PUBLIC WORKS/HYDROLOGY

B14/D5

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City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

NOV 6

November 5, 1991

CERTIFICATE OF COMPLETION AND ACCEPTANCE

Mr. Ron Bohannan
Tierra West Development Management Services
4600 Montgomery Boulevard N.E., Suite 9
Albuquerque, NM 87109

RE: PROJECT NO. 4285.90, WINDMILL ESTATES, (MAP NO. B-14/D5

Dear Mr. Bohannan:

This is to certify that the City of Albuquerque accepts Project No. 4285.90 as being completed according to approved plans and construction specifications. The City of Albuquerque will accept for continuous maintenance all public infrastructure improvements constructed as part of Project No. 4285.90.

The project is described as follows:

- Removed existing shoulder on Coors Road, prepped subgrade and installed decel lane from Coors Road to Cita Road. Re-striped into Ceta Road N.W., access road to Windmill Estates, and east side of Coors Road N.W.

- The contractor's correction period begins the date of this letter and will be effective for a period of one (1) year.

Sincerely,

Brian L. Speicher, P.E.
Chief Construction Engineer
Design/Construction Division
Engineering Group
Public Works Department

BLS:kt

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xc: Mark Goodwin & Associates
C.C.M., Inc.
Fred Aguirre, Engineering Group, PWD
Phil Fischer, Engineering Group, PWD
Terri Martin, Engineering Group, PWD
Martin Barker, Engineering Group, PWD
Steve Gonzales, Special Assessments
Sam Hall, Operations Group, PWD
A. N. Gaume, Operations Group, PWD
Jim Fink, Operations Group, PWD
Ray Chavez, Engineering Group, PWD
Greg Olson, Water/Wastewater Group, PWD
Dave Parks, Engineering Group, PWD
Tom Kennerly, Engineering Group, PWD
Josie Gutierrez, New Meter Sales, Finance Group, PWD
Claudia Gallegos, Standby Clerk, Finance Group, PWD
Lynda Michelle Devanti, Engineering Group, PWD
Richard Zamora, Engineering Group, PWD
Kelly Trujillo, Engineering Group, PWD
f/Project 4285.90
f/Warranty
f/Readers
(INP 140191)

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MEMORANDUM

TO: FILE (B14/D5) WINDMILL ESTATES

FROM: GILBERT ALDAZ

DATE: 9/5/90

The above referenced drainage report is outside the City Limits, and within Bernalillo County Jurisdiction, no 100-year floodplain.
We will defer comments and review to County and AMAFCA, this file will be unlogged from file list.
Per telecom I informed Mark Goodwin of this deferral.

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DRAINAGE INFORMATION SHEET

PROJECT TITLE: WINDMILL ESTATES ZONE ATLAS/DRNG. FILE #: B-14 /DS

LEGAL DESCRIPTION: Lands of Briscoe & Groff

CITY ADDRESS: NE Corner Coors and Calabacillas

ENGINEERING FIRM: D. MARK GOODWIN AND ASSOCIATES, P.A. CONTACT: Mark Goodwin, P.E.

ADDRESS: PO Box 90606, Alb, NM 87199 PHONE: 505/828-2200

OWNER: WINDMILL JOINT VENTURE CONTACT: Ms. Jennie Spradlin

ADDRESS: 4127 Carlisle Blvd NE Albuquerque, NM 87107 PHONE: 505/883-7592

ARCHITECT: n/a CONTACT:

ADDRESS: PHONE:

SURVEYOR: D. MARK GOODWIN AND ASSOCIATES, P.A. CONTACT: Richard Borgel, P.S.

ADDRESS: PO Box 90606, Alb, NM 87199 PHONE: 505/828-2200

CONTRACTOR: n/a CONTACT:

ADDRESS: PHONE:

PRE-DESIGN MEETING:

____ YES

XX NO

____ COPY OF CONFERENCE RECAP SHEET PROVIDED

DRB NO. DRB-90-0195

EPC NO.

