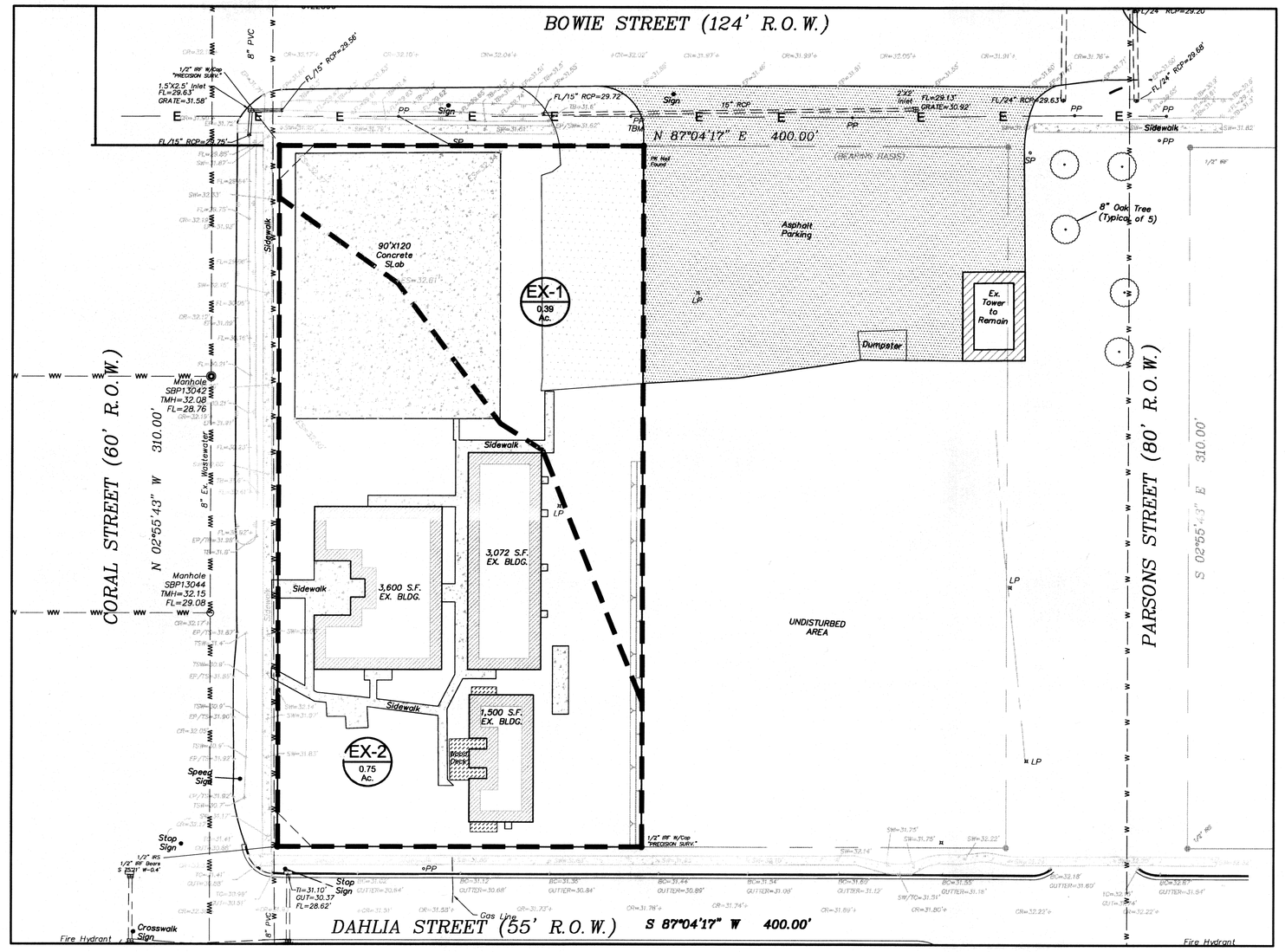
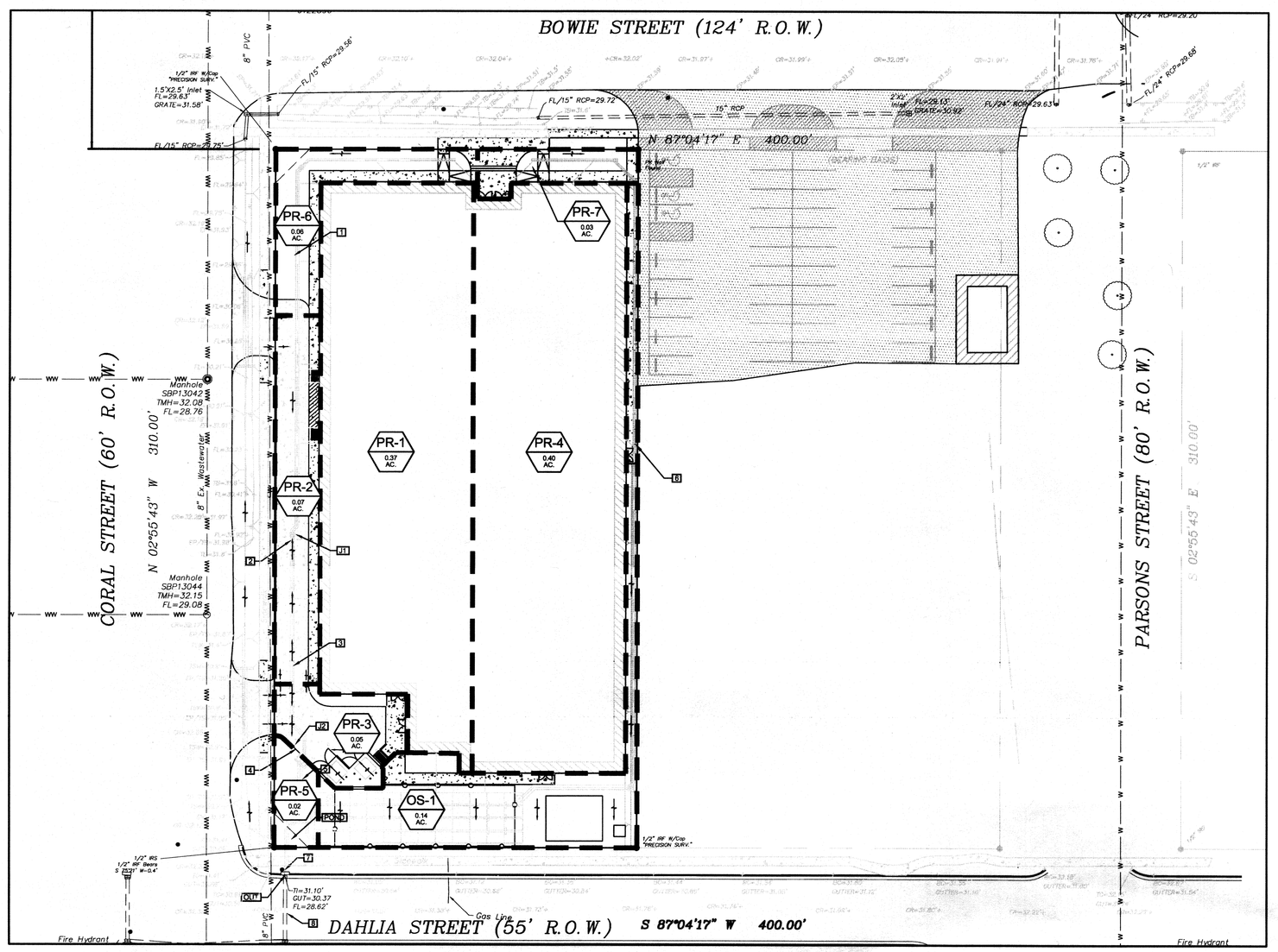


