Rev. 12/21/88, Tdh
(Sheets 1-5)
Rev. 12.13.88 Tdh

Frontier Plaza — 82.129D

2.02 Ac

15 year storm: 2.02 Ac @ 1.87 = 3.78 cfs
@ 3.85 = 7.78
differential Runoff 4.0 cfs

25 year Storm: 2.02 Ac @ 2.31 = 4.67 cfs
@ 4.75 = 9.60
differential Runoff 4.93 cfs

I Basin South of Hwy K Entrance;

Total area to this basin = 0.56 Ac
0.56 Ac @ 3.85 = 2.16 cfs (0.56 Ac @ 4.75 = 2.66 cfs)

2.16 cfs x (3) min x (60 sec) = 3888 cf (15 yr.)
(2.66 x (30 x 60) = 4788 cf (25 yr.))

| Elev. | Area | Storage | Accum Storage |
|---|---|---|---|
| 599.0 | 0 | | 0 |
| 600.0 | ~~2650~~ ~~2065~~ s.f. | $\frac{0+2650}{2} \times 1 = 1326 \div 2 = 663$ (triangle area) | (663) ~~516.5~~ |
| 601.0 | ~~6618~~ ~~4536~~ s.f. | $\frac{2650+6618}{2} \times 1 = 4634 \div 2 = 2317$ | ~~2980~~ ~~2166.5~~ 2980 |
| 601.5 | ~~8992~~ ~~5850~~ s.f. | $\frac{6618+8992}{2} \times .5 = 2596 \div 2 = 1298$ | ~~4931~~ ~~3465~~ |

I (Continued)

Runoff to Basin: 2.16 (15 yr.)
design opening as small as possible, to store as much as possible.

A) Construct a CI, in pks, corner
Pavement = 599.0
Highwater = 601.5 ± (top curb)
top CI = 602.3 ±
opening = 601.3 (throat of structure)

Use 4" ϕ opening @ 599.0
$Q = CA\sqrt{2gh}$
$= 0.6(.087)\sqrt{64.4(2.05)}$
$Q = 0.6$ cfs

Storage provided = 4931 c.f.
Quantity Stored = 2.66 cfs (25 yr.) - .6 cfs = 2.06 cfs

Frontier Plaza (cont.) 82-129D.

II Basin North of Hwy K entrance;

Total area to this basin = 0.43 $A^c$

0.43 $A^c$ @ 3.85 = 1.66 cfs

(0.43 $A^c$ @ 4.75 = 2.04 cfs → 25 yr. storm)

1.66 cfs × (30 min × 60 sec) = 2988 cf

(2.04 cfs × (1800) = **3672** cf., 25 yr. storm)

| Elev. | Area | Storage | Accum. Storage |
|---|---|---|---|
| 600.5 | 812 | 0 | 0 |
| 601.0 | 1233 | $\frac{812+1233}{2} \times .5 =$ | ÷2. 256 256 |
| 601.5 | 1654 | | 361 617 |
| 602.0 | 2074 | | 466 1083 |

1083 cy storage ÷ 1800 = 0.6 cfs

II (Continued)

Runoff to basin

$0.43 A^c$ @ 3.85. 1.66 cfs ( $2.04^{cfs}$ = 25 yr.)

A) Construct a 6" opening

Pavement 600.0

Top curb 602.0

HW 601.5

$Q = C\,a\sqrt{2gh}$

$0.6(.196)\sqrt{64.4(1.25)}$

$Q = 1.06$ cfs

Storage provided = 1083 cf.

Quantity stored = 0.6 cfs.

(2.04 - 1.06 = 0.98 cfs)

Frontier Plaza 82 129 D

III Basin Northwest corner site;

Total area to this basin = 0.6 Ac

0.6 Ac @ 3.85 = 2.31 cfs (15 yr.)

(0.6 Ac @ 4.75 = 2.85 cfs, 25 yr.)

2.31 cfs x (30 min x 60 sec) = 4158 cf.

2.85 cfs x 1800 = 5130 cf

Elev. Pavement 601.0

Top curb 603.5

| Elev. | Area | Storage | Accum Storage |
|---|---|---|---|
| 601.0 | 0 | | |
| 601.5 | 440 | $\frac{440+0}{2} \times .5 = 110$ | 110 |
| 602.0 | 927 | $\frac{927+440}{2} \times .5 = 342$ | 452 |
| 603.0 | 3225 | $\frac{927+3225}{2} \times 1 = 2076 \times 1.2076$ | 2528 |

Use 6" opening

$Q = Ca\sqrt{2gh}$

$0.6(.196)\sqrt{64.4(1.75)}$

$Q = 1.25$ cfs

2528 : 1800 = 1.40 cfs (Storage Provided) (2.85 - 1.25 = 1.6 cfs)

Construct a trash screen around 6" PVC - to help prevent blockage.

Conclusion ;

2.02 @ ( 4.75 - 2.31 ) = 4.93 cfs to be stored.

Basin I = 2.06 cfs stored

II = 0.98 cfs stored

III = 1.60 cfs stored

4.64 cfs stored w/ 3 basins

4.93 - 4.64 = 0.29 cfs = additional runoff, we do not have enough storage for.

{ But, the 2.02 Ac is not completely developed ; 15' transition strip, 4' ± buffer around other Property lines.

# HYDRAULIC DATA

**PROJECT:** Frontier Plaza

**SHEET** 1 **OF** 1

Computed By _____ Date _____ Checked By _____ Date _____

| LINE Upper Station | LINE Lower Station | Length | Size | Upper Flow Line | Lower Flow Line | F.L. Grade | Upper St. Elev. | Lower St. Elev. | Depth To Hy. Gr. Upper End | Upper Hy. Elev. | Lower Hy. Elev. | Hy. Grade | Frict. Head | Veloc ft/sec | $\frac{V^2}{2g}$ feet | $K\frac{V^2}{2g}$ K Head | Turn Loss | Street Grade at Inlet | Inlet Capacity Adjustment | Area Acres | P. I. | Quantity Cu. Ft./Sec. | 82 129 D T. Q. | 82 129 D Pipe Cap. Cu. Ft./Sec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| FE 2 | FE 1 | 43 | 18" | 596.64 | 595.80 | 2.0 | — | — | — | 597.55 | <FULL 598.14 E.J 597.30 | .0059 | 0.25 | 4.6 | 0.3 | — | 10° | — | — | 2.3 | 3.85 | 8.86 | 8.86 | 14.86 |
| | | | | (596.64 | +1.73 : | 598. | 37 vs | 598.0 | ±) | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| C1 5 | PD 4 | 85 | 15 | 597.5 | 595.8 | 2.0 | 602.3 | 600.0 | 3.6 | 597.14 | <FULL 598.75 <FULL 597.05 | .0011 | 0.09 | 1.76 | .05 | — | 90° | low | 4.0 | 0.56 | 3.85 | 2.16 | 2.16 | 9.15 |
| PD 4 | EP 3 | 10 | 15 | 595.6 | 595.4 | 2.0 | 600.0 | — | 3.0 | 596.68 | 596.65 | .003 | 0.03 | 3.11 | .15 | .10 | 0° | low | — | 0.43 | 3.85 | 1.66 | 3.82 | 9.15 |

Using Chart V Headwater depth for pipe culverts w/ inlet control $H_w/D$: 1.73'