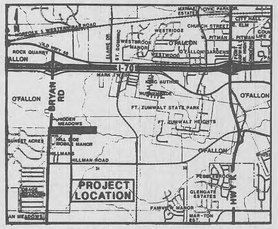


LOCATION MAP

Note: Existing underground and overhead utilities and drainage structures have been plotted from available information and their locations must be considered approximate only. It is the responsibility of the contractor to notify the utility companies and to verify the locations of existing utilities before actual construction begins. Any descrepancies noted must be reported to the Engineer immediately.

GBA
GEORGE BUTLER ASSOCIATES, INC.
Engineers / Architects / Landscape Architects / Planners
Kansas City, Mo. / Lenexa, Ks. / O'Fallon, Mo. / Ames, Ia. / Oklahoma City, Ok.

DATE:	JULY, 1992
DESIGN BY:	PL
DRAWN BY:	JG
PROJECT NO.:	6603.01
SHEET NO.	1
TOTAL SHEETS	1

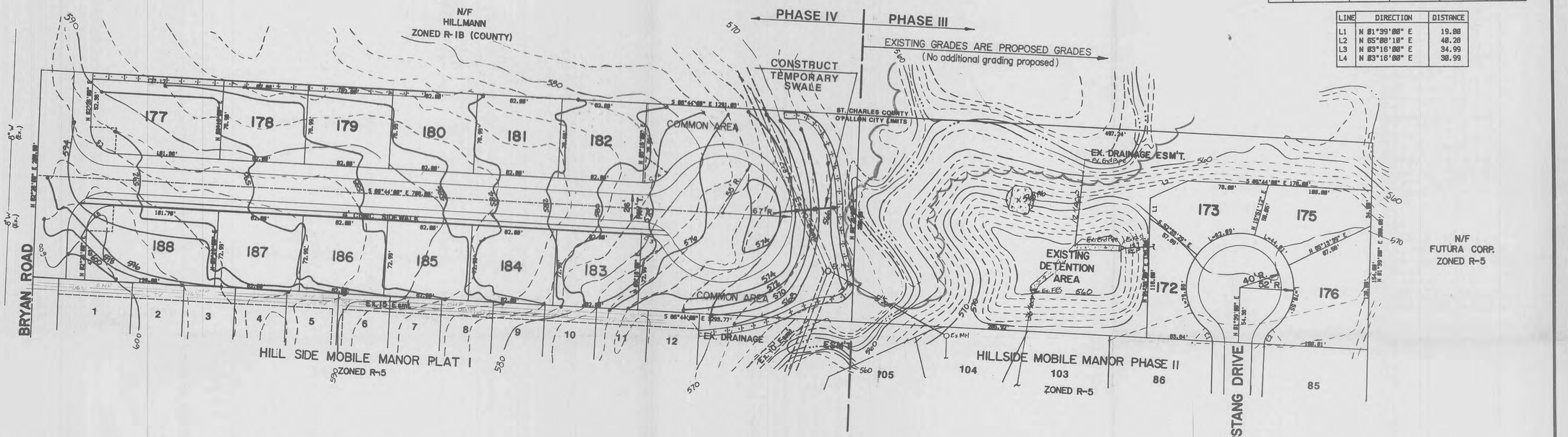
HILLSIDE MOBILE MANOR
GRADING PLAN
PHASE III & IV

REVISIONS	BY	DATE

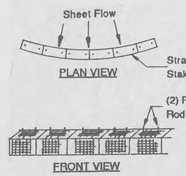
1" = 50'

CURVE	DELTA ANGLE	RADIUS	ARC LENGTH	CHORD	TANGENT
C1	51°19'04"	20.00	17.91	17.32	9.61
C2	51°19'04"	20.00	17.91	17.32	9.61
C3	57°04'45"	25.00	24.91	23.89	13.60
C4	57°04'45"	25.00	24.91	23.89	13.60
C5	89°18'00"	25.00	38.91	35.10	24.64
C6	90°58'00"	25.00	39.69	35.61	25.37

LINE	DIRECTION	DISTANCE
L1	N 01°39'00" E	19.00
L2	N 65°00'10" E	40.28
L3	N 83°16'00" E	34.99
L4	N 83°16'00" E	38.99



NOTE: EXISTING CONTOUR INFORMATION PROVIDED BY OWNER; NOT VERIFIED BY GBA.



STRAW BALE DETAIL

SILTATION CONTROL NOTE

Siltation Control shall be Bales of Straw placed end to end and anchored to ground with 4' long reinforcing rods.

Note: Siltation control is to be placed in all areas where a potential exists for silt to leave the construction site.

Note: Straw Bale Erosion Control to be used until vegetation is established.

