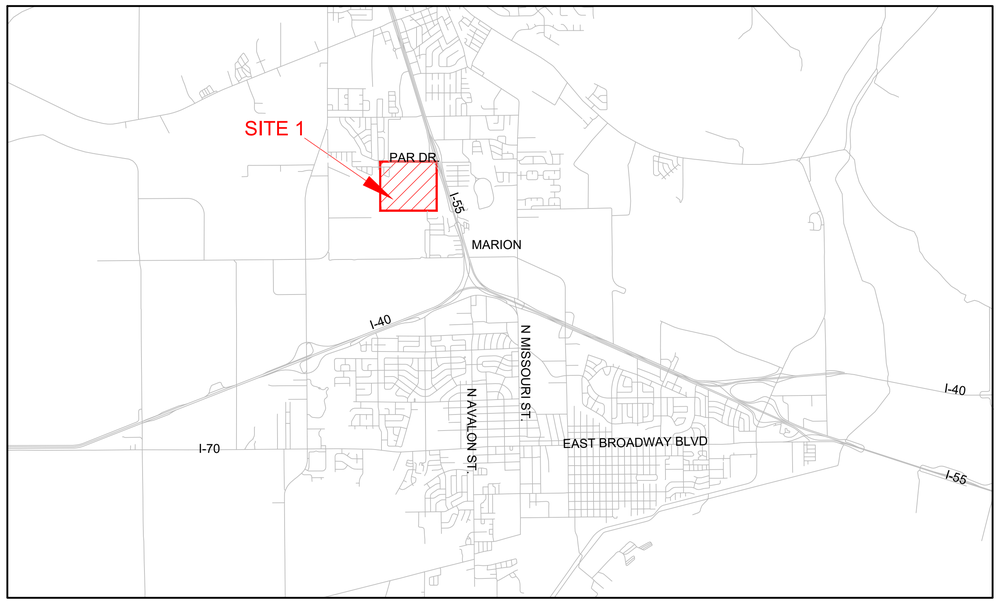
PLANS FOR
BROWNSTONE ESTATES SUBDIVISION PHASE 1
CRITTENDEN COUNTY, ARKANSAS



Know what's below.
Call before you
dig.

IT IS THE CONTRACTORS RESPONSIBILITY TO CONTACT UTILITY COMPANIES PRIOR TO ANY CONSTRUCTION. THE LOCATION OF UTILITIES SHOWN ON THESE PLANS ARE APPROXIMATE AND POSSIBLY INCOMPLETE. THEREFORE CERTIFICATION TO THE LOCATION OF ALL UNDERGROUND UTILITIES IS WITHHELD.
1-800-482-8998

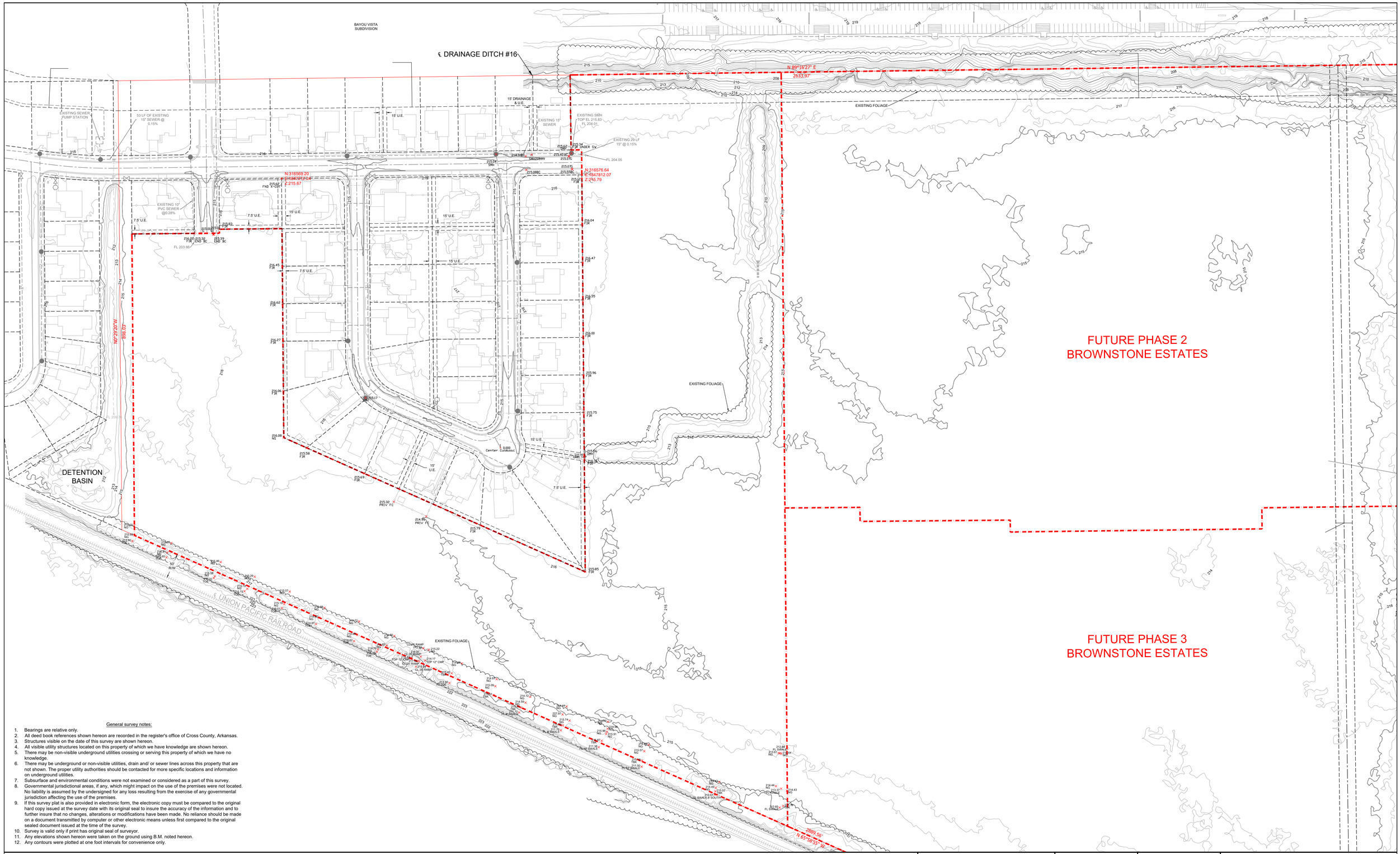
INDEX

SORRELL-SMITH
2SEC
engineering consultants

110 MISSOURI ST. - WEST MEMPHIS, ARKANSAS

CERTIFICATE OF AUTHORIZATION
SORRELL-SMITH ENGINEERING
No. 2874
ARKANSAS

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 5613
JOHN W. SMITH



General survey notes:

1. Bearings are relative only.
2. All deed book references shown hereon are recorded in the register's office of Cross County, Arkansas.
3. Structures visible on the date of this survey are shown hereon.
4. All visible utility structures located on this property of which we have knowledge are shown hereon.
5. There may be non-visible underground utilities crossing or serving this property of which we have no knowledge.
6. There may be underground or non-visible utilities, drain and/ or sewer lines across this property that are not shown. The proper utility authorities should be contacted for more specific locations and information on underground utilities.
7. Subsurface and environmental conditions were not examined or considered as a part of this survey.
8. Governmental jurisdictional areas, if any, which might impact on the use of the premises were not located. No liability is assumed by the undersigned for any loss resulting from the exercise of any governmental jurisdiction affecting the use of the premises.
9. If this survey plat is also provided in electronic form, the electronic copy must be compared to the original hard copy issued at the survey date with its original seal to insure the accuracy of the information and to further insure that no changes, alterations or modifications have been made. No reliance should be made on a document transmitted by computer or other electronic means unless first compared to the original sealed document issued at the time of the survey.
10. Survey is valid only if print has original seal of surveyor.
11. Any elevations shown hereon were taken on the ground using B.M. noted hereon.
12. Any contours were plotted at one foot intervals for convenience only.

BASIS OF BEARINGS:
GRID NORTH ON 2SEC GPS
ARK SPC SYSTEM, NORTH ZONE
GRAPHIC SCALE:
FULL SIZE 1"=80'
HALF SIZE 1"=160'

NORTH

0 80 160 240

0 80 160

SORRELL-SMITH
2SEC
engineering consultants

110 MISSOURI ST. West Memphis, AR 72301 (870) 735-8084

EXISTING SURVEY PHASE 1
BROWNSTONE ESTATES SUBDIVISION
MARION, ARKANSAS

Scale: AS NOTED	Drawn By: RS, JB, HF	Sheet No.
Date: 11/21/2023	Checked By: CP & JS	C - 1.0

BAYOU VISTA SUBDIVISION

℄ DRAINAGE DITCH #16

N 89°16'27" E
2633.97'

CLEARING & GRUBBING 0.41 ACRE EXISTING FOILAGE

EXISTING FOLIAGE

CLEARING, GRUBBING, & REGRADING OF EXISTING DETENTION BASIN

REMOVE EXISTING FLUSH HYDRANT

RETAIN EXISTING PIPE & FES

N0°25'20"W
698.03'

CLEAN-OUT & REGRADE 500 L.F. OF EXISTING DITCH

FUTURE PHASE 2
BROWNSTONE ESTATES

DETENTION BASIN

CLEARING & GRUBBING 0.70 ACRE OF EXISTING FOILAGE

℄ UNION PACIFIC RAILROAD

CLEARING & GRUBBING 1.0 ACRE OF EXISTING FOILAGE

FUTURE PHASE 3
BROWNSTONE ESTATES

2869.56'
N 65°39'55" W

BASIS OF BEARINGS:
GRID NORTH ON 2SEC GPS
ARK SPC SYSTEM, NORTH ZONE
GRAPHIC SCALE:
FULL SIZE 1"=80'
HALF SIZE 1"=160'

NORTH

0 80 160 240

0 80 160

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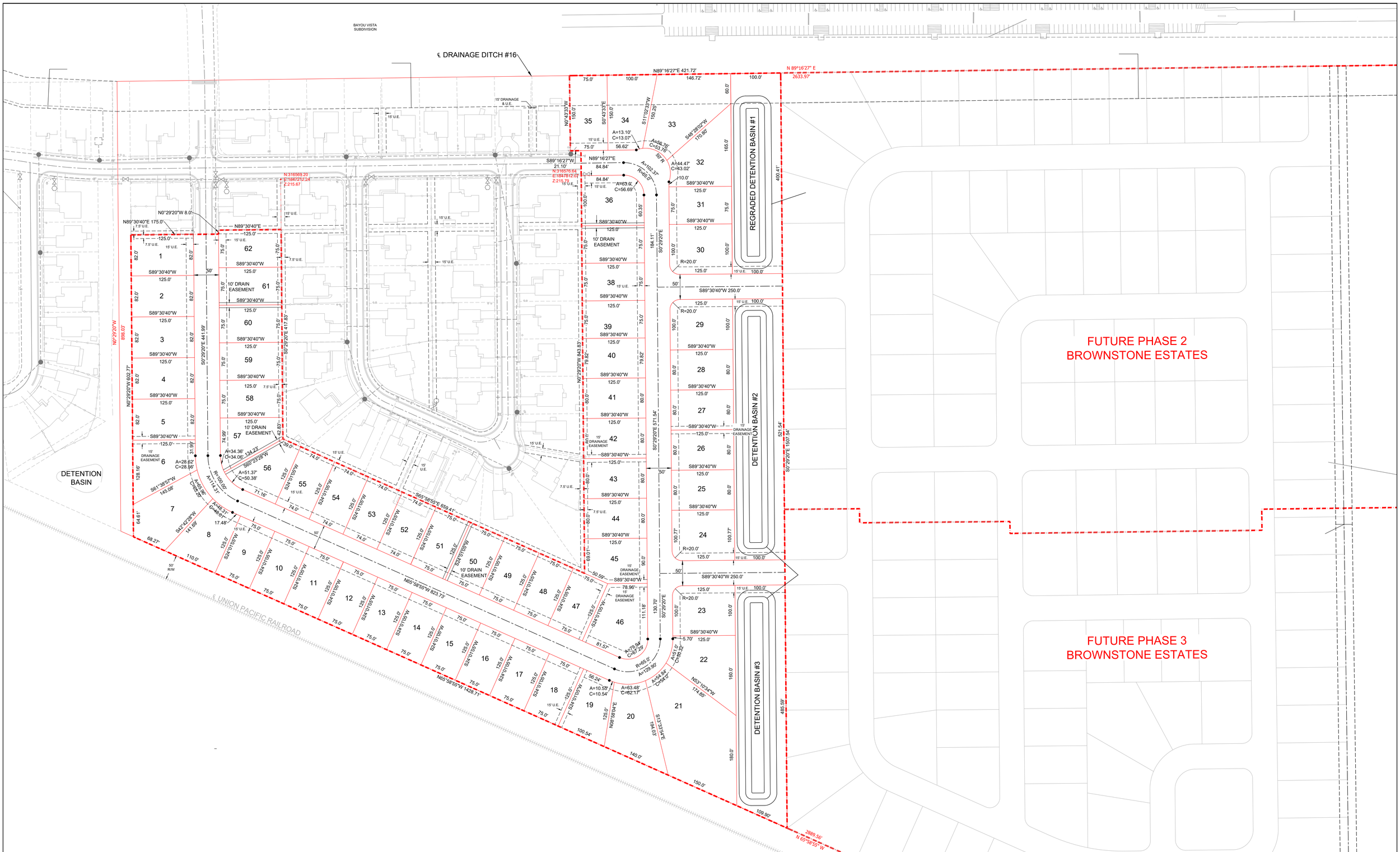
110 MISSOURI ST. West Memphis, AR 72301 (870) 735-8084

DEMOLITION PLAN PHASE 1
BROWNSTONE ESTATES SUBDIVISION
MARION, ARKANSAS

Scale: AS NOTED	Drawn By: RS, JB, HF	Sheet No.
Date: 11/21/2023	Checked By: CP & JS	C - 2.0



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NORTH

0 80 160 240

0 80 160

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PLAT PLAN PHASE 1
BROWNSTONE ESTATES SUBDIVISION
MARION, ARKANSAS

Scale: AS NOTED	Drawn By: RS, JB, HF	Sheet No.
Date: 11/21/2023	Checked By: CP & JS	C - 3.0

DRAINAGE CALCULATIONS
Brownstone Phase 1-A Marion AR

Existing Site Conditions

				% Usage
Avg. Runoff Coeficient	0.552	Paved Surface	0.41 Ac	6.1%
T.C	15 min.	Buildings	2.41 Ac	35.9%
Q10 Discharge	0.654 CFS	Grass	3.90 Ac	58.0%
		TOTAL	6.72 Ac	

Proposed Site Conditions

Avg. Runoff Coeficient	0.681	Paved Surface	1.03 Ac 15.4%
T.C	10 min.	Buildings	3.24 Ac 48.2%
Q10 Discharge	0.807 CFS	Grass	2.45 Ac 36.5%
Disturbed Area	3.9 Acres	TOTAL	6.72 Ac

DETENTION BASIN DATA

Additional Detention Provided - Ponds	25069.6 CF
Additional Detention Provided - Pipes	1069.6 CF
Total Additional Detention Provided	26139.1 CF
Detention Required	13214.4
Q10 Discharge from Basin - Existing Outlet Channel	0.26 CFS
Hours to discharge pond	28.47 hours
100 Year Flood Elevation	= 216.00 *

FEMA Map# 05035C0330E Dated 5-3-2011

* Zone X - Estimated Elev. of 216.0 by City of Marion AR

Drainage & Detention Pond Calculations

Brownstone Phase 1-A Marion AR

	Area(Ac)	Coeff	Wt Avg	Flow Q = CIA	Runoff Volume V = Qt = CIAt	Pond Dimensions @ Avg Depth 2.00 SqFt	L	X	W	@ Avg Depth 1.00 SqFt	L	X	W
Parking Existing	0.41	0.90	0.372										
Building Existing	2.41	0.90	2.169										
Grass Existing	3.90	0.30	1.169										
	6.72		**0.552**	**0.654** cfs	**56507.2** CF	28253.6 SF				56507.2 SF			
						0 =	0	X	0	0 =	0	X	0
							0	X	0		0	X	0
Parking Proposed	1.03	0.90	0.930										
Building Proposed	3.24	0.90	2.913										
Grass Proposed	2.45	0.30	0.736										
	6.72		**0.681**	**0.807** cfs	**69721.6** CF	34860.8 SF				69721.6 SF			
						12000 =	200	X	60	**10120** =	46	X	220
							0	X	60		0	X	60
							0	X	0		0	X	0
10 year / 24 hr Rainfall Intensity	0.235												
% increase due to proposed Expansion				23%									
Increased CF Volume due to Project						**13214.4** CF				**13214.4** CF			
Increased CF Volume of Pond / Pipes						**25069.6** CF				**11189.6** CF			

DRAINAGE CALCULATIONS
Brownstone Phase 1-B Marion AR

Existing Site Conditions

				% Usage
Avg. Runoff Coeficient	0.380	Paved Surface	3.60 Ac	13.4%
T.C	17 min.	Buildings	0.00 Ac	0.0%
Q10 Discharge	1.800 CFS	Grass	23.25 Ac	86.6%
		TOTAL	26.85 Ac	

Proposed Site Conditions

Avg. Runoff Coeficient	0.630	Paved Surface	11.34 Ac 42.2%
T.C	9 min.	Buildings	3.44 Ac 12.8%
Q10 Discharge	2.983 CFS	Grass	12.06 Ac 44.9%
Disturbed Area	1.2 Acres	TOTAL	26.85 Ac

DETENTION BASIN DATA

Additional Detention Provided - Ponds	237541.4 CF	
Additional Detention Provided - Pipes	8650.7 CF	
Total Additional Detention Provided	246192.1 CF	
Detention Required	102187.5 CF	
Q10 Discharge from Basin (Single 15" RCP)	1.80 CFS	Velocity 1.67 f/s
Hours to discharge pond	38.0 hours	
100 Year Flood Elevation	= 216.00 *	

