



February 4, 2022

City of Bryant - Engineering & Construction Department
210 SW 3rd St.
Bryant, Arkansas 72022

**RE: Church's Chicken (1901 N Reynolds Rd)
Drainage Submittal Explanation Letter**

To Whom It May Concern:

Please accept this letter as part of the permit submittal requirements for the proposed Church's Chicken restaurant, located in Lot 2 of the 10 Fitness subdivision, 1901 N. Reynolds Road, in Bryant Arkansas.

A drainage report for the 10 Fitness subdivision that encompassed Lots 1 and 2 was completed May 9, 2018 by Whitlow Engineering Services, Inc. The report originally established a blanket "C" factor of 0.67 for Lots 1 and 2 (3.465 acres) and determined that 6,435 cubic-feet of detention storage would be required (10,183 cubic-feet provided) for the subdivision. Upon further analysis of the report, it was discovered that the "C" factor established was not an appropriate value based on the development of Lot 1 and the proposed development of Lot 2. A composite "C" factor of 0.817 was established by breaking down the square footage of the existing and proposed surfaces types and assigning the correct "C" value shown in Table 400-1 of the City of Bryant, Arkansas Stormwater Management Manual. The required detention storage for the subdivision will increase due to the updated "C" factor by a ratio of 0.817/0.67. It was determined that the increase in the "C" factor would require 7,847 cubic feet of detention storage which is less than the total detention storage provided. Therefore, a detention pond will not be required for the development of Lot 2. However, Lot 2 will have an on-site storm system to capture and convey runoff to the 10 Fitness detention pond in order to limit the amount of release to predevelopment conditions.

Please feel free to contact me at 210-321-3433, if additional information is required.

Sincerely,

KIMLEY-HORN AND ASSOCIATES, INC.

Matt Gatto, EIT
Project Manager



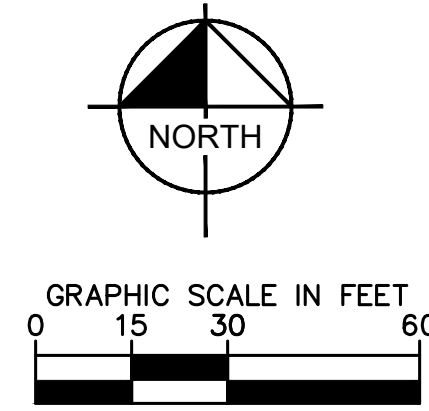
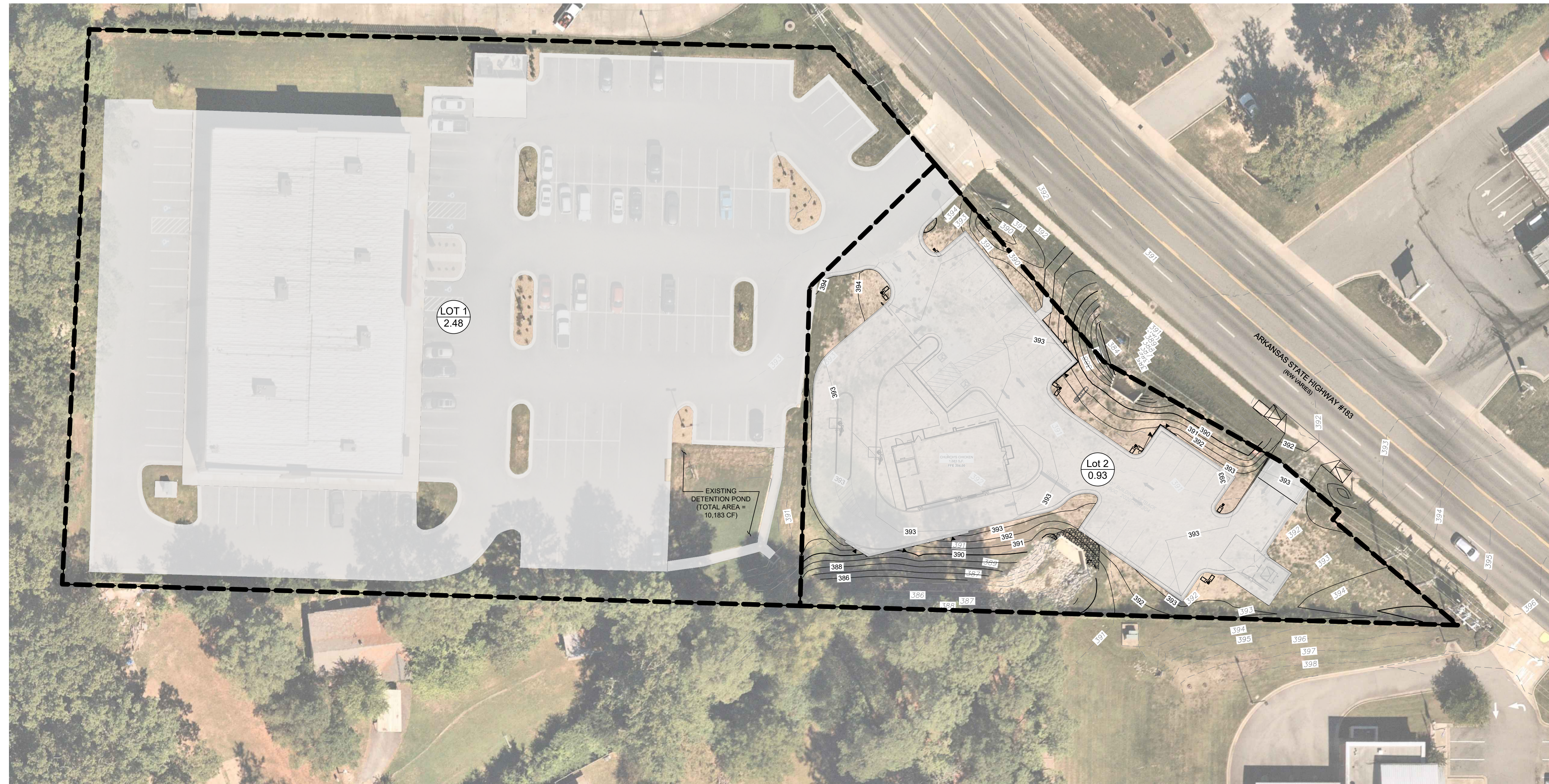
02/04/22