SILTATION CONTROL DETAIL
N.T.S.

GENERAL NOTES

1. All filled and graded areas shall be seeded with grass within 45 days following completion of filling or grading.
2. The only existing trees are located near the creek and none are proposed to be disturbed as part of the grading operation. Therefore, the Tree Protection Ordinance does not apply.
3. No slope shall be steeper than 3:1.
4. APPROXIMATE GRADING QUANTITIES:
   C - 10,750 C.Y. F - 2860 C.Y. (Includes shrinkage)
5. All existing underground utilities and services that are to remain are to be protected throughout construction.
6. All construction and materials required shall conform to the City of O'Fallon standards.
7. All filled places under proposed storm and sanitary sewer lines and/or paved areas shall be compacted to 90% of maximum density as determined by the Modified AASHTO T-180 Compaction Test or 95% of maximum density as determined by the Standard Proctor Test AASHTO T-99.
8. All filled places in proposed roads shall be compacted from the bottom of the fill up to 90% maximum density as determined by the Modified AASHTO T-180 Compaction Test or 95% of maximum density as determined by the Standard Proctor Test AASHTO T-99. All tests shall be verified by a soils engineer concurrent with grading and backfilling operations.

FILE COPY
APPROVED
8-4-92
Frank Goldwin

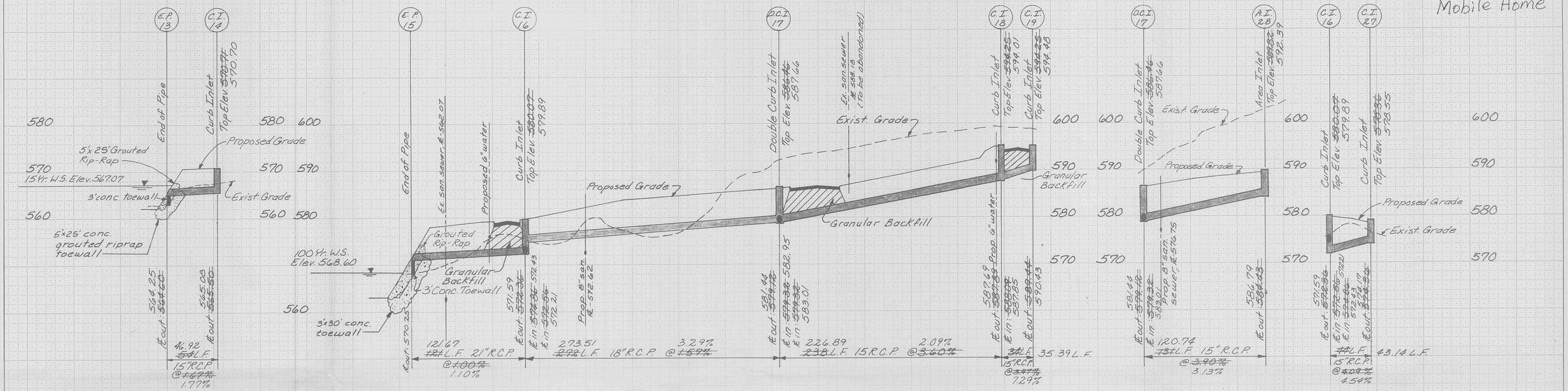
STATE OF MISSOURI
PAUL L. LONTON
NUMBER PE-1995
REGISTERED PROFESSIONAL ENGINEER

EXISTING GRADE
PROPOSED GRADE 574

539447

GBA GEORGE BUTLER ASSOCIATES, INC. Engineers / Architects / Landscape Architects / Planners	PROJECT	SHEET NO.	TOTAL SHEETS
	STORM SEWER PROFILES	14	19
	PROJECT NO.: 4973	DATE: Jan, 88	
	REVISIONS: Rev. Detention Calcs JLB. 3-15-88.		

Hillside Manor Mobile Home



Part I

Part I

Part I

Detention Basin Calculations

Area of Hillside 25.75 Ac.
Area of Warehouse 3.90 Ac. – Current Ph. IV
29.65 Ac.

Undeveloped PI Factor = 2.31 (25 Year Storm)
Allowable discharge = 2.31 x 29.65 = 68.45 c.f.s.

Now find PI Factor for Hillside
Each lot is 6250 s.f. to the centerline of the street.

Trailer Pad	75'x14'	1050 s.f.
Shed Pad	10'x10'	100 s.f.
Patio	20'x10'	200 s.f.
Driveway	30'x20'	600 s.f.
Street	13'x50'	650 s.f.
Sidewalk	2'x50'	100 s.f.
		2700 s.f.

