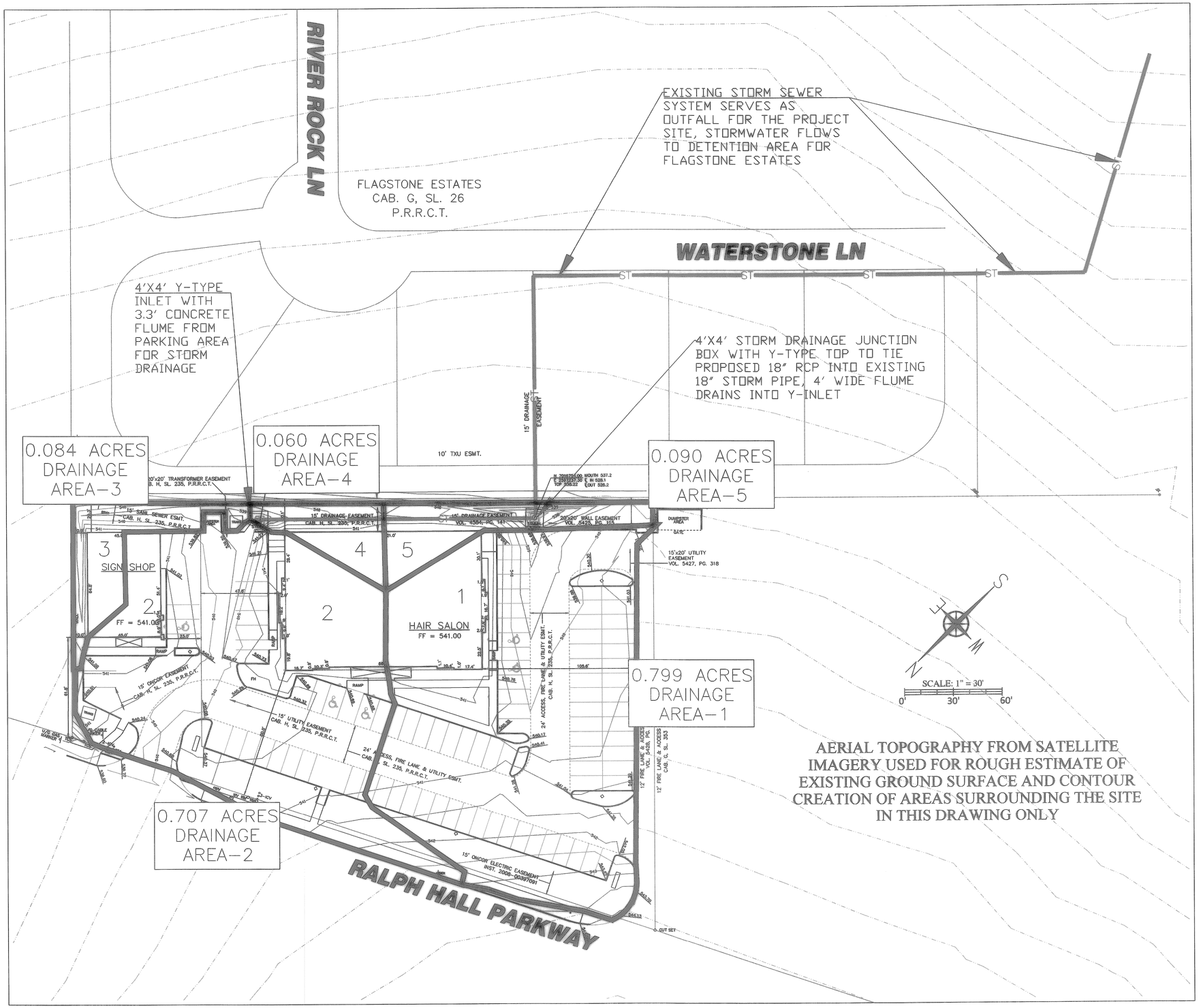

DRAINAGE CALCULATIONS

ROCKWALL SALON

POST-DEVELOPED CONDITIONS
for 100-year Storm using Q=CIA
C=0.9 for Commercial Business & I(100-year)=9.8

Drainage Area 1:
Q(100) = 0.9*9.8*0.799 = 7.05 cfs
Drainage Area 2:
Q(100) = 0.9*9.8*0.707 = 6.24 cfs
Drainage Area 3:
Q(100) = 0.9*9.8*0.084 = 0.741 cfs
Drainage Area 4:
Q(100) = 0.9*9.8*0.060 = 0.529 cfs
Drainage Area 5:
Q(100) = 0.9*9.8*0.090 = 0.794 cfs

Capacity of 4' wide x 0.5' deep West Concrete Flume
A = 4*0.5 = 2 sqft
Q(100) = A(1.486/n)*R^(2/3)*S^(1/2)
Q(100) = 2(114.31)*(2/3)^(2/3)*0.02^(1/2)
= 17.55 cfs Flume Capacity
6.24 cfs required for West Flume, therefore
CAPACITY EXCEEDS REQUIREMENTS

