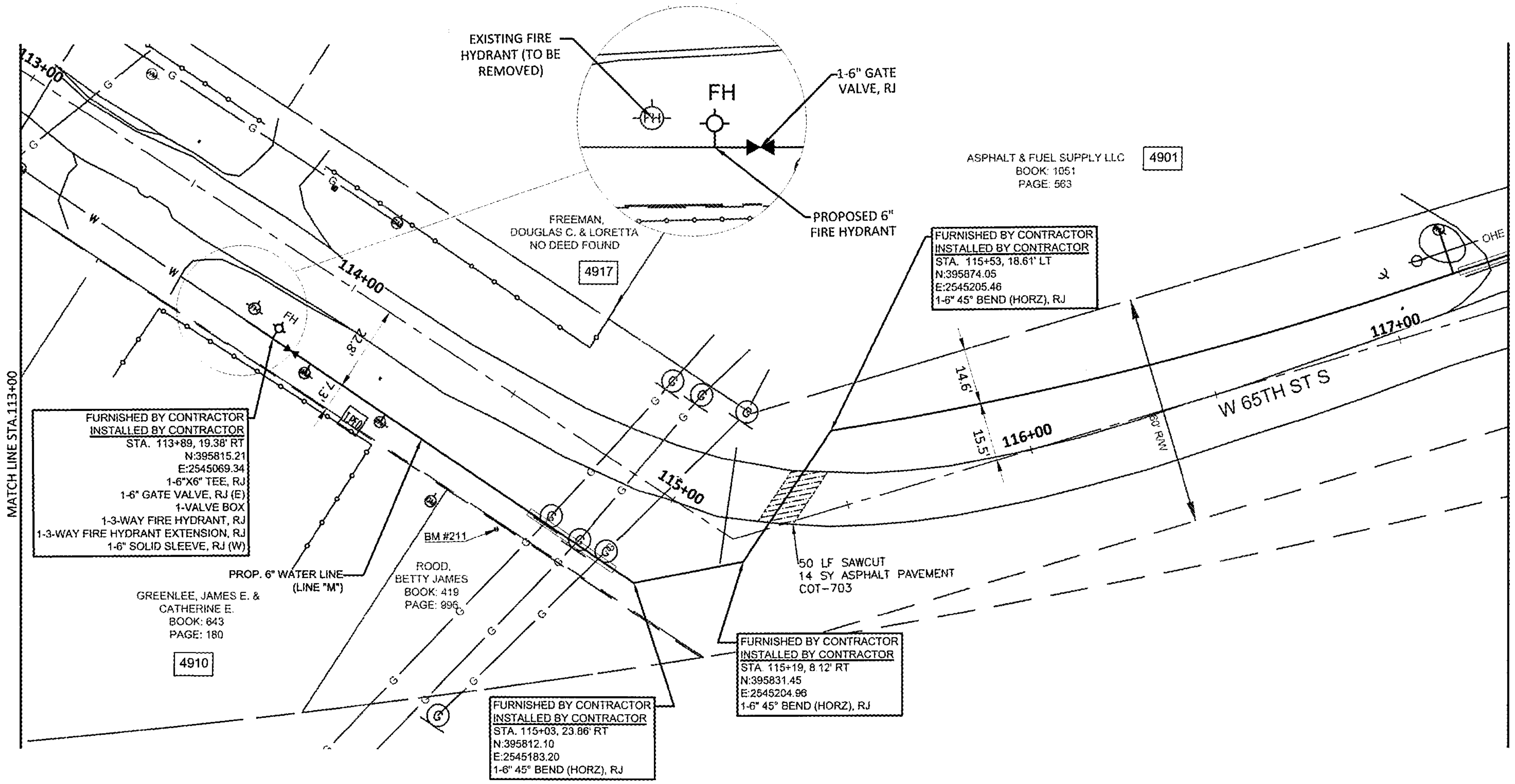
PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020
	DESIGNED	KDB	04/2020
	SURVEY	SDC	07/2019
PROFILE SCALE:	PROJ. MGR.		
HORIZONTAL 1" = 20'	LEAD ENGR.	CEW	4/20
	FIELD MGR.		4/20
VERTICAL 1" = 5'	RECOMMENDED: DESIGN MANAGER	HKS	4.20

APPROVED:
CITY ENGINEER
DATE: 05.15.20

FILE: CV-WAT-PP-WTRL DRAWING:

ATLAS PAGE NO: 395 AND 478

SHEET 41 OF 51 SHEETS



SERVICE CONNECTIONS	
LONG SERVICE	2 EA.
SHORT SERVICE	1 EA.

HORIZONTAL SCALE 1"=20'
0 10' 20' 40'
SCALE IN FEET

VERTICAL SCALE 1"=5'
0 5' 10'
SCALE IN FEET

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6
CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE: https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe			
INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED			

LEGEND - PLAN

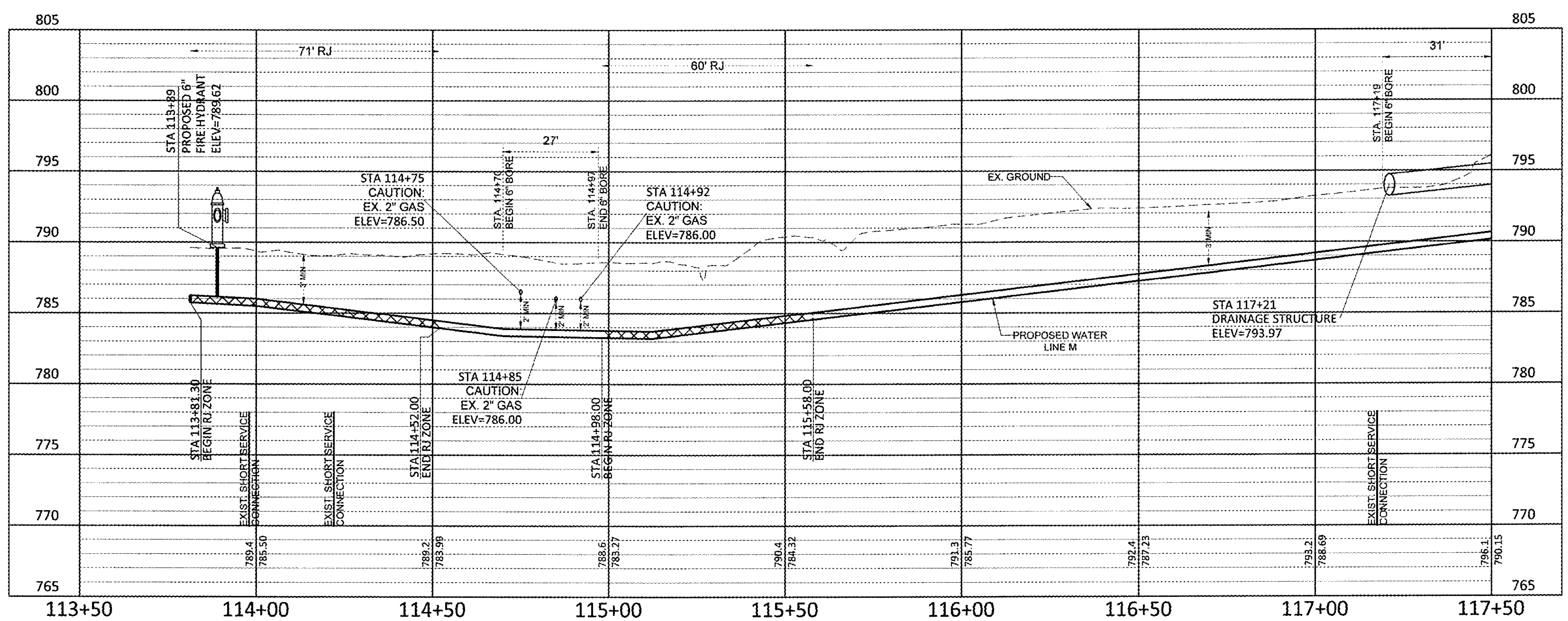
- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND - PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.



KEITH BEATTY 29905 LICENSED PROFESSIONAL ENGINEER OKLAHOMA 4-8-20

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

OKIE 811

W 65TH ST S

PLAN AND PROFILE EAST (SHEET 4 of 5)

PROJECT TMUA-W 18-21 CONTRACT 134789

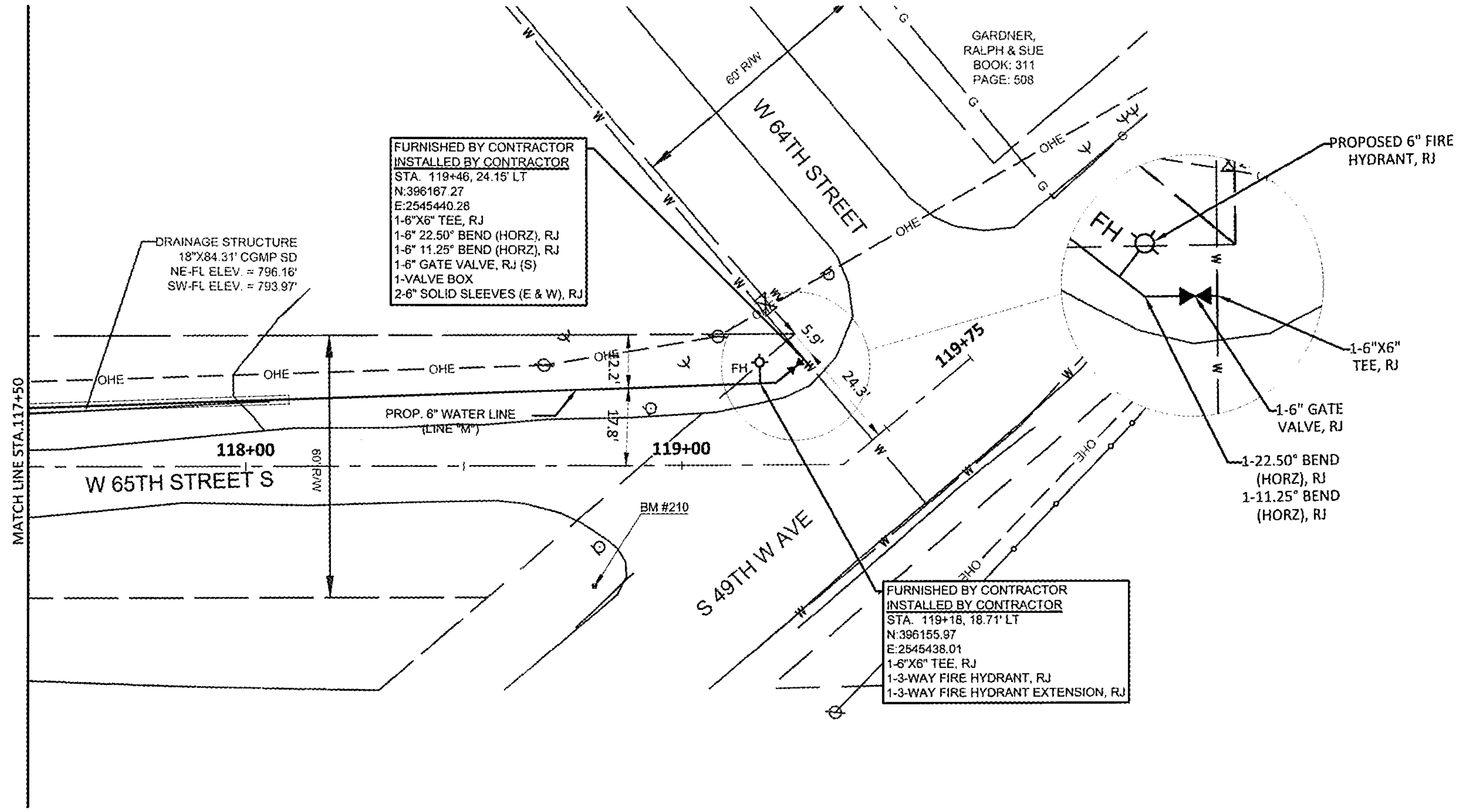
2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC. 4200 E. SKELLY DRIVE SUITE 410 TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1" = 20'	LEAD ENGR.	CEW 4/20		
	FIELD MGR.	4/20		
VERTICAL 1" = 5'	RECOMMENDED: DESIGN MANAGER	HAS 4-20		CITY ENGINEER
FILE: CV-WAT-PP-WTRL	DRAWING:			DATE: 05.15.20
ATLAS PAGE NO: 395 AND 478				SHEET 42 OF 51 SHEETS



SERVICE CONNECTIONS	
LONG SERVICE	0 EA.
SHORT SERVICE	0 EA.