EXISTING CONDITIONS



PROPOSED CONDITIONS

SITE INFORMATION

SCHOOL TRACT: 1.14 AC.

SCHOOL TRACT:
- EXISTING IMPERVIOUS COVER: 0.611 AC. / 53.6%
- PROPOSED IMPERVIOUS COVER: 0.972 AC. / 85.3%
- INCREASE IN IMPERVIOUS COVER: 0.363 AC. / 31.9%

OFF-SITE LEASE PARKING (CHURCH TRACT)
- EXISTING IMPERVIOUS COVER: 0.39 AC. / 33.1%
- PROPOSED IMPERVIOUS COVER: 0.39 AC. / 33.1%
- INCREASE IN IMPERVIOUS COVER: 0.0 AC. / 0.0%

REQUIRED DETENTION VOLUME:
0.5 ACRE-FT PER ACRE OF INCREASED IMPERVIOUS COVER
0.5X(.972-.611) = 0.18 AC-FT
= 7,906 C.F.

OUTFLOW CALCULATIONS:
ORIFICE #1: 0.5 CFS/ACRE 6" MIN. DIAMETER
- Q1=0.5 (1.14)=0.57 CFS
- h=1.38' @ 25% CAPACITY
- D=ORIFICE DIAMETER
- $D^1=Q\frac{1}{2}/(2.25h\frac{1}{2})$
- D^1=0.31' < 0.5' USE 6" ORIFICE

ORIFICE#2: 2.0 CFS/ACRE 6" MIN. DIAMETER
- Qtotal=2.0 (1.14)=2.28 CFS
- ORIFICE #1 @ POND MAX. ELEVATION
- $Q^1=CA\sqrt{2gX}\sqrt{h}$
- $Q^1=(.6)(\pi.25^2)\sqrt{2x32.2}\cdot\sqrt{5.88}$
- Q^1=2.29 CFS
- Q^2=Qtotal-Q^1 = -0.01 CFS (NO ORIFICE #2)

