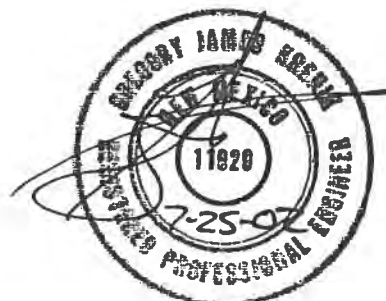
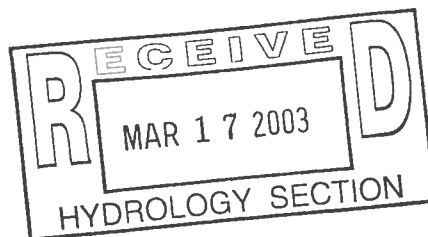


DRAINAGE REPORT
for
Desert Highlands at La Cueva



9-16-02
1-17-03
3-14-03



D. Mark Goodwin & Associates, P.A.
Consulting Engineers

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PROJECT DESERT HIGHLANDS @ GCEWA
SUBJECT DRAINAGE CALCS
BY GJK DATE 7-23-02
CHECKED _____ DATE _____
SHEET 1 OF _____

REVISED 9-16-02

- THE PROJECT AREA IS 2,0122 AC
- THE SITE IS NOT IN A 100 YEAR FLOOD ZONE.
- THE SITE IS ADJACENT TO EXISTING DEVELOPED 1 ACRE LOTS.
- THE MAJORITY OF THE DRAINAGE WILL FLOW TO THE NORTH AND ACROSS LOT 4 IN A 20' PUBLIC DRAINAGE EASEMENT TO THE EL CAMINO ARROYO.
- BACKYARD PONDS WILL BE REQUIRED ON THE 3 WEST LOTS TO MINIMIZE THE EFFECT ON THE ADJACENT LOTS, MINIMIZATION OF RETAINING WALLS IS REQUIRED.
- FLOWS IN MODESTO AVE. WILL CONTINUE TO THE WEST TO WYOMING WITHIN THE MODESTO RIGHT OF WAY.
- THE SITE SLOPES FROM SE TO NW AT 6%.
- THE PROJECT IS LOCATED JUST EAST OF WYOMING ON THE NORTH SIDE OF MODESTO.
- RUNOFF INTO THE EL CAMINO ARROYO IS THE CURRENT SITUATION AS IT WILL BE AS A DEVELOPED SITE.
- THIS AREA WAS INCLUDED IN THE DESERT RIDGE TRAILS REPORT PREPARED BY MARK GOODWIN & ASSOC. AND ALSO THE CLMR THEY DID.

AREA OF MODESTO = 0.2282 AC ADJACENT TO SITE

AREA OF INTERIOR ROW = 0.3174 AC

6 PADS AT 5,373 $\times$ EACH = 32,238 = 0.7461 AC TYPE "D"
6 DRIVEWAYS AT 400 $\times$ EACH = 2,400 = 0.0551 AC TYPE "D"

TYPE "B" OF INTERIOR ROW = 2325 = 0.0534 AC

TYPE "D" OF INTERIOR ROW = 0.2640 AC

AREA OF SITE W/O AREA OF MODESTO = 1.7840 AC

TOTAL TYPE "D" OF SITE = 1.0592 AC = 59.37%

TYPE "B" = 0.7248 AC = 40.63%

FROM AH4MO OUTPUT SHEETS 7-9

Q = 6.79 CFS

V = 0.2304 AC-FT



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PROJECT DESERT HIGHLANDS @ LA CUEVA
SUBJECT DRAINAGE CALCS
BY SSK DATE 2-23-02
CHECKED _____ DATE _____
SHEET 2 OF _____

REVISED 9-16-02

- WE NEED TO SUBTRACT BACKYARD AREA TO BE PONDED

$$75' \times 30' = 2250 \text{ sq ft} = 0.0517 \text{ AC}$$

100% TYPE "B"

FROM AHYMO OUTPUT SHEETS 10-12

$$Q = 0.16 \text{ CFS / LOT}$$

$$V = 0.0046 \text{ AC-FT} = 200.38 \text{ CF / LOT}$$

- POND NEEDS TO BE TWICE THIS SIZE FOR RETENTION

$$V = 400.75 \text{ CF / LOT}$$

ELEV	AREA (SF)	VOLUME (CF)
0	$40 \times 10 = 400$	0.0
1	$43 \times 13 = 559$	$479.5 > 400.75 \text{ CF}$ OK

- SUBTRACT POND Q'S FROM TOTAL FLOW

$$Q = 6.79 - 3(0.16)$$

= 6.31 CFS WILL FLOW NORTH ACROSS LOT 4
INTO THE EL CAMINO ARROYO THROUGH
A 20' PUBLIC DRAINAGE EASEMENT

GO TO
SHEET 3
FIRST
①

- ② • FIND Q TAKEN BY INLETS ON MONESTO
USE DBL A ON EACH SIDE
FROM NOMO SHEET 5

$$Q_{\text{inlet}} = 5.9 \text{ CFS}$$

$$Q_{\text{past inlets}} = 2(7.8 - 5.9) \\ = 3.80 \text{ CFS}$$

THIS WILL ADD TO THE SUMP ON WYOMING
AT GLENDALE.