HORIZONTAL SCALE 1"=20'
0 10' 20' 40'
SCALE IN FEET

VERTICAL SCALE 1"=5'
0 5' 10'
SCALE IN FEET

REQUIRED RESTRAINED LENGTH

FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE: https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND – PLAN

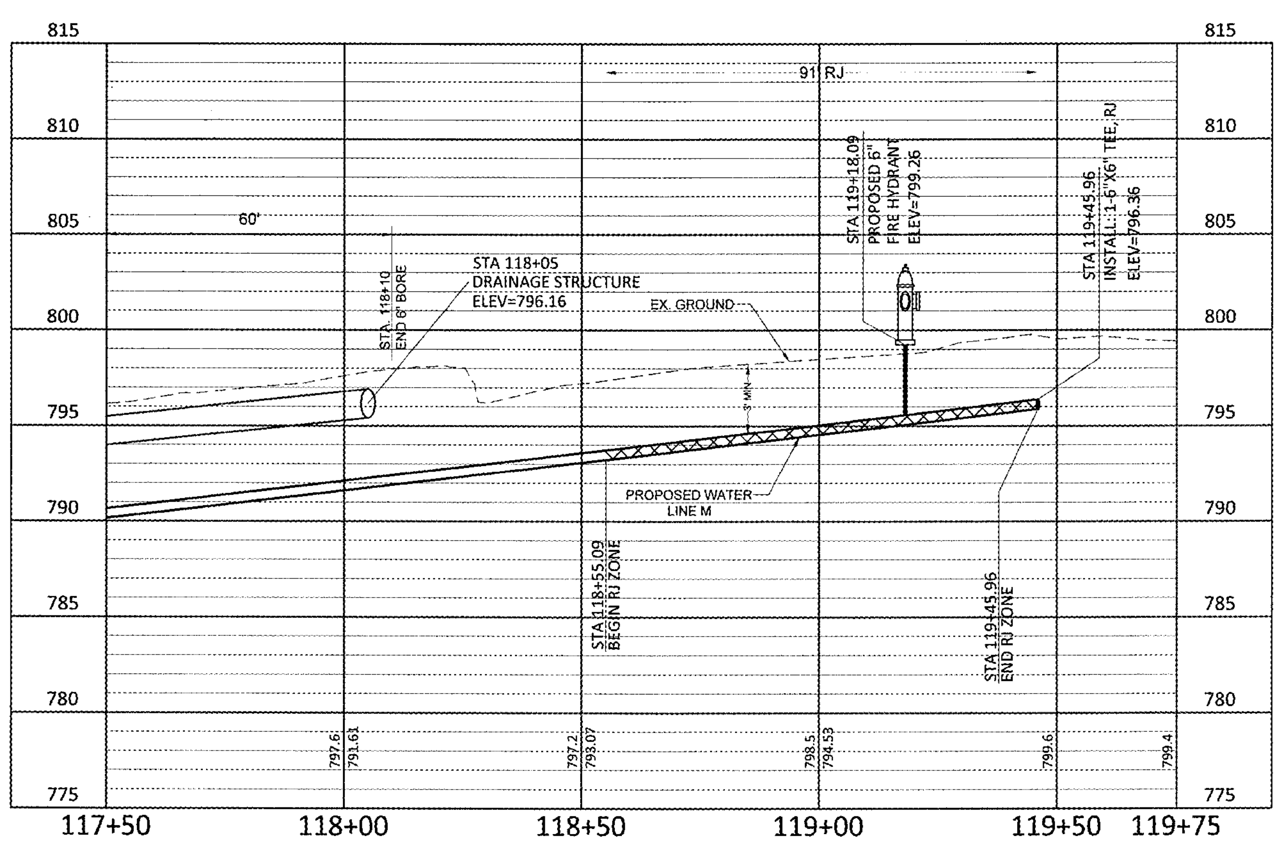
- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND – PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.



OKIE 811

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA 4-8-2020

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

W 65TH ST S

PLAN AND PROFILE EAST (SHEET 5 of 5)

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

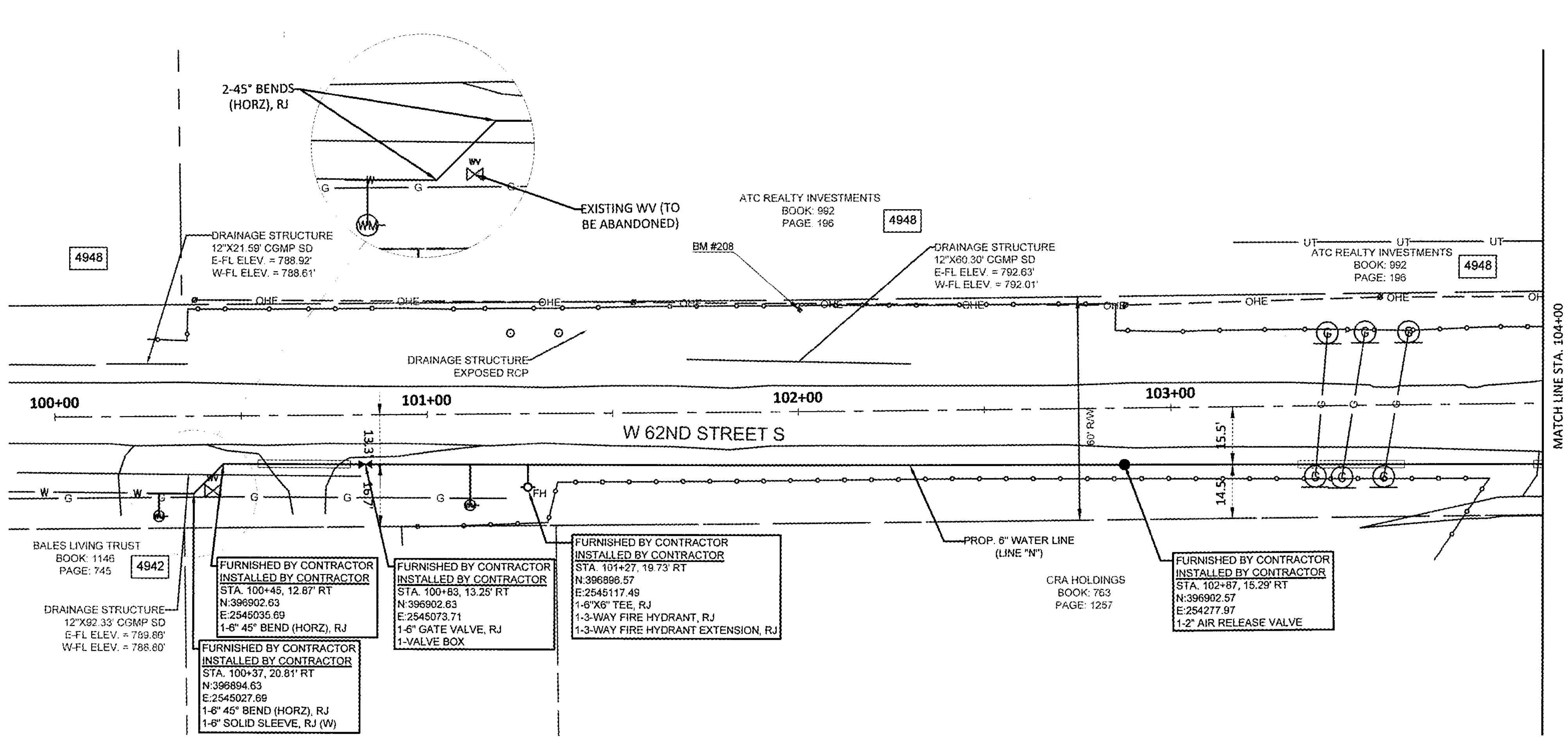
PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410 TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020
	DESIGNED	KDB	04/2020
	SURVEY	SDC	07/2019
PROFILE SCALE:	PROJ. MGR.		
HORIZONTAL 1" = 20'	LEAD ENGR.	4/20	
	FIELD MGR.	4/20	
VERTICAL 1" = 5'	RECOMMENDED	HAS 4-20	
	DESIGN MANAGER		

APPROVED:
CITY ENGINEER
DATE: 05.15.20

FILE: CV-WAT-PP-WTRL DRAWING:
ATLAS PAGE NO: 395 AND 478



SERVICE CONNECTIONS	
LONG SERVICE	0 EA.
SHORT SERVICE	2 EA.

HORIZONTAL SCALE 1"=20'
0 10' 20' 40'
SCALE IN FEET

VERTICAL SCALE 1"=5'
0 5' 10'
SCALE IN FEET

N

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6
CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE: https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe			
INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED			

LEGEND – PLAN

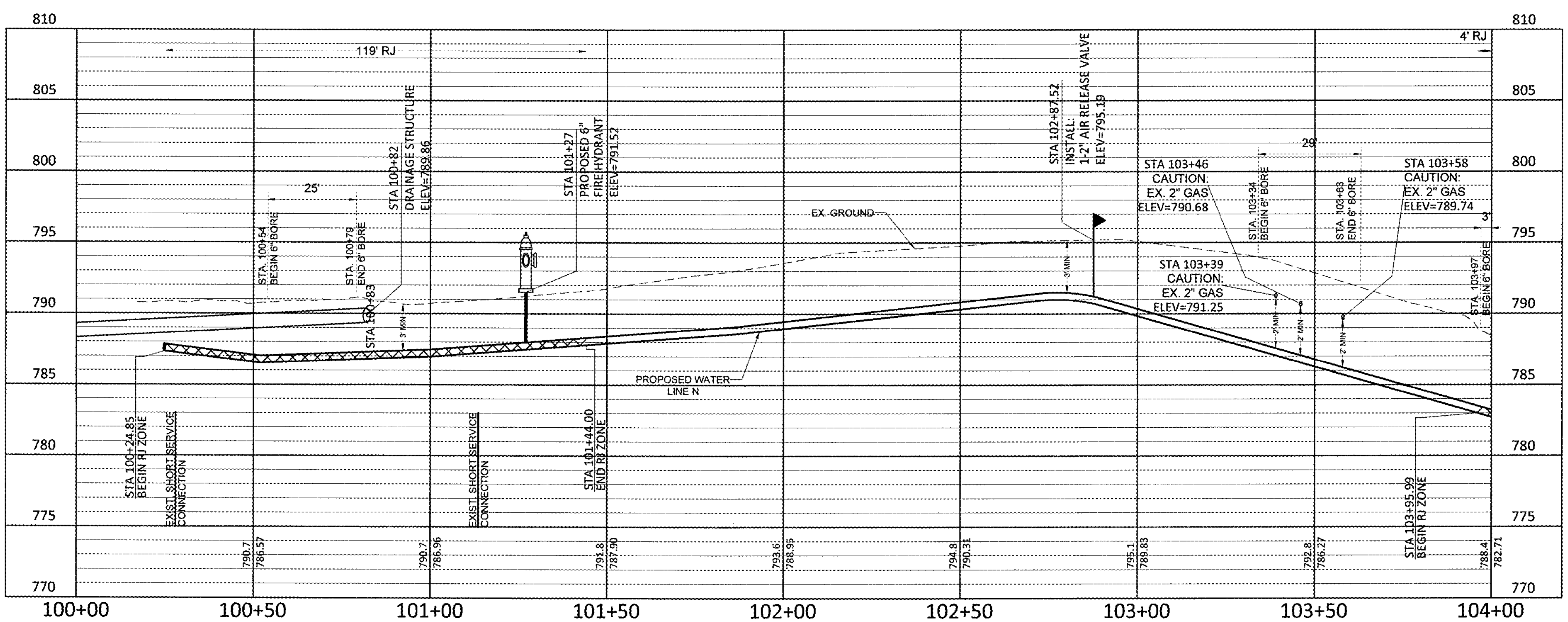
- EXISTING SS
- EXISTING GAS
- EXISTING OHE
- PROPOSED WATERLINE
- BORE
- PROPOSED WATER METER
- ASPHALT PATCHING
- 5802 HOUSE NUMBER

LEGEND – PROFILE

- PROPOSED WATERLINE
- RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.



OKIE 811
Know what's below. Call before you dig.