FEMA Map# 05035C0330E Dated 5-3-2011

* Zone X - Estimated Elev. of 216.0 by City of Marion AR

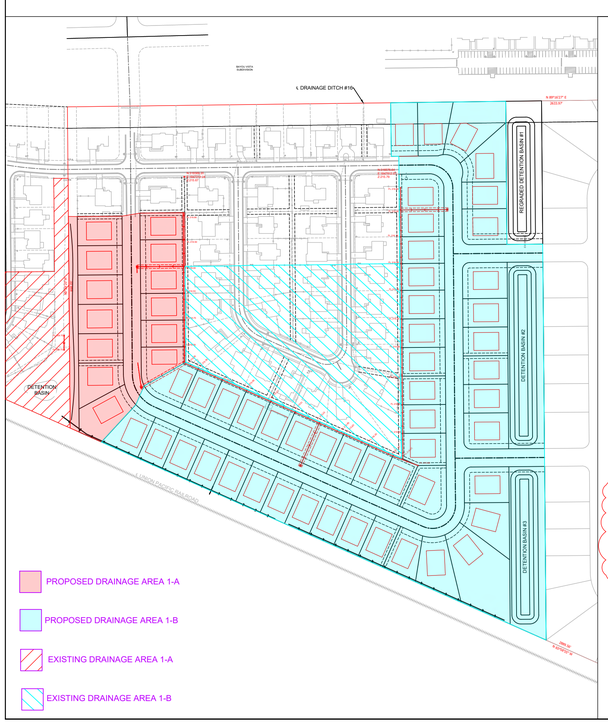
Drainage & Detention Pond Calculations

Brownstone Phase 1-B Marion AR

	Area(Ac)	Coeff	Wt Avg	Flow Q = CIA	Runoff Volume V = Qt = CIAt	Pond Dimensions @ Avg Depth 4.00 SqFt	L	X	W	@ Avg Depth 2.00 SqFt	L	X	W
Parking Existing	3.60	0.90	3.240										
Building Existing	0.00	0.90	0.000										
Grass Existing	23.25	0.30	6.975										
	26.85		**0.380**	**1.800** cfs	**155541.5** CF	38885.4 SF				77770.7 SF			
						0 =	0	X	0	0 =	0	X	0
							0	X	0		0	X	0
Parking Proposed	11.34	0.90	10.207										
Building Proposed	3.44	0.90	3.099										
Grass Proposed	12.06	0.30	3.619										
	26.85		**0.630**	**2.983** cfs	**257729.0** CF	64432.2 SF				128864.5 SF			
						50000 =	1000	X	50	**10120** =	46	X	220
							0	X	60		0	X	60
							0	X	0		0	X	0
10 year / 24 hr Rainfall Intensity	0.235												
% increase due to proposed Expansion				66%									
Increased CF Volume due to Project						**102187.5** CF				**102187.5** CF			
Increased CF Volume of Pond / Pipes						**208650.7** CF				**28890.7** CF			

Brownstone Phase 1 - DRAINAGE STRUCTURES

Inlet ID	Inlet Type	Height	Top Elevation	Flow Line
CI-1	Curb Inlet 5' x 5'	3.50	***215.00***	***211.50***
CI-2	Curb Inlet 5' x 5'	3.70	***215.00***	***211.30***
CI-3	Curb Inlet 5' x 5'	4.25	***215.00***	***210.75***
CI-4	Curb Inlet 5' x 5'	4.60	***215.00***	***210.40***
CI-5	Curb Inlet 5' x 5'	3.50	***215.00***	***211.50***
CI-6	Curb Inlet 5' x 5'	3.70	***215.00***	***211.30***
CI-7	Curb Inlet 5' x 5'	3.50	***215.00***	***211.50***
CI-8	Curb Inlet 5' x 5'	3.90	***215.00***	***211.10***
CI-9	Curb Inlet 5' x 5'	3.50	***215.00***	***211.50***
CI-10	Curb Inlet 5' x 5'	4.25	***215.00***	***210.75***
GI-11	Grated inlet w. 2' x 4' grate	5.20	***215.80***	***210.60***
CI-12	Curb Inlet 5' x 5'	4.90	***215.15***	***210.25***
CI-13	Curb Inlet 5' x 5'	4.90	***215.00***	***210.10***
CI-14	Curb Inlet 5' x 5'	3.50	***215.00***	***211.50***
JB-15	Junction Box 5' x 6'	7.57	***215.50***	***207.93***
CI-16	Curb Inlet 5' x 5'	4.75	***215.00***	***210.25***
CI-17	Curb Inlet 5' x 5'	5.00	***215.00***	***210.00***
JB-18	Junction Box 5' x 5'	5.50	***215.30***	***209.80***
JB-19	Junction Box 5' x 6'	8.22	***215.50***	***207.28***
CI-20	Curb Inlet 5' x 5'	3.50	***215.00***	***211.50***
CI-21	Curb Inlet 5' x 5'	4.20	***215.00***	***210.80***
CI-22	Curb Inlet 5' x 5'	3.90	***215.00***	***211.10***
CI-23	Curb Inlet 5' x 5'	3.65	***215.00***	***211.35***
CI-24	Curb Inlet 5' x 5'	3.50	***215.00***	***211.50***
Ex-GI	Convert Ex. JB to GI w/ 2'x4' Grate	4.65	***215.69***	***211.04***



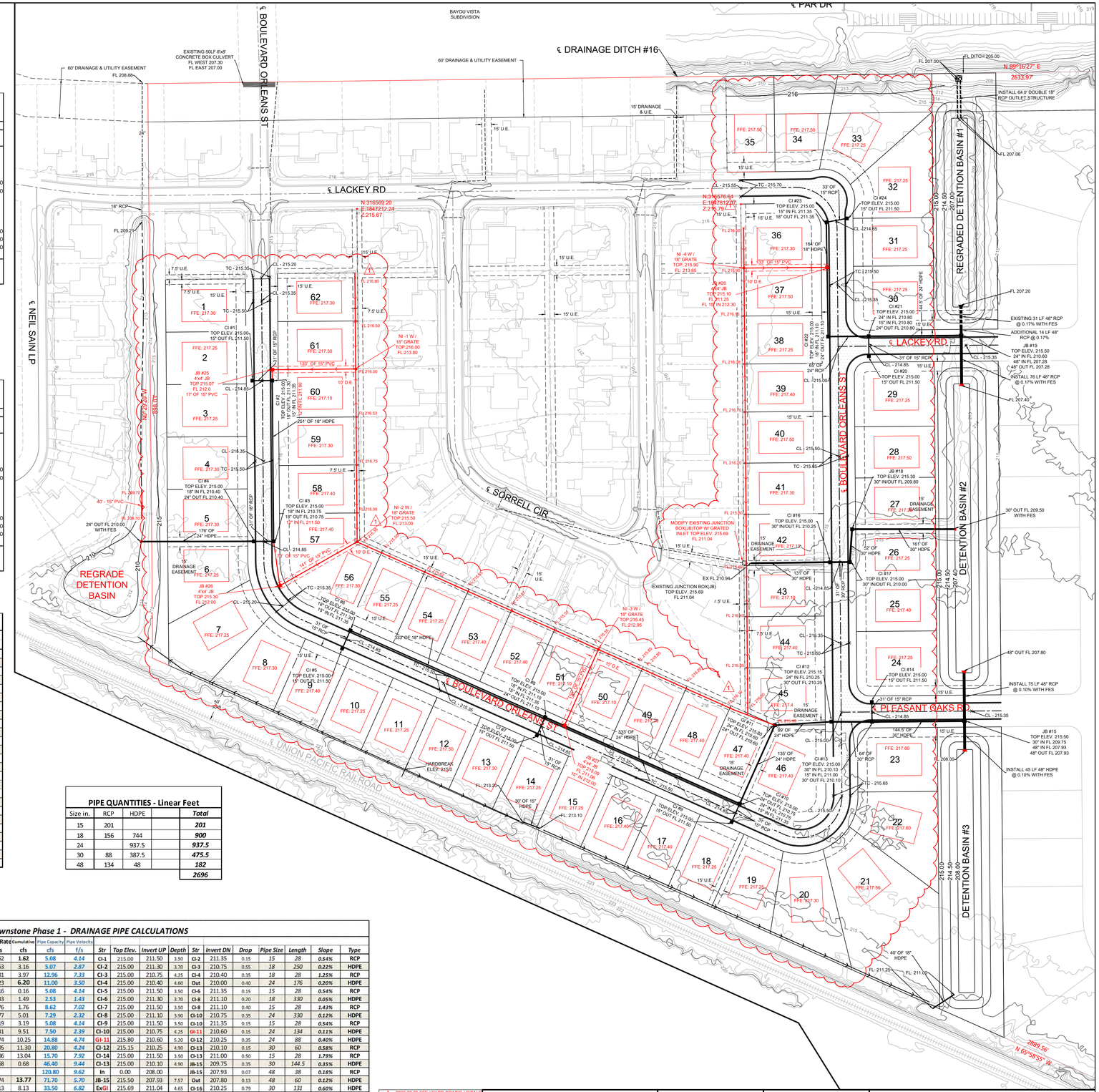
JB-11 = GI-11
EXJB = GI

PIPE QUANTITIES - Linear Feet

Size in.	RCP	HDPE		*Total*
15	201			***201***
18	156	744		***900***
24		937.5		***937.5***
30	88	387.5		***475.5***
48	134	48		***182***
				2696

Brownstone Phase 1 - DRAINAGE PIPE CALCULATIONS

Line #	Line ID	Drainage Area Length	Area Ac	Cumulative A	Values C	I	Flow Rate cfs	Cumulative cfs	Pipe Capacity cfs	Pipe Velocity f/s	Str	Top Elev.	Invert UP	Depth	Str	Invert DN	Drop	Pipe Size	Length	Slope	Type
1	**CI-1 - CI-2**	200	1.10	**1.10**	0.50	2.95	1.62	**1.62**	**5.08**	***4.14***	**CI-1**	215.00	211.50	3.50	**CI-2**	211.35	0.15	*15*	*28*	***0.54%***	**RCP**
2	**CI-2 - CI-3**	200	1.04	2.14	0.50	2.95	1.53	3.16	**5.07**	***2.87***	**CI-2**	215.00	211.30	3.70	**CI-3**	210.75	0.55	*18*	*250*	***0.22%***	**HDPE**
3	**CI-3 - CI-4**	160	0.55	2.69	0.50	2.95	0.81	3.97	**12.96**	***7.33***	**CI-3**	215.00	210.75	4.25	**CI-4**	210.40	0.35	*18*	*28*	***1.25%***	**RCP**
4	**CI-4 - Out.4**	220	1.51	4.20	0.50	2.95	2.23	**6.20**	**11.00**	***3.50***	**CI-4**	215.00	210.40	4.60	**Out**	210.00	0.40	*24*	*176*	***0.20%***	**HDPE**
5	**CI-5 - CI-6**	200	1.08	**1.08**	0.05	2.95	0.16	0.16	**5.08**	***4.14***	**CI-5**	215.00	211.50	3.50	**CI-6**	211.35	0.15	*15*	*28*	***0.54%***	**RCP**
6	**GI-6 - CI-8**	220	0.90	1.98	0.50	2.95	1.33	1.49	**2.53**	***1.43***	**CI-6**	215.00	211.30	3.70	**CI-8**	211.10	0.20	*18*	*330*	***0.05%***	**HDPE**
7	**CI-7 - CI-8**	220	1.19	1.19	0.50	2.95	1.76	1.76	**8.62**	***7.02***	**CI-7**	215.00	211.50	3.50	**CI-8**	211.10	0.40	*15*	*28*	***1.43%***	**RCP**
8	**CI-8 - CI-10**	220	1.20	4.37	0.50	2.95	1.77	5.01	**7.29**	***2.32***	**CI-8**	215.00	211.10	3.90	**CI-10**	210.75	0.35	*24*	*330*	***0.12%***	**HDPE**
9	**CI-9 - CI-10**	360	2.16	2.16	0.50	2.95	3.19	3.19	**5.08**	***4.14***	**CI-9**	215.00	211.50	3.50	**CI-10**	211.35	0.15	*15*	*28*	***0.54%***	**RCP**
10	**CI-10 - GI-11**	180	0.89	7.42	0.50	2.95	1.31	9.51	**7.50**	***2.39***	**CI-10**	215.00	210.75	4.25	**GI-11**	210.60	0.15	*24*	*134*	***0.11%***	**HDPE**
11	**GI-11 - CI-12**	280	0.50	7.92	0.50	2.95	0.74	10.25	**14.88**	***4.74***	**GI-11**	215.80	210.60	5.20	**CI-12**	210.25	0.35	*24*	*88*	***0.40%***	**HDPE**
12	**CI-12 - CI-13**	220	0.71	8.63	0.50	2.95	1.05	11.30	**20.80**	***4.24***	**CI-12**	215.15	210.25	4.90	**CI-13**	210.10	0.15	*30*	*60*	***0.58%***	**RCP**
13	**CI-14 - CI-13**	150	0.72	0.72	0.50	2.95	1.06	13.04	**15.70**	***7.92***	**CI-14**	215.00	211.50	3.50	**CI-13**	211.00	0.50	*15*	*28*	***1.79%***	**RCP**
14	**CI-13 - JB-15**	280	0.46	9.81	0.50	2.95	0.68	0.68	**46.40**	***9.44***	**CI-13**	215.00	210.10	4.90	**JB-15**	209.75	0.35	*30*	*144.5*	***0.35%***	**HDPE**
15	**In-15 - JB-15**								**120.80**	***9.62***	**In**	0.00	208.00		**JB-15**	207.93	0.07	*48*	*38*	***0.18%***	**RCP**
16	**JB-15 - Out15**	400	0.50	10.31	0.50	2.95	0.74	**13.77**	**71.70**	***5.70***	**JB-15**	215.50	207.93	7.57	**Out**	207.80	0.13	*48*	*60*	***0.12%***	**HDPE**
17	**EXGI - CI-16**	640	5.51	5.51	0.50	2.95	8.13	8.13	**33.50**	***6.82***	**ExGI**	215.69	211.04	4.65	**CI-16**	210.25	0.79	*30*	*131*	***0.60%***	**HDPE**
18	**CI-16 - CI-17**	200	0.85	6.36	0.50	2.95	1.25	9.38	**41.40**	***8.43***	**CI-16**	215.00	210.25	4.75	**CI-17**	210.00	0.25	*30*	*28*	***2.82%***	**RCP**
19	**CI-17 - JB-18**	260	1.09	7.45	0.50	2.95	1.61	10.99	**26.27**	***5.35***	**CI-17**	215.00	210.00	5.00	**JB-18**	209.80	0.20	*30*	*52*	***0.38%***	**HDPE**
20	**JB-18 - Out18**	200	2.00	9.45	0.50	2.95	2.95	**13.94**	**18.80**	***3.83***	**JB-18**	215.30	209.80	5.50	**Out**	209.50	0.30	*30*	*161*	***0.12%***	**HDPE**
21	**CI-24 - CI-23**	300	1.86	1.86	0.50	2.95	2.74	2.74	**4.65**	***3.79***	**CI-24**	215.00	211.50	3.50	**CI-23**	211.35	0.15	*15*	*33*	***0.45%***	**RCP**
22	**CI-23 - CI-22**	180	0.55	2.41	0.50	2.95	0.81	3.55	**4.16**	***2.35***	**CI-23**	215.00	211.35	3.65	**CI-22**	211.10	0.25	*18*	*164*	***0.09%***	**HDPE**
23	**CI-22 - CI-21**	260	0.90	3.31	0.50	2.95	1.33	5.61	**16.12**	***5.13***	**CI-22**	215.00	211.10	3.90	**CI-21**	210.80	0.30	*24*	*65*	***0.46%***	**HDPE**
24	**CI-20 - CI-21**	160	0.49	0.49	0.50	2.95	0.72	0.72	**10.67**	***8.70***	**CI-20**	215.00	211.50	3.50	**CI-21**	210.80	0.70	*15*	*28*	***1.07%***	**RCP**
25	**CI-21 - JB-19**	120	0.36	3.26	0.50	2.95	0.53	6.86	**25.16**	***8.01***	**CI-21**	215.00	210.80	4.20	**JB-19**	210.60	0.20	*24*	*144.5*	***0.14%***	**HDPE**
26	**In - JB-19**								**83.70**	***6.66***	**In**		207.40		**JB19**	207.28	0.12	*48*	*60*	***0.33%***	**RCP**
27	**JB-19 - Out**	500	2.75	6.91	0.50	2.95	4.06	**10.92**	**110.30**	***8.78***	**JB-19**	215.50	207.28	8.22	**Out**	207.20	0.08	*48*	*36*	***0.22%***	**RCP**
28	**Detention Outfall**										**Outfall**		207.06		**Out**	207.00	0.06	*18*	*64*	***0.09%***	**Dbl RCP**



1	2023.09.21 FFE / YARD DRAINS / SWALE DRAINAGE TABLE

BASIS OF BEARINGS:
GRID NORTH ON 2SEC GPS
ARK SPC SYSTEM, NORTH ZONE
GRAPHIC SCALE:
FULL SIZE 1"=80'
HALF SIZE 1"=160'