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PROJECT DESERT HIGHLANDS @ LA CUEVA
SUBJECT DRAINAGE CALCS
BY GSK DATE 7-23-02
CHECKED _____ DATE _____

SHEET 3 OF _____

REVISED 9-16-02

- ① • FIND FLOW IN MODESTO FROM BARSTON TO WYOMING
FOR TOTAL BUILDOUT

$$A = 3.58 \text{ AC}$$

$$\text{TYPE "B"} = 27\%$$

$$\text{TYPE "D"} = 73\%$$

FROM ANYMO OUTPUT SHEETS 13-15

$$Q = 15.60 \text{ CFS} \quad Q_{1/2} = 7.8 \text{ CFS} \quad S = 2.09\% \quad n = 0.017$$

$$\text{Find } d = 0.39$$

$$WP = 15.64$$

$$A = 2.41$$

$$V_{1/2} = 3.55 \text{ F/S}$$

$$Q_{1/2} = 8.56 \text{ CFS} > 7.8 \text{ CFS} \text{ OK}$$

$$d + V^2/2g = 0.59 < 0.85 \text{ OK}$$

GO TO SHEET 2 ②

- FIND OFFSITE DRAINAGE BASIN THAT ENTERS SITE

PART OF Lots 25, 26 & 27, BLK 12, UNIT 3, TRACT 1, NAA
DRAINS TO OUR SITE

LOT 25 + 26 DRAIN OVERLAND BUT LOT 27 COLLECTS
ALL THIS WATER AND DISCHARGES THROUGH A PIPE
ONTO OUR PROPERTY AT A CONCENTRATED LOCATION

$$\text{OFFSITE BASIN} = 1,1744 \text{ AC}$$

$$\text{PADS} = 3960 \text{ SF} + 2073 \text{ SF} = 6033 \text{ SF}$$

$$\text{DRIVES} = 5701 \text{ SF} + 850 \text{ SF} = 6551 \text{ SF}$$

$$\text{SDWKS} = 142 \text{ SF} + 167 \text{ SF} = 309 \text{ SF}$$

$$12,893 \text{ SF} = 0.2960 \text{ AC TYPE "D"} \\ = 25.20\%$$

$$\text{TYPE "A"} = 74.80\% = 0.8784 \text{ AC}$$

FROM ANYMO OUTPUT SHEETS 16-18

$$Q = 3.07 \text{ CFS}$$

THIS FLOW IS TO BE ROUTED AROUND THE
SITE TO THE NORTH AND DISCHARGE ONTO LOTS

- TOTAL Q ALLOWED

$$A = 1,7840 + 1,1744 - [3(0.0517)] \text{ BACKYARDS} \\ = 2.8033 \text{ AC}$$

$$0.2960 \text{ AC TYPE "D"} 10.56\%$$

$$2.8033 - 0.2960 = 2.5073 \text{ AC TYPE "A"} 89.44\%$$

FROM ANYMO OUTPUT SHEETS 19-21

$$Q = 5.97 \text{ CFS}$$



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PROJECT DESERT HIGHLANDS @ LA CUEVA

SUBJECT DRAINAGE CALCS

BY GJK DATE 8-26-02

CHECKED _____ DATE _____

SHEET 4 OF _____

REVISED 9-16-02

REVISED 3-14-03

SIZE DETENTION POND ON LOT 4

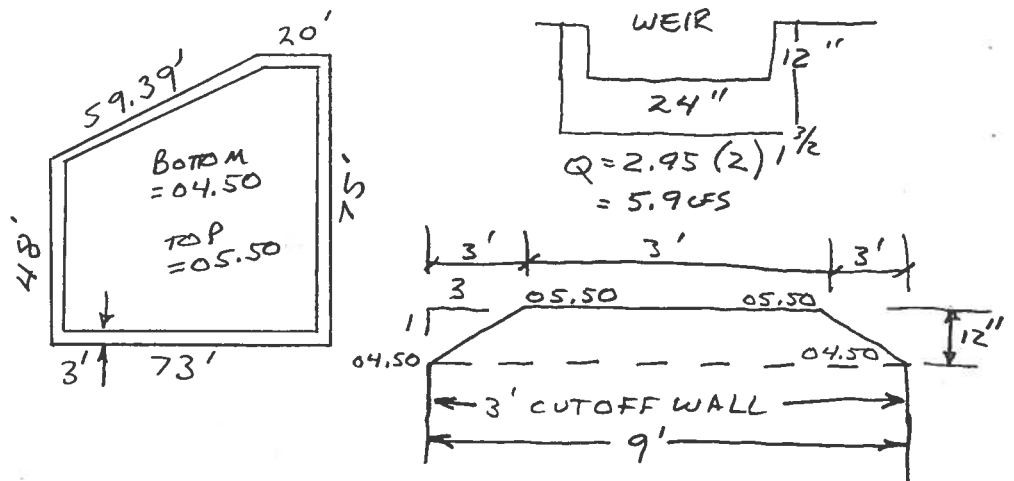
$$A = 2.8033 \text{ AC}$$

$$\begin{aligned} \text{TYPE "D"} &= 1.0592 + 0.2960 \\ &= 1.3552 \text{ AC} \quad 48.34 \% \end{aligned}$$

$$\text{TYPE "B"} = 0.7248 - (3(0.0517)) = 0.5697 \text{ AC} \quad 20.32 \%$$

$$\text{TYPE "A"} = 0.8784 \quad 31.34 \%$$

ELEV	AREA (F)	VOLUME (AC-FT)	DISCHARGE
4.5	3968	0	0
5.5	4760	0.100	5.90



FROM HYMO OUTPUT SHEETS 22-24

PEAK DISCHARGE = 5.87 cfs < 5.97 cfs OK
MAXIMUM WATER SURFACE = 5405.495

• SIZE FUTURE INLET

$$\text{TOTAL } Q = 9.8 \text{ cfs}$$

$$P = 17$$

USE SGL A, DBL THROAT

$$Q/P = 3H^{3/2} \quad H = 0.33' < 0.67 \text{ OK}$$

$$2 \times 9.8 \quad H = 0.53' < 0.67 \text{ OK}$$

• FROM HYMO SHEET 6 18" RCP @ 3.0% CARRIES 18 cfs