W 62ND ST S

PLAN AND PROFILE EAST (SHEET 1 of 5)

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

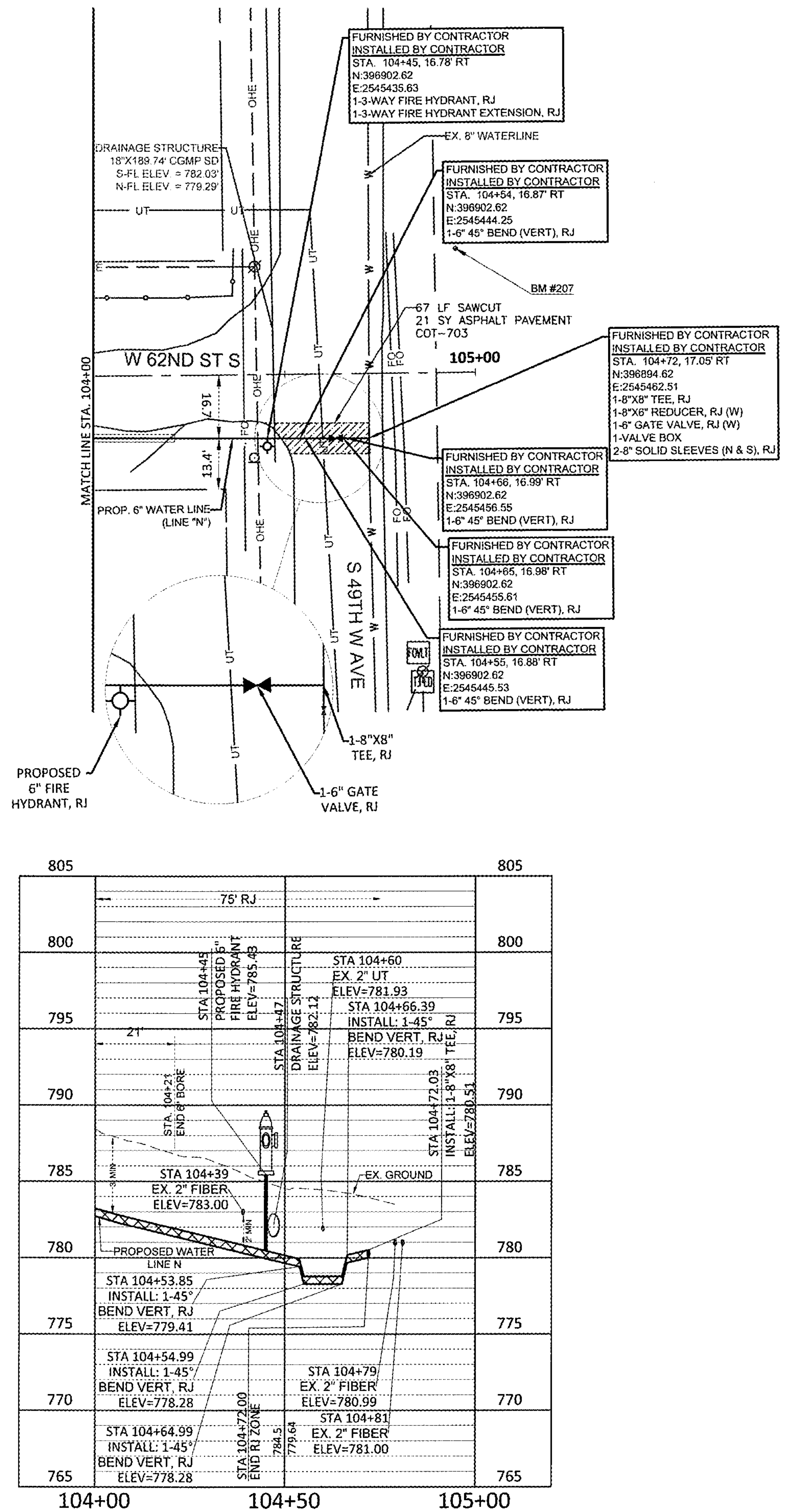
LICENSED PROFESSIONAL ENGINEER
KEITH BEATTY
29905
OKLAHOMA
4-8-2020

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

PLANS AND ESTIMATES PREPARED BY:
FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE: HORIZONTAL 1" = 20' VERTICAL 1" = 5'	PROJ. MGR.			
	LEAD ENGR.	CEW	4/20	
	FIELD MGR.	[illegible]	4/20	
	RECOMMENDED: HAS 4·20 DESIGN MANAGER			CITY ENGINEER
FILE: CV-WAT-PP-WTRL	DRAWING:			DATE: 05.5.20
ATLAS PAGE NO: 395 AND 478				SHEET 44 OF 51 SHEETS



SERVICE CONNECTIONS	
LONG SERVICE	0 EA.
SHORT SERVICE	0 EA.

HORIZONTAL SCALE 1"=20'
0 10' 20' 40'
SCALE IN FEET

VERTICAL SCALE 1"=5'
0 5' 10'
SCALE IN FEET

REQUIRED RESTRAINED LENGTH			
FITTING	6" RESTRAINED JOINT LENGTH (FEET)	8" RESTRAINED JOINT LENGTH (FEET)	12" RESTRAINED JOINT LENGTH (FEET)
DEAD END	58	76	107
11.25° HORZ.	2	3	3
22.50°	4	5	6
45°	7	9	13
90°	17	22	30
45° VERT. DOWN	24	32	45
45° UP	7	9	13
22.5° UP	4	5	6

CALCULATED USING THRUST RESTRAINT CALCULATOR FOUND HERE:
https://www.dipra.org/ductile-iron-pipe-resources/calculators/thrust-restraint-of-ductile-iron-pipe

INPUTS: TYPE 5, GOOD SAND, 3' COVER, 150 PSI, AND 1.5 SAFETY FACTOR. ALL LENGTHS ARE POLYWRAPPED

LEGEND - PLAN

EXISTING SS
EXISTING GAS
EXISTING OHE
PROPOSED WATERLINE
BORE
PROPOSED WATER METER
ASPHALT PATCHING
5802 HOUSE NUMBER

LEGEND - PROFILE

PROPOSED WATERLINE
RESTRAINED JOINTS

NOTES:

1. CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS, CITY OF TULSA ENGINEERING SERVICES DEPARTMENT.
3. ALL TRAFFIC SIGNS IN THE VICINITY OF THIS PROJECT SHOULD BE REPLACED WITH NEW AND UNDAMAGED TRAFFIC SIGNS.
4. IF ANY PAVEMENT MARKINGS ARE DAMAGED DURING CONSTRUCTION SHALL BE REMOVED IN THEIR ENTIRETY AND REPLACED WITH NEW THERMOPLASTIC PAVEMENT MARKINGS.

OKIE811 Know what's below. Call before you dig.

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA
4-15-20

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

W 62ND ST S

PLAN AND PROFILE EAST (SHEET 2 of 5)

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

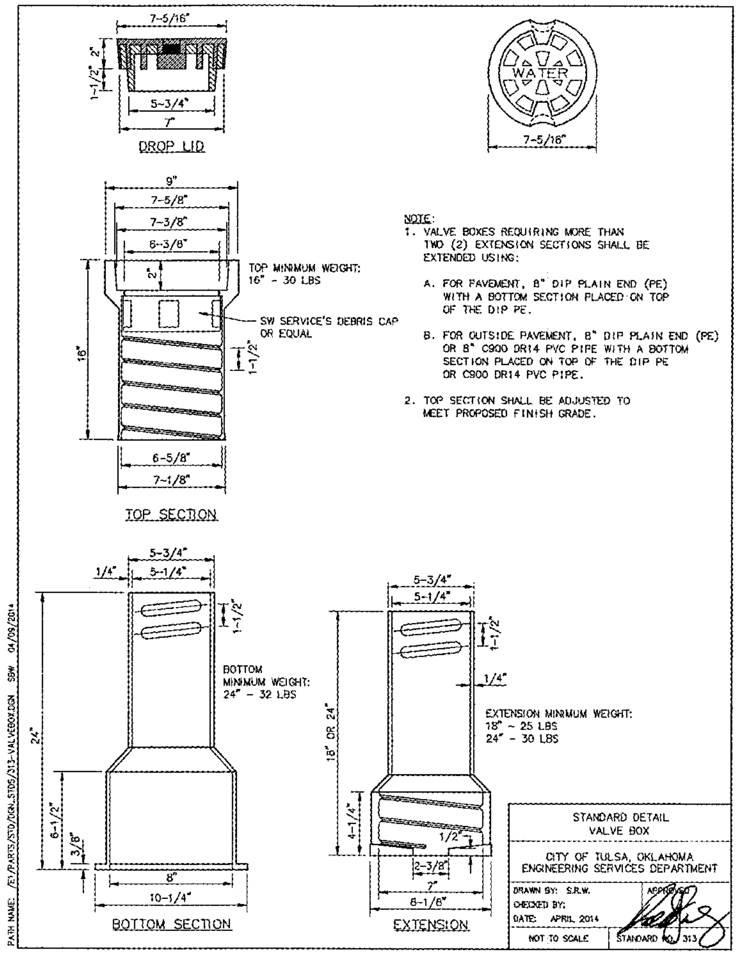
CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

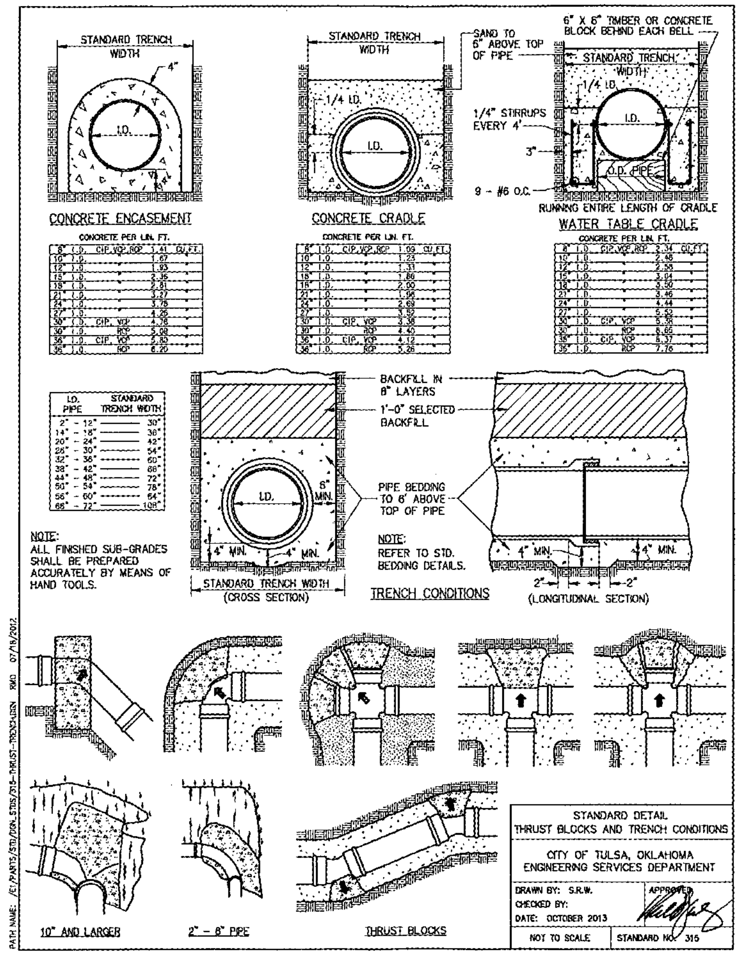
PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

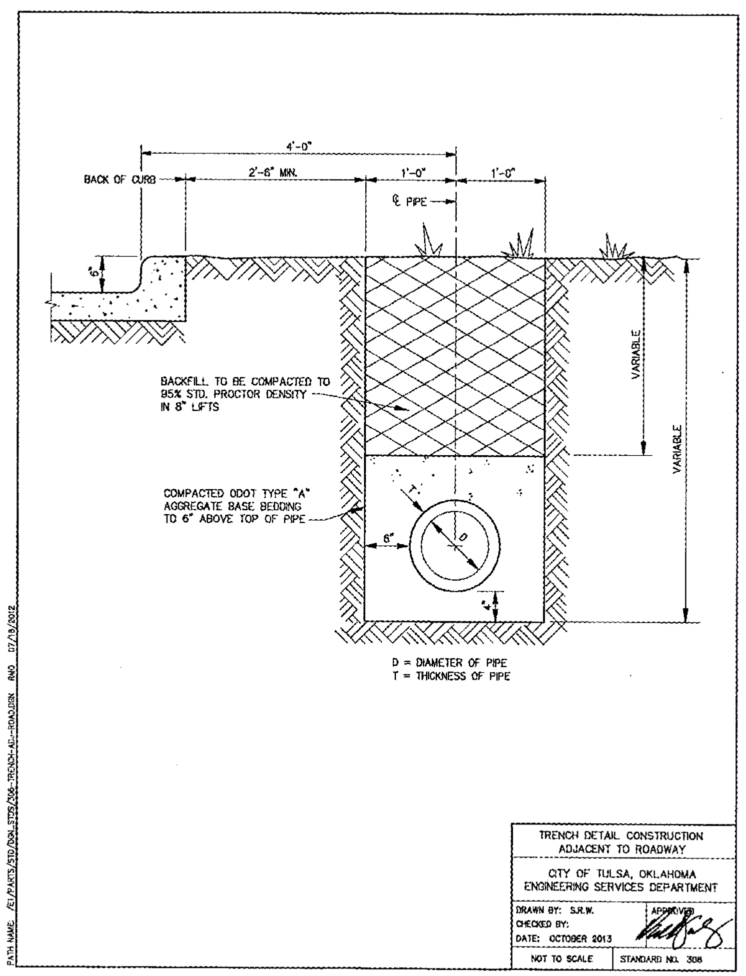
REVISION	BY	DATE

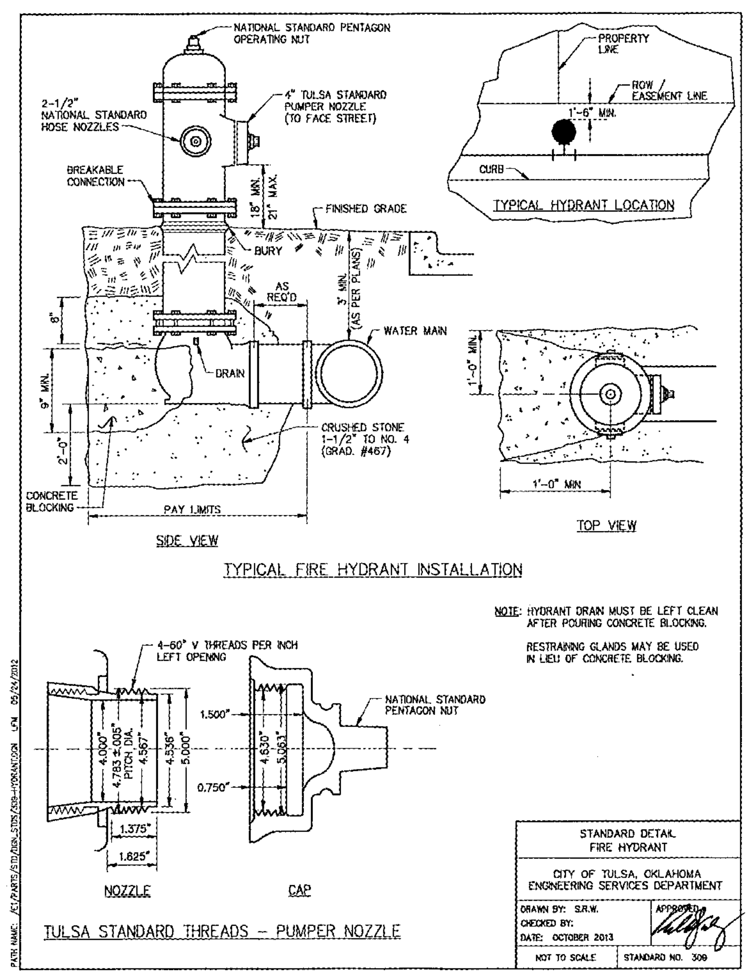
PLAN SCALE: 1" = 20'	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1" = 20'	LEAD ENGR.	CEW 4/20		
	FIELD MGR.	[illegible] 4/20		
VERTICAL 1" = 5'	RECOMMENDED: HAS 4-20			CITY ENGINEER
	DESIGN MANAGER			DATE: 05.15.20

