HYDROLOGY D11/D4 1 of 2 12 PLANS

D11/04

12 Plans

RICHARD E. LEONARD
EXECUTIVE ENGINEER

B. H. SWINBURNE, CHAIRMAN
WILLIAM V. HEREFORD, VICE-CHAIRMAN
FRANCES McCOY, SECRETARY-TREASURER
VERNON DOAK, DIRECTOR
RICHARD H. CLOUGH, DIRECTOR

Albuquerque
Metropolitan
Arroyo
Flood
Control
Authority

2600 PROSPECT AVE. N.E.
P. O. BOX 25851 - ALBUQUERQUE, N. M. 87125
TELEPHONE 344-3516

Taylor Ranch
South Branch

RECEIVED
DEC 29 1978
CITY ENGINEERS

December 22, 1978

Meurer-Serafini & Meurer, Inc.
2601 Wyoming Boulevard, N.E.
Albuquerque, N.M. 87112

ATT: Mr. Frank Krim

Dear Mr. Krim:

Reference is made to Mr. Tebben's October 27, 1978, letter and our subsequent conversations concerning the South Branch of Piedras Marcadas Arroyo in Taylor Ranch.

I am reluctant to consent to a plan which deviates from the Master Plan. However, in view of the City's previous approval, I am willing to go along with your revised plan dated December 22, 1978.

In the future, both the City and AMAFCA will expect closer conformance to the Master Plan.

Sincerely,

Dan Sabo

Dan Sabo
Engineer

For/Richard E. Leonard
Executive Engineer

cc: R. Heller
B. Conegliano ✓ (plan attached)
D. Greene, Bellamah

Taylor Ranch
Horsehead
Wells

CITY OF ALBUQUERQUE, NEW MEXICO
CITY ENGINEER'S OFFICE

MEMORANDUM - April 2, 1979

TO: Gerald Davenport, Director of Municipal Development
FROM: Bruno Conegliano, Assistant City Engineer-Hydrology B.C
SUBJECT: Taylor Ranch

Enclosed is a copy of a letter from MSM regarding Taylor Ranch. A reply was never given because I do not really know what reply should be given. You indicated Friday that we should have a discussion session with the Council on some of these drainage issues and policies. I was wondering if you had a chance to frame up some time for this purpose. I'd like to be able to give some indications to these people.

BC/fs
Enclosure

MEURER, SERAFINI AND MEURER, INC.
CONSULTING ENGINEERS • SURVEYORS • PLANNERS
2601 WYOMING BLVD., N.E., SUITE F • ALBUQUERQUE, NEW MEXICO 87110 • (505) 292-1936

March 30, 1979

Mr. Bruno Conegliano
Assistant City Engineer-Hydrology
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87103

Re: Homestead Hills North, Taylor Ranch, Tract 11, Drainage

Dear Bruno:

The purpose of this letter is to present matters for discussion and decision at the meeting scheduled with you on Tuesday, April 3, 1979, at 2:00 p.m., and to review the history of the drainage in this area.

Several reports and plans have been done on this area in the past. To begin with, William Matotan and Associates, Inc., in 1975 presented the Drainage Management Plan for the Western Albuquerque Metropolitan Area. In this plan the right-of-way and type channel for the Piedras Mercadas Arroyo were discussed. Since that time, Murray-McCormick, now MSM, submitted a drainage report for Homestead Hills East, Taylor Ranch Tract 8, in June 1977 and amended in September 1977, that defined the exact location of the Piedras Mercadas Arroyo, along the south side of Tract 11. Final plans were prepared for the arroyo and a major portion of it has now been constructed. Following that report, MSM prepared the Taylor Ranch Comprehensive Drainage Plan which was submitted to your office in January 1978 and was amended July 12, 1978. We have received no further written communication on it. On October 13, 1978, we furnished AMAFCA with a copy of this report at their request. On February 21st of this year, the City of Albuquerque and AMAFCA signed a Memorandum of Agreement which stated in Item 6 that the City pledges to eliminate the backlog of drainage reports by March 1, 1979. Since we have received no comment letter in regards to this report, we assume that it has been accepted.

We wish now to submit a drainage study on Homestead Hills North that is an amendment to this Overall Drainage Study based on the detailed calculations for this tract. We submitted a copy of the historic runoff versus the proposed runoff in plan form to your office on Thursday, March 29, 1979. As shown by that plan, no water will be drained

toward Taylor Ranch Drive except that which falls on Taylor Ranch Drive. Calculation of this flow shows that 15.6 cfs in the 100-year storm will be drained into the Piedras Mercadas Arroyo where Taylor Ranch crosses it. This flow is well below the 61 cfs shown on said Overall Drainage Study discharging into Taylor Ranch Drive out of Tract 11. As shown on the plan submitted, historically 108 cfs drains from this site in a natural condition, the majority of which flows onto the downstream property owner to the east. By our proposed plan, we show this flow to be reduced to 71 cfs where it discharges at a proposed concrete rundown at the southeast corner of subject site. The street at this location will carry up to 95 cfs with the velocity of only 6 ft./sec., at a depth of only 8" or .67 of a foot at a 1% slope. The depth times this velocity is equal to 4, which is well below the floodway criteria of 5. This calculation indicates adequate capacity within the street to handle this quantity of flow.

At our meeting at 1:30 on Wednesday, March 28, you also brought up the point that development could not occur on this tract due to the fact that there was no downstream drainage easement or drainage right-of-way for the Piedras Mercadas Arroyo. At that time you stated that this was the policy. Since we are reducing the flow that drains into this arroyo, below the historic, and flows are already concentrated at this location in the Piedras Mercadas Arroyo, we would like to know when this policy was implemented and by whose authority. According to the Memorandum of Agreement previously noted between AMAFCA and the City, in Item 9 it states "that it is not the intent of the drainage regulation to dictate a total solution at any cost; rather the intent is to require an economically reasonable degree of compliance." If the owner is required to secure drainage easements or wait until they are secured all the way to the River from this site before he can develop, he will be faced with an unreasonably economical solution.

In conclusion, the major purpose of this letter and the scheduled meeting is to clarify some of these concepts so that the owner may develop this tract in a reasonable manner. Your attention to these matters will be deeply appreciated, and if you have any questions please feel free to contact me.

Very truly yours,

MEURER, SEPAFINI AND MEURER, INC.

Jeryl D. Hart

Jeryl D. Hart, Jr., P.E.
Project Manager

JDH:dw

cc: Mr. Don Greene, Bellamah
Mr. Thomas Burlison, Bellamah
Mr. Richard Heller, City Engineer
Mr. Rich Leonard, AMAFCA

Encls.

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
David Rusk

April 23, 1979

Mr. Carl A. Tebbens
Meurer, Serafini and Meurer
2601 Wyoming N.E., Suite F
Albuquerque, New Mexico 87110

Subject: Taylor Ranch, Tract 11

Dear Carl:

After submission of the drainage report and storm drainage proposal for Taylor Ranch, Tract 11, recommendations and alternatives have been reviewed. This tract, as a great portion of Taylor Ranch, has many problems due to the fact that discharge from the subdivision is not confined to existing watercourses or public drainage ways.

For the above reasons it is imperative that in the development of Tract 11 of Taylor Ranch, one of the following alternatives be pursued to control the drainage:

1. The drainage should be conveyed off of the subject property within a private drainage way conveyed with permission from adjoining property owners until it discharges in a defined natural watercourse. This private way would be maintained by the developer.

2. That adjacent properties be dedicated to the City of Albuquerque or AMAFCA and drainage improvements be constructed until they discharge into an existing watercourse.

The transmission of public waters, those emanating from public streets and drainage ways, are the responsibility of the City of Albuquerque. A review of this problem with the City Attorney reveals that it is the obligation of the City to insure that water can be transmitted from public rights-of-way and drainage easements to water courses in perpituity. For these reasons, we cannot approve Taylor Ranch, Tract 11 for development until such time as the water discharging from the subdivision can be conveyed with no liability for the City of Albuquerque.

Taylor Ranch

AN EQUAL OPPORTUNITY EMPLOYER

Should you have any questions, feel free to contact me anytime.

Very truly yours,

Richard S. Heller

Richard S. Heller
City Engineer

RSH/fs

cc - Gerald Davenport, Director of Municipal Development
John Meyers, Assistant City Attorney
Bruno Conegliano, Assistant City Engineer-Hydrology
Don Greene, Bellamah Homes
V. M. Kimmick, Bellamah Homes

Bruno

MEURER, SERAFINI AND MEURER, INC.
CONSULTING ENGINEERS • SURVEYORS • PLANNERS
2601 WYOMING BLVD., N.E., SUITE F • ALBUQUERQUE, NEW MEXICO 87110 • (505) 292-1936

May 3, 1979

Mr. Richard Heller, City Engineer
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87110

Re: Drainage - Tract 11, Taylor Ranch Homestead Hills North

Dear Dick:

Pursuant to our meeting of Wednesday, May 2, 1979, involving you, Rip Orr, Varne Kimmick, Don Greene, Dick Carter and myself, I would like to recommend the following as a solution to the drainage for the subject tract.