NORTH

0 80 160 240

0 80 160

SORRELL-SMITH 2SEC engineering consultants

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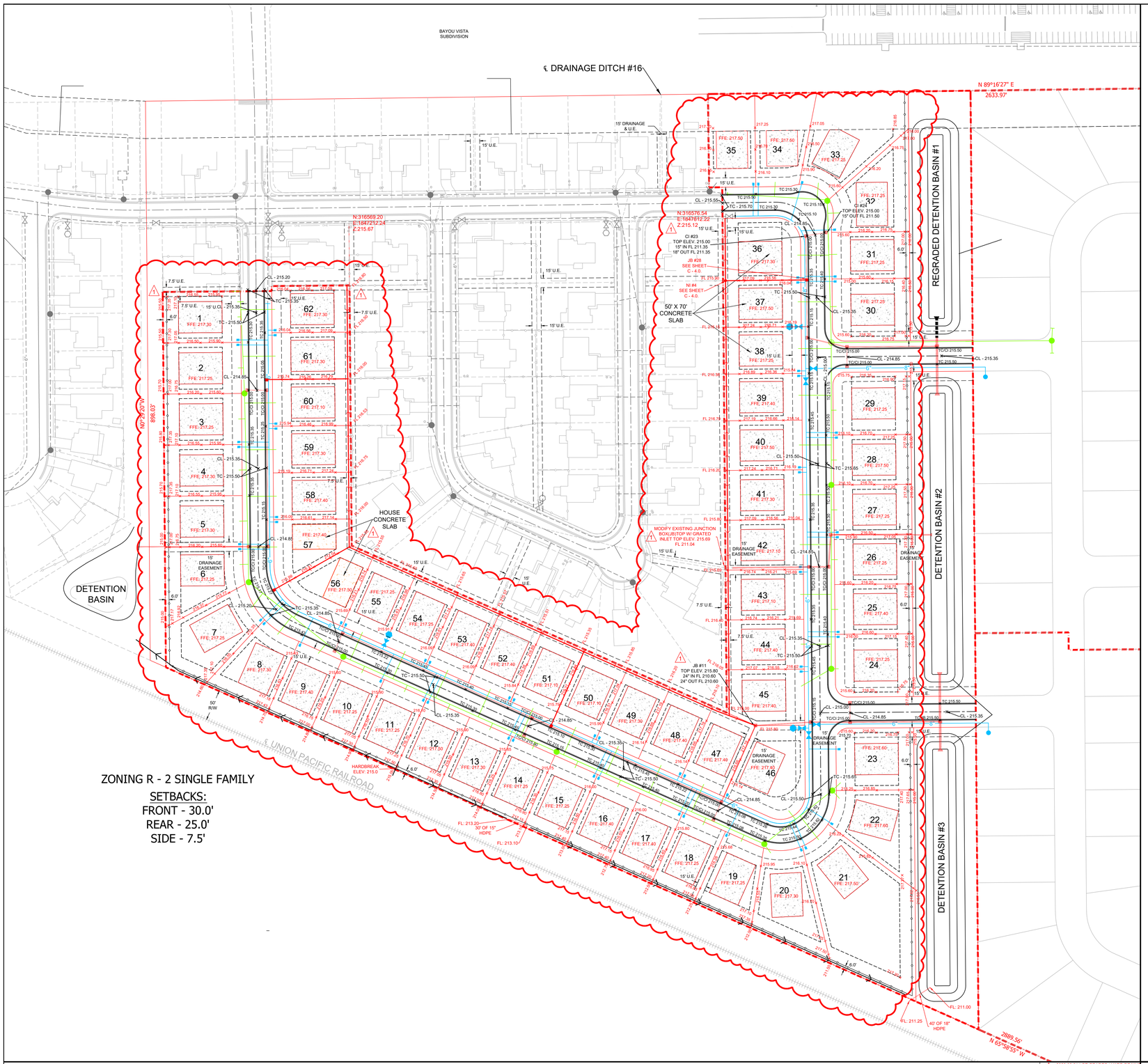
GRADING & DRAINAGE PHASE 1
BROWNSTONE ESTATES SUBDIVISION
MARION, ARKANSAS

Scale: AS NOTED	Drawn By: RS, JB, HF	Sheet No.
Date: 11/21/2023	Checked By: CP & JS	C - 4.0



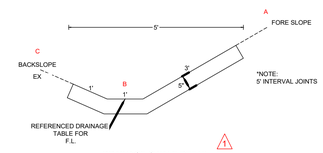
ZONING R - 2 SINGLE FAMILY

SETBACKS:
FRONT - 30.0'
REAR - 25.0'
SIDE - 7.5'

Brownstone Ph.1 Interior Lots Grading

	CL Elev	TBC Elev	Building Envelope			A	B	C
			Front Elev	Mid Elev	Rear Elev	Foreslope Elev	FL Elev	Backslope Elev
Lot Line		0	41.5	76.5	111.5	129	132.5	134
62 - N	215.20	215.35	216.04	216.56	217.09	217.35	216.80	216.92
62 - 61	215.20	215.35	216.04	216.56	217.09	217.35	216.50	216.55
61 - 60	214.90	215.05	215.74	216.26	216.79	217.05	216.00	216.62
60 - 59	215.10	215.25	215.94	216.46	216.99	217.25	216.53	216.86
59 - 58	215.35	215.50	216.19	216.71	217.24	217.50	216.75	216.75
58 - 57	215.00	215.15	216.09	216.61	217.14	217.40	216.00	216.23
57 - 56	215.12	215.27	215.99	216.51	217.04	217.30	215.35	215.63
56 - 55	214.85	215.00	215.69	216.21	216.74	217.00	215.55	215.86
55 - 54	215.07	215.22	215.91	216.43	216.96	217.22	215.62	215.75
54 - 53	215.50	215.65	216.09	216.61	217.14	217.40	215.65	215.68
53 - 52	215.25	215.40	216.09	216.61	217.14	217.40	215.57	215.67
52 - 51	215.00	215.15	215.84	216.36	216.89	217.15	215.51	215.63
51 - 50	214.85	215.00	215.79	216.31	216.84	217.10	215.35	215.76
50 - 49	215.15	215.30	215.99	216.51	217.04	217.30	215.85	215.97
49 - 48	215.30	215.45	216.14	216.66	217.19	217.45	216.20	216.25
48 - 47	215.07	215.22	216.14	216.66	217.19	217.45	216.10	216.23
47 - 46	214.85	215.00	216.14	216.66	217.19	217.45	215.80	215.96
46 - 45	215.00	215.15	216.14	216.66	217.19	217.45	216.00	216.10
45 - 44	215.30	215.45	216.14	216.66	217.19	217.45	216.05	216.08
44 - 43	215.20	215.35	215.69	216.21	216.74	217.00	216.40	215.60
43 - 42	214.85	215.00	215.69	216.21	216.74	217.00	215.69	215.84
42 - 41	215.20	215.35	216.04	216.56	217.09	217.35	215.80	215.85
41 - 40	215.50	215.65	216.19	216.71	217.24	217.50	216.20	216.25
40 - 39	215.30	215.45	216.14	216.66	217.19	217.45	216.70	216.65
39 - 38	215.00	215.15	215.84	216.36	216.89	217.15	216.38	216.45
38 - 37	214.85	215.00	216.19	216.71	217.24	217.50	216.15	216.32
37 - 36	215.20	215.35	216.04	216.56	217.09	217.35	215.90	216.35

Inlet Elevation/Location in Back Yard 5' Concrete Swale



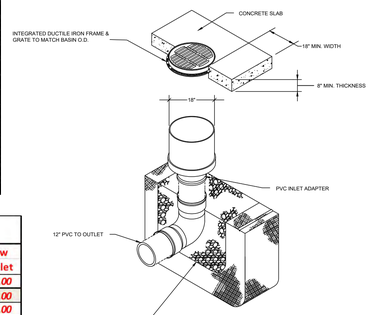
DRAINAGE SWALE DETAIL
N.T.S.

Brownstone Ph. 1 Exterior Lots Grading

	CL Elev	TBC Elev	Building Envelope			Top Bank	Property Line
			Front Elev	Mid Elev	Rear Elev	Elev	Elev
Lot Line		0	41.5	76.5	111.5	130	135
1 - N	215.20	215.35	215.95	216.55	217.10	217.35	215.50
2 - 1	215.15	215.30	215.90	216.50	217.05	217.30	215.50
3 - 2	214.85	215.00	215.60	216.20	216.75	217.00	215.70
4 - 3	215.20	215.35	215.95	216.55	217.10	217.35	215.80
5 - 4	215.20	215.35	215.95	216.55	217.10	217.35	215.70
6 - 5	214.85	215.00	215.60	216.20	216.75	217.00	215.00
7 - 6	215.02	215.17	215.77	216.37	216.92	217.17	215.00
8 - 7	215.20	215.35	215.95	216.55	217.10	217.35	214.60
9 - 8	215.28	215.43	216.03	216.63	217.18	217.43	214.70
10 - 9	214.85	215.00	215.60	216.20	216.75	217.00	214.80
11 - 10	215.15	215.30	215.90	216.50	217.05	217.30	214.90
12 - 11	215.35	215.50	216.10	216.70	217.25	217.50	215.00
13 - 12	215.15	215.30	215.90	216.50	217.05	217.30	214.50
14 - 13	214.90	215.05	215.65	216.25	216.80	217.05	214.00
15 - 14	215.00	215.15	215.75	216.35	216.90	217.15	213.10
16 - 15	215.25	215.40	216.00	216.60	217.15	217.40	213.00
17 - 16	215.25	215.40	216.00	216.60	217.15	217.40	212.75
18 - 17	215.05	215.20	215.80	216.40	216.95	217.20	212.50
19 - 18	214.93	215.08	215.68	216.28	216.83	217.08	212.25
20 - 19	215.20	215.35	215.95	216.55	217.10	217.35	212.00
21 - 20	215.35	215.50	216.10	216.70	217.25	217.50	211.50
22 - 21	215.47	215.62	216.22	216.82	217.37	217.62	216.50
23 - 22	215.50	215.65	216.25	216.85	217.40	217.65	215.00
Street - 23	214.85	215.00	215.60	216.20	216.75	217.00	215.50
Street - 24	214.85	215.00	215.60	216.20	216.75	217.00	215.50
25 - 24	215.25	215.40	216.00	216.60	217.15	217.40	215.00
26 - 25	214.85	215.00	215.60	216.20	216.75	217.00	215.00
27 - 26	215.15	215.30	215.90	216.50	217.05	217.30	215.00
28 - 27	215.35	215.50	216.10	216.70	217.25	217.50	215.00
29 - 28	215.35	215.50	216.10	216.70	217.25	217.50	215.00
Street - 29	215.00	215.15	215.75	216.35	216.90	217.15	215.50
Street - 30	214.85	215.00	215.60	216.20	216.75	217.00	215.50
31 - 30	214.25	214.40	215.00	215.60	216.15	216.40	215.50
32 - 31	214.85	215.00	215.60	216.20	216.75	217.00	216.00
33 - 32	215.00	215.15	215.75	216.35	216.90	217.15	216.00
34 - 33	215.15	215.30	215.90	216.50	217.05	217.30	216.00
35 - 34	215.35	215.50	216.10	216.70	217.25	217.50	216.00
W - 35	215.40	215.55	216.15	216.75	217.30	217.55	216.00

Brownstone Phase 1 - ADDITIONAL DRAINAGE STRUCTURES

Inlet ID	Inlet Type	Height	Top Elevation	Flow Line	Flow Outlet
NI-1	Nyloplast Inlet w/18" Grate	2.50	216.30	213.80	212.00
Ni-2	Nyloplast Inlet w/18" Grate	2.50	215.50	213.00	212.00
Ni-3	Nyloplast Inlet w/18" Grate	2.50	215.45	212.95	212.00
Ni-4	Nyloplast Inlet w/18" Grate	2.05	215.90	213.85	212.20
JB-25	New 4' x 4' Junction Box over proposed pipe	3.07	215.07	212.00	211.85
JB-26	New 4' x 4' Junction Box over proposed pipe	3.30	215.30	212.00	212.00
JB-27	New 4' x 4' Junction Box over proposed pipe	3.59	215.09	211.06	211.50
JB-28	New 4' x 4' Junction Box over proposed pipe	3.30	215.10	211.25	211.15
Ex-JB	Existing JB Remove Top & Replace Top w/ 2'x2' Grate	4.65	215.69	211.04	



THE BACKFILL MATERIAL SHALL BE CRUSHED STONE OR OTHER GRANULAR MATERIAL MEETING THE REQUIREMENTS OF CLASS I, CLASS II, OR CLASS III MATERIAL AS DEFINED IN ASTM D2321. BEDDING & BACKFILL FOR SURFACE DRAINAGE INLETS SHALL BE PLACED & COMPACTED UNIFORMLY IN ACCORDANCE WITH ASTM D2321.

NYLOPLAST INLINE DRAIN WITH STANDARD GRATE
N.T.S

2023.09.21 LOT GRADES / YARD DRAIN TABLE / SWALE

BASIS OF BEARINGS:
GRID NORTH ON 2SEC GPS
ARK SPC SYSTEM, NORTH ZONE
GRAPHIC SCALE:
FULL SIZE 1"=80'
HALF SIZE 1"=160'

NORTH

0 80 160 240

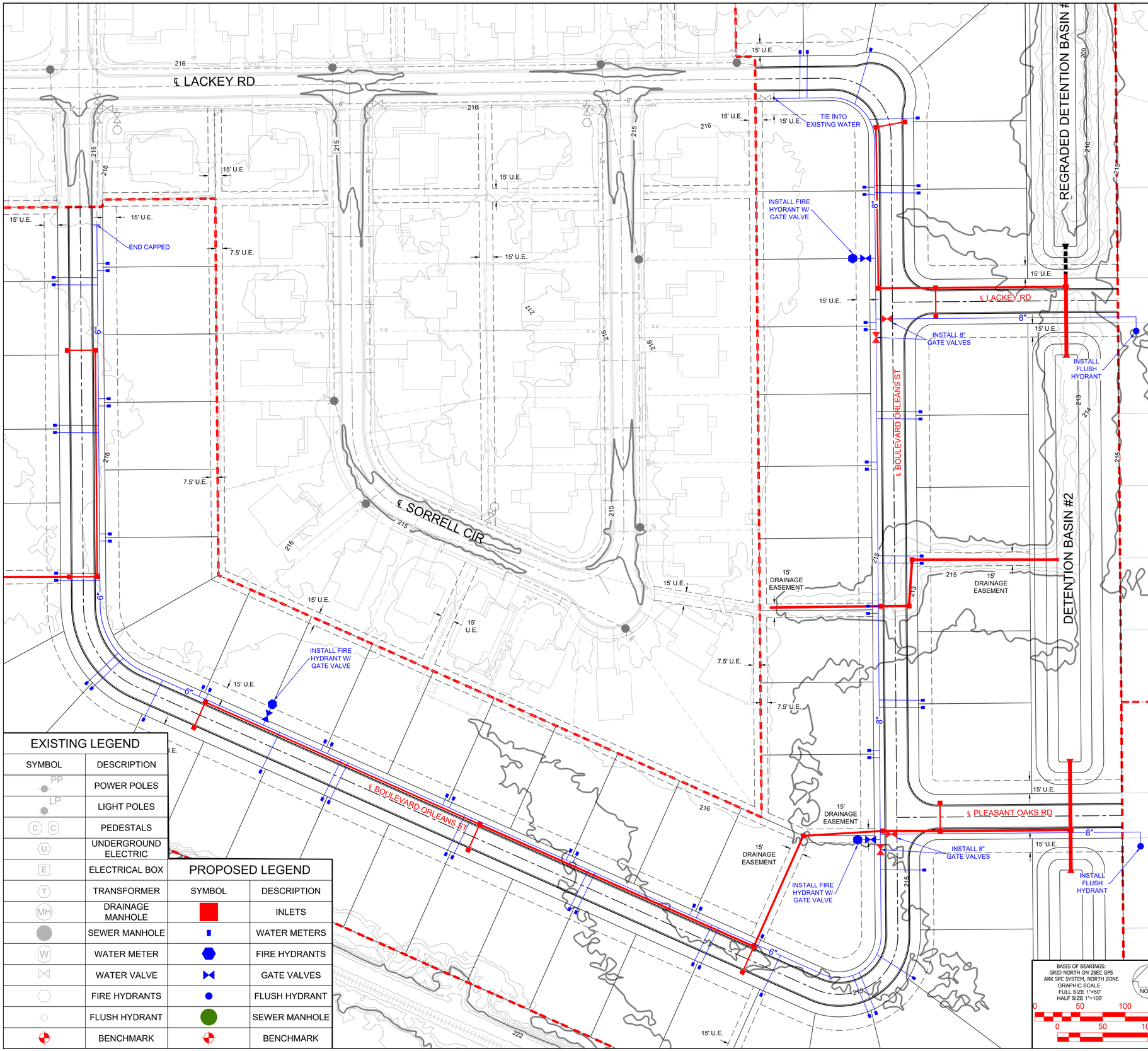
0 80 160

SORRELL-SMITH 2SEC engineering consultants

110 MISSOURI ST. West Memphis, AR 72301 (870) 735-8084

LOT GRADING & DRAINAGE
BROWNSTONE ESTATES SUBDIVISION
MARION, ARKANSAS

Scale: AS NOTED	Drawn By: RS, JB, HF	Sheet No.
Date: 11/21/2023	Checked By: CP & JS	C - 4.1

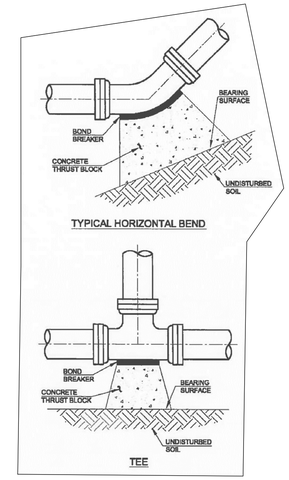


EXISTING LEGEND

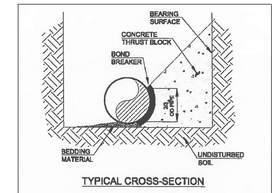
SYMBOL	DESCRIPTION
PP	POWER POLES
LP	LIGHT POLES
C C	PEDESTALS
U	UNDERGROUND ELECTRIC
E	ELECTRICAL BOX
T	TRANSFORMER
MH	DRAINAGE MANHOLE
	SEWER MANHOLE
W	WATER METER
	WATER VALVE
	FIRE HYDRANTS
	FLUSH HYDRANT
	BENCHMARK

PROPOSED LEGEND

SYMBOL	DESCRIPTION
	INLETS
	WATER METERS
	FIRE HYDRANTS
	GATE VALVES
	FLUSH HYDRANT
	SEWER MANHOLE
	BENCHMARK



TYPICAL HORIZONTAL BEND



TYPICAL CROSS-SECTION

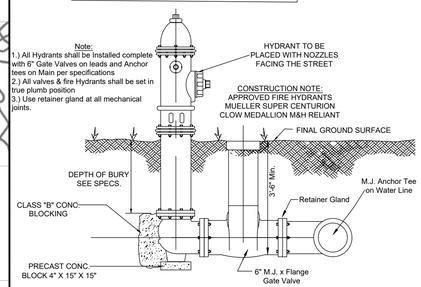
MINIMUM BEARING SURFACE AREA
(IN SQUARE FEET)

SIZE OF PIPE	BENDS				TEE OR DEAD END
	11 1/4°	22 1/2°	45°	90°	
4"	1.0	1.0	1.2	2.3	1.8
6"	1.0	1.4	2.8	5.2	3.7
8"	1.3	2.5	5.0	9.2	6.5
12"	2.9	5.7	11.2	20.8	14.7
18" AND GREATER MUST BE ENGINEERED					

NOTES:
1. BEARING SURFACES SHOWN IN CHART ARE MIN.
2. BASED ON:
   - INTERNAL PIPE PRESSURE = 100 PSI
   - WATER HAMMER = 110 PSI
   - 2,000 PSF SOIL BEARING CAPACITY

TYPICAL BLOCKING FOR WATER LINE FITTINGS
N.T.S.