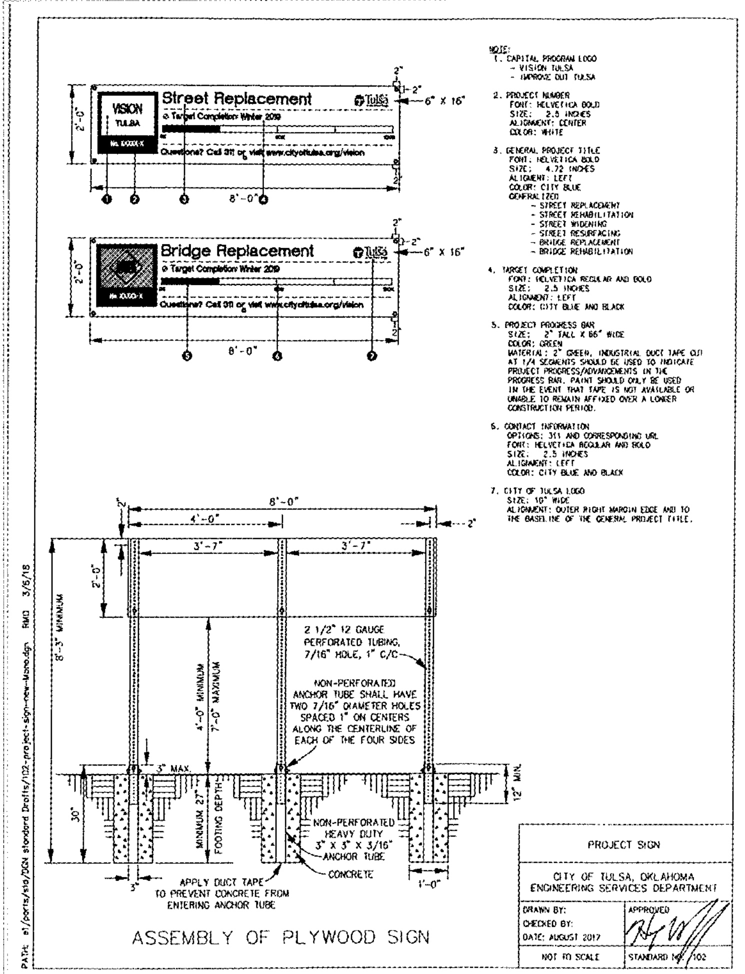
FILE: CV-WAT-PP-WTRL DRAWING:
ATLAS PAGE NO: 395 AND 478
SHEET 45 OF 51 SHEETS











CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

CLIENT DETAILS (SHEET 1 OF 6)

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1"=N/A	DRAWN	BHT	04/2020
	DESIGNED	KDB	04/2020
	SURVEY	SDC	07/2019
PROFILE SCALE:	PROJ. MGR.		
HORIZONTAL 1"=N/A	LEAD ENGR.	CEW	4/20
	FIELD MGR.		4/20
VERTICAL 1"=N/A	RECOMMENDED:	HAS	4-20
	DESIGN MANAGER		

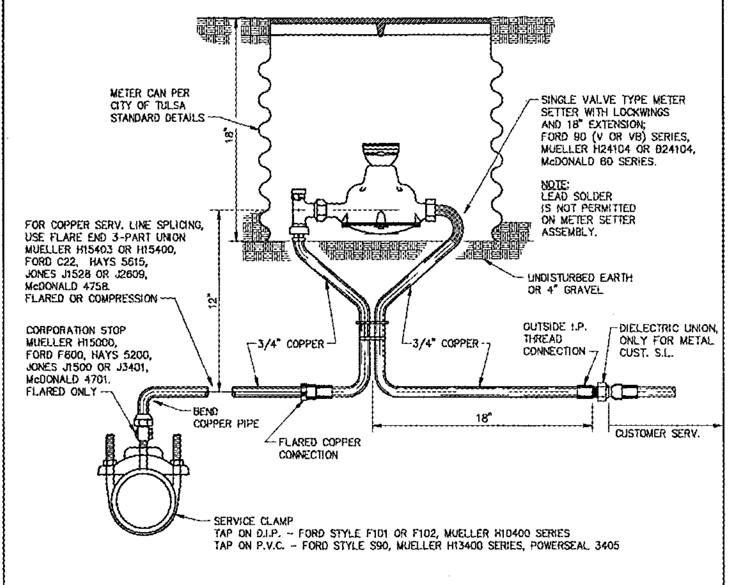
APPROVED:

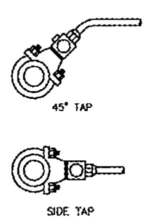
CITY ENGINEER

DATE: 05.15.20

FILE: CV-STND-DETAILS DRAWING:

ATLAS PAGE NO: 395 AND 478

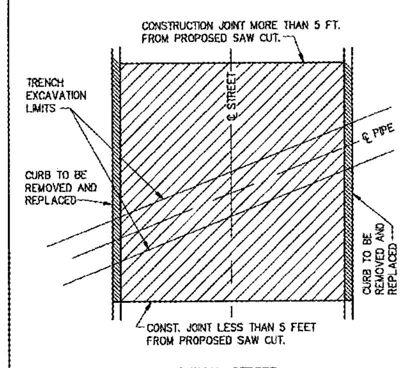




NOTE:

1. SERV. CLAMP REQUIRED FOR ALL SIZES PVC, AND FOR 4" AND SMALLER IRON. FOR 6" AND LARGER IRON, TAP DIRECTLY.
2. TAP AT ANGLE NECESSARY TO PROVIDE 30" OF COVER OVER THE SERVICE LINE.
3. COPPER SERVICE LINES SHALL BE TYPE K SOFT ANNEALED.

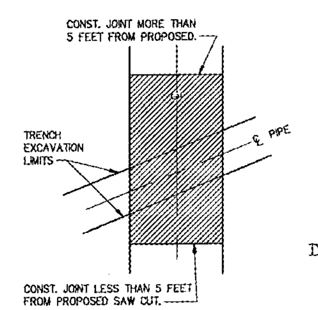
STANDARD METER SETTINGS FOR 5/8" X 3/4" AND 3/4" WATER SERVICE	
CITY OF TULSA, OKLAHOMA ENGINEERING SERVICES DEPARTMENT	
DRAWN BY: S.B.W. CHECKED BY: DATE: SEPTEMBER 2014	APPROVED HMS
NOT TO SCALE	STANDARD NO. 501



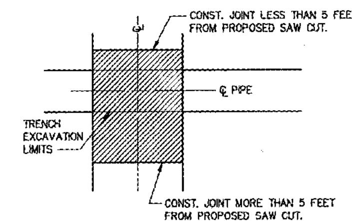
TYPICAL STREET WITH DIAGONAL CROSSING

NOTE:

1. REMOVE AND REPLACE PAVEMENT WITHIN SHADED AREAS BOUNDED BY CONST. JOINTS.
2. FOR DIAGONAL CROSSING, REPLACE PAVEMENT USING SQUARED JOINTS AS SHOWN. PAY QUANTITY WILL INCLUDE SQUARED AREA.
3. REMOVE AND REPLACE PAVEMENT TO CONST. JOINT IF LESS THAN 5 FEET FROM THE PROPOSED SAW CUT. EXTRA AREA WILL BE INCLUDED IN PAY QUANTITY.
4. FOR LONGITUDINAL INSTALLATIONS, REMOVE AND REPLACE PAVEMENT AND CURB TO EDGE OF STREET IF THE SAW CUT IS LESS THAN 5 FT. FROM THE OUTSIDE EDGE OF THE PAVEMENT OR CURB. AVOID SAW CUTS IN THE EXISTING WHEEL LINES. TRENCHES EXCEEDING 300 L.F. SHALL BE BACKFILLED AND MADE MORE DRIVEABLE.
5. ALL CONSTRUCTION JOINTS SHALL BE RE-ESTABLISHED IN ACCORDANCE WITH THE CITY OF TULSA STANDARDS FOR PORTLAND CEMENT CONCRETE PAVEMENT. WHEN A PAVEMENT SECTION IS REMOVED ALONG AN EXISTING LONGITUDINAL CONSTRUCTION JOINT, THE NEW PAVEMENT SHALL BE DOWELLED TO THE PAVEMENT ADJACENT TO THE JOINT.
6. MINIMUM PAVING PANEL DIMENSIONS SHALL BE 5 FEET BY 5 FEET.
7. THE MAXIMUM RATIO OF PAVING PANEL DIMENSIONS SHALL BE 1.5:1
8. JOINTS SHALL NOT BE PLACED IN VEHICLE WHEEL PATH.

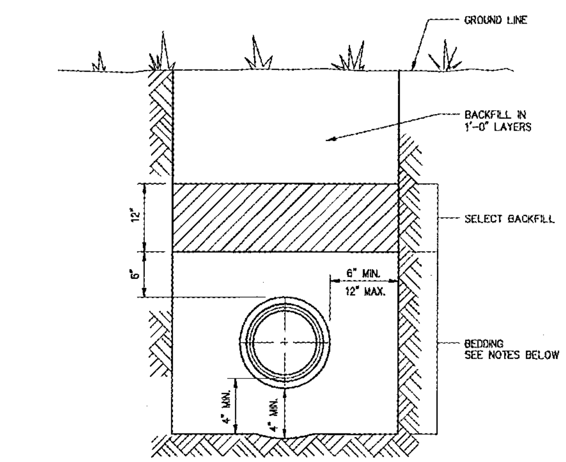


TYPICAL DRIVEWAY OR SIDEWALK WITH DIAGONAL CROSSING



TYPICAL STREET, DRIVEWAY, OR SIDEWALK WITH RIGHT ANGLE CROSSING

STANDARD DETAIL FOR PAVEMENT CUTS	
CITY OF TULSA, OKLAHOMA ENGINEERING SERVICES DEPARTMENT	
DRAWN BY: S.R.W. CHECKED BY: DATE: OCTOBER 2013	APPROVED
NOT TO SCALE	STANDARD NO. 714



TRENCH CROSS-SECTION

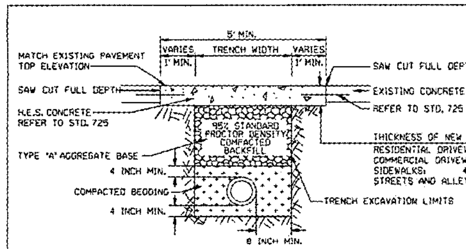
NOTE:

1. BEDDING SHALL BE SAND, COMPACTED TO 95% STANDARD PROCTOR DENSITY BY TAMPING OR VIBRATING. COMPACTION SHALL BE FIELD TESTED BY AN INDEPENDENT LABORATORY TO INSURE 95% PROCTOR DENSITY. CONTRACTOR SHALL BEAR ALL COSTS OF TESTING.
2. AS AN ALTERNATIVE, BEDDING MAY BE A CLEAN CRUSHED STONE, 1/4" TO 1/2", (GRAD. #7). THE CRUSHED STONE SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED 12 INCHES IN THICKNESS, AND THEN COMPACTED. COMPACTION PROCEDURE AND RESULTS SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER.
3. FOR PAVED AREAS, SEE STANDARD DETAIL FOR PAVEMENT REMOVAL AND REPLACEMENT.
4. COMPACTION SHALL BE 95% STANDARD PROCTOR DENSITY PER AASHTO T-99 IN 8" LIFTS.