Capacity of 3.3' wide x 0.5' deep East Concrete Flume
A = 3.3*0.5 = 1.65 sqft
Q(100) = A(1.486/n)*R^(2/3)*S^(1/2)
Q(100) = 1.65(114.31)*(2/3)^(2/3)*0.02^(1/2)
= 14.48 cfs Flume Capacity
7.05 cfs required for East Flume, therefore
CAPACITY EXCEEDS REQUIREMENTS

Capacity of East Y-inlet
yo = 0.3' max depth of flow desired,
from Figure 3.16 = 8 cfs using 4'x4' inlet
East Y-inlet serves Drainage Areas 2, 3 & 4,
therefore 6.24 + 0.741 + 0.529 = 7.51 cfs required
for East Y-inlet and 18" RCP, therefore
CAPACITY EXCEEDS REQUIREMENTS

Capacity of 18" RCP Storm Sewer Pipe out of East Y-inlet (East Drop Inlet)
A = 1.77 sqft, pipe slope = 2%
Q(100) = 6.24 + 0.741 + 0.529 = 7.51 cfs
Critical Depth = 12.96 in from Figure 3.23
wp = 4.39 ft
Q(cap) = 1.77*(1.486/.013)*(1.77/4.39)^(2/3)*0.0255^(1/2) = 17.63 cfs
V(max) = 17.63 cfs / 1.77 = 9.86 ft/s ≈ 9.5 ft/s from Figure 3.17
R = 1.77 / 4.39 = 0.403
S=Qn^2 / 1.486AR^(2/3)
S=7.51(0.013^2) / 1.486(1.77)(0.403^2/3)
S=0.088 %, therefore
CAPACITY EXCEEDS REQUIREMENTS

Capacity of West Y-inlet
yo = 0.3' max depth of flow desired,
from Figure 3.16 = 8 cfs using 4'x4' inlet
East Y-inlet serves Drainage Areas 1 & 5,
therefore 7.05 + 0.794 = 7.84 cfs required
for West Y-inlet, therefore
CAPACITY EXCEEDS REQUIREMENTS

Capacity of "A-A" Swale (see Sheet C-6)
Drainage Area (partial of Drainage Area 1) = 0.035 acre
Q(100) = 0.9*9.8*0.035 = 0.309 cfs
n = 0.030; slope = 1%;
Q*n / 1.486*s^1/2 = 0.309*0.030 / 1.486*0.01^1/2 = 0.062
R = a / wp = 2.72 / 15.36 = 0.177
R^(2/3) = 0.177^(2/3) = 0.315; a*R^(2/3) = 0.857
therefore SWALE "A-A" IS OVERSIZED

Capacity of "B-B" Swale (see Sheet C-6)
Drainage Area (partial of Drainage Area 1) = 0.065 acre
Q(100) = 0.9*9.8*0.065 = 0.573 cfs
n = 0.030; slope = 1%;
Q*n / 1.486*s^1/2 = 0.573*0.030 / 1.486*0.01^1/2 = 0.116
R = a / wp = 10.77 / 30.39 = 0.354
R^(2/3) = 0.354^(2/3) = 0.500; a*R^(2/3) = 5.39
therefore SWALE "B-B" IS OVERSIZED

Capacity of "C-C" Swale (see Sheet C-6)
Drainage Area = 0.009 acre
Q(100) = 0.9*9.8*0.009 = 0.079 cfs
n = 0.030; slope = 1%;
Q*n / 1.486*s^1/2 = 0.079*0.030 / 1.486*0.01^1/2 = 0.016
R = a / wp = 1.04 / 20.38 = 0.051
R^(2/3) = 0.051^(2/3) = 0.138; a*R^(2/3) = 1.43
therefore SWALE "C-C" IS OVERSIZED

WELDON BROWN ENGINEERING, LC
TBPE #10477
297 WATERFORD WAY
MONTGOMERY
TEXAS 77356
(832) 691-1581

STATE OF TEXAS
REESE W. BROWN, III
65511
LICENSED PROFESSIONAL ENGINEER

Reese W. Brown III

THE SEAL AND SIGNATURE APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY REESE W. BROWN, III, P.E. TBPE #65511 ON 11-13-12

OWNER:
ROCKWALL SALONS, LLC
dba SALONS ELITE
P.O. BOX 846
SEAGOVILLE,
TX 75159

TO THE BEST OF OUR KNOWLEDGE
WELDON BROWN ENGINEERING, LC
HEREBY STATES THAT THIS PLAN IS
AS-BUILT. THIS INFORMATION
PROVIDED IS BASED ON SURVEYING
AT THE SITE AND INFORMATION
PROVIDED BY THE CONTRACTOR.

PFEFFER/INMAN ADDITION

2 LOTS - 1.6989 ACRES
J.D. McFARLAND SURVEY, ABSTRACT NO. 145
CITY OF ROCKWALL, ROCKWALL COUNTY, TEXAS

SHEET TITLE:
AS-BUILT DRAINAGE AREA MAP

DATE: 11/13/12

C-2