Chris Rogers, P.E.
Project Engineer

Attachments:

- Church's Chicken (Bryant) – Detention Pond Analysis (Sheet 2.3.3)
- Church's Chicken (Bryant) – Drainage Area Map(Existing and Proposed Conditions) (Sheet 2.3.2)

Drawing name: K:\vms_sva\08693645-churchs chicken\pwr\CAD\planets\c-2.3.dwg 2.3 DRAINAGE AREA MAP (PROPOSED CONDITIONS) Feb 16, 2022 2:36pm By: Matthew Ostro
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10 Fitness (Lot 1) - Composite C					
Type	Area (sf)	Area (ac)	C	CA	
Concrete / Roof	24,814	0.570	0.97	0.553	
Asphalt	59,737	1.371	0.95	1.303	
Lawn (good condition, average 2%-7%)	23,594	0.542	0.46	0.249	
Total	108,145	2.483		2.105	
Composite C				0.848	

Existing Site (Lot 1) - Rational Method Calculations							
Storm	2	5	10	25	50	100	
C	0.848	0.848	0.848	0.848	0.848	0.848	
I	5.9	6.85	7.5	8.5	9.45	10	
A	2.483	2.483	2.483	2.483	2.483	2.483	
Q (cfs)	12.42	14.42	15.78	17.89	19.89	21.05	

Proposed Site (Lot 2) - Composite C					
Type	Area (sf)	Area (ac)	C	CA	
Concrete / Roof	9,945	0.228	0.97	0.221	
Asphalt	12,384	0.284	0.95	0.270	
Lawn (good condition, average 2%-7%)	18,077	0.415	0.46	0.191	
Total	40,406	0.928		0.682	
Composite C				0.736	

Proposed Site (Lot 2) - Rational Method Calculations							
Storm	2	5	10	25	50	100	
C	0.736	0.736	0.736	0.736	0.736	0.736	
I	5.9	6.85	7.5	8.5	9.45	10	
A	0.928	0.928	0.928	0.928	0.928	0.928	
Q (cfs)	4.03	4.68	5.12	5.81	6.45	6.83	

10 Fitness (Lots 1 & 2) - Composite C					
Type	Area (sf)	Area (ac)	C	CA	
Concrete / Roof	34,759	0.798	0.97	0.774	
Asphalt	72,121	1.656	0.95	1.573	
Lawn (good condition, average 2%-7%)	41,671	0.957	0.46	0.440	
Total	148,551	3.410		2.787	
Composite C				0.817	