SEMI-RIGID PIPE:

1. PRETENSIONED CONCRETE – AWWA C303
2. STEEL – AWWA C200
3. PVC – AWWA C900

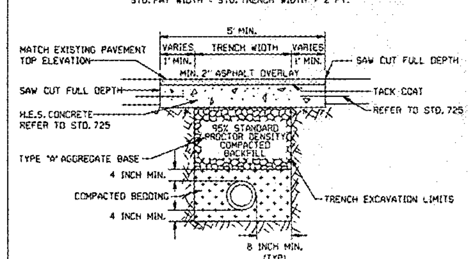
BEDDING DETAIL SEMI-RIGID PIPE	
CITY OF TULSA, OKLAHOMA ENGINEERING SERVICES DEPARTMENT	
DRAWN BY: S.R.W. CHECKED BY: DATE: OCTOBER 2013	APPROVED
NOT TO SCALE	STANDARD NO. 305



SECTION

TYPICAL CONCRETE STREET OR DRIVEWAY (REPLACE FULL PANELS)

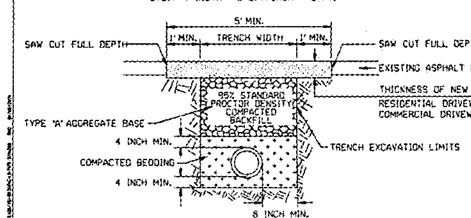
STD. PAY WIDTH = STD. TRENCH WIDTH + 2 FT.



SECTION

TYPICAL CONCRETE WITH 2" ASPHALT OVERLAY

FOR ASPHALT OR CONCRETE/ASPHALT STREETS
STD. PAY WIDTH = STD. TRENCH + 2 FT.



SECTION

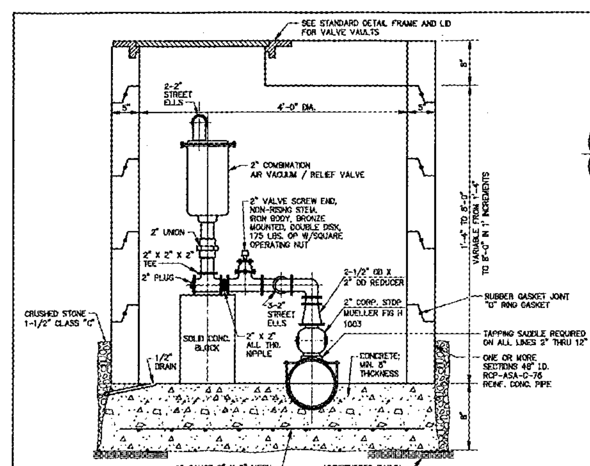
TYPICAL ASPHALT DRIVEWAY OR PARKING LOT

STD. PAY WIDTH = STD. TRENCH WIDTH + 2 FT.

NOTE:

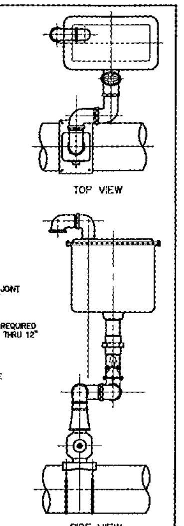
1A. BEDDING MATERIAL WITHIN 4 INCHES OF FLEXIBLE GRAVITY PIPE SHALL BE COMPACTED 3/4" TO NO. 4 CRUSHED STONE (GRAD NO. 67).
1B. BEDDING MATERIAL FOR RIGID AND SEMI-RIGID PIPE SHALL BE AS NOTED IN STDS. 304, 305 AND 751.
2. REMOVE AND REPLACE PAVEMENT TO NEAREST JOINT IF PROPOSED SAW CUT IS LESS THAN 5 FEET FROM JOINT.
3. NO PAYMENT WILL BE MADE FOR REPLACEMENT OF PAVEMENT OUTSIDE OF STANDARD PAY WIDTH DUE TO TRENCH EXCAVATION WIDER THAN STANDARD TRENCH WIDTH.
4. PAY QUANTITY WILL INCLUDE REPLACEMENT OF PAVEMENT DUE TO SQUARING OF DIAGONAL CUTS.
5. WHERE TRENCH EXCAVATION IS WITHIN 12' OF BACK OF CURB, COMPACTED BACKFILL SHALL BE ODOT TYPE 'A' AGGREGATE BASE.
6. SEE STD. 731 FOR MINIMUM PAVING PANEL DIMENSIONS.
7. THE MAXIMUM RATIO OF PAVING PANEL DIMENSIONS SHALL BE 1.5:1
8. JOINT SHALL NOT BE PLACED IN VEHICLE WHEEL PATH.
9. FOR ASPHALT DIMENSIONS AND TYPE REFER TO STD. 725.
10. FOR FLOWABLE FILL BEDDING AND BACKFILL ATERNATIVES REFER TO STANDARDS 730 AND 731.

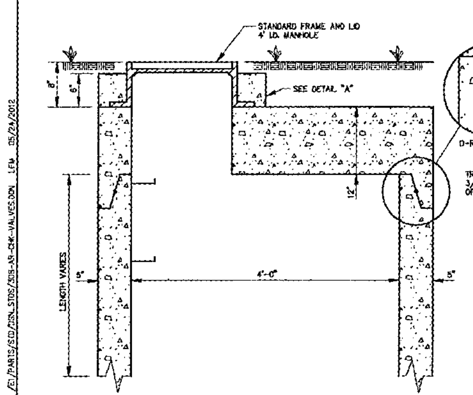
STANDARD DETAIL FOR PAVEMENT REMOVAL AND REPLACEMENT	
CITY OF TULSA, OKLAHOMA ENGINEERING SERVICES DEPARTMENT	
DRAWN BY: R.M.G. CHECKED BY: DATE: APRIL 2019	APPROVED
NOT TO SCALE	STANDARD NO. 723



REINFORCED CONCRETE VAULT

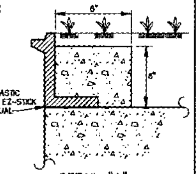
ALTERNATE FOR STREET TRAFFIC





PRECAST MANHOLE IN YARD DETAIL

NOT TO SCALE



DETAIL "A"

NOT TO SCALE

NOTE: FOR 12" AND SMALLER MAINS ONLY. FOR LARGER MAINS SEE DETAIL DRAWING IN PLANS.

STANDARD DETAIL COMBINATION AIR VACUUM/AIR RELIEF, CHECK VALVES AND VAULTS	
CITY OF TULSA, OKLAHOMA ENGINEERING SERVICES DEPARTMENT	
DRAWN BY: S.R.W. CHECKED BY: DATE: OCTOBER 2013	APPROVED
NOT TO SCALE	STANDARD NO. 308

OKIE 811 Know what's below. Call before you dig.

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA 4-8-2020

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

CLIENT DETAILS (SHEET 2 OF 6)

PROJECT TMUA-W 18-21 CONTRACT 134789

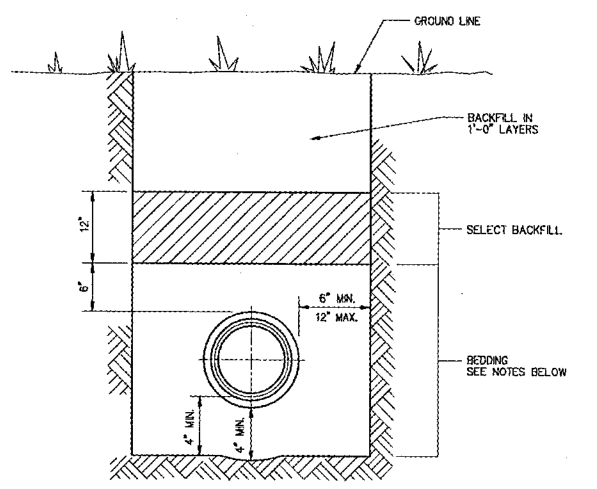
2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC. 4200 E. SKELLY DRIVE SUITE 410 TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1"=N/A	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1"=N/A	LEAD ENGR.	CEW 4/20		
	FIELD MGR.	4/20		
VERTICAL 1"=N/A	RECOMMENDED DESIGN MANAGER	HAS 4·20		CITY ENGINEER
FILE: CV-STND-DETAILS	DRAWING:			DATE: 05.15.20
ATLAS PAGE NO: 395 AND 478				SHEET 47 OF 51 SHEETS



TRENCH CROSS-SECTION

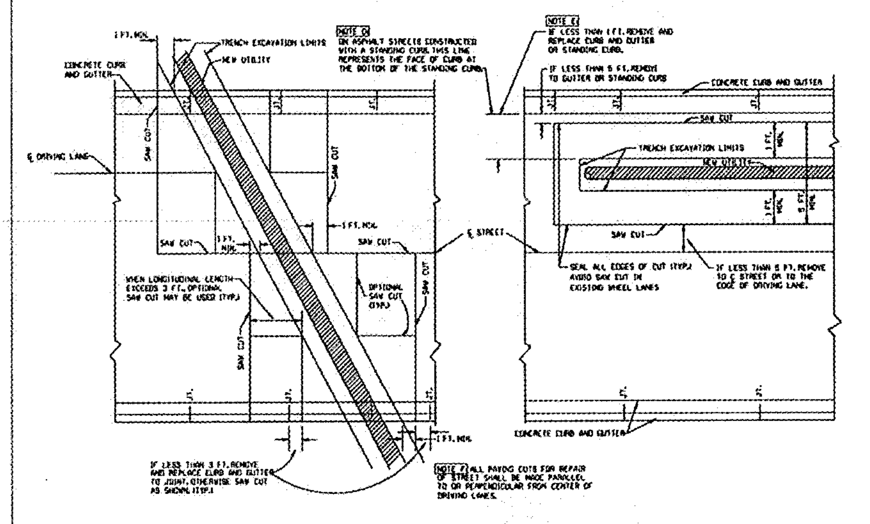
NOTE:

1. BEDDING SHALL BE SAND, PLACED IN THE TRENCH SIMULTANEOUSLY ON BOTH SIDES OF THE PIPE, AND HAND TAMPED TO ASSURE CONSOLIDATION.
2. FOR PAVED AREAS, SEE STANDARD DETAIL FOR PAVEMENT REMOVAL AND REPLACEMENT.
3. CONTRACTOR SHALL BEAR ALL COSTS OF TESTING.
4. COMPACTION SHALL BE 95% STANDARD PROCTOR DENSITY PER AASHTO T-99 IN 8" LIFTS.

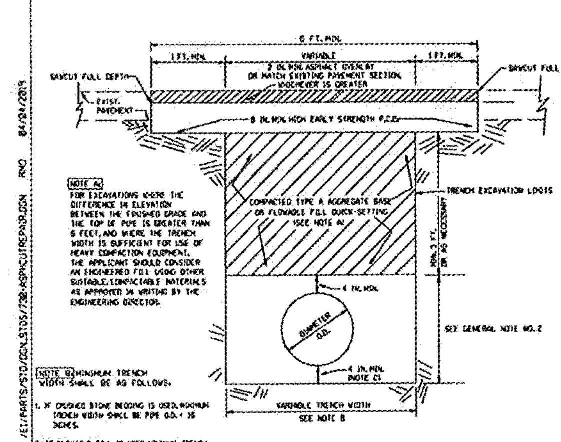
RIGID PIPE:

1. DUCTILE IRON – AWWA C151
2. PRESTRESSED CONCRETE – AWWA C301
3. REINFORCED CONCRETE SANITARY SEWER
4. VITRIFIED CLAY SANITARY SEWER

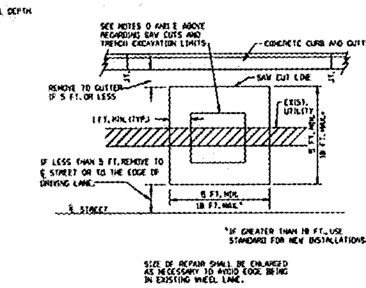
BEDDING DETAIL RIGID PIPE	
CITY OF TULSA, OKLAHOMA ENGINEERING SERVICES DEPARTMENT	
DRAWN BY: S.R.W.	APPROVED:
CHECKED BY:	
DATE: OCTOBER 2013	
NOT TO SCALE	STANDARD NO. 304