In order to discharge drainage to the east in a manner as similar as possible to the historic sheet flow, it is recommended that several discharge points be located along the east boundary of the subject development.

Butterfield Trail will be designed to drain to the east thereby discharging runoff conveyed in Wagon Mound Drive, Independence Drive and Golden Spike Drive. The 100-year storm frequency runoff will be approximately 40 cfs, which historically sheet flowed off the site between Calle Nortena and Butterfield Trail.

Drainage generated in the southern portion of the proposed development will be discharged through two temporary drainage easements, one on Lot 33 adjacent to Lot 32 and one on Lot 35 adjacent to Lot 36. A third discharge point will be between Lots 36 and 37 by means of conveying flows in a standard drainage rundown constructed within a 10' drainage right-of-way.

Within the two drainage easements, runoff will be conveyed in a 3' wide, 6" deep Vee shaped stabilized swale graded such that the flows can be adequately handled within the easement. Curb cuts will allow flows to enter the temporary easements and plastic pipes will be constructed under the sidewalk to convey the flow.

Wells Fargo Trail and Sundance Trail will form a low point at the location of the drainage right-of-way; however, as much water as possible will be directed to the two easements.

The temporary easements will be located totally on one lot in order to avoid conflict with walls, etc.

At such time as the necessary steps have been taken to allow free discharge to the east in the Piedras Marcadas Arroyo, the temporary easements will be vacated, the curb openings rebuilt, the pipes plugged, and the entire storm runoff discharged into the right-of-way.

I believe the above drainage solution satisfactorily addresses the City's concern of discharging runoff as close to historic discharge as possible.

We submit this report for your approval and would appreciate your concurrence at your earliest convenience.

Very truly yours,

MEURER, SERAFINI AND MEURER, INC.

Carl A. Tebbens, P.E.
Vice President

Approval:

Richard S. Heller
City Engineer

CAT:dw

cc: Mr. Dick Carter, AMBELL
Mr. Varne Kimmick, AMBELL

MEURER, SERAFINI AND MEURER, INC.
CONSULTING ENGINEERS • SURVEYORS • PLANNERS
2601 WYOMING BLVD., N.E., SUITE F • ALBUQUERQUE, NEW MEXICO 87110 • (505) 292-1936

May 16, 1979

RECEIVED
MAY 17 1979
CITY ENGINEERS

Mr. Richard Heller
City Engineer
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87103

Re: Homestead Hills North

Dear Mr. Heller:

Enclosed are three copies of the drainage study for the above referenced project. This study is being transmitted to you for your review and approval or comments.

Should you have any questions or comments please contact me.

Very truly yours,

MEURER, SERAFINI AND MEURER, INC.

Frank Krim

Frank Krim
Project Engineer

cc: Mr. Dick Carter, Bellamah

FK:dw

Builders/realtors/developers
commercial & residential

Bellamah Corporation

October 2, 1979

RECEIVED
OCT 05 1979
CITY ENGINEER

Mr. Richard Heller, City Engineer
City of Albuquerque
City Engineer's Office
P. O. Box 1293
Albuquerque, New Mexico 87103

RE: LA MARIPOSA DRAINAGE CHANNEL

Dear Dick:

Attached please find the city request for a preliminary estimate of cost to be prepared for the La Mariposa Drainage Channel in the area of High Range at Taylor Ranch, Unit I and II.

Also attached please find a location map for this project as well as a set of the approved construction drawings as approved by the City Engineer of the City of Albuquerque, Mr. V. M. Kimmick, on July 12, 1978.

Please begin work on this preliminary estimate immediately, as we will be ready to commence construction as soon as it has been prepared.

If there are any further questions, please do not hesitate to contact me.

Very truly yours,

AMBELL, a Partnership
BELLAMAH CORP., a Partner

Thomas J. Di Rito
Development Engineer

TDR/rr

Attachments

6121 Indian School Road, NE / PO Box 3325 / Albuquerque, New Mexico 87190 / (505) 883-3000

October 2, 1979
Date

City Engineer
City of Albuquerque
P.O. Box 1293
Albuquerque, New.Mexico

Gentlemen:

I hereby request that a preliminary estimate of costs be prepared for:

Water Main
Sanitary Sewer
(Storm Sewer) (Circled Desired Facility)
Street Paving
Alley Paving
Curb & Gutter

to serve the following property:

Lot or Tract Nos. TAYLOR RANCH

Block No. SEE ATTACHED LOCATION MAP

MRGCD Map No. _____

Name of Subdivision LA MARIPOSA DRAINAGE CHANNEL

The above description includes all the property to be served by the facilities, including accessory property, such as: accessory buildings, parking space, or other uses.

I am concerned with the facility extensions as the (agent) owner lessee (Circle one) of this property.

The owner of this property is AMBELL, a Partnership - BELLAMAH CORP., a Partner
Name

P. O. BOX 3325, ALBUQUERQUE, NEW MEXICO 87190
Street City State Zip Code

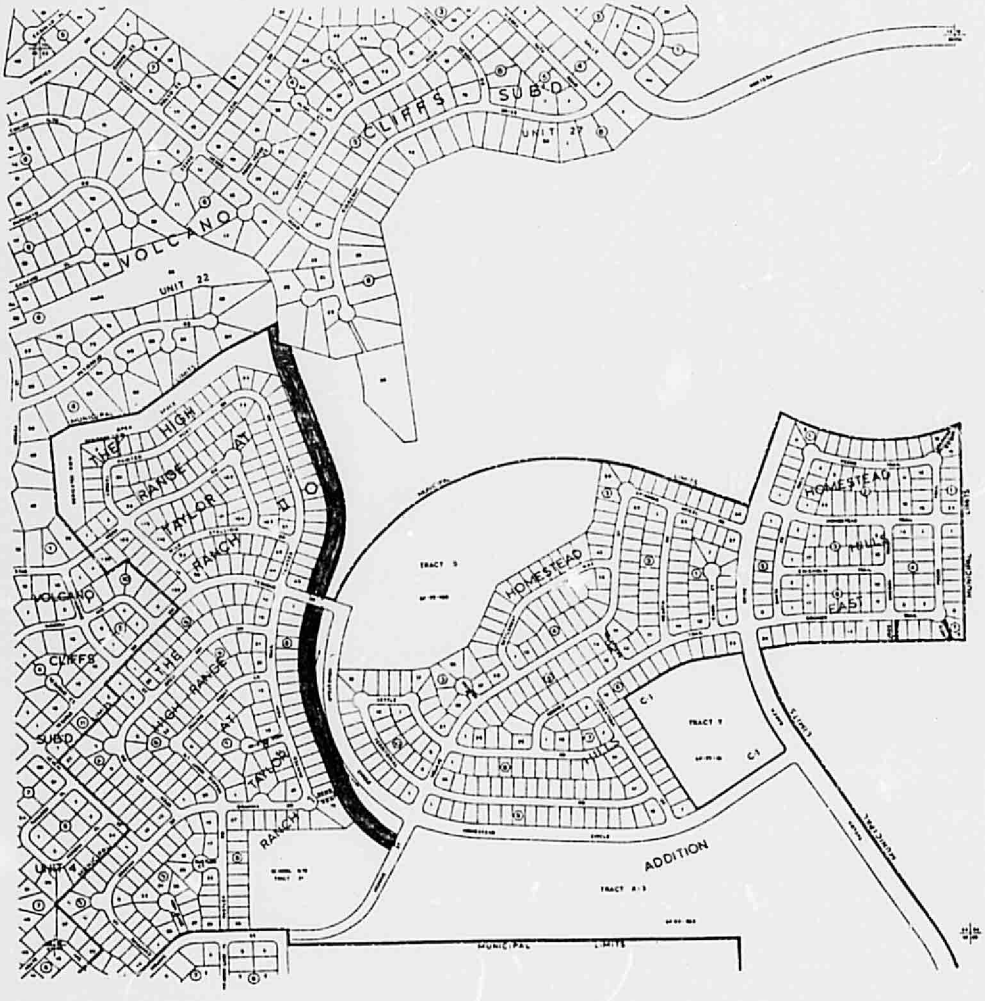
The described property (is) is not (Circle One) annexed to the City.

THOMAS J. DI RITO, DEVELOPMENT ENGINEER
(Requestor)

P. O. BOX 3325
(Street Address)

ALBUQUERQUE, NEW MEXICO 87190
(City State Zip Code)

(505) 883-3000, EXT. 120
(Telephone Number)


CLIFFS
SUBD
UNIT 22
VOLCANO
UNIT 22
THE HIGH RANGE AT TAYLOR RANCH
VOLCANO CLIFFS SUBD UNIT 4
THE HIGH RANGE AT TAYLOR RANCH
TRACT 5
HOMESTEAD
HOMESTEAD EAST
TRACT 7
C-1
C-1
ADDITION
TRACT A-3
MUNICIPAL LIMITS
MUNICIPAL LIMITS

D-11-Z

D-11 D 4

Bellamah
Community
Development

September 19, 1984

Mr. Fred Aguirre
City of Albuquerque
City Engineering Division
400 Marquette, N.W.
Albuquerque, New Mexico 87103

SUBJECT: Lots 33 and 35, Homestead Hills North, DRB Case #84-621

Dear Fred:

Bellamah Community Development hereby guarantees that the curb and gutter improvements for Lots 33 and 35 of Homestead Hills North will be constructed to City of Albuquerque Design standards within a 90 day period from the date of this letter. BCD also agrees to furnish the City of Albuquerque verification and acceptance of said improvements.