PROJ. NO.

TYPE OF SUBMITTAL:

____ DRAINAGE REPORT

____ DRAINAGE PLAN

XX CONCEPTUAL GRADING & DRAINAGE PLAN

____ GRADING PLAN

____ EROSION CONTROL PLAN

____ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

____ SKETCH PLAT APPROVAL

XX PRELIMINARY PLAT APPROVAL

____ SITE DEVELOPMENT PLAN APPROVAL

____ FINAL PLAT APPROVAL

____ BUILDING PERMIT APPROVAL

____ FOUNDATION PERMIT APPROVAL

____ CERTIFICATE OF OCCUPANCY APPROVAL

____ ROUGH GRADING PERMIT APPROVAL

____ GRADING/PAVING PERMIT APPROVAL

____ OTHER _____ (SPECIFY)

RECEIVED AUG 16 1990 HYDROLOGY DIVISION

DATE SUBMITTED: 8/16/90

BY: Mark Goodwin

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Tierra West Development Management Services

RECEIVED
AUG 10 1990
HYDROLOGY DIVISION

August 10, 1990

Cliff Anderson
AMAFCA
2600 Prospect Avenue NE
Albuquerque, NM 87107

RE: Drainage Submittal for Windmill Estates DRB 89-195, Zone Atlas Page B-14.

Dear Cliff:

Enclosed please find a copy of the grading and drainage plan for the above referenced project. The project located on the North side of the Calabacillas Arroyo and just East of Coors Boulevard.

We are sending copies of the report to County Public Works and City of Albuquerque concurrently. As mentioned in our meeting AMAFCA seems the appropriate lead agency in the review due to the proximity of the Calabacillas Arroyo.

Should you have any questions concerning this submittal, please do not hesitate to contact either Mark Goodwin or myself.

Sincerely,

Ronald R. Bohannan, P.E.

Enclosures

cc: Bob Foglesong, County Public Works
Fred Aguirre, City Hydrology

RRB/lad
Job No. 890026

4127 Carlisle Boulevard NE • Albuquerque, NM 87107 • (505) 883-7592

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DRAINAGE REPORT

for

WINDMILL ESTATES

Prepared for

TIERRA WEST DEVELOPMENT MANAGEMENT SERVICES

4127 Carlisle Blvd NE
Albuquerque, NM 87107

August 1990

D. MARK GOODWIN
NEW MEXICO
8948
REGISTERED PROFESSIONAL ENGINEER

RECEIVED
AUG 10 1990
HYDROLOGY DIVISION

D. MARK GOODWIN & ASSOCIATES

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dmg D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors
P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200

August 10, 1990

Public Works Department
BERNALILLO COUNTY
2400 Broadway SE
Albuquerque, NM 87102

Re: Proposed Commercial / Residential Subdivision;
Windmill Estates, CZ-90-11 and DRB-90-0195

Gentlemen:

Attached please find the Drainage Report and Master Grading Plan for the referenced project.

We are including all supporting calculations and details for your review and we feel that you will find that everything is in order.

If we may be of further help, please contact us.

Sincerely,

D. MARK GOODWIN AND ASSOCIATES, P.A.

Mark Goodwin

Mark Goodwin, P.E.

DMG/mbs

Attachment

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PROJECT LOCATION AND DESCRIPTION

The proposed Windmill Estates subdivision is planned for a 25.13 acre tract bound by Coors Road NW on the west, the Calabacillas Arroyo on the south, the Corrales Main Canal on the east, and Tract B, Black Ranch, on the north. The development will ultimately be comprised of 11.47 acres SU-1 for C-1 and O-1, and 13.66 acres R-1. Fifteen lots ranging from .75 acres to 1.01 acres would be developed in the R-1 portion.

The proposed development will "horseshoe" an existing 2.95 acre area containing two single family homes. This area will be considered during this analysis and provisions will be made to accept and convey the stormwater runoff generated from this area at its current level of development.