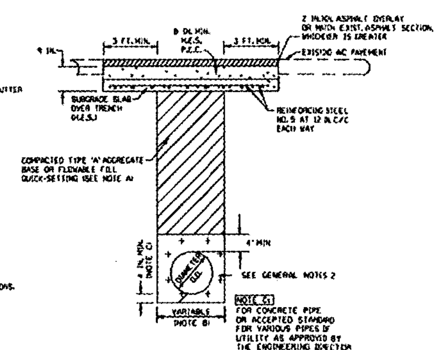
DIAGONAL INSTALLATIONS LONGITUDINAL INSTALLATIONS



TYPICAL SECTION



TYPICAL UTILITY REPAIR



TYPICAL SECTION

FOR STATE HIGHWAYS THAT ARE ARTERIAL STREETS

GENERAL NOTES

1. A STREET CUT PERMIT SHALL BE OBTAINED FOR ANY STREET CUTS BEFORE WORK PROCEEDS.
2. MATERIAL WITHIN 4 IN. OF PIPE SHALL BE EITHER COMPACTED 3/4" TO NO. 4 CRUSHED STONE, FLOWABLE FILL CONCRETE, OR MAY BE ANY SUITABLE MATERIAL APPROVED IN WRITING BY THE ENGINEERING DIRECTOR. IF FLOWABLE FILL IS USED AS BACKFILL MATERIAL, THEN EMBEDMENT MATERIAL MUST BE FLOWABLE FILL.
3. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH CURRENT ODOT SPECIFICATIONS, THE CITY OF TULSA STANDARDS AND SPECIAL PROVISIONS AS NOTED.
4. WHERE MATERIALS ARE TRANSPORTED IN THE PROSECUTION OF THE WORK, VEHICLES SHALL NOT BE LOADED BEYOND THE LOADING CAPACITY RECOMMENDED BY THE MANUFACTURER OF THE VEHICLE OR PRESCRIBED BY ANY FEDERAL, STATE, OR LOCAL LAW OR REGULATION. WHERE IT IS NECESSARY TO CROSS CURBING OR SIDEWALKS, PROTECTION AGAINST DAMAGE SHALL BE PROVIDED BY THE CONTRACTOR AND ANY DAMAGE TO ROADS, CURBING, OR SIDEWALKS SHALL BE REPAIRED BY THE C.O.T. PAVEMENT CUT CONTRACTOR AT THE EXPENSE OF THE PERMIT HOLDER.
5. TRAFFIC CONTROL: ALL WORK SHALL BE DONE IN COOPERATION WITH THE CITY TO ESTABLISH, INSTALL, MAINTAIN, AND OPERATE COMPLETE, ADEQUATE, AND SAFE TRAFFIC CONTROL DURING THE ENTIRE CONSTRUCTION PERIOD. BARRICADES, SIGNS, LIGHTS SHALL BE APPROVED BY THE TRAFFIC ENGINEER OF THE C.O.T. ALL TRAFFIC CONTROL ITEMS SHALL BE PROMPTLY REMOVED UPON COMPLETION OF THE WORK.
6. ALL LONGITUDINAL TRENCHES EXCEEDING 300 LINEAR FEET SHALL BE BACKFILLED AND MADE DRIVEABLE PRIOR TO EXCAVATING ANY ADDITIONAL TRENCH.
7. ALL SIDEWALK AND/OR CURB CONSTRUCTION OR RECONSTRUCTION WITHIN THE STREET RADIUS, SHALL INCLUDE THE INSTALLATION OF A STANDARD WHEELCHAIR RAMP AS A PART OF THE CONSTRUCTION.
8. CONTACT THE CITY OF TULSA TRAFFIC ENGINEERING DIVISION AT 918-596-9760 BEFORE REMOVING OR REPLACING ANY TRAFFIC CONTROL DEVICES, INCLUDING, BUT NOT LIMITED TO, STRIPING AND REFLECTORS, SCHOOL CROSSING STRIPING AND DEVICES, ETC.
9. ALL EXISTING PAVEMENT CONTROL JOINTS SHALL BE RE-ESTABLISHED.
10. COMPACTION SHALL BE PER SECTION 303.04(c) AND (d) OF THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION AND APPLICABLE SUPPLEMENTS, AS PUBLISHED BY THE OKLAHOMA DEPARTMENT OF TRANSPORTATION.
11. JOINTS SHALL NOT BE PLACED IN VEHICLE WHEEL PATH.

CONSTRUCTION NOTES

1. BACKFILL

1A. BACKFILL UNDER PAVEMENT SHALL BE BY ONE OF THE FOLLOWING METHODS:
   1. AGGREGATE BASE MATERIAL SHALL BE PLACED IN 8 IN. MAXIMUM LIFTS AND SHALL BE COMPACTED TO 100% STANDARD DENSITY AASHTO 180, METHOD D AS MEASURED BY THE NUCLEAR DENSITY METHOD. COMPACTION SHALL BE DONE BY A VIBRATORY HAND TAMPER, PER GENERAL NOTE 10.
   2. QUICK-SET FLOWABLE FILL

1B. BACKFILL OUTSIDE OF PAVEMENT
COMPACTION SHALL BE 95% STD. DENS. PER SECTION 303.04 (c) AND (d) OF THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION AND APPLICABLE SUPPLEMENTS, AS PUBLISHED BY THE OKLAHOMA DEPARTMENT OF TRANSPORTATION.

1C. AGGREGATE BASE MATERIAL
THIS MATERIAL COMMONLY CALLED 1 1/2 IN. TYPE A AGGREGATE BASE SHALL HAVE THE FOLLOWING GRADATION WHICH IS ODOT SECTION 703.01 TYPE A.

SQUARE MMS	TYPE A
1-1/2 IN. (37.5)	100
3/4 IN. (19.0)	40-100
3/8 IN. (9.5)	30-75
NO. 4 (4.75)	25-60
NO. 10 (2.00)	20-43
NO. 40 (0.425)	8-26
NO. 200 (0.075)	4-12

1D. THE SAND SHALL HAVE 100% PASSING THE 3/4 INCH SIEVE AND 8% - 20% PASSING THE NO. 200 SIEVE.

1E.

FLOWABLE FILL	
QUICK SETTING MASTER BUILDERS OR APPROVED EQUAL	
TYPE I CEMENT	100 LBS.
FLY ASH	0 LBS.
SAND	2925 LBS.
WATER	565 LBS.
POZZUTEC 20	80 OZ.
FLOW	4-1/2 IN. MIN.

28 DAY COMPRESSIVE STRENGTH SHALL BE 25 PSI TO 50 PSI.

2. CONCRETE
BEFORE ANY RESTORATION, PAVEMENT THAT HAS BEEN UNDERMINED SHALL BE REMOVED TO STABLE MATERIAL BY SAWCUT AS PER DETAIL. ALL PAVEMENT REMOVAL SHALL BE A MINIMUM OF 5 FEET BY 5 FEET. CONCRETE FOR THE REPLACEMENT OF PAVEMENT, CURBS AND SIDEWALKS SHALL BE HIGH EARLY STRENGTH CLASS A AS PER ODOT SECTION 701.01.

3. ASPHALT
ALL ASPHALT SHALL BE ODOT TYPE "S4". THE ASPHALT SHALL BE COMPACTED TO 92% MAXIMUM DENSITY AS DETERMINED BY AASHTO T-209 METHOD.
SPREADING AND FINISHING OF ASPHALT TO MEET ODOT SECTION 411.04 (g)
EDGES OF CUT SHALL BE SAW CUT TO FULL DEPTH.
PRIOR TO PLACEMENT OF ASPHALT IN CUT A TACK COAT SHALL BE UNIFORMLY APPLIED. TACK COAT SHALL BE IN ACCORDANCE WITH SECTION 407 OF THE ODOT SPECIFICATIONS.
ALL SURFACE EDGE JOINTS OF THE CUT/OVERLAY SHALL BE SEALED WITH AN ASPHALT RUBBER MEETING THE REQUIREMENTS OF SECTION 701.08(f) OF THE ODOT SPECIFICATIONS.
IF CURB AND GUTTER ARE REMOVED THEY SHALL BE REPLACED TO THE STANDARDS AND SPECIFICATIONS OF THE TYPICAL EXISTING CURB AND GUTTER.
MATERIALS FOR ASPHALTIC CONCRETE SHALL MEET ODOT SECTION 708.

4. REVEGETATION
ALL AREAS OUTSIDE THE PAVED PORTION OF THE RIGHT OF WAY WHERE VEGETATION HAS BEEN REMOVED SHALL BE RESTORED BY SODDING, AND MAINTAINED UNTIL FINAL ACCEPTANCE.

5. JOINTS
WHEN ONE OR MORE LONGITUDINAL CONSTRUCTION JOINT IS REMOVED FOR A STREET CUT, THE JOINT SHALL BE RE-ESTABLISHED AS PER THE PAVEMENT STANDARDS FOR PORTLAND CEMENT CONCRETE.

6. DOWEL BARS
DOWEL BARS SHALL BE INSTALLED IN ACCORDANCE WITH THE ENGINEERING SERVICES DEPARTMENT CRITERIA FOR LOAD TRANSFER DEVICES, AS SHOWN IN THE DETAILS ON THIS SHEET.

7. IF FLOWABLE FILL IS UTILIZED, IT SHALL BE PLACED IN LIFTS TO PREVENT FLOATATION OF THE PIPE.

REVISION	BY	DATE

CITY ENGINEER

DESIGN MANAGER

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

STANDARD ASPHALT PAVEMENT CUT AND REPAIR

DATE: APRIL 2019 STD. 230

OKIE 811

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020

ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

CLIENT DETAILS (SHEET 3 OF 6)

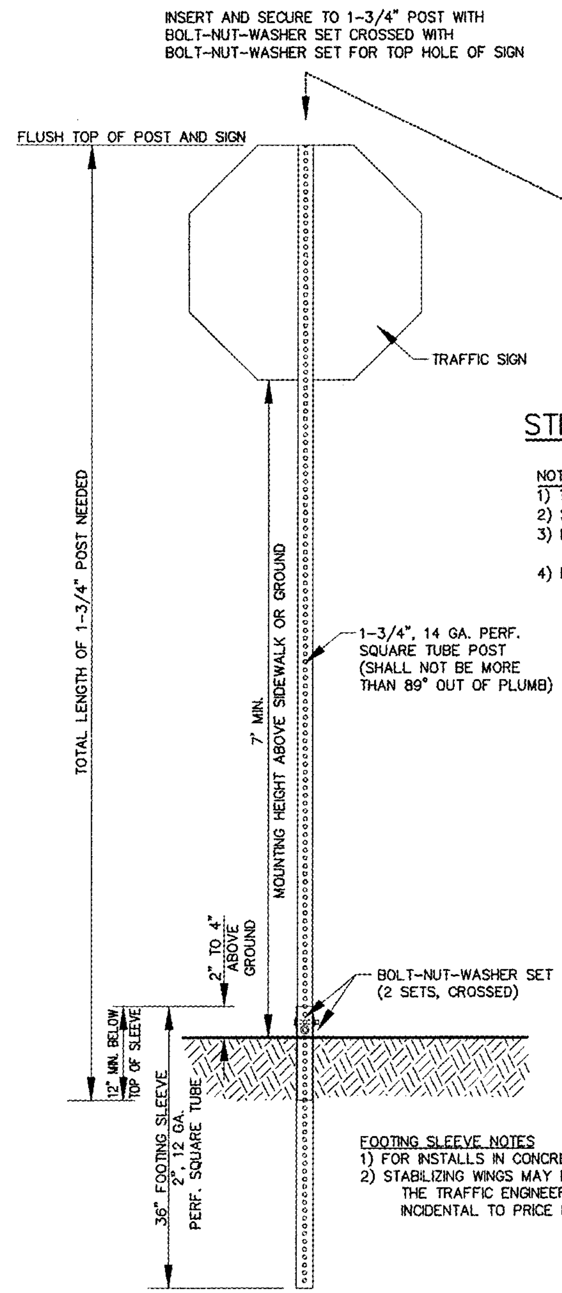
PROJECT TMUA-W 18-21 CONTRACT 134789

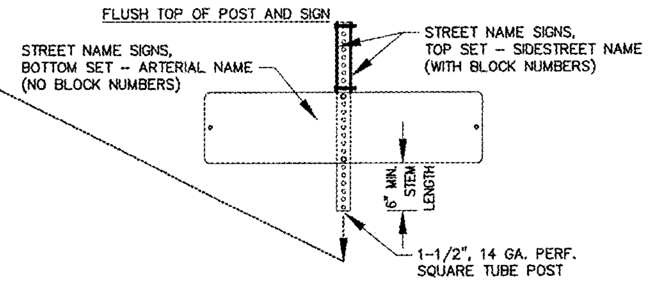
2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC. 4200 E. SKELLY DRIVE SUITE 410 TULSA, OK 74135 (539) 444-8677

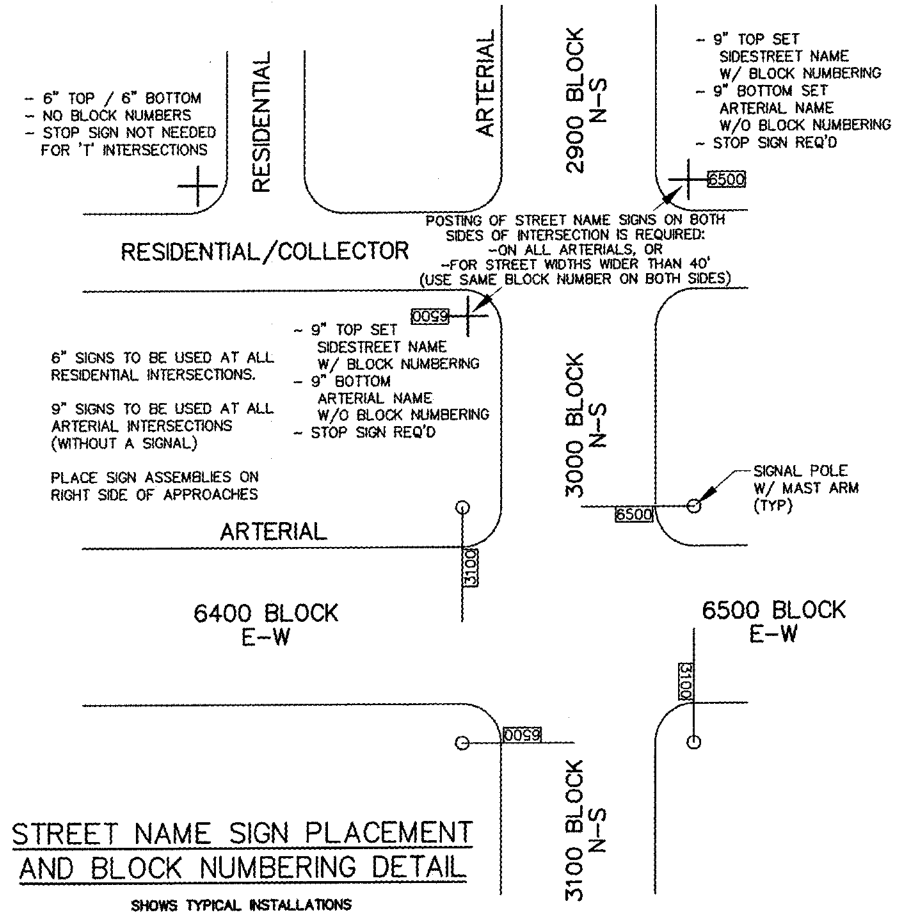
REVISION	BY	DATE	PLAN SCALE: 1"=N/A	DRAWN	BHT	04/2020	APPROVED:
				DESIGNED	KDB	04/2020	
				SURVEY	SDC	07/2019	
			PROFILE SCALE:	PROJ. MGR.			
			HORIZONTAL 1"=N/A	LEAD ENGR.		4/20	
				FIELD MGR.		4/20	
			VERTICAL 1"=N/A	RECOMMENDED: HAS 4.20 DESIGN MANAGER			CITY ENGINEER
			FILE: CV-STND-DETAILS	DRAWING:			DATE: 05.15.20
			ATLAS PAGE NO: 385 AND 478				SHEET 48 OF 51 SHEETS