Sincerely,

BELLAMAH COMMUNITY DEVELOPMENT

D. T. Robertson
Senior Vice President and
Regional Manager

DTR:rl

INTER-OFFICE MEMORANDUM
MUNICIPAL DEVELOPMENT DEPARTMENT

ENGINEERING

☐ Administration	☐ City Engineer
☐ Capital Implementation	☒ Asst. City Engineer Design
☐ Code Administration	☐ Asst. City Engineer Field
☐ Engineering	☒ Asst. City Engineer Hydrology
☐ Information	☐ Chief City Surveyor
☐ Planning	☐ Office Coordinator
☐ Renewal & Rehabilitation	☐ Secretary
☐ Other	

ATTENTION:

For Your:	☐ Comment & Return	☐ Information
☐ Approval	☐ Files	☐ Investigation & Report
☐ Circulation	☐ Handling	☐ Signature

Response Requested by:

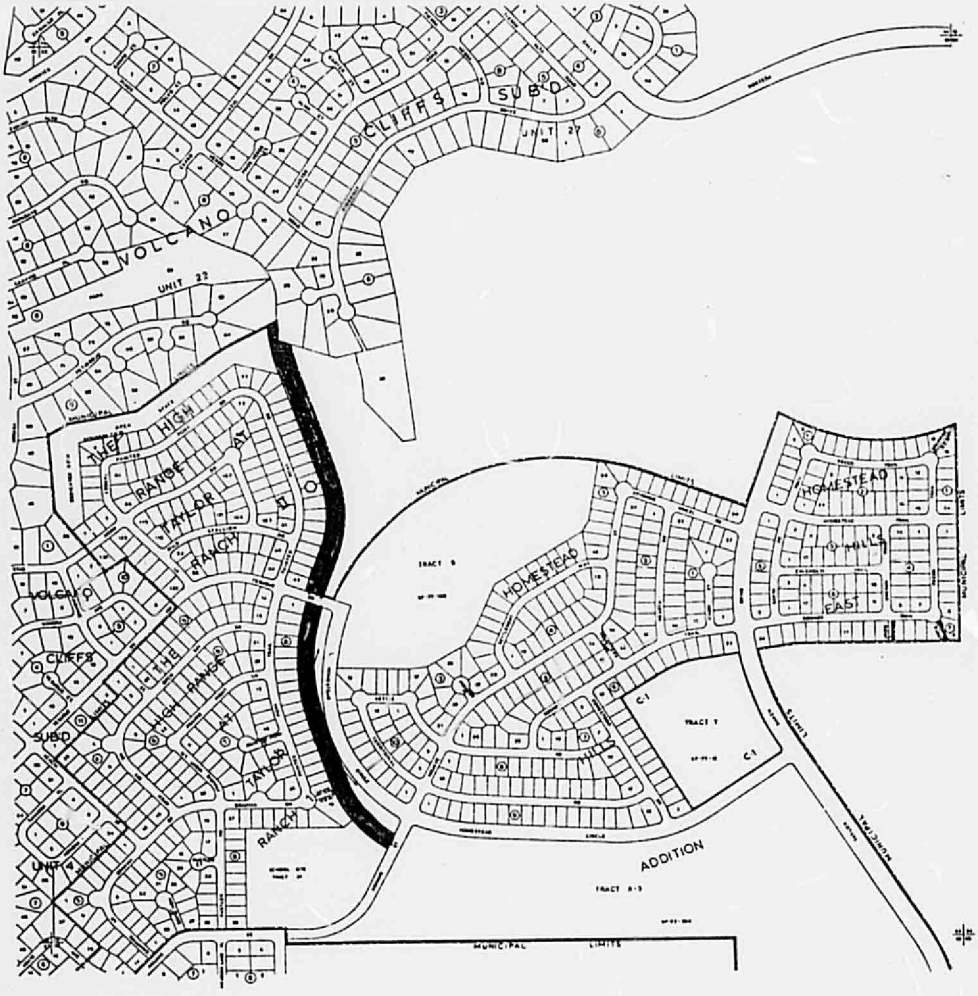
REMARKS:

Copy to Bob for action

Copy to Bruno for comment.

cc: RIB

10/5/79 ☐ _____ ☐ _____
Date City Engineer


VOLCANO CLIFFS SUBD
UNIT 22
UNIT 27
THE HIGH RANGE AT TAYLOR RANCH
HOMESTEAD
HOMESTEAD EAST
TRACT 5
TRACT 7
C-1
ADDITION
TRACT A-3
MUNICIPAL LIMITS
D-11-Z

October 2, 1979
Date

City Engineer
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico

Gentlemen:

I hereby request that a preliminary estimate of costs be prepared for:

Water Main
Sanitary Sewer
(Storm Sewer)
Street Paving
Alley Paving
Curb & Gutter

(Circled Desired Facility)

to serve the following property:

Lot or Tract Nos. TAYLOR RANCH

Block No. SEE ATTACHED LOCATION MAP

MRGCD Map No. _____

Name of Subdivision LA MARIPOSA DRAINAGE CHANNEL

The above description includes all the property to be served by the facilities, including accessory property, such as: accessory buildings, parking space, or other uses.

I am concerned with the facility extensions as the (agent / owner / leasee) (Circle one) of this property.

The owner of this property is AMBELL, a Partnership - BELLAMAH CORP., a Partner
Name

P. O. BOX 3325, ALBUQUERQUE, NEW MEXICO 87190
Street City State Zip Code

The described property (is / is not) (Circle One) annexed to the City.

THOMAS J. DI RITO, DEVELOPMENT ENGINEER
(Requestor)

P. O. BOX 3325
(Street Address)

ALBUQUERQUE, NEW MEXICO 87190
(City State Zip Code)

(505) 883-3000, EXT. 120
(Telephone Number)

Builders/realtors/developers
commercial & residential

Bellamah Corporation

October 2, 1979

RECEIVED
OCT 05 1979
CITY ENGINEER

Mr. Richard Heller, City Engineer
City of Albuquerque
City Engineer's Office
P. O. Box 1293
Albuquerque, New Mexico 87103

RE: LA MARIPOSA DRAINAGE CHANNEL

Dear Dick:

Attached please find the city request for a preliminary estimate of cost to be prepared for the La Mariposa Drainage Channel in the area of High Range at Taylor Ranch, Unit I and II.

Also attached please find a location map for this project as well as a set of the approved construction drawings as approved by the City Engineer of the City of Albuquerque, Mr. V. M. Kimmick, on July 12, 1978.

Please begin work on this preliminary estimate immediately, as we will be ready to commence construction as soon as it has been prepared.

If there are any further questions, please do not hesitate to contact me.

Very truly yours,

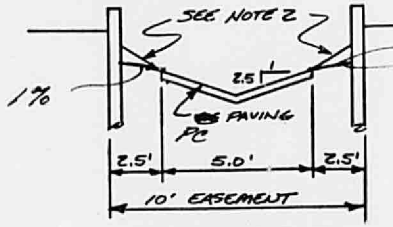
AMBELL, a Partnership
BELLAMAH CORP., a Partner

Thomas J. Di Rito
Development Engineer

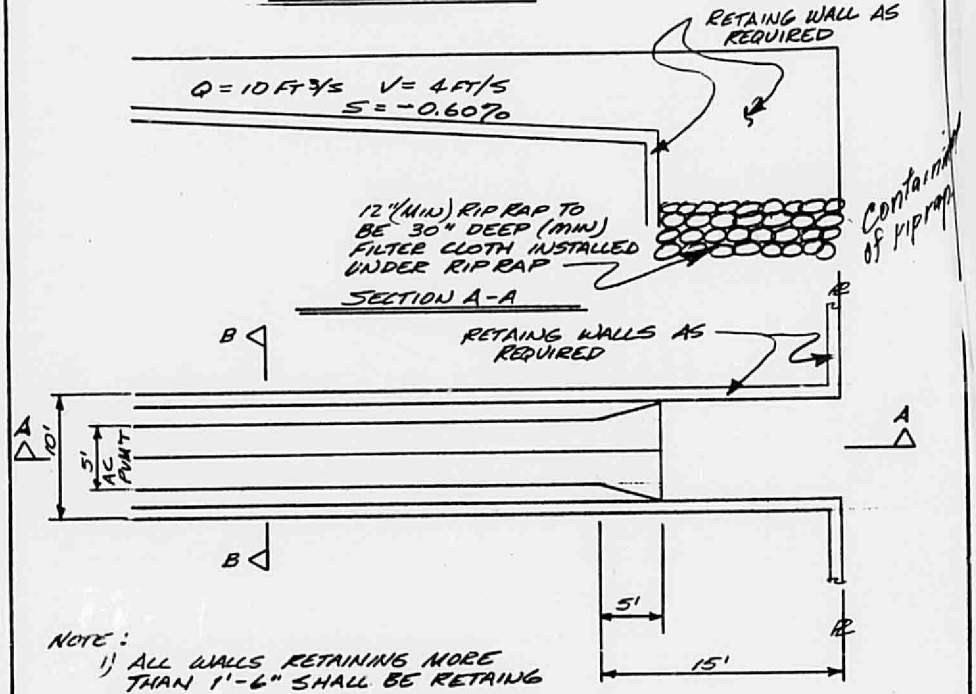
TDR/rr

Attachments

6121 Indian School Road, NE / PO Box 3325 / Albuquerque, New Mexico 87190 / (505) 883-3000



SECTION B-B

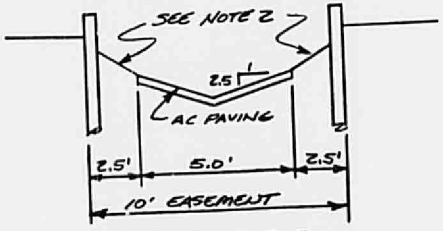


NOTE:

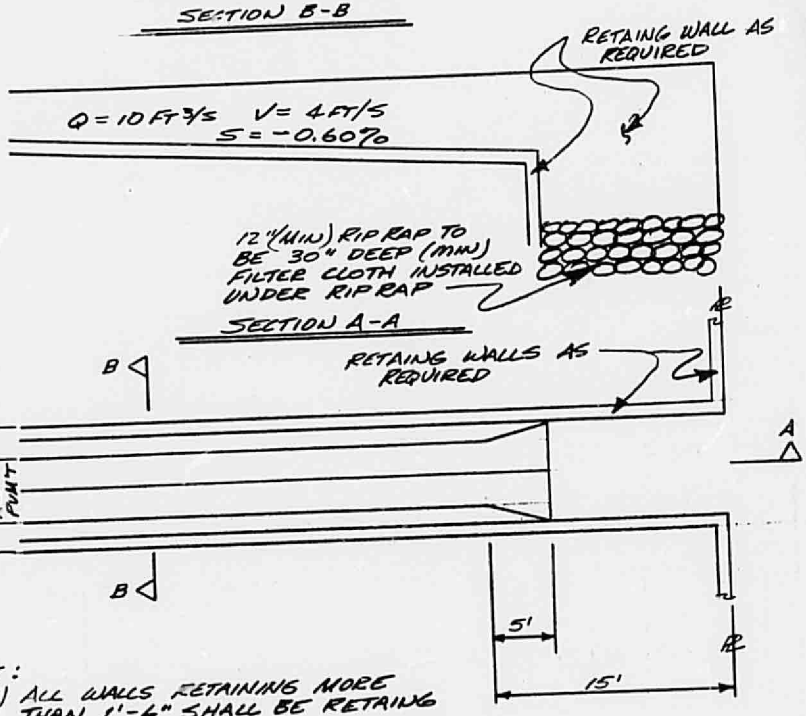
1) ALL WALLS RETAINING MORE THAN 1'-6" SHALL BE RETAING WALLS
2) MAX SLOPE TO BE 2 HORIZONTAL TO 1 VERTICAL.
3) GARDEN WALLS BUILT BY OTHERS
4) RETAING WALLS TO BE BUILT BY DEVELOPERS.

MEURER, SERAFINI AND MEURER, INC.
CONSULTING ENGINEERS • SURVEYORS • PLANNERS
2601 WYOMING BOULEVARD • SUITE F • ALBUQUERQUE, NEW MEXICO 87110 • (505) 292-1936

JOB NO. 8120063 DATE 3-11-80
PROJECT TRACT 11, DRAINAGE EASEMENTS SCALE NTS



SECTION B-B



SECTION A-A

NOTE:
1) ALL WALLS RETAINING MORE THAN 1'-6" SHALL BE RETAING WALLS
2) MAX SLOPE TO BE 2 HORIZONTAL TO 1 VERTICAL.
3) GARDEN WALLS BUILT BY OTHERS
4) RETAING WALLS TO BE BUILT BY DEVELOPERS.

MEURER, SERAFINI AND MEURER, INC.
CONSULTING ENGINEERS • SURVEYORS • PLANNERS
2601 WYOMING BOULEVARD • SUITE F • ALBUQUERQUE, NEW MEXICO 87110 • (505) 292-1936

JOB NO. B120063 DATE 3-11-80
PROJECT TRACT 11, DRAINAGE EASEMENTS SCALE NTS

DRAINAGE REPORT

FOR

HOMESTEAD HILLS NORTH
(TRACT 11, TAYLOR RANCH)

ALBUQUERQUE, NEW MEXICO



MEURER, GRAEPEL AND MEURER, INC.
2400 Wyoming Boulevard, N.E.
Albuquerque, New Mexico 87110
(505) 292-1675

DRAINAGE REPORT

FOR

HOMESTEAD HILLS NORTH
(TRACT 11, TAYLOR RANCH)

ALBUQUERQUE, NEW MEXICO

RECEIVED
MAY 17 1979
CITY ENGINEERS

Prepared By

Meurer, Serafini and Meurer, Inc.
2601 Wyoming Boulevard N.E.
Albuquerque, New Mexico 87110

(505) 292-1936

May 16, 1979

TABLE OF CONTENTS

	Page No.
PURPOSE AND SCOPE	1
SITE LOCATION & TOPOGRAPHY	1
DESIGN CRITERIA	2
ESTIMATED RUNOFF UNDEVELOPED STATE	2
ESTIMATED RUNOFF DEVELOPED STATE	3
EXPLANATION OF RESULTS	4
RECOMMENDATIONS	6
SUMMARY	7

APPENDIX

Appendix 1	Composite Runoff Coefficient
Appendix 2	Ponding Requirement
Appendix 3	Runoff Computations
Appendix 4	Agreement Letter
Figure I	Developed Drainage Conditions
Figure II	Typical Lot Drainage
Figure III	Time of Concentration of Small Drainage Basins
Figure IV	Intensity Duration Frequency Curves
Figure V	Offsite & Undeveloped Drainage

DRAINAGE REPORT

HOMESTEAD HILLS NORTH
(TRACT 11, TAYLOR RANCH)

PURPOSE AND SCOPE

AMBELL, a joint venture of AMDEC and Dale Bellamah Land Company, is currently developing lands located on the western Albuquerque Metropolitan Area known as Taylor Ranch. Taylor Ranch is a many faceted development, master planned concept which includes single family, multi-family, parks, schools, and commercial areas. Homestead Hills North is a single family subdivision containing 182 lots.

The purpose of this report is to present a plan for controlling surface runoff from the said subdivision in a manner acceptable to the Albuquerque Metropolitan Arroyo Flood Control Authority and the Albuquerque City Engineer's office.

SITE LOCATION AND TOPOGRAPHY

Homestead Hills North is located within Section 28, T. 11 N., R. 2 E., N.M.P.M. The lands to the south are developed in the name of Homestead Hills East. Lands on all other sides are currently undeveloped. The Piedras Marcadas south branch diversion channel is located on the south side of this development.

The soil of the site is generally comprised of eolian sand and gravel. The natural ground slopes from northwest to southeast with several small swales. Ground cover consists mainly of rabbitbrush, cactus, native grass and sand and gravel.

DESIGN CRITERIA

In analyzing the storm runoff, the Rational Formula, Q = CIA is used.

Where:

Q = Runoff quantity in cubic feet/second.

A = Contributing area in acres.

I = Intensity in inches/hour for a duration equal to the time of accumulation (duration) measured in minutes and obtained from Figure IV, Intensity Duration Frequency Curves, Albuquerque Area 1961. (Note: Where a Time Concentration (Tc) is less than ten minutes from Figure III, the intensity value, derived from a Tc equal to ten minutes is employed.)

C = Runoff Coefficient (No Unit). This coefficient represents the integrated effects of infiltration, detention storage, evaporation, retention, flow routing, and interception which all affect the time distribution and peak rate of runoff.

ESTIMATED RUNOFF UNDEVELOPED STATE:

Drainage within the boundary of the site is basically overland flow with some small swales. The drainage naturally exits the area at a number of locations along the east boundary line. Flows discharge from the site as sheet flow in some areas and as slightly more concentrated flows in some areas. The historic flows are shown on Table 1. Offsite flows from offsite areas to the north and west will be intercepted by the subject development and can easily be carried through the project.

For the purposes of this report the offsite flows into Homestead Hills North have been developed based on existing conditions and are shown below. Provisions are being made to carry these offsite flows through the development by means of intercepting flows by construction of Taylor Ranch Drive on the west and Calle Nortena Drive on the north.

The total runoff in the undeveloped state forms the basis for comparison with flows in the developed state.