2700 / 6250 = 43%

Therefore, each lot will be approximately 43% impervious.

Now find PI Factor for Hillside

100% impervious PI = 4.75 (25 Year)
5% impervious PI = 2.31 (25 Year)

100	4.75
43	PI
5	2.31

PI = 3.26

25 Year Discharge = (3.26x25.75) + (4.75x3.90) = 102.47 c.f.s.
(Developed Runoff).

Required Storage Volume = (102.47-68.45)1800 = 61,236 cu. ft.

25 Year Runoff tributary to detention basin

Q = 45.85 x 3.26 / 3.30 = 45.29 c.f.s.

Flow stored = 102.47-68.45 = 34.02 c.f.s.
Therefore we can release 45.29-34.02 = 11.27 c.f.s.

Stage vs. Storage

Elevation	Sq. In.	Sq. Ft.	Cu. Ft.	Storage Volume
570	7.80	19500		121,317
			18688	
569		17875		102,629
			17063	
568	6.50	16250		85,566
			15407	
567		14563		70,159
			13719	
566	5.15	12875		56,440
			12188	
565		11500		44,252
			10813	
564	4.05	10125		33,439
			9500	
563		8875		23,939
			8250	
562	3.05	7625		15,689
			7063	
561		6500		8,626
			5938	
560	2.15	5375		2,688
			2688	
559		0		0

(Elev.) Stage	(Cu. Ft.) Volume
567	70,159
WS	61,236
566	56,440

4796 / 13719 = 0.35

(25 Year) WS = 566.35

Q_{allow} = 11.27 c.f.s.

Try 12" RCP A = $\frac{\pi (1)}{4}$ = 0.785 ft

Available Head = 566.35 - 558.70 - 1/2 = 7.15'

Q = .62(.785) $\sqrt{(2)(32.2)(7.15)}$ = 10.44 c.f.s.
10.44 c.f.s. ≈ 11.27 c.f.s.

Therefore, we are voluntarily storing an additional 11.27 - 10.44 = 0.83 c.f.s.

This will adjust our storage volume and 25 Year Water Surface Elevation.

61236 + 1800(.83) = 62,730 cu. ft.

Elev. (Stage)	Cu. Ft. (Volume)
567	70,159
x	62,730
566	56,440

6290 / 13719 = 0.46

Revised 25 Year W.S. Elev. = 566.46

How check outfall pipe FE-1 to EP-2

Avaiable Head = 566.46 - 558.70 - 1/2 = 7.26'

Q = .62 (.785) $\sqrt{2(32.2)(7.26)}$ = 10.52 c.f.s.
10.52 c.f.s. ≈ 10.44 c.f.s.

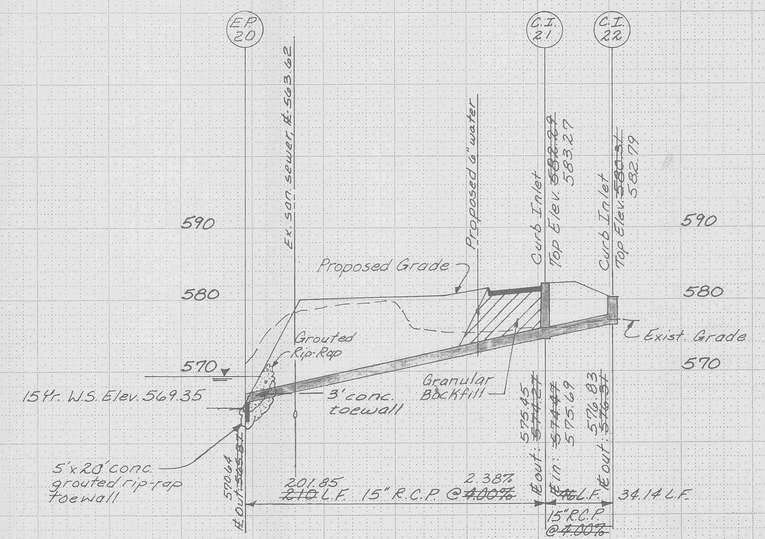
Therefore no further adjustments are needed.

Now design 100 Year Emergency Spillway

25 Year Inflow = 45.29 c.f.s.
100 Year Inflow = 1.2777 x 45.29 = 57.83 c.f.s.

Place weir at 25 Year elevation at 566.46

A 20 foot wide flat bottom weir with 3:1 side slopes will allow 73 c.f.s. of flow with 1 foot of head. Our 100 Year flow is 57.83 c.f.s., therefore our weir design is adequate.



Part I

Scale: 1"=10' Vert.
1"=50' Horiz.

As Constructed 10-21-88 S.A.S.