Proposed Site (Lots 1 & 2) - Rational Method Calculations							
Storm	2	5	10	25	50	100	
C	0.817	0.817	0.817	0.817	0.817	0.817	
I	5.9	6.85	7.5	8.5	9.45	10	
A	3.410675	3.410675	3.410675	3.410675	3.410675	3.411	
Q (cfs)	16.45	19.09	20.90	23.69	26.34	27.87	

DETENTION POND CALCULATIONS

PREVIOUSLY APPROVED CALCULATIONS:

TOTAL DRAINAGE STUDY AREA = 3.465 ACRES
 PROPOSED RUNOFF COEFFICIENT C=0.67
 TIME OF CONCENTRATION: T_c=5 MINUTES
 REQUIRED DETENTION VOLUME = 6,435 CF
 DETENTION VOLUME PROVIDED = 10,163 CF

PROPOSED CALCULATIONS:

TOTAL DRAINAGE AREA = 3.410 ACRES
 PROPOSED RUNOFF COEFFICIENT C=0.817
 TIME OF CONCENTRATION: T_c=5 MINUTES
 REQUIRED DETENTION VOLUME: 6,435 CF x $\frac{0.817}{0.67}$ = 7,847 CF
 DETENTION VOLUME PROVIDED = 10,163 CF > 7,847 CF

LEGEND	
	BASIN NAME
	ACRES
	PROPERTY BOUNDARY
	DRAINAGE AREA
	IMPERVIOUS COVER (CONCRETE / ROOFS / ETC.)

NOTES	
1.	DRAINAGE CALCULATIONS ARE PERFORMED ACCORDING TO THE CITY OF BRYANT STORMWATER MANAGEMENT MANUAL.
2.	THE SUBJECT PROPERTY CONFORMS TO THE DRAINAGE ANALYSIS AS OUTLINED IN THE APPROVED DRAINAGE REPORT FOR THE 10 FITNESS COMMERCIAL SUBDIVISION DATED MAY 9, 2018 BY WHITLOW ENGINEERING SERVICES, INC.

DRAINAGE CALCULATIONS

BY RATIONAL METHOD:
 Q = CIA

- C - RUNOFF COEFFICIENT PER THE CITY OF BRYANT STORMWATER MANAGEMENT MANUAL
- I - VARIES PER TIME OF CONCENTRATION BASED OFF OF PRECIPITATION AREA PER THE APPROVED DRAINAGE REPORT FOR THE 10 FITNESS COMMERCIAL SUBDIVISION DATED MAY 9, 2018 BY WHITLOW ENGINEERING SERVICES, INC.
- A - DRAINAGE BASIN AREA

REVISIONS:

DETENTION POND ANALYSIS

Church's Chicken
 1901 N. Reynolds Rd.
 Bryant, AR 72022

Kimley»Horn
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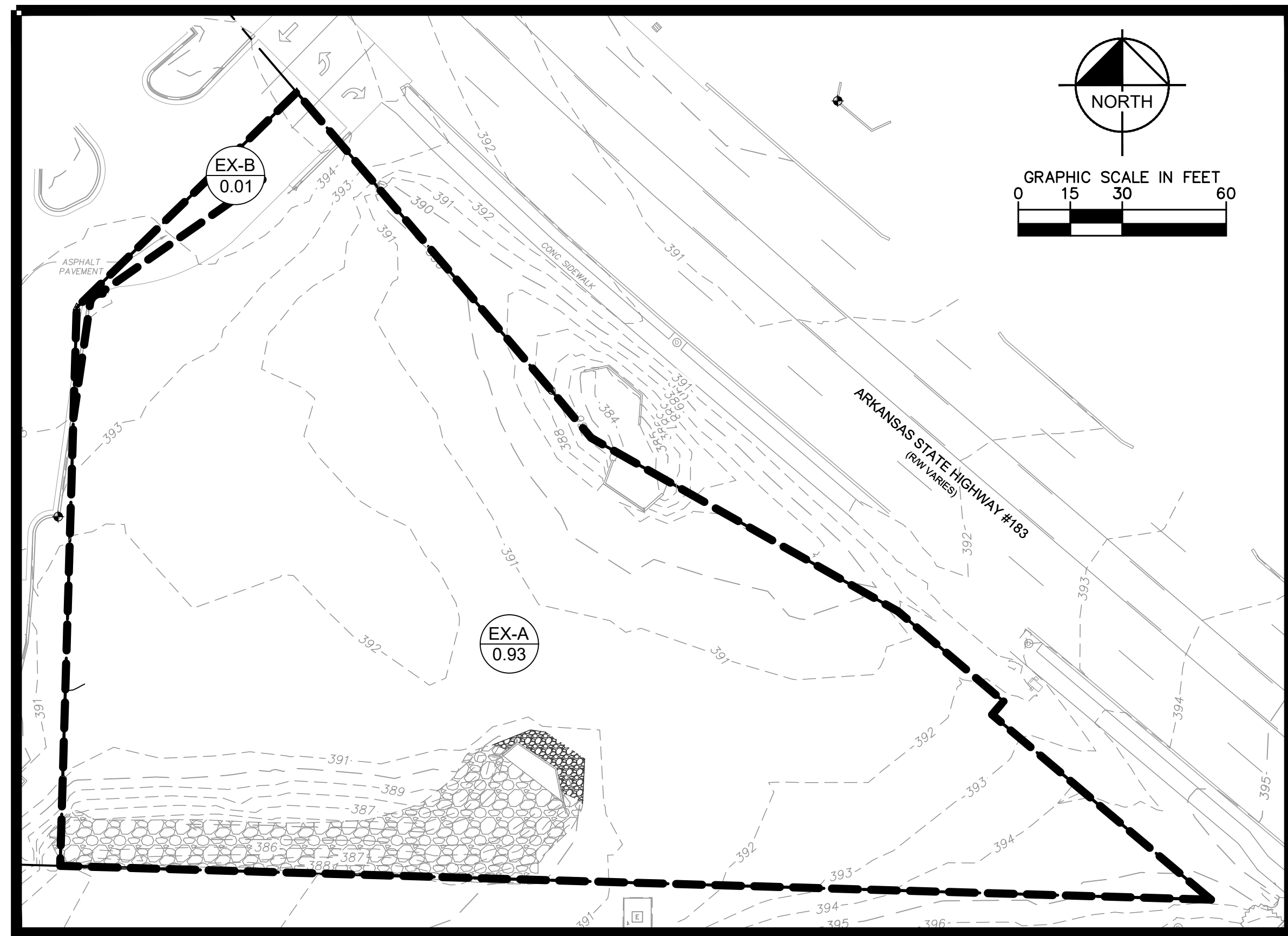
Charles William Pope
 & Associates
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 7400 BEARD RD., SUITE 257, SAN ANTONIO, TEXAS 78216 TEL: (210) 349-8005