STREET NAME SIGN INSERT DETAIL (WHERE REQUIRED)

NOTES:
1) TO BE USED FOR ALL STREET NAME SIGN INSTALLATIONS, WITH OR WITHOUT OTHER TRAFFIC SIGNS.
2) STREET NAME SIGNS SHALL NOT BE ATTACHED DIRECTLY TO 1-3/4" POST.
3) HAMMER-BEND ALL BOLTS AFTER INSTALLATION (EXCEPT FOOTING SLEEVE) TO PREVENT UNAUTHORIZED REMOVAL OF SIGNS AND INSERT.
4) FOR SIGN LENGTHS 30" AND OVER, ENDS SHALL BE PINCHED-BOLTED USING #10-24 x 1/2" PHILLIPS/SLOTTED PAN HEAD BOLT, NUT, AND 2 WASHERS.



STREET NAME SIGN PLACEMENT AND BLOCK NUMBERING DETAIL

SHOWS TYPICAL INSTALLATIONS
CONTRACTOR SHALL INSTALL BASED ON PLANS

FOOTING SLEEVE NOTES
1) FOR INSTALLS IN CONCRETE, USE 12" MIN. FOOTING SLEEVE.
2) STABLIZING WINGS MAY BE REQUIRED, AS DETERMINED BY THE TRAFFIC ENGINEER. IF REQUIRED, COSTS SHALL BE INCIDENTAL TO PRICE BID FOR 2" SQUARE TUBE POST.

SIGN INSTALLATION DETAIL

PAY ITEM	DESCRIPTION	UNIT	USE FOR:
608(A)	GROUND SIGN	S.F.	POST-MOUNTED TRAFFIC / STREET NAME SIGNS
608(B)	OVERHEAD SIGN	S.F.	MAST-ARM MOUNTED SIGNS
608(C)	1-1/2" SIGN POST	L.F.	STREET NAME SIGN INSERT
608(D)	1-3/4" SIGN POST	L.F.	MAIN SIGN POST
608(E)	2" SIGN POST	L.F.	FOOTING SLEEVE

SIGN PAY ITEM TABLE

PATH NAME: /E1/PARTS/STD/DGN_STDS/608B-traffic-signs.dgn SBW 09/21/2012

REVISION	BY	DATE

CITY ENGINEER
CITY TRAFFIC ENGINEER

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

TRAFFIC SIGNS

DATE: OCTOBER 2013 STD. 608B

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA 4-8-2020

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

OKIE 811 Know what's below. Call before you dig.

CLIENT DETAILS (SHEET 4 OF 6)

PROJECT TMUA-W 18-21 CONTRACT 134789

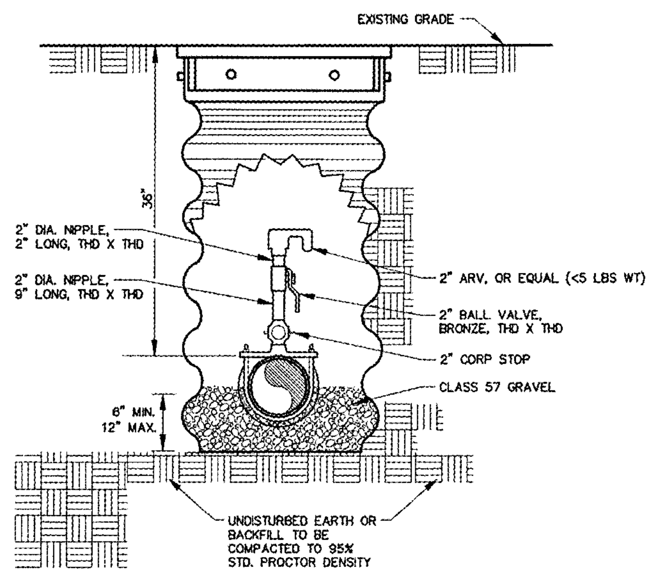
2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

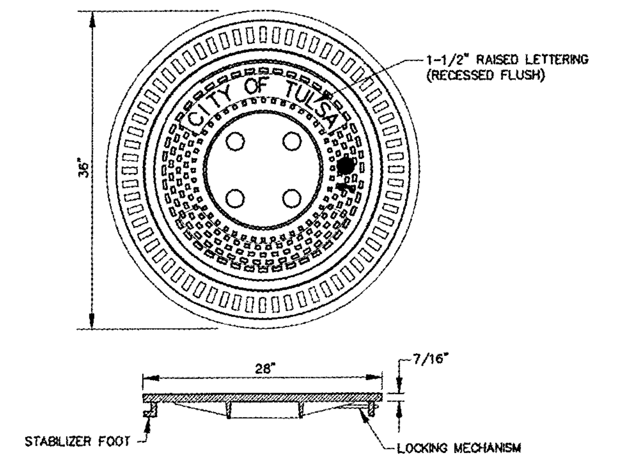
PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC. 4200 E. SKELLY DRIVE SUITE 410 TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

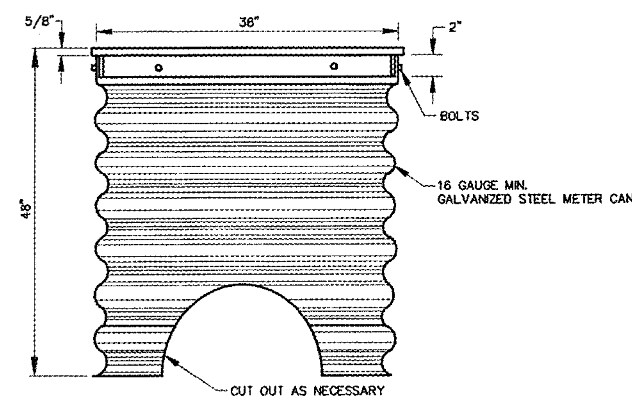
				APPROVED:
PLAN SCALE: 1"=N/A	DRAWN	BHT	04/2020	
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1"=N/A	LEAD ENGR.	CEW 4/20		
	FIELD MGR.	ZOA 4/20		
VERTICAL 1"=N/A	RECOMMENDED: HAS 4-20			
	DESIGN MANAGER			CITY ENGINEER
FILE: CV-STND-DETAILS	DRAWING:			DATE: 05.15.20
ATLAS PAGE NO: 395 AND 478				SHEET 49 OF 51 SHEETS



ELEVATION VIEW



ARV RING AND LID



ARV CAN

NOTE:

1. ARV'S SHOWN NOT TO EXCEED 5 LBS IN WEIGHT FITTINGS COMPATIBLE WITH THE TYPE OF PIPE FURNISHED.
2. LOCATE IN GREEN AREAS ONLY.

TO BE FURNISHED AND INSTALLED BY CONTRACTOR

1 – 2" COMBO ARV OR EQUAL (5 LBS OR LESS)
1 – 36" X 48" METER CAN W/ RIM AND LID
1 – 2" CORP STOP
1 – 2" X ___ SADDLE
1 – 2" NIPPLE, 9" LONG, THD X THD
1 – 2" BALL VALVE, BRONZE
1 – 2" NIPPLE, 2" LONG, THD X THD

PATH NAME: /E1/PARTS/STD/DGN_STDS/327-COMARVAC-RVVAULT-2IN.DGN LFM 05/02/2012

REVISION	BY	DATE

CITY ENGINEER
DESIGN MANAGER

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

COMBINATION AIR VACUUM / RELIEF VALVE VAULT FOR 2" ARV LESS THAN 5 LBS IN WEIGHT

DATE: OCTOBER 2013 STD. 327

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

Know what's below. Call before you dig.

CLIENT DETAILS (SHEET 5 OF 6)

PROJECT TMUA-W 18-21 CONTRACT 134789

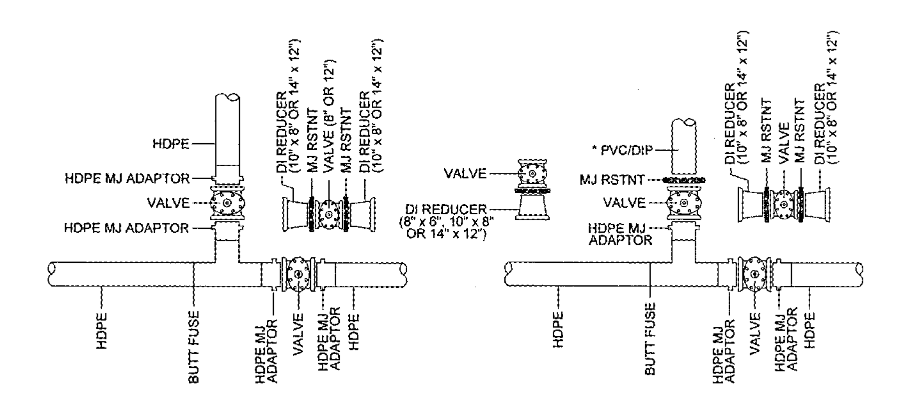
2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410
TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1"=N/A	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1"=N/A	LEAD ENGR.	CEW	4/20	
	FIELD MGR.	[illegible]	4/20	
VERTICAL 1"=N/A	RECOMMENDED: HAS 4.20 DESIGN MANAGER			CITY ENGINEER
FILE: CV-STND-DETAILS	DRAWING:			DATE: 05.15.20
ATLAS PAGE NO: 395 AND 478				SHEET 50 OF 51 SHEETS



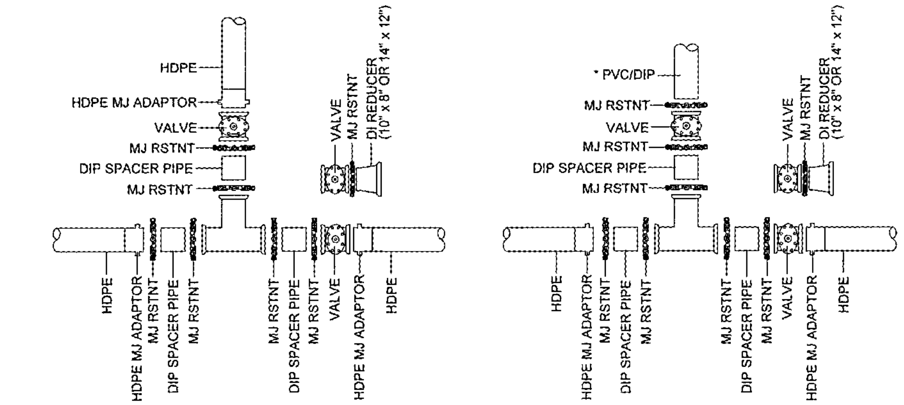
HDPE TEE (HDPE MAIN / HDPE BRANCH)

HDPE TEE (HDPE MAIN / DIP OR PVC BRANCH)

NOTES:
WHEN HDPE MAIN IS CONNECTED TO DI FITTING, USE HDPE MJ ADAPTER AND DI REDUCER AS NECESSARY TO MAKE CONNECTION.

TYPICAL CONFIGURATIONS:
WHEN HDPE BRANCH IS 8", USE 8" GATE VALVE. USE 8" x 6" DI REDUCER AND 6" GATE VALVE ONLY WHEN CONNECTING TO 6" DIP/PVC
WHEN HDPE BRANCH IS 10", USE 10" x 8" DI REDUCER AND 8" GATE VALVE.
WHEN HDPE BRANCH IS 12", USE 12" GATE VALVE.
WHEN HDPE BRANCH IS 14", USE 14" x 12" DI REDUCER AND 12" GATE VALVE.
* DESIGN ENGINEER TO PROVIDE RESTRAINED JOINT REQUIREMENTS.