The existing site basically comprises two levels. The upper level adjacent to Coors Road has a medium slope falling from west to east. This area has poor cover and is comprised of Bluepoint soils. The existing homes are on this level. The undeveloped flows from this area sheet flow east then over the bluff to the lower level of this project. Offsite flows do not enter this level, but are collected and conveyed in a roadside ditch adjacent to Coors Road. We do not propose to change this with this plan. The upper level will be utilized for the commercial development.

The lower level below the bluff will be the area utilized for the single family development. This area is generally flat, has medium cover, and is comprised of Bluepoint soils. Undeveloped flows from this area combine with those from above, and sheet flow east to the levee adjacent to the Corrales Main Canal. However, per FIRM panel 350002 0002 C, the site does not lie in nor contribute to the 100 year flood plain. The only offsite flows entering this area are those from the same tract, but from the upper level.

The Calabacillas Arroyo which abuts the entire south boundary of this project has improved earthen side slopes and dikes, and adequately contains the 100 year event. Due to the sandy soils encountered, a Building Restriction or Prudent Line study was obtained by AMAFCA upstream from Coors Road. Due to the overwhelming expense of a study such as this, we opted to utilize that which was previously done, and have applied it to this site. Due to the nature of this reach of the Calabacillas, i.e., more uniform, we feel that this is a conservative approach.

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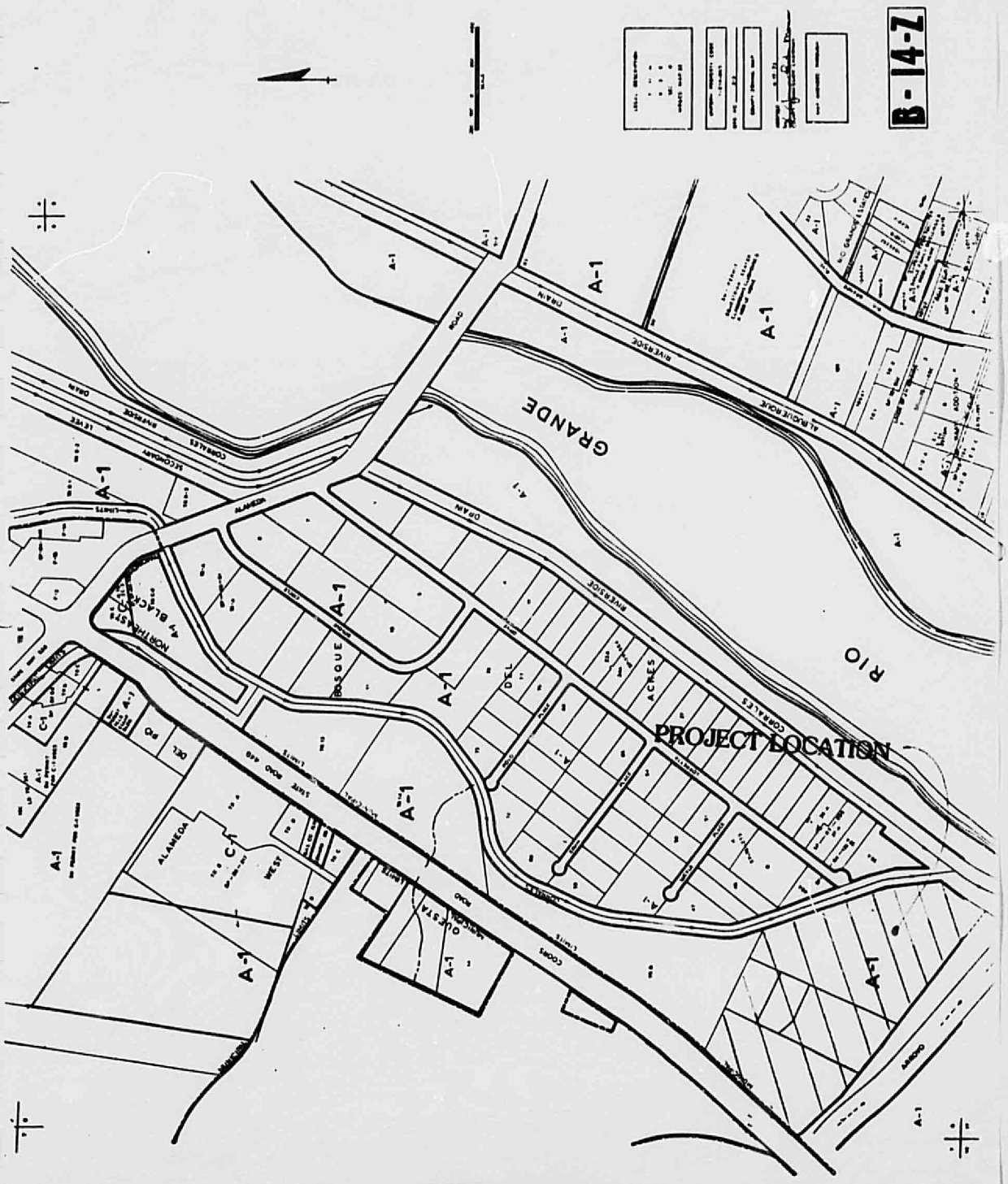