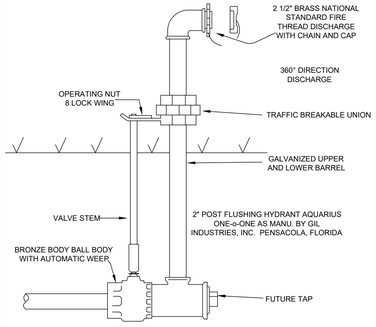
Note:
1.) All Hydrants shall be Installed complete with 6" Gate Valves on leads and Anchor tees on Main per specifications
2.) All valves & fire Hydrants shall be set in true plumb position
3.) Use retainer gland at all mechanical joints.



FIRE HYDRANT & VALVE SETTING
N.T.S.

ESTIMATED QUANTITIES

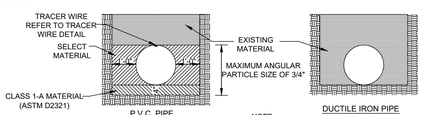
1.) 8" P.V.C. PIPE	337 LF
2.) 6" P.V.C. PIPE	2693 LF
3.) 6" GATE VALVES	4 EACH
4.) FIRE HYDRANTS W/ GATE VALVES	3 EACH
5.) 1" POLYETHYLENE SERVICE TUBING	2030 LF
6.) 1" WATER SERVICES	62 EACH
7.) REMOVE & REINSTALL FLUSH HYDRANT	1 EACH
8.) FLUSH HYDRANT	1 EACH
9.) BEDDING & TRENCH COMPACTION	1 LUMP SUM



FLUSHING HYDRANT DETAIL
N.T.S.

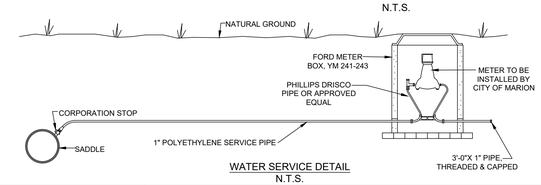
CONSTRUCTION NOTES:

1.) CONTRACTOR SHALL MAINTAIN A MINIMUM OF 36" COVER OVER WATER MAINS AND A MINIMUM OF 18" COVER OVER SERVICE LINES.
2.) 6" & 8" C-900 CLASS 150 DR 18 WATER LINE TO BE INSTALLED W/TRACER WIRE. PRICE TO BE INCLUDED IN UNIT PRICE BID PER LINEAL FOOT OF PIPE.
3.) WATER METER BOXES WILL NOT BE INSTALLED UNTIL LOT GRADING IS COMPLETE.
4.) PIPE AND JOINT RESTRAINT DEVICES SHALL BE MANUFACTURED OF DUCTILE IRON, ASTM A536, GRADE 65-45-12 FOR PIPE SIZES 6" THROUGH 24". APPROVED RESTRAINT DEVICES ARE: FORD METER BOX /UNIFLANGED BLOCK BUSTER SERIES.
5.) CONTRACTOR SHALL MAINTAIN A 10 FOOT HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN ANY WATER MAIN AND ANY SANITARY SEWER MAIN, MANHOLE, OR PUMP STATION WET WELL. A MINIMUM HORIZONTAL DISTANCE OF THREE FEET SHALL BE MAINTAINED BETWEEN WATER LINES AND OTHER UNDERGROUND UTILITIES OF A NONSANITARY NATURE (GAS, ELECTRIC, ETC.)
6.) CONTRACTOR SHALL INCLUDE ALL FITTINGS IN UNIT PRICE BID PER LINEAL FOOT OF PIPE.
7.) ALL TRENCH COMPACTION IN THE STREET RIGHT OF WAY SHALL BE THE RESPONSIBILITY OF THE UTILITY CONTRACTOR AND SHALL BE DONE WITH WASH ROCK/LIMESTONE OR CEMENT GROUT.
8.) SEE SEQUENCE OF CONSTRUCTION ON SHEET C-6.0.



NOTE:
FOR PLACEMENT OF BEDDING AND SELECT BACKFILL MATERIAL ON P.V.C. PIPES, SPECIAL CONSIDERATIONS SHALL BE GIVEN TO COMPACTION OF MATERIAL BELOW THE SPRINGLINE (HAUNCHING ZONE) IN ACCORDANCE WITH ASTM STANDARD D2321 AND D2774.

WATER LINE BEDDING DETAIL
N.T.S.



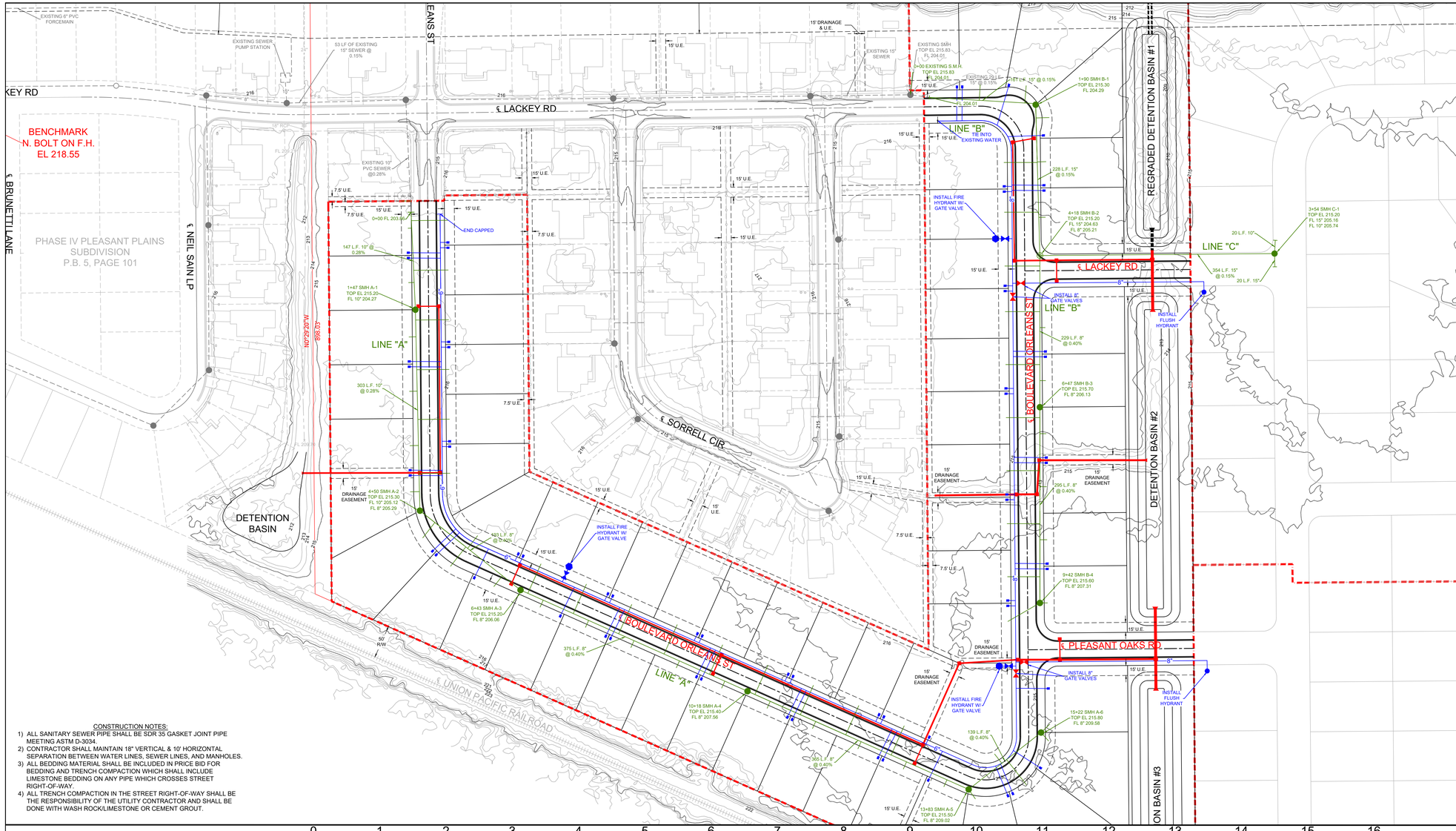
WATER SERVICE DETAIL
N.T.S.

BASIS OF BEARINGS:
GRID NORTH ON 2SEC GPS
ARK SPC SYSTEM, NORTH ZONE
GRAPHIC SCALE:
FULL SIZE 1"=50'
HALF SIZE 1"=100'
NORTH
0 50 100 150
0 50 100

SORRELL-SMITH
2SEC engineering consultants
110 MISSOURI ST. West Memphis, AR 72301 (870) 735-8084

WATER UTILITIES PHASE 1
BROWNSTONE ESTATES SUBDIVISION
MARION, ARKANSAS

Scale: AS NOTED	Drawn By: RS, JB, HF	Sheet No.
Date: 11/21/2023	Checked By: CP & JS	C - 5.0



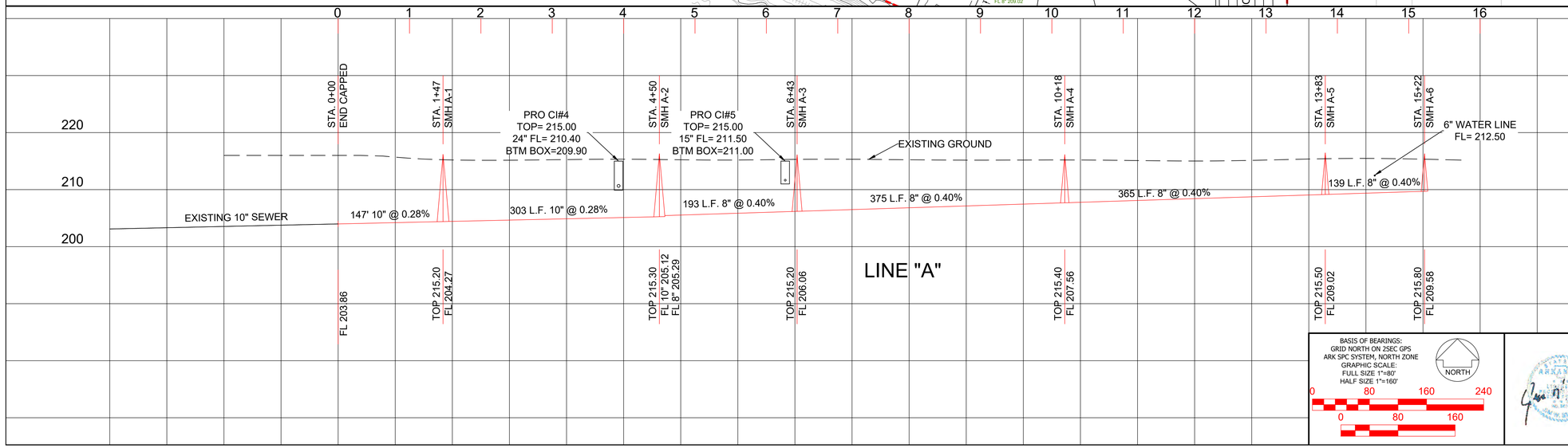
PROPOSED LEGEND		EXISTING LEGEND	
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	INLETS	PP	POWER POLES
	WATER METERS	LP	LIGHT POLES
	FIRE HYDRANTS	C C	PEDESTALS
	GATE VALVES	U	UNDERGROUND ELECTRIC
	FLUSH HYDRANT	E	ELECTRICAL BOX
	SEWER MANHOLE	T	TRANSFORMER
	BENCHMARK	MH	DRAINAGE MANHOLE
			SEWER MANHOLE
		W	WATER METER
			WATER VALVE
			FIRE HYDRANTS
			FLUSH HYDRANT
			BENCHMARK

CONSTRUCTION NOTES:

1) ALL SANITARY SEWER PIPE SHALL BE SDR 35 GASKET JOINT PIPE MEETING ASTM D-3034.
2) CONTRACTOR SHALL MAINTAIN 18" VERTICAL & 10' HORIZONTAL SEPARATION BETWEEN WATER LINES, SEWER LINES, AND MANHOLES.
3) ALL BEDDING MATERIAL SHALL BE INCLUDED IN PRICE BID FOR BEDDING AND TRENCH COMPACTION WHICH SHALL INCLUDE LIMESTONE BEDDING ON ANY PIPE WHICH CROSSES STREET RIGHT-OF-WAY.
4) ALL TRENCH COMPACTION IN THE STREET RIGHT-OF-WAY SHALL BE THE RESPONSIBILITY OF THE UTILITY CONTRACTOR AND SHALL BE DONE WITH WASH ROCK/LIMESTONE OR CEMENT GROUT.

ESTIMATED QUANTITIES

1.) 15" P.V.C. PIPE	763 L.F.
2.) 10" P.V.C. PIPE	450 L.F.
3.) 8" P.V.C. PIPE	1616 L.F.
4.) 4' DIA. MANHOLES	11 EACH
5.) 4" P.V.C. PIPE	1800 L.F.
6.) 15" x 4" T-WYES	8 EACH
7.) 10" x 4" T-WYES	12 EACH
8.) 8" x 4" T-WYES	42 EACH



BASIS OF BEARINGS:
GRID NORTH ON 2SEC GPS
ARK SPC SYSTEM, NORTH ZONE
GRAPHIC SCALE:
FULL SIZE 1"=80'
HALF SIZE 1"=160'

NORTH

0 80 160 240

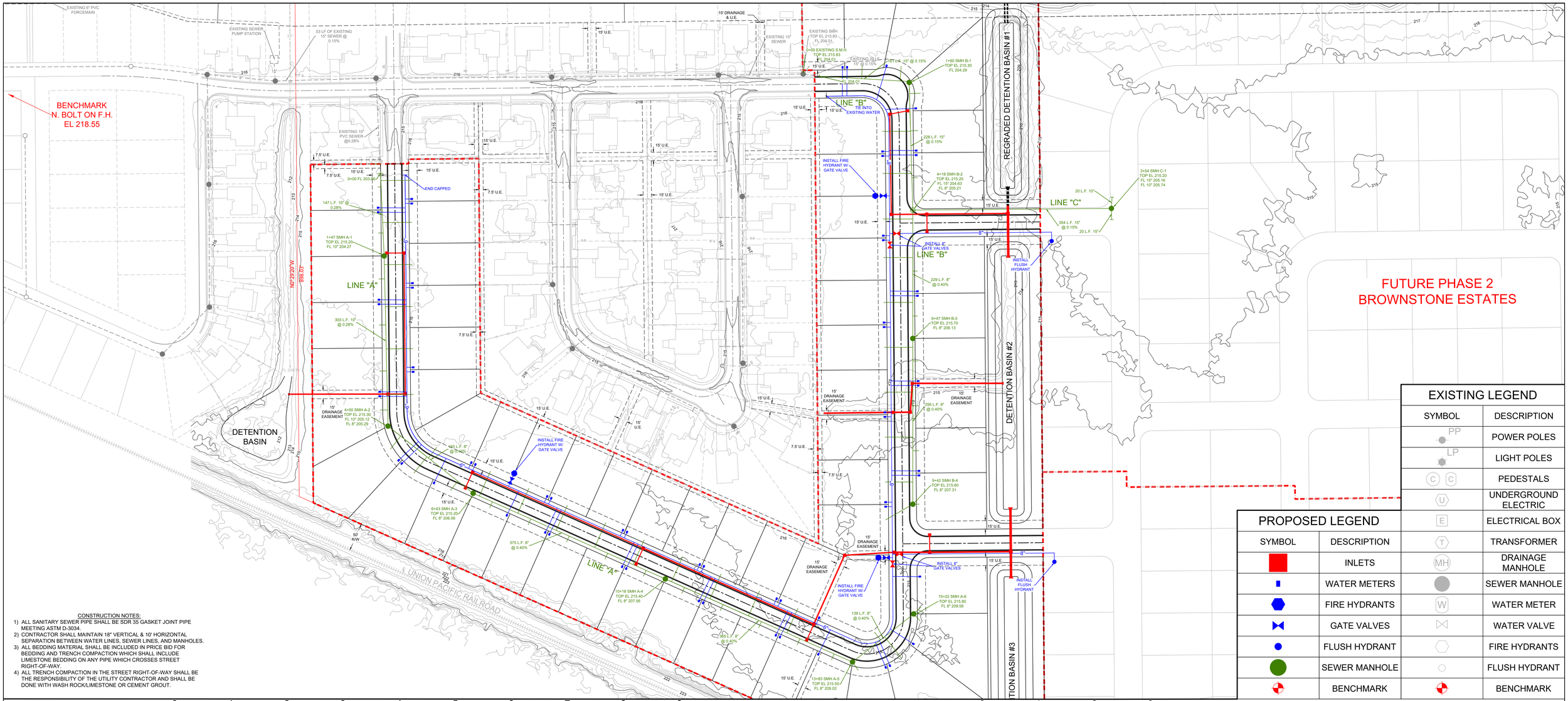
0 80 160

SORRELL-SMITH 2SEC engineering consultants

110 MISSOURI ST. West Memphis, AR 72301 (870) 735-8084

SANITARY SEWER UTILITIES PHASE 1
BROWNSTONE ESTATES SUBDIVISION
MARION, ARKANSAS

Scale: AS NOTED	Drawn By: RS, JB, HF	Sheet No.
Date: 11/21/2023	Checked By: CP & JS	C - 5.1



CONSTRUCTION NOTES:

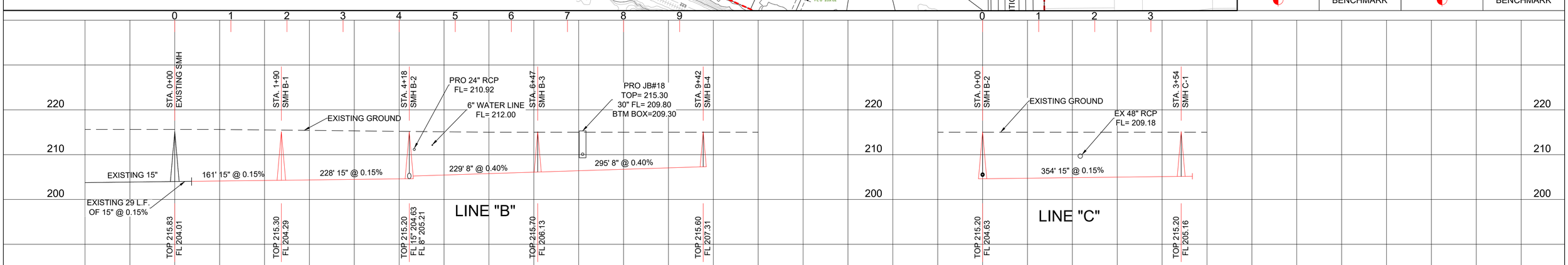
1) ALL SANITARY SEWER PIPE SHALL BE SDR 35 GASKET JOINT PIPE MEETING ASTM D-3034.
2) CONTRACTOR SHALL MAINTAIN 18" VERTICAL & 10' HORIZONTAL SEPARATION BETWEEN WATER LINES, SEWER LINES, AND MANHOLES.
3) ALL BEDDING MATERIAL SHALL BE INCLUDED IN PRICE BID FOR BEDDING AND TRENCH COMPACTION WHICH SHALL INCLUDE LIMESTONE BEDDING ON ANY PIPE WHICH CROSSES STREET RIGHT-OF-WAY.
4) ALL TRENCH COMPACTION IN THE STREET RIGHT-OF-WAY SHALL BE THE RESPONSIBILITY OF THE UTILITY CONTRACTOR AND SHALL BE DONE WITH WASH ROCK/LIMESTONE OR CEMENT GROUT.