OVERFLOW WEIR:
- $Q^{1ST}=3.3P(h)^{1.5}$
- Q=5.9 CFS 100 YEAR FLOW
- P=10 FT
- h=head

$$\left[\frac{Q^{1ST}}{3.3(10)}\right]^{\frac{2}{3}} = h = 0.32'$$

SUMMARY:
(1) 6" ROUND ORIFICE @ 25.42
(1) 10' WEIR @ 31.80

TOTAL FLOW AT 25% CAPACITY = 1.11 CFS
TOTAL FLOW AT 100% CAPACITY= 2.29 CFS

SCALE: 1" = 50'

LEGEND
- BOUNDARY
- ADJACENT BOUNDARY
- BUILDING LINE
- EASEMENT
- EXISTING CONTOURS
- PROPOSED CONTOUR
- WATER LINE
- WASTEWATER LINE
- OVERHEAD ELECTRIC
- STORMSEWER
- TREE TO REMAIN
- E-1 / 2.072 Ac. — EXISTING DRAINAGE AREA LABEL
- DA-1 / 2.072 AC. — PROPOSED DRAINAGE AREA LABEL
- DRAINAGE BOUNDARY
- 1 — PIPE NUMBER
- J1 — JUNCTION NUMBER

Houston Gateway Academy Stage-Storage Table Detention Pond					
Stage	Elevation (ft MSL)	Inc. Volume (cf)	Cumulative Volume (cf)	Cumulative Volume (ac-ft)	
0.0	25.42	0	0	0.00000	
1.0	26.42	904.5	905	0.02076	
2.0	27.42	2935	3839	0.08813	25% capacity (1994 cf @ 26.80)
3.0	28.42	2230	6069	0.13932	75% capacity (5981 cf @ 28.38)
4.0	29.42	1303	7371	0.16923	
5.0	30.42	487	7858	0.18040	
5.9	31.30	117	7975	0.18309	Provided Detention
6.4	31.80	52	8028	0.18429	0.5' freeboard

Drainage Calculations
Houston Gateway Academy

EXISTING CONDITIONS

Drainage Area	Size (Ac.)	Impervious Cover (Ac.)	Impervious Cover (%)	Tc (min)	Runoff Coefficient "C"	Intensity, "I" (in/hr) 2-Yr	10-Yr	25-Yr	100-Yr	Runoff, "Q" (cfs) 2-Yr	10-Yr	25-Yr	100-Yr
EX1	0.39	0.24	61.5%	23.5	0.57	3.52	5.14	5.97	7.18	0.8	1.1	1.3	1.6
EX2	0.75	0.38	50.7%	24.5	0.50	3.44	5.05	5.86	7.06	1.3	1.9	2.2	2.7
	1.14	0.62	54.4%						Total	2.1	3.1	3.5	4.3

PROPOSED CONDITIONS

Drainage Area	Size (Ac.)	Impervious Cover (Ac.)	Impervious Cover (%)	Tc (min)	Runoff Coefficient "C"	Intensity, "I" (in/hr) 2-Yr	10-Yr	25-Yr	100-Yr	Runoff, "Q" (cfs) 2-Yr	10-Yr	25-Yr	100-Yr
PR1	0.37	0.37	100.0%	23.4	0.80	3.52	5.15	5.97	7.19	1.0	1.5	1.8	2.1
PR2	0.07	0.07	100.0%	21.3	0.80	3.69	5.36	6.21	7.46	0.2	0.3	0.3	0.4
PR3	0.05	0.04	80.0%	20.9	0.68	3.72	5.40	6.25	7.51	0.1	0.2	0.2	0.3
PR4	0.40	0.40	100.0%	23.5	0.80	3.51	5.14	5.96	7.18	1.1	1.6	1.9	2.3
PR5	0.02	0.02	100.0%	20.0	0.80	3.79	5.49	6.35	7.63	0.1	0.1	0.1	0.1
PR6	0.06	0.03	43.3%	21.1	0.46	3.70	5.38	6.23	7.48	0.1	0.1	0.2	0.2
PR7	0.03	0.02	66.7%	20.4	0.60	3.76	5.45	6.31	7.57	0.1	0.1	0.1	0.1
OS1	0.14	0.02	14.3%	22.1	0.29	3.62	5.28	6.12	7.36	0.1	0.2	0.2	0.3
	1.14	0.97	84.7%						Total	2.9	4.2	4.9	5.9

TEXAS DESIGN INTERESTS, LLC
6001 W. WILLIAM CANNON
BUILDING 2, SUITE 203-C
AUSTIN, TX 78749
(512) 301-3389 (o)
(512) 301-3348 (f)
COMMERCIAL/RESIDENTIAL - CIVIL & STRUCTURAL ENGINEERING

BOWIE STREET CAMPUS
7310 BOWIE STREET
HOUSTON, TX 77012

HATCH + ULLAND OWEN ARCHITECTS

JEFFREY B. SHINDLER
91160
REGISTERED PROFESSIONAL ENGINEER
12/29/09
FIRM REG. # F-8601

DRAINAGE PLAN

PROJECT # 302-103

DATE 10/29/09

SHEET C10

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