VICINITY MAP

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PROPOSED IMPROVEMENTS

As can be seen from the Master Grading Plan located in the map pocket, we propose to treat this project and its runoff in four ways:

1. In the area of the planned commercial development in the upper level, we propose to intercept the runoff prior to the bluff and convey these flows to two inlets and drop structures located adjacent to the Calabacillas. A problem encountered with this solution was that the Hydraulic Grade Line in the Calabacillas adjacent to the proposed outlets is higher than the drop inlets. We are, therefore, proposing to route the outlets downstream from each inlet approximately 150 feet to avoid delays or backups with our system. Appropriate easements will be provided. Another concern with the outlets was what form the structure would take at its termination in the Calabacillas, i.e, headwalls, slope blankets, etc. We feel that there is a real possibility that any structure may be lost during large flows, so we have opted for concrete end sections. These would be the easiest and most cost effective to replace. Both outlet pipes would be 24 inch, RCP with slope of approximately 4.5%. Both would operate as open channels allowing for future increases in flow as conditions dictate. The inlet structures will be Single or Double "D" inlets placed in 2 foot sumps as detailed in the drawings.

2. In the area of the existing residential development in the upper level, we propose to intercept the runoff at the bluff's edge by means of a diversion dike, and convey the flows to a retention pond on Lot 12 in the lower level by means of a drop structure. This drop structure will also utilize a Single "D" inlet in a 2 foot sump. The outlet pipe will be an 18 inch CMP placed in the appropriate easement. The retention pond on Lot 12 has been sized for the existing volume from this area as well as the developed volume from Lot 12.

3. We propose to collect and convey the roadway runoff in the residential area via roadside ditch and pond on Lot 5 temporarily until such time as the Coors Road Drainage Calabacillas Outlet is constructed. The necessity for this pond would be eliminated at that time, and flows would directly discharge to the new structure. We have designed an outlet from the pond at this time to show the suitability of such an outlet. A small portion of the roadway drainage will be ponded on Lot 11.

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4. We propose to provide individual lot ponding for complete retention on all proposed residential lots.

Utilizing Bernalillo County's Interim Drainage Design Criteria, we determined all peak rates of runoff for structure sizing for the 100 year - 6 hour event. All retention ponding volume calculations were based upon the 100 year - 24 hour event. Due to the nature of the site soils, we feel that use of these events is suitable.

For the purpose of sediment control, de-silting basins have been utilized in conjunction with all outlet structures. In addition, non-erosive velocities in roadside ditches are to be anticipated per our calculations. Where steep grades are encountered, the roadside ditches will be asphalt paved and "ribbed" to avoid erosion. This asphalt section is detailed in the drawings. Roadway culverts will also be utilized in three locations. All three will be 18 inch RCP with end sections.