EXISTING LEGEND

SYMBOL	DESCRIPTION
PP	POWER POLES
LP	LIGHT POLES
C C	PEDESTALS
U	UNDERGROUND ELECTRIC
E	ELECTRICAL BOX
T	TRANSFORMER
MH	DRAINAGE MANHOLE
	SEWER MANHOLE
W	WATER METER
	WATER VALVE
	FIRE HYDRANTS
	FLUSH HYDRANT
	BENCHMARK

PROPOSED LEGEND

SYMBOL	DESCRIPTION
	INLETS
	WATER METERS
	FIRE HYDRANTS
	GATE VALVES
	FLUSH HYDRANT
	SEWER MANHOLE
	BENCHMARK



BASIS OF BEARINGS:
GRID NORTH ON 2SEC GPS
ARK SPC SYSTEM, NORTH ZONE
GRAPHIC SCALE:
FULL SIZE 1"=80'
HALF SIZE 1"=160'

NORTH

0 80 160 240

0 80 160

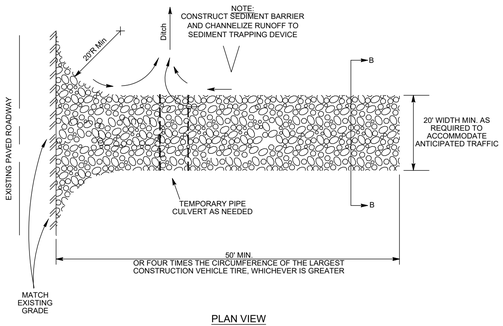
STATE OF ARKANSAS
NO. 9847
10-18-2023

SORRELL-SMITH
2SEC
engineering consultants

110 MISSOURI ST. West Memphis, AR 72301 (870) 735-8084

SANITARY SEWER UTILITIES PHASE 1
BROWNSTONE ESTATES SUBDIVISION
MARION, ARKANSAS

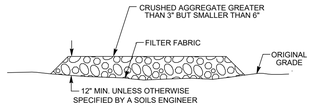
Scale: AS NOTED	Drawn By: RS, JB, HF	Sheet No.
Date: 11/21/2023	Checked By: CP & JS	C - 5.2



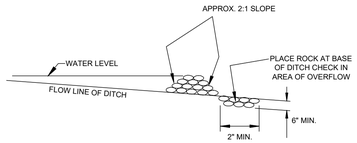
PLAN VIEW
N.T.S.

SEED VARIETY TABLE	
	COMMERCIAL
MARCH 1 - JUNE 15	LBS / ACRE
BERMUDA GRASS (COMMON) UNHULLED	5.0
BERMUDA GRASS (COMMON) HULLED	10.0
LESPEDEZA (KOBE)	10.0
WILDFLOWER MIX	4.0
JUNE 16 - AUGUST 31	
BERMUDA GRASS (COMMON) UNHULLED	5.0
BERMUDA GRASS (COMMON) HULLED	10.0
WILDFLOWER MIX	4.0
SEPTEMBER 1 - FEBRUARY 28 / 29	
WHEAT	15.0
CRIMSON CLOVER (DIXIE)	10.0
BERMUDA GRASS (COMMON) UNHULLED	20.0
WILDFLOWER MIX	4.0

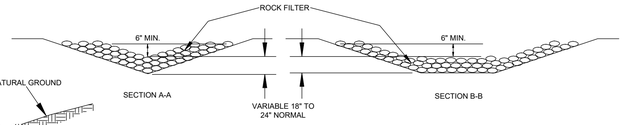
NOTE:
1. ALL SEEDED AREAS SHALL BE CHECKED REGULARLY TO SEE THAT A GOOD STAND IS MAINTAINED. AREAS SHOULD BE FERTILIZED AND RESEEDED AS NEEDED.
2. SOLID SOD PLACED IN ACCORDANCE W/ ARDOT CURRENT STANDARDS SPECIFICATIONS SECTION 624



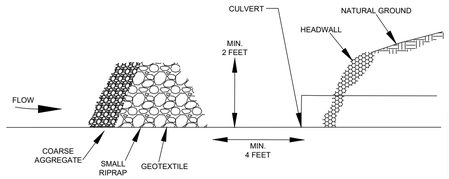
SECTION B-B
N.T.S.



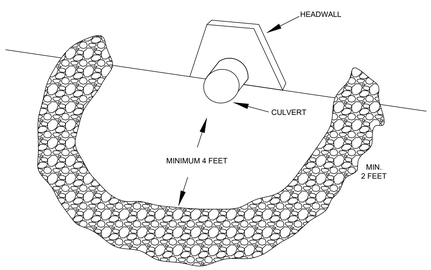
CONSTRUCTION ENTRANCE DETAIL
N.T.S.



ROCK CHECK DAM
N.T.S.

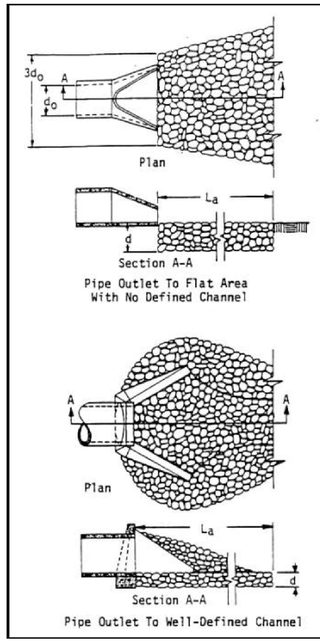


SECTION VIEW



PERSPECTIVE VIEW

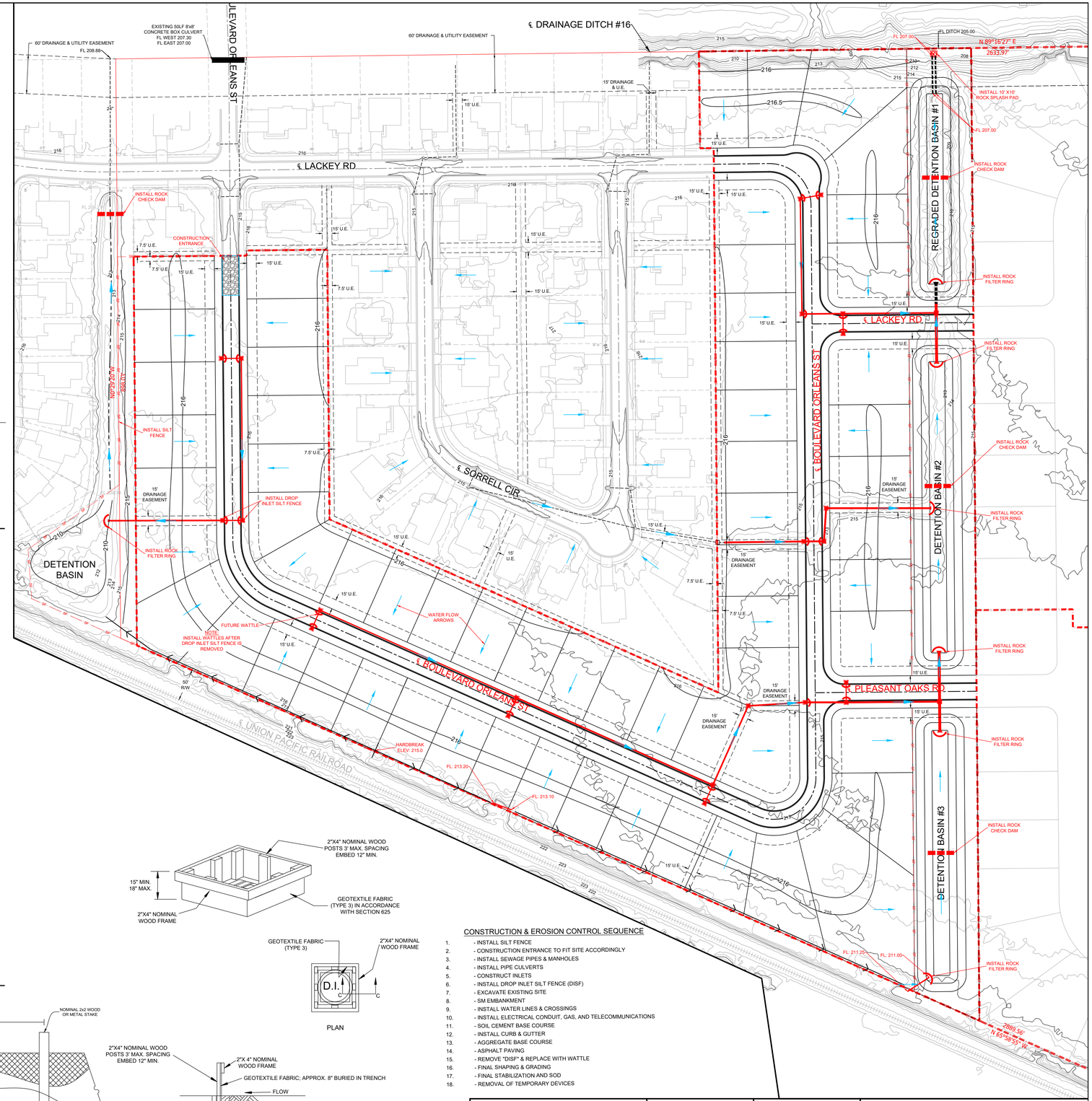
ROCK FILTER RING
N.T.S.



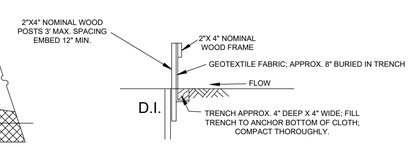
Notes

1. Apron lining may be riprap, grouted riprap, or concrete.
2. L_a is the length of the riprap apron as calculated using Plates 1.36d and 1.36e.
3. d = 1.5 times the maximum stone diameter but not less than 6 inches.

ROCK SPLASH PAD INLET/ OUTLET PROTECTION
N.T.S.



PLAN

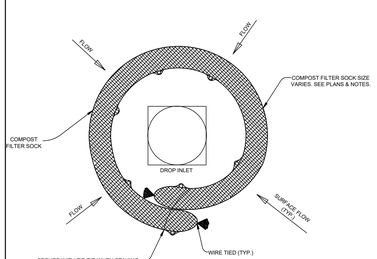


SECTION C-C

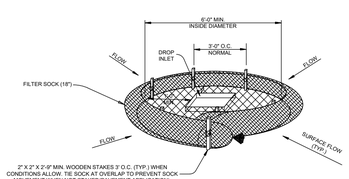
DROP INLET SILT FENCE
N.T.S.

CONSTRUCTION & EROSION CONTROL SEQUENCE

1. - INSTALL SILT FENCE
2. - CONSTRUCTION ENTRANCE TO FIT SITE ACCORDINGLY
3. - INSTALL SEWAGE PIPES & MANHOLES
4. - INSTALL PIPE CULVERTS
5. - CONSTRUCT INLETS
6. - INSTALL DROP INLET SILT FENCE (DISF)
7. - EXCAVATE EXISTING SITE
8. - SM EMBANKMENT
9. - INSTALL WATER LINES & CROSSINGS
10. - INSTALL ELECTRICAL CONDUIT, GAS, AND TELECOMMUNICATIONS
11. - SOIL CEMENT BASE COURSE
12. - INSTALL CURB & GUTTER
13. - AGGREGATE BASE COURSE
14. - ASPHALT PAVING
15. - REMOVE "DISF" & REPLACE WITH WATTLE
16. - FINAL SHAPING & GRADING
17. - FINAL STABILIZATION AND SOD
18. - REMOVAL OF TEMPORARY DEVICES



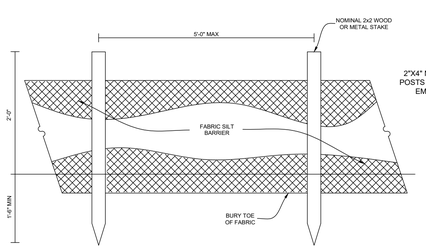
DROP INLET PLAN VIEW
N.T.S.



DROP INLET PERSPECTIVE VIEW
N.T.S.

NOTES:
1. OVERLAP ENDS OF SOCK (1' MIN. 3' MAX.).
2. USE 18" DIA. SOCK IN NON-TRAFFIC AREAS OR AREAS WHERE SAFETY IS NOT A CONCERN.

COMPOST FILTER SOCK DROP INLET PROTECTION (E-13)
N.T.S.



SILT FENCE DETAIL
N.T.S.

BASIS OF BEARINGS:
GRID NORTH ON 2SEC GPS
ARK SPC SYSTEM, NORTH ZONE
GRAPHIC SCALE:
FULL SIZE 1"=80'
HALF SIZE 1"=160'

NORTH

0 80 160 240

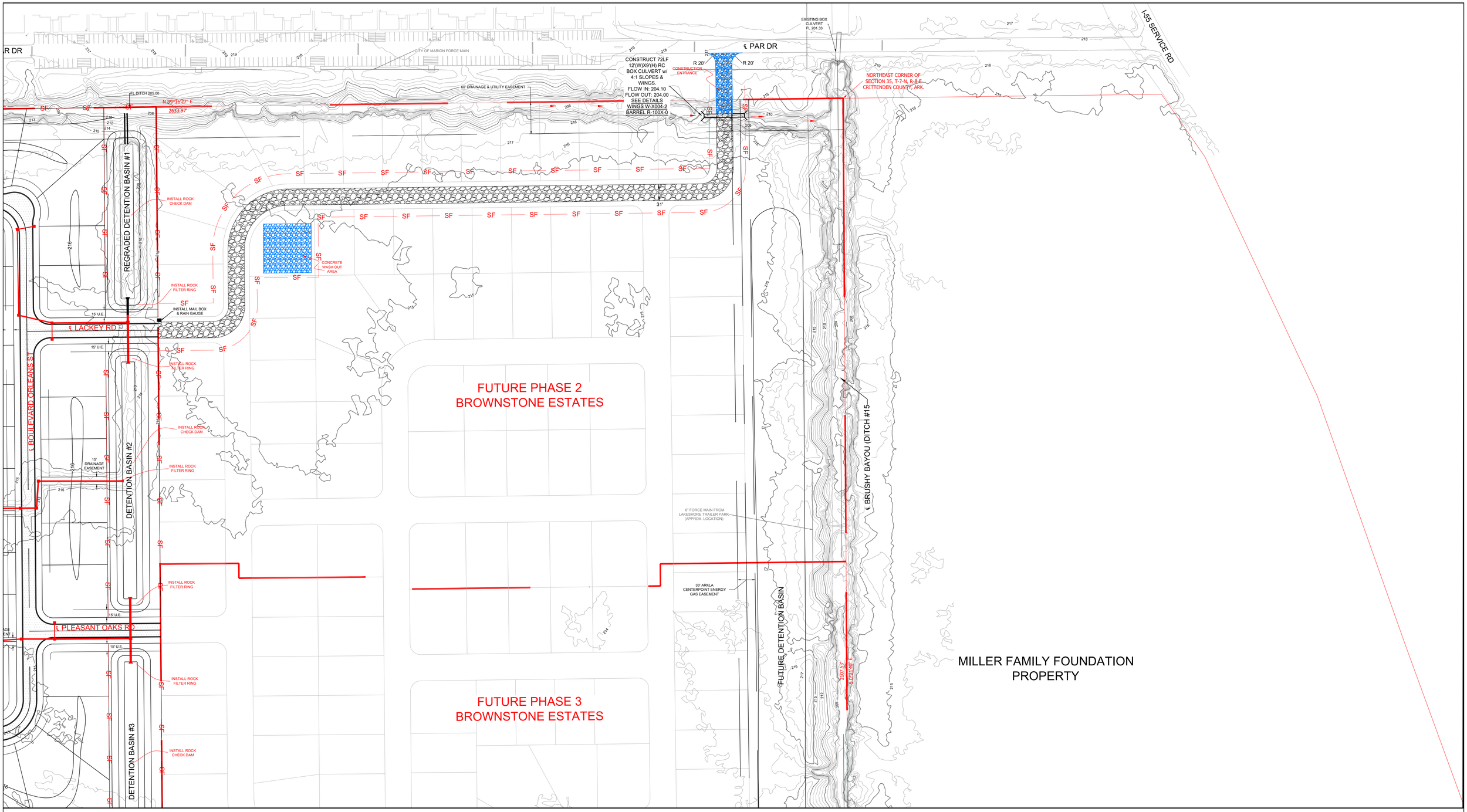
0 80 160

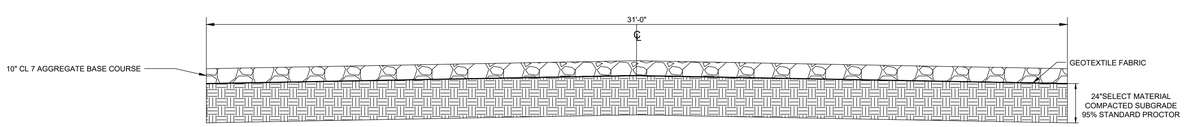
SORRELL-SMITH 2SEC engineering consultants

110 MISSOURI ST. West Memphis, AR 72301 (870) 735-8084

EROSION CONTROL PLAN PHASE 1
BROWNSTONE ESTATES SUBDIVISION
MARION, ARKANSAS

Scale: AS NOTED	Drawn By: RS, JB, HF	Sheet No.
Date: 11/21/2023	Checked By: CP & JS	C - 6.0





TYPICAL CONSTRUCTION ACCESS SECTION
N.T.S.