DATE: 02.15.2022
 JOB NO: 068693645
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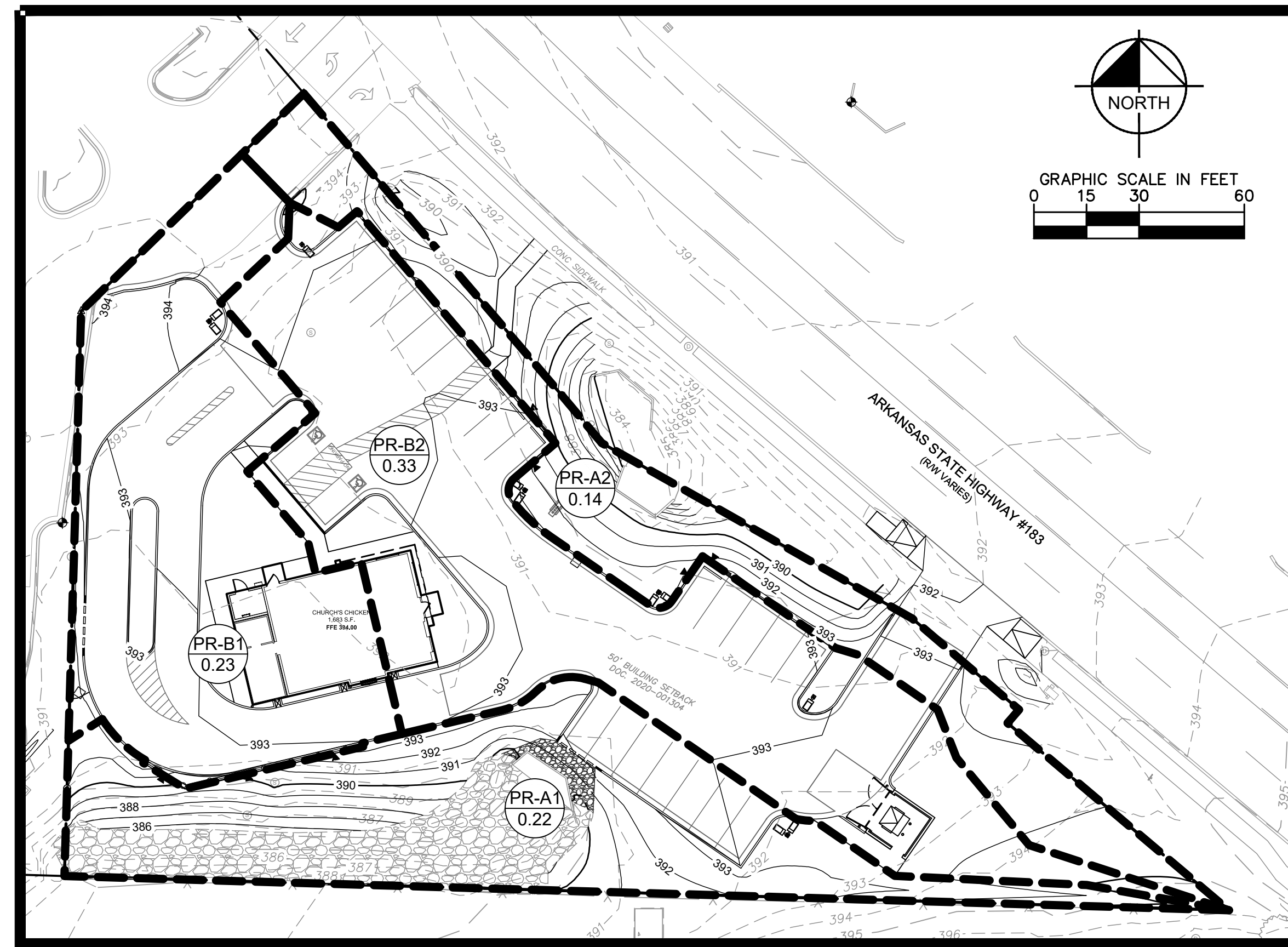
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Drawing name: K:\vms_04168693445-churchs chickens\pilot\CAD\plan\sheet\2.3.3 DRAINAGE AREA MAP (PROPOSED CONDITIONS) Feb 18, 2022 2:36pm by: Matthew Goto
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EXISTING DRAINAGE AREA MAP



PROPOSED DRAINAGE AREA MAP

PR-A1 - Composite C				
Type	Area (sf)	Area (ac)	C	CA
Concrete / Roof	206	0.005	0.97	0.005
Asphalt	1,116	0.026	0.95	0.024
Lawn (good condition, average 2%-7%)	8,194	0.188	0.46	0.087
Total	9,516	0.218		0.115
Composite C			0.53	

PR-A2 - Composite C				
Type	Area (sf)	Area (ac)	C	CA
Concrete / Roof	175	0.004	0.97	0.004
Asphalt	763	0.018	0.95	0.017
Lawn (good condition, average 2%-7%)	5,282	0.121	0.46	0.056
Total	6,220	0.143		0.076
Composite C			0.53	

PR-B1 - Composite C				
Type	Area (sf)	Area (ac)	C	CA
Concrete / Roof	6,023	0.138	0.97	0.134
Asphalt	1,155	0.027	0.95	0.025
Lawn (good condition, average 2%-7%)	2,779	0.064	0.46	0.029
Total	9,957	0.229		0.189
Composite C			0.83	

PR-B2 - Composite C				
Type	Area (sf)	Area (ac)	C	CA
Concrete / Roof	3,133	0.072	0.97	0.070
Asphalt	9,350	0.215	0.95	0.204
Lawn (good condition, average 2%-7%)	1,795	0.041	0.46	0.019
Total	14,278	0.328		0.293
Composite C			0.89	

LEGEND	
	BASIN NAME
	ACRES
	PROPERTY BOUNDARY
	DRAINAGE AREA
	EXISTING CONTOUR (SEE NOTE 3 THIS SHEET)
	PROPOSED CONTOUR

NOTES	
1.	DRAINAGE CALCULATIONS ARE PERFORMED ACCORDING TO THE CITY OF BRYANT STORMWATER MANAGEMENT MANUAL.
2.	THE SUBJECT PROPERTY CONFORMS TO THE DRAINAGE ANALYSIS AS OUTLINED IN THE APPROVED DRAINAGE REPORT FOR THE 10 FITNESS COMMERCIAL SUBDIVISION DATED MAY 9, 2018 BY WHITLOW ENGINEERING SERVICES, INC.
3.	ON-SITE TOPOGRAPHIC INFORMATION IS TAKEN FROM A TOPOGRAPHIC SURVEY PREPARED BY YOUNG - HOBBS AND ASSOCIATES FROM NOVEMBER 2021.