In concluding, the plan as presented addresses all reasonable concerns associated with stormwater management for a project of this nature. A Prudent Line has been established, sediment control is provided, suitability with future plans is accounted for, and sufficient collection and conveyance systems have been provided. The appropriate calculations, which follow, verify the solutions presented in this report.

A final recommendation would be that as the commercial / office zone develops, individual grading and drainage plans be required to insure compliance with this plan.

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dmg D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors

JOB Windmill Estates
SUBJECT Drainage
JOB NO. _____ SHEET 1 OF ___
BY MG DATE 8/3/90
CHECKED _____ DATE _____

Since this project is in Bernalillo County, we will use their new interim design criteria.

Two precipitation values will be utilized for this project:

1. 100 Yr - 6 Hr → utilized for structures
2. 100 Yr - 24 Hr → utilized for ponding

Site lies west of Rio Grande in Zone 1:

P_6 = 2.20 inches

P_{24} = 2.66 inches

Four land usages will be analyzed by this report:

1. Commercial (incl. roads) = 11.47 Ac.
   We propose to free discharge this area to Calabacillas Arroyo approx. 500' east of Coors.

2. Residential; 3/4 Ac to 1 Ac. lots (w/o roads) = 12.31 Ac.
   We propose to pond each lot individually, via 2 outlets.

3. Residential Streets - 1.61 Ac
   We propose to pond temporarily in lot 5 until construction of North Coors Drainage Calabacillas outlet by AMAFCA; and a small portion will pond in Lot 11.

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dmg D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors

JOB Windwell Estates
SUBJECT Drainage
JOB NO. _____ SHEET 2 OF ___
BY MJ DATE 8/3/90
CHECKED _____ DATE _____

We will design outlet C this time so that it can be taken into account in future.

4. Existing Residential - 2.95 Ac.
We propose to collect & convey runoff from 2 residences that will remain via diversion dike / drop structure to a pond on lot 12.

LAND Treatments for Each Land use are as follows:

1. Commercial : Treatment B = 15%
Treatment D = 85%

2. New Residential : Treatment B = 20%
Treatment C = 60%
Treatment D = 20%

3. Residential Street R/W : Treatment C = 40%
Treatment D = 60%

4. Existing Residential : Treatment A = 50%
Treatment B = 10%
Treatment C = 30%
Treatment D = 10%

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dmg D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors

JOB Windmill Estates
SUBJECT Drainage
JOB NO. _____ SHEET 3 OF ___
BY MAG DATE 8/3/90
CHECKED _____ DATE _____

Determine Peak Rates of Runoff

The peak rates of runoff for the 100 yr - 6 Hr event will be determined for use in hydraulic sizing of various structures.

COMMERCIAL AREAS

Drainage Area 1 :

$A = 6.75$ Ac.

$Q_p = (.15)(6.75)(2.30) + .85(6.75)(4.80) = 30$ cfs

Outlet to Calabacillas Arroyo from S.E. corner of D.A. 1 will be sized for 30 cfs

Drainage Areas 2 + 3 :

$A = 4.72$ Ac.

$Q_p = (.15)(4.72)(2.30) + (.85)(4.72)(4.80) = 21$ cfs

Outlet to Calabacillas Arroyo from SE Corner of D.A. 3 will be sized for 21 cfs

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dmg D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors

JOB Windmill Estates
SUBJECT Drainage
JOB NO. _____ SHEET 4 OF ____
BY MG DATE 8/3/90
CHECKED _____ DATE _____

Existing Residential Area :

$Q_p = (.50)(2.95)(1.61) + (.10)(2.95)(2.30) + (.30)(2.95)(3.15) + (.10)(2.95)(4.80) = 7$ cfs

Inlet with drop structure to be placed at east end of existing residential area against diversion dike to be sized for 7 cfs

Residential Roadway E/W

Drainage Area 5:

A = 0.53 Ac.