TABLE 1

RUNOFF IN UNDEVELOPED STATE FOR HOMESTEAD HILLS NORTH

Drainage Basin	Elev. Diff.	Length of Flow	Tc Min.	I100 yr. In./Hr.	C	Area Ac.	Q C.F.S.
UD-1	62	1270	(10)	(5.4)	.40	6.03	13.0
UD-2	64	1300	(10)	(5.4)	.40	11.90	25.7
UD-3	77	1600	(10)	(5.4)	.40	12.17	26.3
UD-4	57.5	1600	(10)	(5.4)	.40	14.69	31.7
UD-5	16.0	870	(10)	(5.4)	.40	2.19	4.7

Summation UD-1 through UD-5 = 101.40 C.F.S.

ESTIMATED RUNOFF DEVELOPED STATE

As development occurs, the area of impervious surfaces increases and thereby the amount of runoff also increases. To offset this increase, onsite restrictions of flows must be incorporated into the development. While this can take different forms, the most practical solution for this type of development is to utilize on-lot ponding. The contributing area to the backyard ponding includes the backyard, sideyard, and in a majority of cases, one-half of the roof area due to the popularity of the pitched roof concept. The area drained to

to the street includes the front yard, driveway, sidewalk-parkway areas, and one-half the roof area. This approach will satisfy A.M.A.F.C.A.'s requirement that the runoff rate from the developed tract not exceed the runoff rate from the tract in its natural state.

The runoff coefficients for the various surfaces are as follows:

Streets, Walks and Drives	C = 0.9
Roofs	C = 0.9
Lawns, Sandy Soils (Average 2 to 7%)	C = 0.4

The runoff in the developed state is shown in Appendix 3.

EXPLANATION OF RESULTS

Undeveloped Runoff:

Onsite - Total Flow = 101.40 C.F.S.

Developed Runoff:

Onsite - Total Flow = 78.00 C.F.S.

As shown above, the development of this project, including lot ponding, will not increase the storm runoff from that occurring in the natural undeveloped state.

Storm runoff from OS-1 and OS-2 will be intercepted by Taylor Ranch Drive and Calle Nortena Drive respectively. Flow entering Taylor Ranch Drive will be conveyed south to the south branch of the Piedras Marcadas Arroyo. Flows conveyed in Calle Nortena Drive will discharge into an already natural arroyo to the east. The discharge of flows from Calle Nortena Drive will be very similar to the historic conditions.

Drainage to be discharged from the development will be accomplished as described below. The concept for discharging runoff has been approved by the City Engineer in a letter dated May 3, 1979.

In order to discharge drainage to the east in a manner as similar as possible to the historic sheet flow, it is recommended that several discharge points be located along the east boundary of the subject development.

Butterfield Trail will be designed to drain to the east thereby discharging runoff conveyed in Wagon Mound Drive, Independence Drive and Golden Spike Drive. The 100-year storm frequency runoff will be approximately 40 cfs, which historically sheet flowed off the site between Calle Nortena and Butterfield Trail.

Drainage generated in the southern portion of the proposed development will be discharged through two temporary drainage easements, one on Lot 33 adjacent to Lot 32 and one on Lot 35 adjacent to Lot 36. A third discharge point will be between Lots 36 and 37 by means of conveying flows in a standard drainage rundown constructed within a 10' drainage right-of-way.

Within the two drainage easements, runoff will be conveyed in a 3' wide, 6" deep Vee shaped stabilized swale graded such that the flows can be adequately handled within the easement. Curb cuts will allow flows to enter the temporary easements and 1/4" deck plating will be constructed over the temporary swales at the sidewalk to provide safe pedestrian traffic.

Wells Fargo Trail and Sundance Trail will form a low point at the location of the drainage right-of-way. Flows being discharged down each temporary drainage easement will be approximately 10 cfs.

The temporary easements will be located totally on one lot in order to avoid conflict with walls, etc.

At such time as the necessary steps have been taken to allow free discharge to the east in the Piedras Marcadas Arroyo, the temporary easements will be vacated, the curb openings and sidewalks will be rebuilt and the entire storm runoff discharged into the right-of-way.

All the developed runoff from the Homestead Hills North will be collected by the streets within the development and be transported to the east and southeast, then discharged at four locations as described above.

RECOMMENDATIONS

The following recommendations are made to enable the developer on this site and the local government to complete this project within the design criteria:

1. The ponding areas in each backyard would be best situated toward the rear of the yard. There should be a minimum of five foot (5') buffer zone between the rear property lines and the edge of the pond. This will protect any walls which might be constructed. In no case should ponded waters be allowed to stand against the wall or house foundation.
2. Ponds should average 6" deep and the minimum surface area should not be less than 22% of the total area drained into the pond. All lots on the site have been ponded wherever it is practical.
3. Flows within the streets of the development are distributed enough so that no one street assumes a critical burden in

carrying capacities. However, no street should be graded at less than 0.4% slope in order to insure adequate carrying capacities.

4. Runoff from OS-1 and OS-2 will be intercepted by Taylor Ranch Drive and Calle Nortena Drive. Those offsite flows will then be conveyed to respective water courses. Rip-rap or an equivalent energy dissipator should be constructed at the east end of Calle Nortena for erosion protection.

5. Discharge from the development will be to the east and southeast through two temporary drainage easements and two rights-of-way in order to simulate as nearly as practicable the historic flows. The conceptual manner of discharge has been approved by the City Engineer in a letter dated May 3, 1979.

SUMMARY

The subject property, by utilizing backyard ponding, will contribute no more surface runoff to surrounding areas than that which existed before development.

In conclusion, the development of this site will not have an adverse effect on the drainage characteristics of this area, and runoff can be developed safely with no harm to life or property.

Prepared by:

Frank Krim

FRANK KRIM

Under the supervision of

Jeryl D. Hart

JERYL HART, JR.

JERYL D. HART, JR. NEW MEXICO 6788 REGISTERED PROFESSIONAL ENGINEER

APPENDIX 1

APPENDIX 1

COMPOSITE RUNOFF COEFFICIENT

Undeveloped Land

C = 0.40

Developed Land

Typical Lot Area

Gross Area 55.04 Acres

Average Lot Area (~~48~~ 182 Lots) 7820 ft.^{2}

Typical Lot Width 68 Ft.

Ponded Lots (Area draining from lot, including 1/2 street)

C = 0.90

Streets & Walk Area	20' x 68' =	1360	sq.ft.
Roof Area	25' x 50' =	1250	sq.ft.
Driveway	20' x 25' =	500	sq.ft.
Total Impervious Area		3110	sq.ft.

C = 0.40

Front Landscaping	(FRONT YARD 4 4'x68' PLANTER AREA@FRONT)	1008	sq.ft.
Side Yards	9' x 25 x 2 =	450'	sq.ft.
Total Pervious Area		1458'	sq.ft.

Impervious Area	3110 sq.ft.	0.68 @ 0.90	0.61
Pervious Area	1458 sq.ft.	0.32 @ 0.40	0.13
Total Area	4568 sq.ft.		0.74