BASIS OF BEARINGS:
GRID NORTH ON 2SEC GPS
ARK SPC SYSTEM, NORTH ZONE
GRAPHIC SCALE:
FULL SIZE 1"=80'
HALF SIZE 1"=160'

NORTH

0 80 160 240

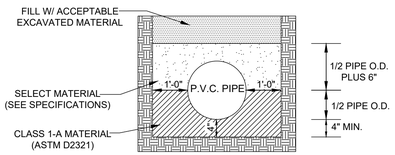
0 80 160

SORRELL-SMITH 2SEC engineering consultants

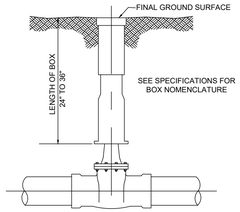
110 MISSOURI ST. West Memphis, AR 72301 (870) 735-8084

CONSTRUCTION ACCESS PLAN PHASE 1
BROWNSTONE ESTATES SUBDIVISION
MARION, ARKANSAS

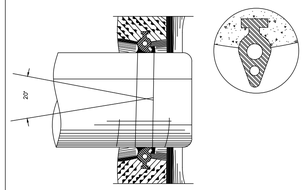
Scale: AS NOTED	Drawn By: RS, JB, HF	Sheet No.
Date: 02/02/2024	Checked By: CP & JS	C - 7.0



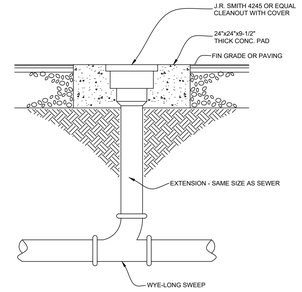
SANITARY SEWER BEDDING DETAIL
N.T.S.



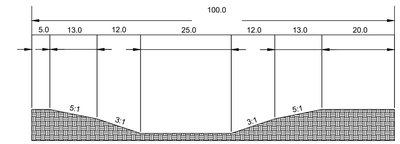
TYPICAL VALVE SETTING
N.T.S.



A-LOK GASKET DETAIL
N.T.S.

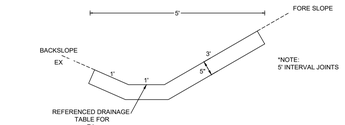


EXTERIOR CLEANOUT DETAIL
N.T.S.



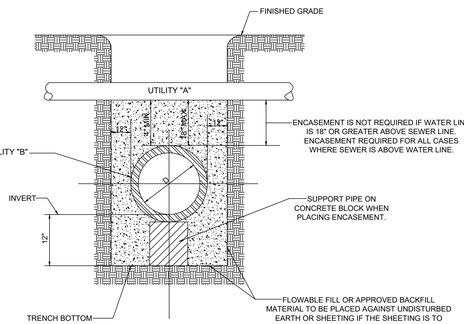
SEDIMENTATION/DETENTION BASIN DETAIL
N.T.S.

NOTE:
FOR GRADE BREAK ELEVATIONS REFER TO G&D SHEET C - 4.0



*NOTE:
5' INTERVAL JOINTS

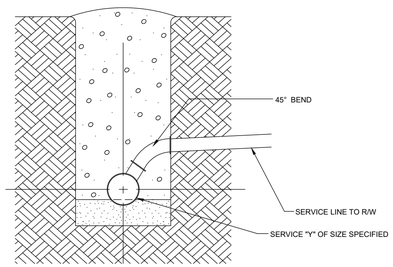
DRAINAGE SWALE DETAIL
N.T.S.



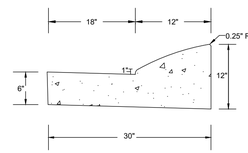
ENCASEMENT DETAIL
AT UTILITY CROSSINGS
N. T. S.

NOTES:

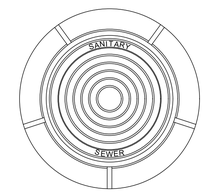
1. UTILITIES "A" AND "B" CAN BE EITHER NEW OR EXISTING.
2. WHEN ONE UTILITY IS A SANITARY SEWER, IT IS PREFERABLE TO BE POSITIONED AS SHOWN FOR UTILITY "B".
3. UTILITY "B" JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE CENTERLINE OF UTILITY "A".
4. ENCASEMENT EXTENDS 10'-0" ON EACH SIDE OF THE CENTERLINE OF UTILITY "A".
5. PIPE MUST BE BRACED VERTICALLY AND HORIZONTALLY TO PREVENT MOVEMENT DURING PLACEMENT OF BACKFILL.
6. 18" SEPARATION IN ADDITION TO ENCASEMENT REQUIRED WHEN SEWER IS UNAVOIDABLY ABOVE WATER. ALL EXCEPTIONS MUST BE APPROVED IN WRITING BY ADH.



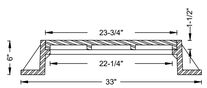
SEWER SERVICE CONNECTION DETAIL
N.T.S.



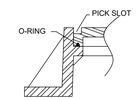
6-30 CURB & GUTTER (3500 PSI CONCRETE)
N.T.S.



	H-20 LOADING	
	CASTING	WEIGHT
LID	1157000	125 LBS
SS-LID	1157010	125 LBS
RING	1257000	135 LBS
SET	1557001	260 LBS
SS-SET	1557010	260 LBS

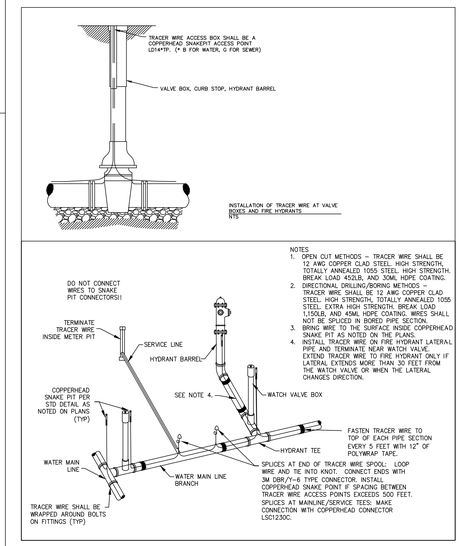


STANDARD DETAIL



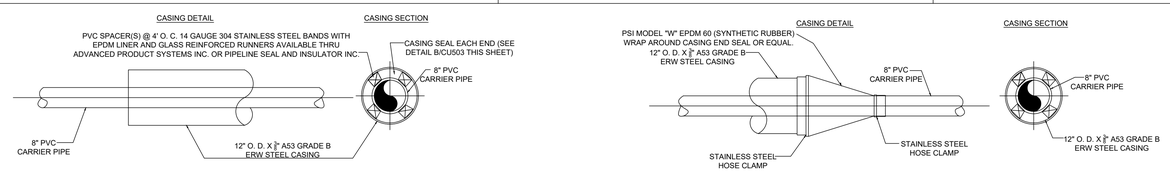
SELF SEALING LID DETAIL
THIS LID IS CAST WITH TWO PICK SLOTS STANDARD.

260 STANDARD MANHOLE LID & RING
N.T.S.



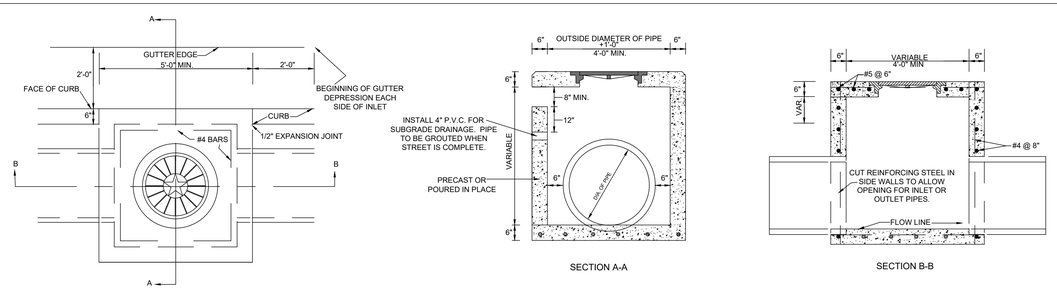
NOTES
1. OPEN CUT METHODS -- TRACER WIRE SHALL BE 12 AWG COPPER CLAD STEEL. HIGH STRENGTH, TOTALLY ANNEALED 1055 STEEL. HIGH STRENGTH. BREAK LOAD 452LB, AND 30ML HDPE COATING.
2. DIRECTIONAL DRILLING/BORING METHODS -- TRACER WIRE SHALL BE 12 AWG COPPER CLAD STEEL. HIGH STRENGTH, TOTALLY ANNEALED 1055 STEEL. EXTRA HIGH STRENGTH. BREAK LOAD 1,150LB, AND 45ML HDPE COATING. WIRES SHALL NOT BE SPLICED IN BORED PIPE SECTION.
3. BRING WIRE TO THE SURFACE INSIDE COPPERHEAD SNAKE PIT AS NOTED ON THE PLANS.
4. INSTALL TRACER WIRE ON FIRE HYDRANT LATERAL PIPE AND TERMINATE NEAR WATCH VALVE. EXTEND TRACER WIRE TO FIRE HYDRANT ONLY IF LATERAL EXTENDS MORE THAN 30 FEET FROM THE WATCH VALVE OR WHEN THE LATERAL CHANGES DIRECTION.

TRACER WIRE DETAIL
N.T.S.



A CU503 CASING DETAIL
N. T. S.

B CU503 CASING DETAIL
N. T. S.

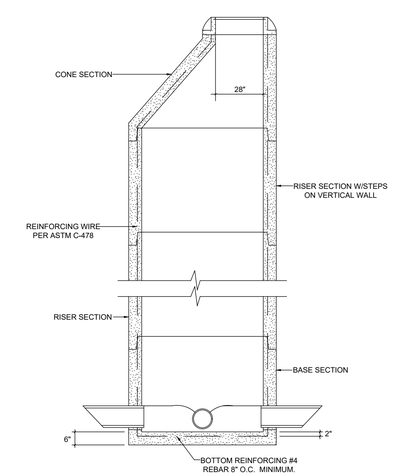


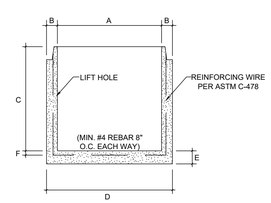
PLAN

SECTION A-A

SECTION B-B

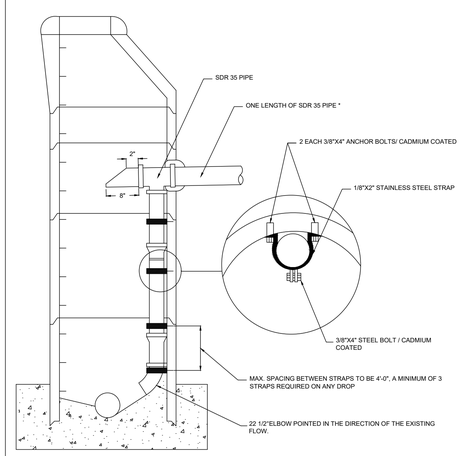
CURB INLET/JUNCTION BOX DETAIL
N.T.S.





STANDARD DIMENSIONS & WEIGHTS								
SIZE	A	B	C	D	E	F	WEIGHT PER FOOT	WEIGHT PER BOTTOM
48	48	5	2,3,4	58	6	2	870	970
60	60	6	2,3,4	72	6	2	1280	1500
72	72	7	2,3,4	86	6	2	1840	2150
84	84	8	2,3,4	100	6	2	2300	3890
96	96	9	2,3,4	114	6	2	3000	5080
108	108	9	3,4,5	126	6	2	3440	6430

MANHOLE DETAIL
N.T.S.



INSIDE DROP

* OPENING IN MANHOLE-WALL TO BE GROUTED BACK WITH QUICK SETTING, HIGH STRENGTH, NON SHRINKING, CEMENT GROUT

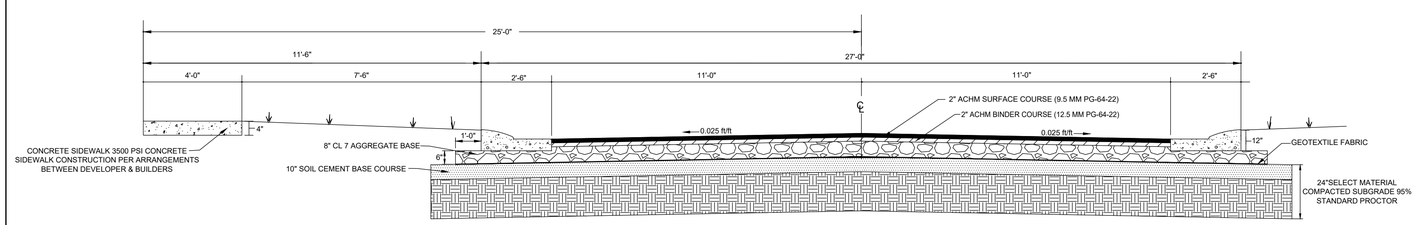
NOTES:

INSURE THAT MANHOLE STEPS AND DROP CONSTRUCTION LOCATIONS DO NOT INTERFERE.

STEPS TO BE A MAX. OF 16" O.C. - MIN. 8" FROM TOP AND BOTTOM

4' DIAMETER MANHOLE FOR UP TO 8" PIPE, FOR LARGER PIPE, MANHOLE WILL BE SIZED ACCORDINGLY

SEWER MANHOLE DROP DETAIL
N.T.S.



TYPICAL STREET SECTION
N.T.S.

STATE OF ARKANSAS
CHRISTOPHER PHILLIP SMITH
LICENSED PROFESSIONAL ENGINEER
No. 5012

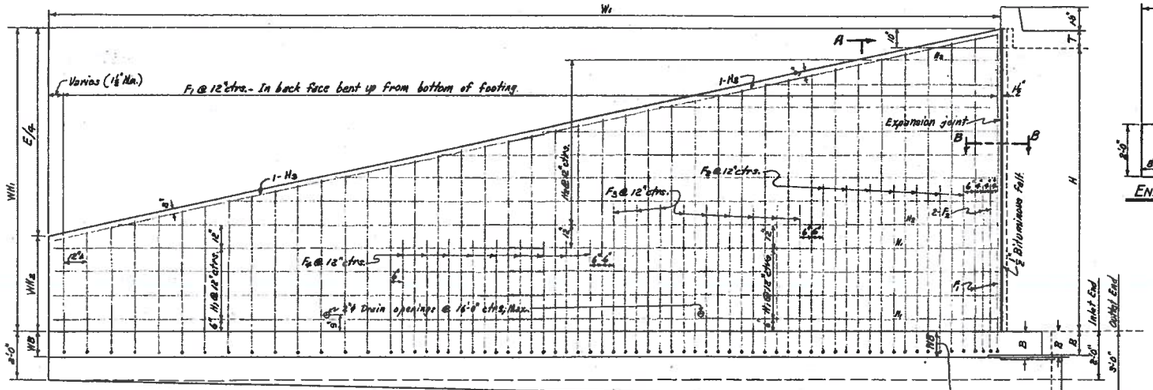
SORRELL-SMITH
2SEC engineering consultants

110 MISSOURI ST. West Memphis, AR 72301 (870) 735-8084

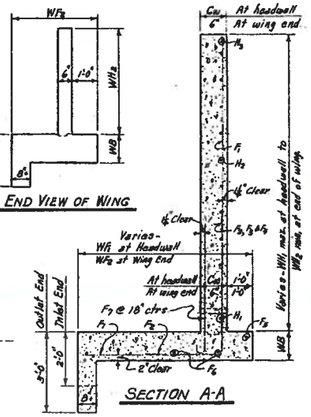
DETAILS PHASE 1
BROWNSTONE ESTATES SUBDIVISION
MARION, ARKANSAS

Scale: N.T.S.	Drawn By: RS, JB, HF	Sheet No.
Date: 11/21/2023	Checked By: CP & JS	C - 7.1

FED. ROAD No.	STATE	FED. AID PROJECT	FISCAL YEAR	SHEET No.	TOTAL SHEETS
6	ARK.				
JOB No.					

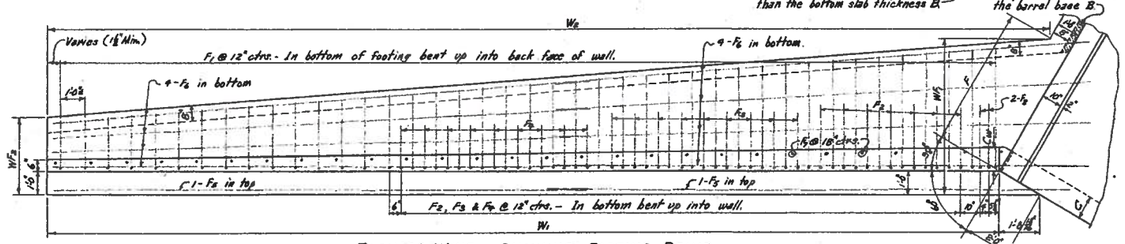


REAR ELEVATION OF WING - SHOWING BACK FACE REINF.