PEAK FLOW CALCULATIONS																
Basin	Tc (min)	A (ac)	C	I2 (in/hr)	I5 (in/hr)	I10 (in/hr)	I25 (in/hr)	I50 (in/hr)	I100 (in/hr)	Q2 (cfs)	Q5 (cfs)	Q10 (cfs)	Q25 (cfs)	Q50 (cfs)	Q100 (cfs)	Collection Point
EX-A	5.0	0.93	0.35*	5.90	6.85	7.50	8.50	9.45	10.00	1.92	2.23	2.44	2.77	3.08	3.26	DRAINAGE CULVERT
EX-B	5.0	0.01	0.35*	5.90	6.85	7.50	8.50	9.45	10.00	0.02	0.02	0.03	0.03	0.03	0.04	DETENTION POND
PR-A1	5.0	0.22	0.53	5.90	6.85	7.50	8.50	9.45	10.00	0.69	0.80	0.87	0.99	1.10	1.16	DRAINAGE CULVERT
PR-A2	5.0	0.14	0.53	5.90	6.85	7.50	8.50	9.45	10.00	0.44	0.51	0.56	0.64	0.71	0.75	DRAINAGE CULVERT
PR-B1	5.0	0.23	0.83	5.90	6.85	7.50	8.50	9.45	10.00	1.12	1.30	1.42	1.61	1.79	1.90	DETENTION POND**
PR-B2	5.0	0.33	0.89	5.90	6.85	7.50	8.50	9.45	10.00	1.74	2.02	2.21	2.50	2.78	2.95	DETENTION POND***

NOTE:
 * "C" VALUES FOR EXISTING DRAINAGE AREAS PER THE APPROVED DRAINAGE REPORT FOR THE 10 FITNESS COMMERCIAL SUBDIVISION DATED MAY 9, 2018 BY WHITLOW ENGINEERING SERVICES, INC.
 ** PR-B1 WILL BE CONVEYED TO THE 10 FITNESS DETENTION POND VIA SHEET FLOW
 *** PR-B2 WILL BE CONVEYED TO THE 10 FITNESS DETENTION POND VIA AN ON-SITE STORM SYSTEM

DRAINAGE CULVERT COMPARISON TABLE						
Basin	Q2 (cfs)	Q5 (cfs)	Q10 (cfs)	Q25 (cfs)	Q50 (cfs)	Q100 (cfs)
EX-A	1.92	2.23	2.44	2.77	3.08	3.26
PR-A***	1.13	1.31	1.43	1.62	1.81	1.91
Δ	-0.79	-0.92	-1.01	-1.14	-1.27	-1.34

NOTE:
 *** PR-A IS MADE UP OF THE DEVELOPED RUNOFF NOT BEING CONVEYED TO THE 10 FITNESS DETENTION POND. THE RUNOFF SHOWN FOR PR-A CONSISTS OF THE DRAINAGE BASINS PR-A1 AND PR-A2 COMBINED.

DRAINAGE CALCULATIONS
 BY RATIONAL METHOD:
 $Q = CIA$
 C - RUNOFF COEFFICIENT PER THE CITY OF BRYANT STORMWATER MANAGEMENT MANUAL
 I - VARIES PER TIME OF CONCENTRATION BASED OFF OF PRECIPITATION AREA PER THE APPROVED DRAINAGE REPORT FOR THE 10 FITNESS COMMERCIAL SUBDIVISION DATED MAY 9, 2018 BY WHITLOW ENGINEERING SERVICES, INC.
 A - DRAINAGE BASIN AREA

INLET CAPACITY CALCULATIONS
 ORIFICE EQUATION
 $Q = C_d A \sqrt{2gh}$
 $C = 0.70$
 2'X2' GRATE INLET (V5622):
 AREA = 256 SQ. IN
 *50% CLOGGED AREA = 133 SQ. IN
 $h = 0.50$ FT
 $Q_{max} = 3.67$ CFS
 $Q_{avg} = 2.95$ CFS

REVISIONS:

DRAINAGE AREA MAP (EXISTING AND PROPOSED CONDITIONS)
Church's Chicken
 1901 N. Reynolds Rd.
 Bryant, AR 72022

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