Composite Runoff Coefficient = 0.74

AREA A-1 3.0 ACRES

STREET AREA = 0.43 Ac

SIDEWALK AREA=0.09 Ac

DRIVEWAY AREA=0.16 Ac

PATIO AREA = 0.01

1/2 ROOF AREA (8 EA.) 25x50 = 0.23Ac

FULL ROOF AREA (6 EA.) 50x60 = 0.34Ac

TOTAL IMPERVIOUS AREA 1.26 Ac. @ 42 % x .9 = .38

TOTAL PERVIOUS AREA 1.74 Ac. @ 58 % x .4 = .23

.61

AREA A-2 2.1 ACRES

STREET AREA = 0.31 Ac

SIDEWALK AREA=0.08Ac

DRIVEWAY AREA 0.13Ac

PATIO AREA = 0.01 Ac

1/2 ROOF AREA (5.5 EA.) 25x50 = 0.16Ac

FULL ROOF AREA (5.5 EA.) 50x50 = 0.32Ac

TOTAL IMPERVIOUS AREA 1.01 Ac. @ 48 % x .9 = .43

TOTAL PERVIOUS AREA 1.00 Ac. @ 48 % x .4 = .19

.62

B-1

AREA B-1 3.8 ACRES

STREET AREA = 0.69 Ac

SIDEWALK AREA = 0.16Ac

DRIVEWAY AREA = 0.24Ac

PATIO AREA = 0.03Ac

1/2 ROOF AREA (11 EA.) 25x50 = 0.32Ac

FULL ROOF AREA (10 EA.) 50x50 = 0.57

TOTAL IMPERVIOUS AREA 2.01 Ac. @ 53 % x .9 = .48

TOTAL PERVIOUS AREA 1.79 Ac. @ 47 % x .4 = .19

.67

B-2

AREA B-2 3.1 ACRES

STREET AREA = 0.67Ac

SIDEWALK AREA=0.16Ac

DRIVEWAY AREA=0.26Ac

PATIO AREA = 0.01Ac

1/2 ROOF AREA (20 EA.) 25x50 = 0.57

FULL ROOF AREA (1 EA.) 50x50 = 0.06

TOTAL IMPERVIOUS AREA 1.73 Ac. @ 56 % x .9 = .50

TOTAL PERVIOUS AREA 1.37 Ac. @ 44 % x .4 = .18

.68

A-3 ✓

AREA 1.2 ACRES

STREET AREA = 0.20Ac

SIDEWALK AREA=0.04Ac

DRIVEWAY AREA=0.08Ac

PATIO AREA = 0.01Ac

1/2 ROOF AREA (3 EA.) 25x50 = 0.09Ac

FULL ROOF AREA (3 EA.) 50x50 = 0.17Ac

TOTAL IMPERVIOUS AREA .59 Ac. @ 49 % x .9 = .44

TOTAL PERVIOUS AREA .61 Ac. @ 51 % x .4 = .20

.64

A-4 ✓

AREA 1.6 ACRES

STREET AREA=0.37Ac

SIDEWALK AREA=0.08Ac

DRIVEWAY AREA=0.06Ac

PATIO AREA = 0.01Ac

1/2 ROOF AREA (5 EA.) 25x50 = 0.14

FULL ROOF AREA (2.5 EA.) 50x50 = 0.14

TOTAL IMPERVIOUS AREA .80 Ac. @ 50 % x .9 = .45

TOTAL PERVIOUS AREA .80 Ac. @ 50 % x .4 = .20

.65

AREA I-2 3.7 ACRES

STREET AREA .366 Ac

SIDEWALK AREA .17 Ac

DRIVEWAY AREA 21'x 20'x25' = .24 Ac

PATIO AREA 7 x 100SF = .02

1/2 ROOF AREA (14 EA.) 25x50 = .40 Ac

FULL ROOF AREA (7 EA.) 50x50 = .40

TOTAL IMPERVIOUS AREA 1.89 Ac. @ .51 % x .9 = 0.459

TOTAL PERVIOUS AREA 1.81 Ac. @ .49 % x .4 = 0.196

0.66

AREA H-1 0.9 ACRES

STREET AREA = 0.20Ac

SIDEWALK AREA = 0.05Ac

DRIVEWAY AREA = 0.11Ac

PATIO AREA ———

1/2 ROOF AREA (6 EA.) 25x50 = 0.17Ac

FULL ROOF AREA (EA.)

TOTAL IMPERVIOUS AREA .53 Ac. @ 59 % x .9 = .53

TOTAL PERVIOUS AREA .37 Ac. @ 41 % x .4 = .15

.68

AREA _____ _____ACRES

STREET AREA

SIDEWALK AREA

DRIVEWAY AREA

PATIO AREA

1/2 ROOF AREA (EA.)

FULL ROOF AREA (EA.)

TOTAL IMPERVIOUS AREA _____Ac. @ _____% x .9 =

TOTAL PERVIOUS AREA _____Ac. @ _____% x .4 =

AREA G-2 1.4 ACRES

STREET AREA = 0.13 7Ac

SIDEWALK AREA = 0.09 Ac

DRIVEWAY AREA = 0.07 Ac

PATIO AREA _____

1/2 ROOF AREA (6.5 EA.) 25x50 = 0.19 Ac

FULL ROOF AREA (1 EA.) 0.06 Ac

TOTAL IMPERVIOUS AREA .78 Ac. @ 56 % x .9 = .50

TOTAL PERVIOUS AREA .62 Ac. @ 44 % x .4 = .18

.68

AREA I-1 1.2 ACRES

STREET AREA = 0, 24 Ac

SIDEWALK AREA = 0. 06 Ac

DRIVEWAY AREA = 0. 09 Ac

PATIO AREA _____

1/2 ROOF AREA (8 EA.) 25x50 = 0.23 A.

FULL ROOF AREA (EA.)

TOTAL IMPERVIOUS AREA .62 Ac. @ 52 % x .9 = .47

TOTAL PERVIOUS AREA .58 Ac. @ 48 % x .4 = .19

.66

AREA _____ _____ ACRES

STREET AREA

SIDEWALK AREA

DRIVEWAY AREA

PATIO AREA

1/2 ROOF AREA (EA.)

FULL ROOF AREA (EA.)

TOTAL IMPERVIOUS AREA ___ Ac. @ _____ % x .9 =

TOTAL PERVIOUS AREA _____ Ac. @ _____ % x .4 =

B-3

AREA B-3 1.1 ACRES

STREET AREA = 0.29 Ac

SIDEWALK AREA = 0.06 Ac

DRIVEWAY AREA = 0.05 Ac

PATIO AREA = 0.005 Ac

1/2 ROOF AREA (3 EA.) 25 x 50 = 0.09 Ac

FULL ROOF AREA (2 EA.) 50 x 50 = 0.11 Ac

TOTAL IMPERVIOUS AREA .61 Ac. @ 55 % x .9 = .50

TOTAL PERVIOUS AREA .49 Ac. @ 45 % x .4 = .18

.68

A-5

AREA A-5 3.3 ACRES

STREET AREA = 0.48 Ac

SIDEWALK AREA 0.11 Ac

DRIVEWAY AREA 0.17 Ac

PATIO AREA = 0.02 Ac

1/2 ROOF AREA (11 EA.) 25 x 50 = 0.32 Ac

FULL ROOF AREA (6 EA.) 50 x 50 = 0.34 Ac

TOTAL IMPERVIOUS AREA 1.44 Ac. @ 44 % x .9 = .40

TOTAL PERVIOUS AREA 1.86 Ac. @ 56 % x .4 = .22

.62

AREA D-1 .8 ACRES

STREET AREA = 0.22 Ac

SIDEWALK AREA = 0.04 Ac

DRIVEWAY AREA =

PATIO AREA = 0.01 Ac

1/2 ROOF AREA (3 EA.) 20 x 25 = 0.07

FULL ROOF AREA (EA.)

TOTAL IMPERVIOUS AREA 0.34 Ac. @ .43 % x .9 = .39

TOTAL PERVIOUS AREA 0.46 Ac. @ .57 % x .4 = .23

.62

E-1
I-1

AREA A-1 2 ACRES

STREET AREA = 0.29 Ac

SIDEWALK AREA = 0.07 Ac

DRIVEWAY AREA = 0.13 Ac

PATIO AREA = 0.01 Ac

1/2 ROOF AREA (4.5 EA.) 25x50 = 0.13 Ac.

FULL ROOF AREA (6 EA.) 50x50 = 0.34 Ac

TOTAL IMPERVIOUS AREA .97 Ac. @ 49 % x .9 = .44

TOTAL PERVIOUS AREA 1.03 Ac. @ 52 % x .4 = .21

.65

AREA F-1 2.4 ACRES

STREET AREA = 0.42 Ac

SIDEWALK AREA = 0.10 Ac

DRIVEWAY AREA = 0.17 Ac

PATIO AREA = 0.01 Ac

1/2 ROOF AREA (11 EA.) 25x50 = .32

FULL ROOF AREA (3 EA.) 50x50 = .17

TOTAL IMPERVIOUS AREA 1.19 Ac. @ 50 % x .9 = .45

TOTAL PERVIOUS AREA 1.21 Ac. @ 50 % x .4 = .20

.65

AREA G-1 1.1 ACRES

STREET AREA = 0.18 Ac

SIDEWALK AREA = 0.05 Ac

DRIVEWAY AREA = 0.09 Ac

PATIO AREA ——

1/2 ROOF AREA (7 EA.) 25x50 = 0.20 Ac

FULL ROOF AREA (1 EA.) 50x50 = 0.06 Ac

TOTAL IMPERVIOUS AREA .58 Ac. @ 53 % x .9 = .47

TOTAL PERVIOUS AREA .52 Ac. @ 47 % x .4 = .19

.66

APPENDIX 2

APPENDIX 2

Ponding Requirements

1/2 Roof Area	(0.9)	25'x50' =	1250 □'
Patio Area	(0.9)	10'x10' =	100 □'
Rear Lawn Area	(0.4)	40x68 = 2720-100 =	2620 □'
Side Yards	(0.4)	9x25x2 =	450 □'
Total Area Draining to Pond			4420 □'

Runoff Coefficient

Impervious Area:

C = 0.90 $\frac{1350}{4420}$ = 0.27

Pervious Area:

C = 0.40 $\frac{3070}{4420}$ = 0.28

Composite C = 0.55

Pond Volume Requirements:

100-year storm precipitation = 2.4 inches

Volume = Runoff Coefficient x Area x Precipitation

V = 2.4/12 x 0.55 x 4420 □' = 486.20 ft³

Depth of Pond 0.50 ft. (6")

Minimum area of pond = 972.40 □'

Pond area as a percentage of area drained = 22 %

NON-PONDED LOTS

C = .90

STREET AREA	20' x 68'	=	1360 □'
ROOF AREA	50' x 50'	=	2500 □'
DRIVEWAY	20' x 25'	=	500 □'
PATIO	10' x 10'	=	100 □'
TOTAL IMPERVIOUS AREA		=	4460 □'

C = .40

AVG LOT AREA	=	7820 □'
LESS ROOF AREA	−	2500 □'
LESS DRIVEWAY	−	500 □'
LESS STREET AREA	−	1360 □'
LESS PATIO AREA	−	100 □'
		3360 □'

IMPERVIOUS AREA	4460 □'	0.57 @ 0.90 =	0.51
PERVIOUS AREA	3360 □'	0.43 @ 0.40 =	0.17
TOTAL AREA	7820 □'	100% =	0.68

APPENDIX 3

APPENDIX 3

RUNOFF COMPUTATIONS

Sheet No. _____

Project: HOMESTEAD HILL NO. -

Drainage Area No. A-1

Area = 3.0 * acres

Maximum Overland Flow: L = 180' S = .01

Maximum Channel Flow:

Channel No. 1 L = 475 S = .0393

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: 10 min.