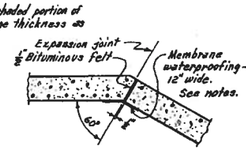


END VIEW OF WING

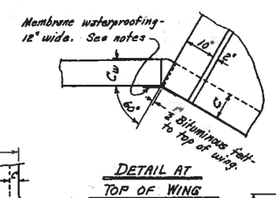
SECTION A-A



PLAN OF WING - SHOWING FOOTING REINF.



SECTION B-B THRU EXPANSION JOINT



DETAIL AT TOP OF WING

WING DIMENSIONS

CLEAR HEIGHT OF BOX	THICKNESS OF WING FOOTING	THICKNESS OF WING AT HEADWALL = C	WINGWALL HEIGHTS: AT HEADWALL	WINGWALL HEIGHTS: AT END OF WING	WIDTHS OF WING FOOTINGS: AT HEADWALL	WIDTHS OF WING FOOTINGS: AT END OF WING	PERPENDICULAR FOOTING DIMENSION	PERPENDICULAR DIST. FROM HDWL. TO END OF WING	LENGTH OF WINGWALLS	INSIDE FOOTING DIMENSION	* QUANTITY PER WING, CLASS S CONCRETE: INLET END	* QUANTITY PER WING, CLASS S CONCRETE: OUTLET END
H	WB	Cw	WH1	WH2	WF3	WF4	F	E	W1	W2	CU.YD.	CU.YD.
9'	10"	9"	9'-10"	3'-6"	5'-2"	2'-11½"	4'-3"	27'-4"	31'-6½"	32'-9½"	9.913	10.528
10'	11"	10"	10'-10"	3'-9"	5'-6"	3'-0"	4'-10"	30'-10"	34'-7½"	36'-2½"	12.648	13.100
11'	12"	11"	11'-10"	3'-8"	6'-8"	3'-1½"	5'-5"	32'-8"	37'-8½"	39'-6½"	15.850	16.399
12'	13"	12"	12'-10"	4'-0"	6'-8"	3'-3"	6'-0"	35'-4"	40'-9½"	42'-11"	19.570	20.110

* Quantity per wing does not include headwall or that portion of apron or toewall for the length W2.

APRON DIMENSION W3

W3 = (OW - 2F)

CLEAR SPAN	CLEAR HEIGHT	2 × FOOTING DIMENSION	SINGLE BARREL CULVERT: OW	SINGLE BARREL CULVERT: W3	DOUBLE BARREL CULVERT: OW	DOUBLE BARREL CULVERT: W3	TRIPLE BARREL CULVERT: OW	TRIPLE BARREL CULVERT: W3	QUADRUPLE BARREL CULVERT: OW	QUADRUPLE BARREL CULVERT: W3	QUINTUPLE BARREL CULVERT: OW	QUINTUPLE BARREL CULVERT: W3
S	H	2F	OW	W3	OW	W3	OW	W3	OW	W3	OW	W3
7'	9'	8'-6"	8'-6"	0'-0"	16'-5"	7'-11"	24'-4"	15'-10"	32'-3"	23'-9"	40'-2"	31'-8"
8'	9'	8'-6"	9'-6"	1'-0"	18'-5"	9'-11"	27'-4"	18'-10"	36'-3"	27'-9"	45'-2"	36'-8"
	10'	9'-8"	9'-8"	0'-0"	18'-8"	9'-0"	27'-8"	18'-0"	36'-8"	27'-0"	45'-8"	36'-0"
9'	9'	8'-6"	10'-6"	2'-0"	20'-5"	11'-11"	30'-4"	21'-10"	40'-3"	31'-9"	50'-2"	41'-8"
	10'	9'-8"	10'-8"	1'-0"	20'-8"	11'-0"	30'-8"	21'-0"	40'-8"	31'-0"	50'-8"	41'-0"
	11'	10'-10"	10'-10"	0'-0"	20'-10"	10'-0"	30'-10"	20'-0"	40'-10"	30'-0"	50'-10"	40'-0"
10'	9'	8'-6"	11'-6"	3'-0"	22'-5"	13'-11"	33'-4"	24'-10"	44'-3"	35'-9"	55'-2"	46'-8"
	10'	9'-8"	11'-8"	2'-0"	22'-8"	13'-0"	33'-8"	24'-0"	44'-8"	36'-0"	55'-8"	46'-0"
	11'	10'-10"	11'-10"	1'-0"	22'-10"	12'-0"	33'-10"	23'-0"	44'-10"	34'-0"	55'-10"	45'-0"
	12'	12'-0"	12'-0"	0'-0"	23'-0"	11'-0"	34'-0"	22'-0"	45'-0"	33'-0"	56'-0"	44'-0"
11'	9'	8'-6"	12'-6"	4'-0"	24'-5"	15'-11"	36'-4"	27'-10"	48'-3"	39'-9"		
	10'	9'-8"	12'-8"	3'-0"	24'-8"	15'-0"	36'-8"	27'-0"	48'-8"	39'-0"		
	11'	10'-10"	12'-10"	2'-0"	24'-10"	14'-0"	36'-10"	26'-0"	48'-10"	38'-0"		
	12'	12'-0"	13'-0"	1'-0"	25'-0"	13'-0"	37'-0"	25'-0"	49'-0"	37'-0"		
12'	9'	8'-6"	13'-6"	5'-0"	26'-5"	17'-11"	39'-4"	30'-10"	52'-3"	43'-9"		
	10'	9'-8"	13'-8"	4'-0"	26'-8"	17'-0"	39'-8"	30'-0"	52'-8"	43'-0"		
	11'	10'-10"	13'-10"	3'-0"	26'-10"	16'-0"	39'-10"	29'-0"	52'-10"	42'-0"		
	12'	12'-0"	14'-0"	2'-0"	27'-0"	15'-0"	40'-0"	28'-0"	53'-0"	41'-0"		

QUANTITIES

CLEAR SPAN	CLEAR HEIGHT	THICKNESS OF WING AT HEADWALL	THICKNESS OF WING FOOTING	REINFORCING STEEL - FOR 4 WINGS ⊕	CLASS S CONCRETE - 4 WINGS, HEADWALLS, WINGWALLS, FOOTINGS, TOEWALLS AND APRONS: SINGLE BARREL CULVERT	DOUBLE BARREL CULVERT	TRIPLE BARREL CULVERT	QUADRUPLE BARREL CULVERT	QUINTUPLE BARREL CULVERT
S	H	Cw	WB	LB.	CU.YD.	CU.YD.	CU.YD.	CU.YD.	CU.YD.
7'	9'	9"	10"	2910.8	41.04	42.72	44.39	46.07	47.75
8'	9'	9"	10"	2910.8	41.27	43.16	45.09	46.93	48.82
	10'	10"	11"	3588.5	52.12	54.45	56.96	57.90	59.82
9'	9'	9"	10"	2910.8	41.99	43.61	45.68	47.79	49.89
	10'	10"	11"	3588.5	52.35	54.99	56.62	58.76	60.90
	11'	11"	12"	4374.9	65.11	67.28	69.43	71.59	73.76
10'	9'	9"	10"	2910.8	41.71	44.05	46.35	48.67	50.99
	10'	10"	11"	3588.5	52.57	54.94	57.27	59.62	61.98
	11'	11"	12"	4374.9	66.94	67.72	70.08	72.45	74.83
	12'	12"	13"	5477.2	80.15	82.55	84.94	87.33	89.73
11'	9'	9"	10"	2910.8	41.92	44.52	47.03	49.53	
	10'	10"	11"	3588.5	52.79	55.40	57.94	60.50	
	11'	11"	12"	4374.9	65.56	68.17	70.74	73.38	
	12'	12"	13"	5477.2	80.37	83.00	85.60	88.22	
12'	9'	10"	10"	2910.8	42.15	44.99	47.72	50.45	
	10'	10"	11"	3588.5	52.01	55.87	58.62	61.39	
	11'	11"	12"	4374.9	65.78	68.64	71.40	74.20	
	12'	12"	13"	5477.2	80.60	83.46	86.27	89.10	

⊕ For reinforcing steel in Headwalls and Aprons, See Details of Standard Barrel Sections for R.C. Box Culverts for the desired Span and Height.

GENERAL NOTES:-

CONCRETE:- All concrete to be Class S, and shall be poured in the dry. All exposed corners to have ¾" chamfers.

REINFORCING STEEL:- Reinforcing steel to be deformed bars of intermediate or hard grade.

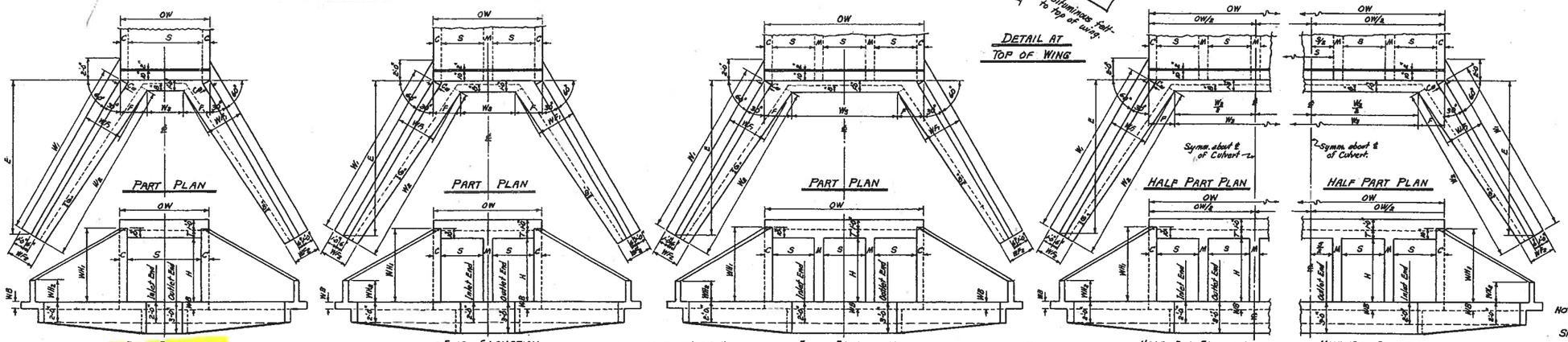
CONSTRUCTION JOINTS:- Construction joints between wingwalls, footings and sidewalls shall be only where shown on plans.

MEMBRANE:- A membrane waterproofing 12" wide, consisting of three mopings of waterproofing asphalt and two alternate layers of treated cotton fabric shall be applied to the back face of wing to cover the expansion joints.

Payment for the membrane waterproofing and bituminous felt shall be included in unit price bid for Class S Concrete.

SPECIFICATIONS:- Arkansas State Highway Commission Standard Specifications for Highway Construction and applicable Special Provisions.

UNIT STRESSES:-
Class S Concrete (n=10) 1200 #/□"
Reinforcing Steel 20,000 #/□"



NOTE:- Plans and Elevations are not to scale.

NOTE:- This drawing to be used in conjunction with Standard Barrel Sections, Drawing Nos. as listed below.

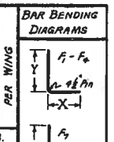
SINGLES	DOUBLES	TRIPLES	QUADRUPLES	QUINTUPLES
R-100X-0	R-200X-0	R-300X-0	R-400X-0	R-500X-0
R-100X-X2	R-200X-X2	R-300X-X2	R-400X-X2	
	R-200X-X3	R-300X-X3		

BAR LIST FOR ONE WING - 4 REQUIRED

CLEAR HEIGHT H	F1 BENT (In bottom of footing, bent up into back face of wing. One bar of each length.): SIZE	SPACING	No. REQ'D	LENGTHS VARY MIN.	MAX.	X MIN.	MAX.	Y MIN.	MAX.	F2 BENT (In bottom of footing, bent up into back face of wing. Alt. with F1 bars.): SIZE ⊕	SPACING	No. REQ'D	LENGTH	X	Y	F3 BENT (In bottom of footing, bent up into back face of wing. Alt. with F1 bars.): SIZE	SPACING	No. REQ'D	LENGTH	X	Y	F4 BENT (In bottom of footing, bent up into back face of wing. Alt. with F1 bars.): SIZE	SPACING	No. REQ'D	LENGTH	X	Y	F5 STRAIGHT (Longitudinal in top of wing footing heel.): SIZE	No. REQ'D	LENGTH	F6 STRAIGHT (Longitudinal in bottom of wing footing toe.): SIZE	No. REQ'D	LENGTH	F7 BENT (Footing dowels extending up into front face of wing.): SIZE	SPACING	No. REQ'D	LENGTH	X	H1 STRAIGHT (Horizontal in back face of wing.): SIZE	SPACING	No. REQ'D	LENGTH	H2 STRAIGHT (Horizontal in back face of wing. One bar of each length): SIZE	SPACING	No. REQ'D	LENGTHS VARY MAX.	MIN.	H3 (In back face of wing at top - on slope): SIZE	No. REQ'D	LENGTH	QUANTITY REINFORCING STEEL PER WING LB.
9'	#5	12"	32	5'-0"	13'-10"	1'-6"	3'-6"	3'-9"	10'-3"	#5	12"	5	7'-6"	2'-1"	5'-6"	#4	12"	9	6'-6"	1'-10"	4'-9"	—	—	—	—	—	—	#4	2	18'-0"	#4	8	18'-0"	#4	18"	22	4'-0"	3'-6"	#4	12"	6	16'-6"	#4	12"	6	28'-6"	5'-6"	#4	2	16'-8"	727.7
10'	#5	12"	35	5'-6"	15'-5"	1'-7"	4'-0"	4'-0"	11'-9"	#6	12"	4	8'-6"	2'-8"	6'-8"	#5	12"	5	7'-6"	2'-1"	5'-6"	#4	12"	9	6'-6"	1'-10"	4'-9"	#4	2	19'-6"	#4	8	19'-6"	#4	18"	24	4'-8"	3'-10"	#4	12"	6	18'-0"	#4	12"	7	33'-1"	5'-6"	#4	2	18'-8"	897.1
11'	#5	12"	38	6'-1"	17'-0"	1'-9"	4'-8"	4'-5"	12'-5"	#6	12"	9	8'-6"	2'-4"	6'-9"	#5	12"	5	7'-6"	2'-1"	5'-6"	#4	12"	9	6'-6"	1'-10"	4'-9"	#4	2	21'-0"	#4	8	21'-9"	#4	18"	26	4'-8"	4'-2"	#4	12"	8	19'-6"	#4	12"	7	33'-1"	5'-6"	#4	2	19'-10"	1093.7
12'	#5	12"	41	6'-8"	18'-6"	1'-11"	5'-1"	4'-10"	13'-6"	#7	12"	9	9'-6"	2'-7"	7'-0"	#6	12"	9	8'-6"	2'-4"	6'-9"	#4	12"	9	6'-6"	1'-10"	4'-9"	#4	2	22'-6"	#4	8	23'-0"	#4	18"	28	5'-0"	4'-6"	#4	12"	8	21'-0"	#4	12"	8	37'-9"	5'-6"	#4	2	21'-5"	1369.3

⊕ Except as shown at headwall.

BAR BENDING DIAGRAMS



NOTE:- Dimensions are to bar centers.

CLASS S CONCRETE

ARKANSAS STATE HIGHWAY COMMISSION

DETAILS OF STANDARD WINGS FOR REINFORCED CONCRETE BOX CULVERTS

7', 8', 9', 10', 11' & 12' SPANS — 4:1 SLOPES

SINGLES, DOUBLES, TRIPLES, QUADRUPLES & QUINTUPLES. — ALL DEPTHS OF COVER FOR H = 9'-0" & OVER

STANDARD DRAWING NO. W-X004-2

(6)

Designed By:- W.C.H. 7-25-62 Checked By:- RWS - 12-12-62
Drawn By:- W.C.H. 1-3-63 Checked By:- RWS - 1-4-63
Quantities By:- W.C.H. 1-11-63 Checked By:- RWS - 1-31-63

FED. ROAD No.	STATE	FED. AID PROJECT	FISCAL YEAR	SHEET No.	TOTAL SHEETS
6	ARK.				
JOB No.					