$Q_p = (.40)(.53)(3.15) + (.60)(.53)(4.80) = 2$ cfs

Culvert adjacent to lot 11 & Roadway ditches upstream will have to have 2 cfs min. capacity.

Drainage Area 6 :

A = 1.08 Ac.

$Q_p = (.40)(1.08)(3.15) + (.60)(1.08)(4.80) = 5$ cfs

Culvert adjacent to lot 9 & all ditch sections within D.A. 6 will have to have 5 cfs min. capacity.

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dmg D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors

JOB Woodwell Estates
SUBJECT Drainage
JOB NO. SHEET 5 OF
BY MG DATE 8/6/90
CHECKED DATE

Determine Runoff Volumes

The runoff volumes due to the 100yr-24 Hr event will be determined in order to show the developed amounts in general & to size all necessary ponds.

COMMERCIAL AREAS

Drainage Area 1:

$$\text{Weighted } E = \frac{(.15)(6.75)(.60) + (.85)(6.75)(1.87)}{6.75}$$

$$= 1.68 \text{ in.}$$

$$Vol._{360} = \frac{1.68}{12}(6.75) = 0.94 \text{ Ac-Ft} = 41,152 \text{ cu. Ft}$$

Since we do not propose to pond this area, we will not determine $Vol._{1440}$

Drainage Areas 2 & 3:

$$\text{Weighted } E = \frac{(.15)(4.72)(.60) + (.85)(4.72)(1.87)}{4.72}$$

$$= 1.68 \text{ in.}$$

$$Vol._{360} = \frac{1.68}{12}(4.72) = 0.66 \text{ Ac-Ft} = 28,776 \text{ cu. Ft}$$

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EXISTING RESIDENTIAL AREA

Weighted $E = (.50)(2.95)(.45) + (.10)(2.95)(.60) + (.30)(2.95)(.82) + (.10)(2.95)(1.87) = 0.72$ in.

$Vol._{360} = \frac{0.72}{12}(2.95) = 0.18$ Ac-Ft.

$Vol._{1440} = 0.18 + \frac{(.10)(2.95)(2.66-2.20)}{12}$

$= 0.19$ Ac-Ft $= 8333$ cu Ft

This volume will need to be added to that of lot 12 in order to size lot 12 pond

RESIDENTIAL STREET R/W

Drainage Area 5:

Weighted $E = \frac{(.40)(.53)(.82) + (.60)(.53)(1.87)}{.53} = 1.45$ in

$Vol._{360} = \frac{1.45}{12}(.53) = 0.06$ Ac Ft

$Vol._{1440} = 0.06 + \frac{(.60)(.53)(2.66-2.20)}{12}$

$= 0.08$ Ac Ft $= 3321$ cu Ft

This volume will need to be added to that of lot 11 in order to size lot 11 pond.

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Drainage Area 6:

Weighted E = 1.45 in

$Vol._{360} = \frac{1.45}{12}(1.08) = 0.13$ Ac Ft

$Vol._{1440} = 0.13 + \frac{(.60)(1.08)(2.66-2.20)}{12}$

$= 0.15$ Ac Ft $= 6745$ cu Ft

This volume will need to be added to that of lot 5 in order to size lot 5 pond.

TYPICAL LOT POND

Weighted $E = \frac{(0.20)(1.0)(.60) + (0.60)(1.0)(.82) + (.20)(1.0)(1.87)}{1.0}$

$= 0.99$ in

$Vol._{360} = \frac{.99}{12}(1.0) = 0.08$ Ac Ft

$Vol._{1440} = 0.08 + \frac{(.20)(1)(2.66-2.20)}{}$

$= 0.09$ Ac Ft $= 3820$ cu Ft

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dmg D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors

JOB Windmill Estates
SUBJECT Drainage
JOB NO. _____ SHEET 8 OF ____
BY MA DATE 3/6/90
CHECKED _____ DATE _____

RUNOFF SUMMARY

Outlet to Calabacillas from O.A. 1:

Q_p = 30 cfs
$Vol._{360}$ = 41,152 cu.-ft.