Channel No. 1 Flow:

Omit Velocity = 1.6 ft/sec; Time = $\frac{180}{1.6 \times 60}$ = 1.9 min.

Channel No. 2 Flow:

Velocity = 4.0 ft/sec; Time = $\frac{475}{4.0 \times 60}$ = 2.0 min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Total Accumulation Time: T = ~~13.9~~ 12.0 min.

I = _____ = _____ = $tc = \frac{189}{13.9+25}$

Q = CIA = (.61) (4.86) (3) = 8.9 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ____

___ % Non-Ponded @ ___ ____

___ % _____ @ ___ ____

100 % TOTAL ____

* LESS PONDING

Copy #3

RUNOFF COMPUTATIONS

Sheet No. _____

Project: HOMESTEAD HILLS No

Drainage Area No. A-2

Area = 2.1 acres

Maximum Overland Flow: L = 180' S = .01

Maximum Channel Flow:

Channel No. 1 L = 400 S = .0367

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: 10 min.

Channel No. 1 Flow:

Velocity = 3.8 ft/sec; Time = $\frac{400}{3.8 \times 60}$ = 1.75 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\times 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\times 60}$ = _____ min.

Total Accumulation Time: $T_c = 11.75 + 25$ T = 11.75 min.

I = _____ = _____ = _____

Q = CIA = (.62) (5.14) (2.1) = 6.7 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

RUNOFF COMPUTATIONS

Sheet No. _____

Project: HOMESTEAD HILLS No. 1

Drainage Area No. ~~A-5~~ A-3

Area = 1.2 acres

Maximum Overland Flow: L = 200' S = .01

Maximum Channel Flow:

Channel No. 1 L = 170' S = .0376

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: 10 min.

Channel No. 1 Flow:

Velocity = 3.9 ft/sec; Time = $\frac{170}{3.9 \times 60}$ = 0.7 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Total Accumulation Time: T = 10.7 min.

I = _____ = _____ = $t_c = \frac{184}{10.7+25}$

Q = CIA = (.64) (5.29) (1.2) = 4.06 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

RUNOFF COMPUTATIONS

Sheet No. _____

Project: HOMESTEAD HILLS No

Drainage Area No. A-6 A-4

Area = 1.6 acres

Maximum Overland Flow: L = 60 S = .01

Maximum Channel Flow:

Channel No. 1 L = 460' S = .0353

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: 10 min.

Channel No. 1 Flow:

Velocity = 3.8 ft/sec; Time = $\frac{460}{3.8 \times 60}$ = 2.02 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\quad \times 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\quad \times 60}$ = _____ min.

Total Accumulation Time: $t_c = 10 + 2$ T = 12 min.

I = _____ = _____ = _____

Q = CIA = (.65) (5.11) (1.6) = 5.31 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ____

___ % Non-Ponded @ ___ ____

___ % _____ @ ___ ____

100 % TOTAL ____

RUNOFF COMPUTATIONS

Sheet No. _____

Project: HOMESTEAD HILLS No

Drainage Area No. A-5

Area = 3.3 acres

Maximum Overland Flow: L = 125 S = .01

Maximum Channel Flow:

Channel No. 1 L = 335 S = .0343

Channel No. 2 L = 226 S = .0075

Channel No. 3 L = 125 S = .0407

Accumulation Time

Overland Flow or Inlet Time: 10 min.

Channel No. 1 Flow:

Velocity = 3.7 ft/sec; Time = $\frac{335}{3.7 \times 60}$ = 1.5 min.

Channel No. 2 Flow:

Velocity = 1.8 ft/sec; Time = $\frac{225}{1.8 \times 60}$ = 2.1 min.

Channel No. 3 Flow:

Velocity = 4 ft/sec; Time = $\frac{125}{4 \times 60}$ = .5 min.

Total Accumulation Time: $t_c = \frac{189}{14.1 + 25}$ T = 14.1 min.

I = _____ = _____ = _____

Q = CIA = (.62) (4.83) (3.3) = 9.88 c.f.s.

Date: _____

WEIGHTED RUNOFF COEFFICIENT

Comp. by: _____

Checked by: _____

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

RUNOFF COMPUTATIONS

Sheet No. _____

Project: HOMESTEAD HILLS No. 4

Drainage Area No. ~~A-3~~ B-4

Area = 3.8 acres

Maximum Overland Flow: L = 80' S = .01

Maximum Channel Flow:

Channel No. 1 L = 570 S = .0246

Channel No. 2 L = 260 S = .0283

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: 10 min.

Channel No. 1 Flow:

Velocity = 3.1 ft/sec; Time = $\frac{570}{3.1 \times 60}$ = 3.06 min.

Channel No. 2 Flow:

Velocity = 3.3 ft/sec; Time = $\frac{260}{3.3 \times 60}$ = 1.31 min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\quad \times 60}$ = _____ min.

Total Accumulation Time: T = 14.4 min.

I = _____ = _____ = $\frac{185}{tc\ 14.4+25}$

Q = CIA = (.67) (4.80) (3.8) = 12.22 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

RUNOFF COMPUTATIONS

Sheet No. _____

Project: HOMESTEAD Hwis No

Drainage Area No. ~~A4~~ B2

Area = 3.1 acres

Maximum Overland Flow: L = 60' S = .01

Maximum Channel Flow:

Channel No. 1 L = 750' S = .0512

Channel No. 2 L = 500' S = .0190

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: 10 min.

Channel No. 1 Flow:

Velocity = 4.5 ft/sec; Time = $\frac{750}{4.5 \times 60}$ = 2.8 min.

Channel No. 2 Flow:

Velocity = 2.8 ft/sec; Time = $\frac{500}{2.8 \times 60}$ = 3.0 min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\times 60}$ = _____ min.

Total Accumulation Time: t_c T = 15.8 min.

I = _____ = _____ = $\frac{184}{15.8+25}$

Q = CIA = (.68) (4.63) (3.1) = 9.76 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

RUNOFF COMPUTATIONS

Sheet No. _____

Project: HOMESTEAD HILLS No.

Drainage Area No. A-7 B-3

Area = 1.1 acres

Maximum Overland Flow: L = 50 S = .01

Maximum Channel Flow:

Channel No. 1 L = 150' S = .0190

Channel No. 2 L = 175' S = .0523

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: 5 min.

Channel No. 1 Flow:

Velocity = 2.8 ft/sec; Time = $\frac{150}{2.8 \times 60}$ = 0.9 min.

Channel No. 2 Flow:

Velocity = 4.5 ft/sec; Time = $\frac{175}{4.5 \times 60}$ = 0.7 min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\times 60}$ = _____ min.

Total Accumulation Time: T = 6.60 min.

I = _____ = _____ = $t_c = \frac{189}{6.6+25}$

Q = CIA = (.68) (5.48) (1.1) = 4.47 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

RUNOFF COMPUTATIONS

Sheet No. _____

Project: H.H. No (TRACT #11)

Drainage Area No. C-1

Area = 0.85 acres

Maximum Overland Flow: L = _____ S = _____

Maximum Channel Flow:

Channel No. 1 L = 225 S = .04

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: _____ min.

Channel No. 1 Flow:

Velocity = 4.0 ft/sec; Time = $\frac{225}{4.0 \times 60}$ = 1.0 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Total Accumulation Time: T = 1.0 min.

I = _____ = _____ = _____

Q = CIA = (0.64) (7.56) (.85) = 4.11 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

RUNOFF COMPUTATIONS

Sheet No. _____

Project: HOMESTEAD HILLS No

Drainage Area No. A-9 D-1

Area = .8 acres

Maximum Overland Flow: L = 50 S = .01

Maximum Channel Flow:

Channel No. 1 L = 300 S = .0079

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: 3 min.

Channel No. 1 Flow:

Velocity = 1.8 ft/sec; Time = $\frac{300}{1.8 \times 60}$ = 2.8 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Total Accumulation Time: $\frac{189}{5.8+25}$ T = 5.8 min.

I = _____ = _____ = to

Q = CIA = (.62) (6.14) (.8) = 3.05 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

RUNOFF COMPUTATIONS

Sheet No. _____

Project: HOMESTEAD HILLS NO

Drainage Area No. ~~A H~~ E-1

Area = 2.0 acres

Maximum Overland Flow: L = 125 S = .01

Maximum Channel Flow:

Channel No. 1 L = 300' S = .004

Channel No. 2 L = 50 S = .0067

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: ~~10~~ min.

Channel No. 1 Flow:

Velocity = 1.4 ft/sec; Time = $\frac{300}{1.4 \times 60}$ = 3.6 min.

Channel No. 2 Flow:

Velocity = 1.8 ft/sec; Time = $\frac{50}{1.8 \times 60}$ = .5 min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\times 60}$ = _____ min.