CITY OF TULSA, OKLAHOMA ENGINEERING SERVICES DEPARTMENT
HDPE TEE DETAILS



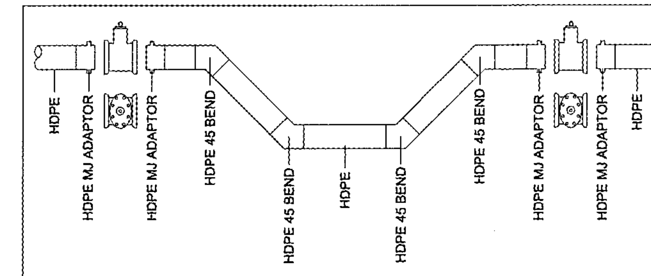
DI TEE (HDPE MAIN / HDPE BRANCH)

DI TEE (HDPE MAIN / DIP OR PVC BRANCH)

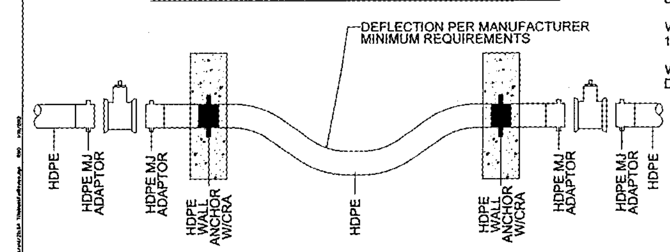
NOTES:
WHEN HDPE MAIN IS CONNECTED TO DI FITTING, USE HDPE MJ ADAPTER AND DI REDUCER AS NECESSARY TO MAKE CONNECTION.

TYPICAL CONFIGURATIONS:
WHEN HDPE BRANCH IS 8", USE 8" GATE VALVE. USE 8" x 6" DI REDUCER AND 6" GATE VALVE ONLY WHEN CONNECTING TO 6" DIP/PVC
WHEN HDPE BRANCH IS 10", USE 10" x 8" DI REDUCER AND 8" GATE VALVE.
WHEN HDPE BRANCH IS 12", USE 12" GATE VALVE.
WHEN HDPE BRANCH IS 14", USE 14" x 12" DI REDUCER AND 12" GATE VALVE.
* DESIGN ENGINEER TO PROVIDE RESTRAINED JOINT REQUIREMENTS.

CITY OF TULSA, OKLAHOMA ENGINEERING SERVICES DEPARTMENT
HDPE-DUCTILE IRON FITTING DETAILS 1 OF 2



HDPE HORIZONTAL / VERTICAL REALIGNMENT USING FITTINGS



HDPE VERTICAL/HORIZONTAL REALIGNMENT USING DEFLECTION

NOTES:
WHEN HDPE MAIN IS CONNECTED TO DI FITTING, USE HDPE MJ ADAPTER AND DI REDUCER AS NECESSARY TO MAKE CONNECTION.

TYPICAL CONFIGURATIONS:

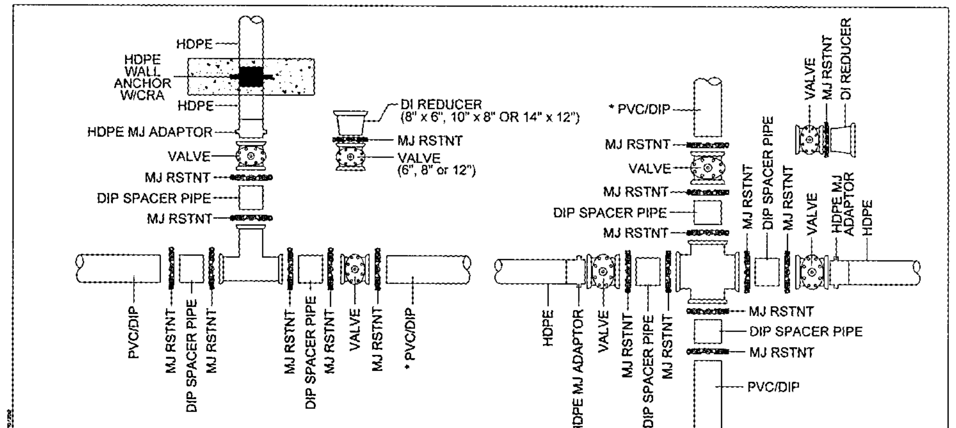
WHEN HDPE BRANCH IS 8", USE 8" GATE VALVE, USE 8" x 6" DI REDUCER AND 6" GATE VALVE ONLY WHEN CONNECTING TO 6" DIP/PVC

WHEN HDPE BRANCH IS 10", USE 10" x 8" DI REDUCER AND 8" GATE VALVE.

WHEN HDPE BRANCH IS 12", USE 12" GATE VALVE.

WHEN HDPE BRANCH IS 14", USE 14" x 12" DI REDUCER AND 12" GATE VALVE.

CITY OF TULSA, OKLAHOMA ENGINEERING SERVICES DEPARTMENT
HDPE REALIGNMENT DETAILS



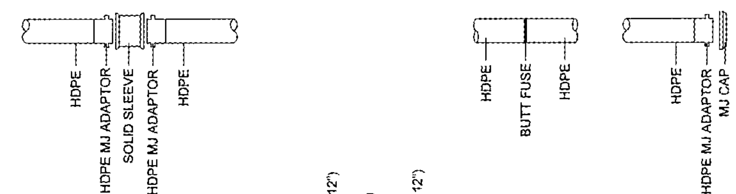
DI TEE (DI MAIN / HDPE BRANCH)

DI CROSS (HDPE MAIN / DIP OR PVC MAIN)

NOTES:
WHEN HDPE MAIN IS CONNECTED TO DI FITTING, USE HDPE MJ ADAPTER AND DI REDUCER AS NECESSARY TO MAKE CONNECTION.

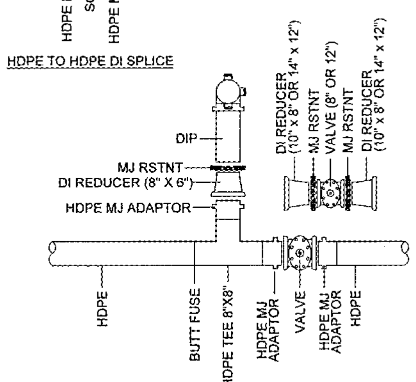
TYPICAL CONFIGURATIONS:
WHEN HDPE BRANCH IS 8", USE 8" GATE VALVE. USE 8" x 6" DI REDUCER AND 6" GATE VALVE ONLY WHEN CONNECTING TO 6" DIP/PVC
WHEN HDPE BRANCH IS 10", USE 10" x 8" DI REDUCER AND 8" GATE VALVE.
WHEN HDPE BRANCH IS 12", USE 12" GATE VALVE.
WHEN HDPE BRANCH IS 14", USE 14" x 12" DI REDUCER AND 12" GATE VALVE.
* DESIGN ENGINEER TO PROVIDE RESTRAINED JOINT REQUIREMENTS.

CITY OF TULSA, OKLAHOMA ENGINEERING SERVICES DEPARTMENT
HDPE-DUCTILE IRON FITTING DETAILS 2 OF 2



HDPE TO HDPE DI SPLICE

HDPE TO HDPE BUTT FUSE



3-WAY FIRE HYDRANT INSTALLATION FOR HDPE

NOTES:
WHEN HDPE MAIN IS CONNECTED TO DI FITTING, USE HDPE MJ ADAPTER AND DI REDUCER AS NECESSARY TO MAKE CONNECTION.

TYPICAL CONFIGURATIONS:
WHEN HDPE BRANCH IS 8", USE 8" GATE VALVE. USE 8" x 6" DI REDUCER AND 6" GATE VALVE ONLY WHEN CONNECTING TO 6" DIP/PVC

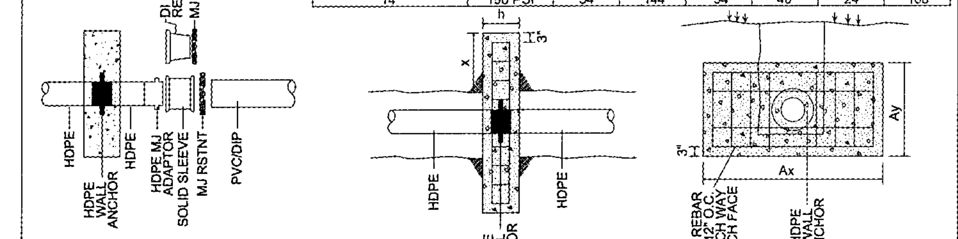
WHEN HDPE BRANCH IS 10", USE 10" x 8" DI REDUCER AND 8" GATE VALVE.

WHEN HDPE BRANCH IS 12", USE 12" GATE VALVE.

WHEN HDPE BRANCH IS 14", USE 14" x 12" DI REDUCER AND 12" GATE VALVE.

CITY OF TULSA, OKLAHOMA ENGINEERING SERVICES DEPARTMENT
HDPE SPLICE AND FIRE HYDRANT DETAILS

DIPS PIPE SIZE (DR11)	PRESSURE	x (in)	Ax (in)	Ay (in)	Ab (sf)	h (in)	Vol (cy)
8"	150 PSI	30	90	36	15	18	34
10"	150 PSI	36	102	42	21	18	45
12"	150 PSI	45	120	48	30	24	80
14"	150 PSI	54	144	54	40	24	108



HDPE TO DI/PVC SPLICE

HDPE WALL ANCHOR

NOTES:
THE MINIMUM SURFACE AREAS SHOWN ARE BASED ON A MAX STATIC PIPE PRESSURE OF 150 PSI AND AN ALLOWABLE SOIL BEARING CAPACITY OF 1000 PSF. POLYETHYLENE PIPINS SYSTEMS FIELD MANUAL FOR MUNICIPAL WATER APPLICATIONS 2009 EDITION.

THE DESIGN ENGINEER IS RESPONSIBLE FOR VERIFYING ASSUMPTION BASED ON ACTUAL SITE CONDITIONS. IF SITE CONDITIONS VARY FROM THE ASSUMPTIONS THE DESIGN ENGINEER SHALL PROVIDE A SITE SPECIFIC DESIGN.

THE MINIMUM LATERAL BEARING SURFACE AREA (Ab) AND APPROXIMATE VOLUME OF CONCRETE (Vol) SHALL BE SHOWN ON THE CONSTRUCTION PLANS FOR ALL CONCRETE WALL ANCHOR BLOCKS.

THE APPROXIMATE VOLUMES SHOWN ARE BASED ON THE MINIMUM DIMENSIONS IN THE TABLE. A TRENCH WIDTH OF 30-INCHES (8" - 12") OR 36-INCHES (14") AND 6" BEDDING UNDER THE PIPE ARE ASSUMED FOR BEARING CALCULATIONS (Ax, Ay, x AND y).

THE DESIGN ENGINEER SHALL ENSURE THE CONSTRUCTION OF THE CONCRETE WALL ANCHOR BLOCK SHALL NOT CONFLICT WITH OTHER UTILITIES.

NOTES:
WHEN HDPE MAIN IS CONNECTED TO DI FITTING, USE HDPE MJ ADAPTER AND DI REDUCER AS NECESSARY TO MAKE CONNECTION.

TYPICAL CONFIGURATIONS:
WHEN HDPE BRANCH IS 8", USE 8" GATE VALVE. USE 8" x 6" DI REDUCER AND 6" GATE VALVE ONLY WHEN CONNECTING TO 6" DIP/PVC

WHEN HDPE BRANCH IS 10", USE 10" x 8" DI REDUCER AND 8" GATE VALVE.

WHEN HDPE BRANCH IS 12", USE 12" GATE VALVE.

WHEN HDPE BRANCH IS 14", USE 14" x 12" DI REDUCER AND 12" GATE VALVE.

CITY OF TULSA, OKLAHOMA ENGINEERING SERVICES DEPARTMENT
HDPE WALL ANCHOR DETAILS
DATE: JANUARY 2017

OKIE 811
Know what's below. Call before you dig.

LICENSED PROFESSIONAL ENGINEER KEITH BEATTY 29905 OKLAHOMA
4-8-2020

CERTIFICATE OF AUTHORIZATION: CA#511
EXPIRATION DATE: 06/30/2020
ENGINEER OF RECORD
KEITH BEATTY
LICENSE NO. 29905

CLIENT DETAILS (SHEET 6 OF 6)

PROJECT TMUA-W 18-21 CONTRACT 134789

2-INCH WATER LINE REPLACEMENT
NEW 6-INCH WATER LINE

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: FREESE AND NICHOLS, INC.
4200 E. SKELLY DRIVE SUITE 410 TULSA, OK 74135 (539) 444-8677

REVISION	BY	DATE

PLAN SCALE: 1"=N/A	DRAWN	BHT	04/2020	APPROVED:
	DESIGNED	KDB	04/2020	
	SURVEY	SDC	07/2019	
PROFILE SCALE:	PROJ. MGR.			
HORIZONTAL 1"=N/A	LEAD ENGR.	KEW 4/20		
	FIELD MGR.	KEW 4/20		
VERTICAL 1"=N/A	RECOMMENDED: HAS 4-20			CITY ENGINEER
	DESIGN MANAGER			DATE: 05.15.20
FILE: CV-STND-DETAILS	DRAWING:			
ATLAS PAGE NO: 395 AND 476				SHEET 51 OF 51 SHEETS