Will use Type "D" inlets in Sump Condition and RCP to drop flows to Arroyo.

Outlet to Calabacillas from OA 2 & 3:

Q_p = 21 cfs
$Vol._{360}$ = 28,776 cu.ft

Will use Type "D" inlets in Sump Condition and RCP to drop flows to Arroyo

Outlet from Exist. Residential: OA 4 to Lot 12:

Q_p = 7 cfs
Vol. = 8333 cu. ft.

Will use diversion dike along bluff to intercept flows & direct to Type "D" inlet in a Sump. Outlet will be 16 GA CMP placed in 10' Drainage Easement to outfall at pond in Lot 12.

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PONDING AREA LOT 5

$Q_p = 5$ cfs

$Vol._{1440} = 6745 + 3820 = 10,565$ cu. ft.

Runoff from 2/3 of residential roadway & all of lot 5 will be ponded at S.E. corner of overall tract until such time that North Coors Road Calabacillas Outlet is constructed. We will show outlet in this design to insure adequacy.

PONDING AREA LOT 11:

$Q_p = 2$ cfs

$Vol._{1440} = 3321 + 3820 + 955 = 8096$ cu.ft

Runoff from 1/3 of residential roadway, 1/4 of lot 12 and all of lot 11 will be ponded on lot 11.

PONDING AREA LOT 12:

$Q_p = 7$ cfs

$Vol._{1440} = 8333 + 3820 = 12,153$ cu ft

Runoff from existing residential Area: DA 4 and lot 12 will be ponded on LOT 12

TYPICAL LOT

$Vol._{1440} = 3820$ cu. ft.

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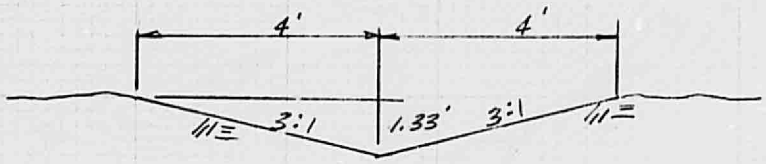
CAPACITY CALCULATIONS

Residential Roadway Ditch : Typical



Q_{100} = 3½ cfs $n = 0.03$ $S = 0.25\%$ $A = 5.32^{\#}$ $Wp = 8.43'$

$$V = \frac{1.486}{.03}\left(\frac{5.32}{8.43}\right)^{2/3}(.0025)^{1/2} = 1.82 \text{ fps}$$

$Q = AV = 9.69$ cfs > 3.5 or 7 cfs

Velocities of 2 fps are non-erosive – Areas where grades approach 1½% or more will need armoring – will be designed in detail when P&P's are prepared & a Soils report is obtained.

ROADWAY CULVERTS :

All culverts are to be min. 18" RCP class III with concrete end sections. All grades to be 1%. Tailwater depth ≈ 0.5' so inlet will control. Allow $\frac{HW}{D}$ = 1.25. Nomograph on following page indicates adequacy @ largest Q_p = 7 cfs.