BAR LIST FOR BARREL SECTION 60'-0" IN LENGTH

DEPTH OF COVER D	SPAN S	CLEAR HEIGHT H	"a" bars STRAIGHT In Top and Bottom Slabs of Barrel. 2 Add'l In Apron and Headwall-Arch. SIZE	SPACING	NUMBER REQ'D 3:1	NUMBER REQ'D 4:1	LENGTH	"b" bars BENT - See Diagram below. In Top and Bottom Slabs of Barrel. Alternate with "a" bars. SIZE	SPACING	NUMBER REQ'D 3:1	NUMBER REQ'D 4:1	LENGTH	X	"d" bars STRAIGHT Longitudinal in Top Slab of Barrel SIZE	SPACING	NO. REQ'D	LENGTH	"d₁" bars STRAIGHT Longitudinal in Sidewalls SIZE	SPACING	NO. REQ'D	LENGTH	"e" bars. Longitudinal in Bottom Slab of Barrel SIZE	SPACING	NO. REQ'D	LENGTH	"f" bars STRAIGHT Verticals in Side walls SIZE	SPACING	NUMBER REQ'D 3:1	NUMBER REQ'D 4:1	LENGTH
0'-0" TO 5'-0" MAXIMUM	1 @ 4'	2'	#5	13"	120	120	4'-9"	#6	13"	110	110	5'-10"	4'-8"	#5	10½"	6		#4	12"	4	#4	12"	5	#4	12"	5	#4	12"	120	120	2'-11"
		3'			120	120	4'-9"			110	110	5'-10"	4'-8"			6				6			5			5			120	120	3'-11"
		4'			120	120	4'-9"			110	110	5'-10"	4'-8"			6				8			5			5			120	120	4'-11"
		5'			120	120	4'-9"			110	110	5'-10"	4'-8"			6				10			5			5			120	120	5'-11"
		6'			120	120	4'-11"			110	110	6'-0"	4'-10"			6				12			5			5			120	120	6'-11"
	1 @ 5'	3'	#6	13"	120	120	5'-9"	#6	13"	110	110	6'-10"	5'-8"	#5	10½"	7		#4	12"	6	#4	12"	6	#4	12"	6	#4	12"	120	120	4'-0"
		4'			120	120	5'-9"			110	110	6'-10"	5'-8"			7				8			6			6			120	120	5'-0"
		5'			120	120	5'-9"			110	110	6'-10"	5'-8"			7				10			6			6			120	120	6'-0"
		6'			120	120	5'-11"			110	110	7'-0"	5'-10"			7				12			6			6			120	120	7'-0"
		7'			120	120	6'-0"			110	110	7'-1"	5'-11"			7				14			6			6			120	120	8'-0"
	1 @ 6'	3'	#6	12"	128	128	6'-9"	#6	12"	118	118	7'-10"	6'-8"	#5	10½"	8		#4	12"	6	#4	12"	7	#4	12"	7	#4	12"	120	120	4'-1"
		4'			128	128	6'-9"			118	118	7'-10"	6'-8"			8				8			7			7			120	120	5'-1"
		5'			128	128	6'-9"			118	118	7'-10"	6'-8"			8				10			7			7			120	120	6'-1"
		6'			128	128	6'-11"			118	118	8'-0"	6'-10"			8				12			7			7			120	120	7'-1"
		7'			128	128	7'-0"			118	118	8'-1"	6'-11"			8				14			7			7			120	120	8'-1"
		8'			128	128	7'-1"			118	118	8'-2"	7'-0"			8				16			7			7	#5	12"	120	120	9'-1"
	1 @ 7'	4'	#6	11"	140	140	7'-9"	#6	11"	130	130	8'-10"	7'-8"	#5	10½"	9	(1'-5" Lap)	#4	12"	8	#4	12"	8	#4	12"	8	#4	12"	120	120	5'-2"
		5'			140	140	7'-9"			130	130	8'-10"	7'-8"			9				10			8			8			120	120	6'-2"
		6'			140	140	7'-11"			130	130	8'-10"	7'-10"			9				12			8			8			120	120	7'-2"
		7'			140	140	8'-0"			130	130	9'-1"	7'-11"			9				14			8			8			120	120	8'-2"
		8'			140	140	8'-1"			130	130	9'-2"	8'-0"			9				16			8			8	10"	144	144	9'-2"
		9'			140	140	8'-3"			130	130	9'-4"	8'-2"			9				18			8			8	#5	12"	120	120	10'-2"
	1 @ 8'	4'	#7	12"	128	128	8'-9"	#6	12"	118	118	9'-10"	8'-8"	#5	10"	11		#4	12"	8	#4	12"	9	#4	12"	9	#4	12"	120	120	5'-9"
		5'			128	128	8'-11"			118	118	10'-0"	8'-10"			11				10			9			9			120	120	6'-9"
		6'			128	128	8'-11"			118	118	10'-0"	8'-10"			11				12			9			9			120	120	7'-9"
		7'			128	128	9'-0"			118	118	10'-1"	8'-11"			11				14			9			9	10"	144	144	8'-9"
		8'			128	128	9'-1"			118	118	10'-2"	9'-0"			11				16			9			9			120	120	9'-9"
		9'			128	128	9'-3"			118	118	10'-4"	9'-2"			11				18			9			9	#5	12"	120	120	10'-9"
		10'			128	128	9'-5"			118	118	10'-6"	9'-4"			11				20			9			9		11"	132	132	11'-9"
	1 @ 9'	5'	#7	11"	140	140	9'-11"	#6	11"	130	130	11'-0"	9'-10"	#5	10"	12	2 @ 30'-6" for 60'-0" Length Barrel.	#4	12"	10	#4	12"	10	#4	12"	10	#4	12"	120	120	6'-5"
		6'			140	140	10'-0"			130	130	11'-1"	9'-11"			12				12			10			10			120	120	7'-5"
		7'			140	140	10'-0"			130	130	11'-1"	9'-11"			12				14			10			10			120	120	8'-5"
		8'			140	140	10'-1"			130	130	11'-2"	10'-0"			12				16			10			10	10"	144	144	9'-5"
		9'			140	140	10'-3"			130	130	11'-4"	10'-2"			12				18			10			10	12"	120	120	10'-5"
		10'			140	140	10'-5"			130	130	11'-6"	10'-4"			12				20			10			10	#5	11"	132	132	11'-5"
		11'			140	140	10'-7"			130	130	11'-8"	10'-6"			12				22			10			10	10"	144	144	12'-5"
	1 @ 10'	5'	#7	12"	128	128	10'-11"	#7	12"	118	118	12'-2"	10'-10"	#5	10"	13		#4	12"	10	#4	12"	11	#4	12"	11	#4	12"	120	120	6'-6"
		6'			128	128	11'-0"			118	118	12'-3"	10'-11"			13				12			11			11			120	120	7'-6"
		7'			128	128	11'-0"			118	118	12'-3"	10'-11"			13				14			11			11			120	120	8'-6"
		8'			128	128	11'-1"			118	118	12'-4"	11'-0"			13				16			11			11	10"	144	144	9'-6"
		9'			128	128	11'-3"			118	118	12'-6"	11'-2"			13				18			11			11	12"	120	120	10'-6"
		10'			128	128	11'-5"			118	118	12'-8"	11'-4"			13				20			11			11	#5	11"	132	132	11'-6"
		11'			128	128	11'-7"			118	118	12'-10"	11'-6"			13				22			11			11	10"	144	144	12'-6"
		12'			128	128	11'-9"			118	118	13'-0"	11'-8"			13				24			11			11	#6	12"	120	120	13'-6"
	1 @ 11'	6'	#7	12"	140	140	12'-1"	#7	12"	130	130	13'-4"	12'-0"	#5	9½"	15		#4	12"	12	#4	12"	12	#4	12"	12	#4	12"	120	120	7'-7"
		7'			140	140	12'-1"			130	130	13'-4"	12'-0"			15				14			12			12			120	120	8'-7"
		8'			140	140	12'-1"			130	130	13'-4"	12'-0"			15				16			12			12	10"	144	144	9'-7"
		9'			140	140	12'-3"			130	130	13'-6"	12'-2"			15				18			12			12	12"	120	120	10'-7"
		10'			140	140	12'-5"			130	130	13'-8"	12'-4"			15				20			12			12	#5	11"	132	132	11'-7"
		11'			140	140	12'-7"			130	130	13'-10"	12'-6"			15				22			12			12	10"	144	144	12'-7"
		12'			140	140	12'-9"			130	130	14'-0"	12'-8"			15				24			12			12	#6	12"	120	120	13'-7"
	1 @ 12'	6'	#8	12"	128	128	13'-1"			118	118	14'-6"	13'-4"			16				12			13	#4	12"	13	#4	12"	120	120	7'-9"
		7'			128	128	13'-1"			118	118	14'-6"	13'-4"			16				14			13			13			120	120	8'-9"
		8'			128	128	13'-1"			118	118	14'-6"	13'-4"			16				16			13			13	10"	144	144	9'-9"
		9'			128	128	13'-3"			118	118	14'-8"	13'-6"			16				18			13			13	12"	120	120	10'-9"
		10'			128	128	13'-5"			118	118	14'-10"	13'-8"			16				20			13			13	#5	11"	132	132	11'-9"
		11'			128	128	13'-7"			118	118	14'-10"	13'-8"			16				22			13			13	10"	144	144	12'-9"
		12'			128	128	13'-9"			118	118	15'-0"	13'-8"			16				24			13			13	#6	12"	120	120	13'-9"

DIMENSIONS / QUANTITIES

MARK. DESIGN DEPTH OF COVER D	CLEAR SPAN S	CLEAR HEIGHT H	BARREL DIMENSIONS: Sq. Ft. Opening A	OVERALL WIDTH OW	THICKNESS OF TOP SLAB T	THICKNESS OF SIDEWALLS C	THICKNESS OF BOTTOM SLAB B	OVERALL HEIGHT OH	UNIT QUANTITIES: CLASS S CONC PER LIN. FT. OF BARREL CU.YD.	REINFORCING STEEL PER LIN. FT. OF BARREL LB.	ADDITIONAL PER LAP LB.	ADDITIONAL TWO HEADWALLS & APRONS LB.
0'-0" TO 5'-0"	1 @ 4'	2'	8	5'-0"	7"	6"	6½"	3'-1½"	0.282	41.99	17.95	66.35
		3'	12	5'-0"		6"		4'-1½"	0.319	44.16	19.62	66.35
		4'	16	5'-0"		6"		5'-1½"	0.356	46.83	21.29	66.35
		5'	20	5'-0"		6"		6'-1½"	0.394	49.50	22.96	66.35
		6'	24	5'-2"		7"		7'-1½"	0.474	52.96	24.63	67.75
	1 @ 5'	3'	15	6'-0"	7½"	6"	7"	4'-2½"	0.380	55.55	22.19	101.27
		4'	20	6'-0"		6"		5'-2½"	0.417	58.23	23.86	101.27
		5'	25	6'-0"		6"		6'-2½"	0.454	60.90	25.53	101.27
		6'	30	6'-2"		7"		7'-2½"	0.535	64.99	27.20	103.27
		7'	35	6'-3"		7½"		8'-2½"	0.604	67.63	28.87	104.27
	1 @ 6'	3'	18	7'-0"	8"	6"	7½"	4'-3½"	0.446	66.29	29.76	118.96
		4'	24	7'-0"		6"		5'-3½"	0.483	68.96	26.93	118.96
		5'	30	7'-0"		6"		6'-3½"	0.520	71.64	28.10	118.96
		6'	36	7'-2"		7"		7'-3½"	0.602	75.81	29.77	120.96
		7'	42	7'-3"		7½"		8'-3½"	0.671	78.98	31.44	121.97
		8'	48	7'-4"		8"		9'-3½"	0.746	88.47	33.11	122.97
	1 @ 7'	4'	28	8'-0"	8½"	6"	8½"	5'-5"	0.568	81.32	29.01	136.88
		5'	35	8'-0"		6"		6'-5"	0.605	84.00	30.68	136.88
		6'	42	8'-2"		7"		7'-5"	0.688	87.76	32.35	138.88
		7'	49	8'-3"		7½"		8'-5"	0.757	90.98	34.02	139.88
		8'	56	8'-4"		8"		9'-5"	0.832	96.45	35.69	140.88
		9'	63	8'-6"		9"		10'-5"	0.996	105.39	37.36	142.89
	1 @ 8'	4'	32	9'-0"	9½"	6"	9½"	5'-7"	0.676	95.26	32.32	196.07
		5'	40	9'-2"		6"		6'-7"	0.754	99.12	34.99	196.80
		6'	48	9'-2"		7"		7'-7"	0.797	101.79	36.66	196.80
		7'	56	9'-3"		7½"		8'-7"	0.867	105.05	38.33	198.16
		8'	64	9'-4"		8"		9'-7"	0.942	110.81	40.00	199.52
		9'	72	9'-6"		9"		10'-7"	1.057	119.92	41.67	202.25
		10'	80	9'-8"		10"		11'-7"	1.184	124.67	43.34	204.99
	1 @ 9'	5'	45	10'-2"	10"	7"	10"	6'-8"	0.844	119.72	37.56	213.61
		6'	54	10'-3"		7½"		7'-8"	0.910	118.04	39.23	220.97
		7'	63	10'-3"		7½"		8'-8"	0.957	120.71	40.90	220.97
		8'	72	10'-4"		8"		9'-8"	1.033	126.54	42.57	222.33
		9'	81	10'-6"		9"		10'-8"	1.198	135.80	44.24	225.06
		10'	90	10'-8"		10"		11'-8"	1.276	192.68	45.91	227.78
		11'	99	10'-10"		11"		12'-8"	1.416	180.40	47.58	230.51
	1 @ 10'	5'	50	11'-2"	10½"	7"	11"	6'-9½"	0.957	130.69	40.13	242.69
		6'	60	11'-3"		7½"		7'-9½"	1.024	133.99	41.80	244.00
		7'	70	11'-3"		7½"		8'-9½"	1.071	136.66	43.47	244.00
		8'	80	11'-4"		8"		9'-9½"	1.147	142.55	45.14	245.36
		9'	90	11'-6"		9"		10'-9½"	1.263	151.92	46.81	248.09
		10'	100	11'-8"		10"		11'-9½"	1.391	158.89	48.48	250.81
		11'	110	11'-10"		11"		12'-9½"	1.532	166.71	50.15	253.54
		12'	120	12'-0"		12"		13'-9½"	1.685	170.67	51.82	256.26
	1 @ 11'	6'	66	12'-9"	11"	8"	11½"	7'-10½"	1.159	186.16	46.12	268.62
		7'	77	12'-9"		8"		8'-10½"	1.202	157.88	47.79	268.62
		8'	88	12'-9"		8"		9'-10½"	1.252	168.06	49.46	268.62
		9'	99	12'-9"		9"		10'-10½"	1.368	172.60	51.13	271.34
		10'	110	12'-9"		10"		11'-10½"	1.497	179.70	52.80	274.07
		11'	121	12'-9"		11"		12'-10½"	1.638	187.67	54.47	276.79
		12'	132	13'-0"		12"		13'-10½"	1.792	199.79	56.14	278.52
	1 @ 12'	6'	72	13'-9"	11½"	8"	12"	8'-0"	1.284	172.20	48.69	357.62
		7'	84	13'-9"		8"		9'-0"	1.333	174.87	50.36	357.62
		8'	96	13'-9"		8"		10'-0"	1.383	180.15	52.03	357.62
		9'	108	13'-9"		9"		11'-0"	1.500	189.85	53.70	361.18
		10'	120	13'-9"		10"		12'-0"	1.630	197.07	55.37	364.74
		11'	132	13'-9"		11"		13'-0"	1.772	205.16	57.04	368.30
		12'	144	14'-0"		12"		14'-0"	1.926	217.95	58.71	371.86

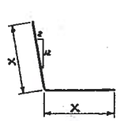
BAR SIZE	PIN DIAM.	K	ADD FOR 2 HOOKS	BENDING DIAGRAM Bars "b".
#6	3"	5"	1'-2"	K, Pin Diam., X
#7	3⅝"	5⅝"	1'-4"	

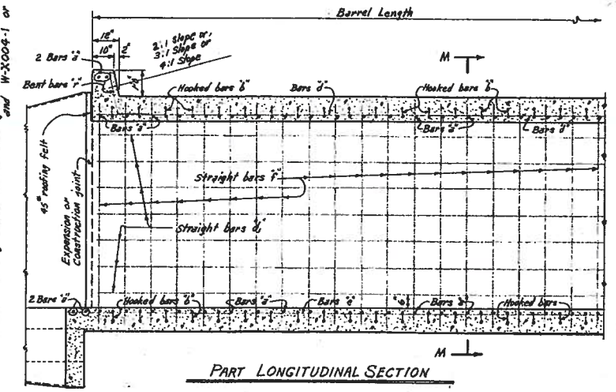
NOTE:- Dimensions are to centers of bars.

DOWEL BARS FOR TWO HEADWALLS

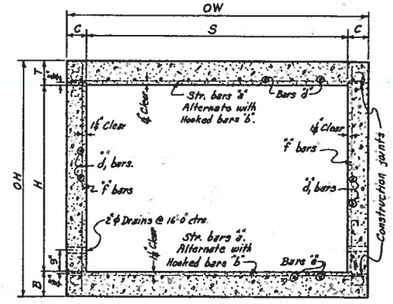
SPAN	SIZE	SPACING	NO. REQ'D	LENGTH	X
4'	#4	11"±	12	2'-6"	1'-3"
5'	#4	11"±	14	2'-7"	1'-3⅛"
6'	#4	11"±	16	2'-8"	1'-4"
7'	#4	11"±	18	2'-9"	1'-4⅝"
8'	#4	11⅛"±	20	2'-11"	1'-5⅝"
9'	#4	11⅛"±	22	3'-0"	1'-6"
10'	#4	11⅛"±	24	3'-1"	1'-6⅝"
11'	#4	12"±	26	3'-2"	1'-7"
12'	#4	12"±	28	3'-3"	1'-7⅝"

Bars "r" Dowel bars in Headwalls.

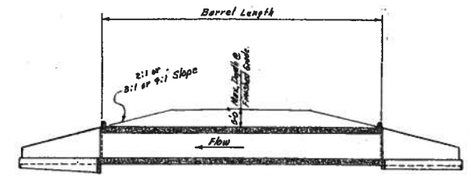




PART LONGITUDINAL SECTION



TYPICAL SECTION M-M



LONGITUDINAL SECTION

W-X002-1 or W-X002-2 and W-X003-1 or W-X003-2 and W-X004-1 or W-X004-2.

GENERAL NOTES:-

CONCRETE:- All concrete to be Class S, and shall be poured in the dry. All exposed corners to have ¾" chamfers.

REINFORCING STEEL:- Reinforcing to be deformed bars of intermediate or hard grade.

BAR LAP:- In computing the quantities of steel from the tables add one lap for each additional 33'-0" length of barrel over 32'-0". Lap longitudinal bars 30 diameters.

CONSTRUCTION JOINTS:- Construction joints between wingwalls, sidewalls and slabs shall be only where shown on plans.

SPECIFICATIONS:- Arkansas State Highway Commission Standard Specifications for Highway Construction and applicable Special Provisions.

DESIGN LIVE LOAD

H20-S16 LOADING A.A.S.H.O. 1961 AND SPECIAL MILITARY LOADING Two 24,000 Lb. Axles @ 4'-0" ctrs.

UNIT STRESSES:-

Class S Concrete (n=10) 1200 #/□"
Reinforcing Steel 24,000 #/□"

NOTE:- This drawing to be used in conjunction with Standard Drawing Nos. W-X003-1 or W-X003-2 and W-X004-1 or W-X004-2. Also Drawing Nos. W-X002-1 or W-X002-2.

CLASS S CONCRETE

ARKANSAS STATE HIGHWAY COMMISSION

DETAILS OF STANDARD BARREL SECTIONS FOR REINFORCED CONCRETE BOX CULVERTS

4',5',6',7',8',9',10',11' & 12' SPANS — 3:1 OR 4:1 SLOPES

SINGLES — UNDER 5'-0" COVER

STANDARD DRAWING NO. R-100X-0

Designed By:- W.C.H. 1-28-63. Checked By:- RWS-5-24-63
Drawn By:- W.C.H. 2-8-63. Checked By:- RWS-5-24-63
Quantities By:- W.C.H. 2-12-63. Checked By:- RWS-5-24-63