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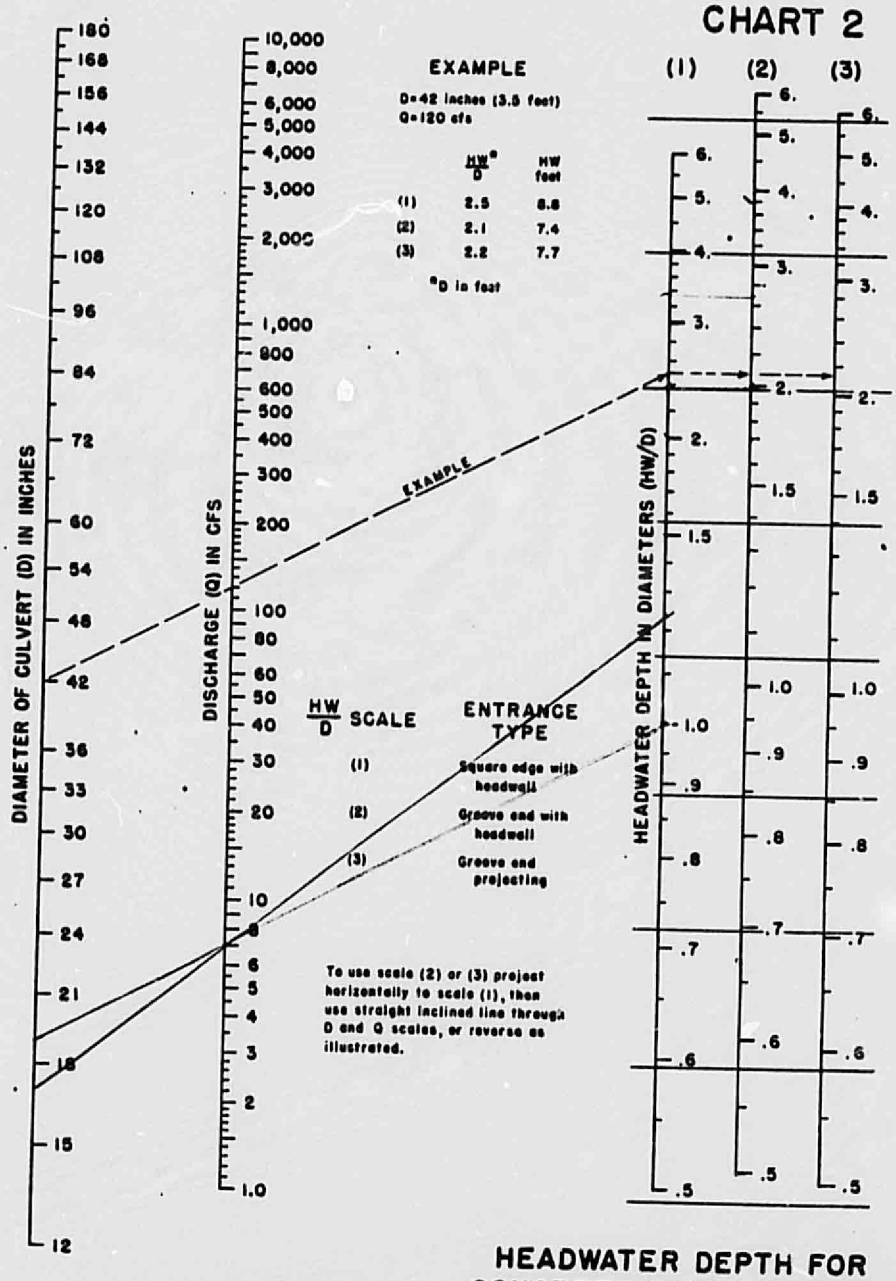
11 of

CHART 2



HEADWATER SCALES 2 & 3
REVISED MAY 1964

BUREAU OF PUBLIC ROADS JAN. 1963

HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL

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TYPE "D" INLETS

All inlets will be placed in 2' paved sumps - to give some freeboard (≈0.5') we will base calculations on 1½' sumps. We will utilize the equation (from FHWA) $Q = 5.37 A H^{1/2}$ & $A = 632$ sq. in $= 4.39$ sq. ft. for grate area of City Std. Single "D"

Drainage Area 1

$Q = 31$ cfs req'd

Capacity of 1 inlet $= Q_G = 5.37(4.39)(1.5)^{1/2} = 29$ cfs

We will need 2 "D" or a Double "D" inlet

Drainage Area 2 & 3

$Q = 20$ cfs → Single "D" inlet

Drainage Area 4

$Q = 7$ cfs → Single "D" inlet

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PLANS/PLATS ON FILE

FILE DESC: B14/D5

PLANS/PLATS 3

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