Total Accumulation Time: 185/14.1+25 T = ~~14.1~~ 4.1 min.

I = _____ = $\frac{\quad}{6.49}$ = t_c

Q = CIA = (.65) (~~4.8~~ 6.49) (2) = 6.24 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

RATIONAL METHOD

RUNOFF COMPUTATIONS

Sheet No. _____

Project: _____

Drainage Area No. A-12 F-1

Area = 2.4 acres

Maximum Overland Flow: L = _____ S = _____

Maximum Channel Flow:

Channel No. 1 L = 575 S = 5.0110

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: _____ min.

Channel No. 1 Flow:

Velocity = 2.0 ft/sec; Time = $\frac{575}{2.0 \times 60}$ = 4.8 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Total Accumulation Time: T = 4.8 min.

I = _____ = _____ = _____

Q = CIA = (0.65) (6.34) (2.4) = 9.89 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

RATIONAL METHOD

RUNOFF COMPUTATIONS

Sheet No. _____

Project: _____

Drainage Area No. ~~A-13~~ G-1

Area = 1.1 acres

Maximum Overland Flow: L = _____ S = _____

Maximum Channel Flow:

Channel No. 1 L = 200 S = .01

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: _____ min.

Channel No. 1 Flow:

Velocity = 2.0 ft/sec; Time = $\frac{200}{2.0 \times 60}$ = 1.67 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Total Accumulation Time: 10 min

T = 1.67 min.

I = _____ = _____ = ~~tc~~ 1.67+25

Q = CIA = (.66) (7.09) (1.1) = 5.15 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

RUNOFF COMPUTATIONS

Sheet No._____

Project:_____

Drainage Area No. A-14 G-2

Area = 1.4 acres

Maximum Overland Flow: L = _____ S = _____

Maximum Channel Flow:

Channel No. 1 L = 500 S = 1.18

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: _____ min.

Channel No. 1 Flow:

Velocity = 2.1 ft/sec; Time = $\frac{500}{2.1 \times 60}$ = 3.97 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{X\ 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{X\ 60}$ = _____ min.

Total Accumulation Time: $t_c = 3.97 + 25$ T = 3.97 min.

I = _____ = _____ = 189

Q = CIA = (.68) (6.52) (1.4) = 6.21 c.f.s.

Date:_____

Comp. by:_____

Checked by:_____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

RUNOFF COMPUTATIONS

Sheet No. _____

Project: _____

Drainage Area No. Hq I-1

Area = _____ acres

Maximum Overland Flow: L = _____ S = _____

Maximum Channel Flow:

Channel No. 1 L = 300 S = .40

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: _____ min.

Channel No. 1 Flow:

Velocity = 1.5 ft/sec; Time = $\frac{300}{1.5 \times 60}$ = 4.2 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Total Accumulation Time: T = _____ min.

I = _____ = _____ = _____

Q = CIA = ( ) ( ) ( ) = _____ c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ____

___ % Non-Ponded @ ___ ____

___ % _____ @ ___ ____

100 % TOTAL ____

RUNOFF COMPUTATIONS

Sheet No. _____

Project: _____

Drainage Area No. 15-2

Area = _____ acres

Maximum Overland Flow: L = 100 S = 0.0100

Maximum Channel Flow:

Channel No. 1 L = 320 S = 0.0115

Channel No. 2 L = 560 S = 0.005

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: 10 min.

Channel No. 1 Flow:

Velocity = 2.1 ft/sec; Time = $\frac{320}{2.1 \times 60}$ = 2.54 min.

Channel No. 2 Flow:

Velocity = 1.5 ft/sec; Time = $\frac{560}{1.5 \times 60}$ = 6.22 min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{X\ 60}$ = _____ min.

Total Accumulation Time: T = 18.8 min.

I = _____ = _____ = _____

Q = CIA = (.66) (5.59) (3.7) = 13.65 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

RATIONAL METHOD

RUNOFF COMPUTATIONS

Sheet No. _____

Project: _____

Drainage Area No. ~~A-16~~ H-1

Area = .9 acres

Maximum Overland Flow: L = _____ S = _____

Maximum Channel Flow:

Channel No. 1 L = 250 S = .0110

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: _____ min.

Channel No. 1 Flow:

Velocity = 2.1 ft/sec; Time = $\frac{250}{2.1 \times 60}$ = 1.98 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Total Accumulation Time: $tc = \frac{185}{1.98 \times 25}$ T = 1.98 min.

I = _____ = _____ = _____

Q = CIA = (.68) (7.01) (.9) = 4.29 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

BDIVISION TAYLOR RANCH NORTH
CATION T.R.
B NO.
ESIGN STORM YR. RECURRENCE INTERVAL
AJOR STORM YR.
OMPUTATIONS BY F.K. DATE

RUNOFF COMPUTATIONS
(Rational Method)

PAGE 1 O

Area Designation	A (Acres)	c	c_f	$\bar{c}$ = (c x c_f)	A·$\bar{c}$	$\Sigma A \cdot \bar{c}$	tc (min)	I (in/hr)	Q = ($\Sigma A \cdot \bar{c}$) x I cfs	Street capacity cfs	Flow in Pipe cfs	Pipe Dia. in.	Slope %	Length ft.	VEL V fps	Δt (min)	
A-1	3.0			0.61	1.83		12.0	5.11	9.4	175							
A-2	2.1			0.62	1.30		11.75	5.17	6.7	175							
Σ A-1 to A-2						3.13	12.0	5.11	16.0								
A-3	1.2			0.64	0.77		10.7	5.29	4.1	175							
A-4	1.6			0.65	1.04		12.0	5.11	5.3	164			3.53	460		2.02	
Σ A-1 to A-4						4.94	14.0	4.85	23.9				2.46	570'		3.1	
A-5	3.3			0.62	2.05		14.1	4.83	9.9	175			2.83	260		1.3	
Σ A-1 to A-5						6.99	18.5	4.34	30.3								
B-1	3.8			0.67	2.55		14.4	4.60	12.24	150							
B-2	3.1			0.68	2.11		15.8	4.63	9.77	175							

HYDROLOGY D11/D4 1 of 2 12 PLANS

D11/D4

12 Plans

Taylor Ranch
South Branch

RICHARD E. LEONARD
EXECUTIVE ENGINEER

B. H. SWINBURNE, CHAIRMAN
WILLIAM V. HEREFORD, VICE-CHAIRMAN
FRANCES McCOY, SECRETARY-TREASURER
VERNON DOAK, DIRECTOR
RICHARD H. CLOUGH, DIRECTOR

Albuquerque
Metropolitan
Arroyo
Flood
Control
Authority

2600 PROSPECT AVE. N.E.
P. O. BOX 25851 - ALBUQUERQUE, N. M. 87125
TELEPHONE 344-3516

December 22, 1978

RECEIVED
DEC 29 1978
CITY ENGINEERS

Meurer-Serafini & Meurer, Inc.
2601 Wyoming Boulevard, N.E.
Albuquerque, N.M. 87112

ATT: Mr. Frank Krim

Dear Mr. Krim:

Reference is made to Mr. Tebben's October 27, 1978, letter and our subsequent conversations concerning the South Branch of Piedras Marcadas Arroyo in Taylor Ranch.

I am reluctant to consent to a plan which deviates from the Master Plan. However, in view of the City's previous approval, I am willing to go along with your revised plan dated December 22, 1978.

In the future, both the City and AMAFCA will expect closer conformance to the Master Plan.

Sincerely,

Dan Sabo

Dan Sabo
Engineer

For/Richard E. Leonard
Executive Engineer

cc: R. Heller
B. Conegliano — (plan attached)
D. Greene, Bellamah

Taylor Ranch
Hurstland
ltr

CITY OF ALBUQUERQUE, NEW MEXICO
CITY ENGINEER'S OFFICE

MEMORANDUM - April 2, 1979

TO: Gerald Davenport, Director of Municipal Development
FROM: Bruno Conegliano, Assistant City Engineer-Hydrology BC
SUBJECT: Taylor Ranch

Enclosed is a copy of a letter from MSM regarding Taylor Ranch. A reply was never given because I do not really know what reply should be given. You indicated Friday that we should have a discussion session with the Council on some of these drainage issues and policies. I was wondering if you had a chance to frame up some time for this purpose. I'd like to be able to give some indications to these people.

BC/fs
Enclosure

MEURER, SERAFINI AND MEURER, INC.
CONSULTING ENGINEERS • SURVEYORS • PLANNERS
2601 WYOMING BLVD., N.E., SUITE F • ALBUQUERQUE, NEW MEXICO 87110 • (505) 292-1936

March 30, 1979

Mr. Bruno Conegliano
Assistant City Engineer-Hydrology
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87103

Re: Homestead Hills North, Taylor Ranch, Tract 11, Drainage

Dear Bruno:

The purpose of this letter is to present matters for discussion and decision at the meeting scheduled with you on Tuesday, April 3, 1979, at 2:00 p.m., and to review the history of the drainage in this area.

Several reports and plans have been done on this area in the past. To begin with, William Matotan and Associates, Inc., in 1975 presented the Drainage Management Plan for the Western Albuquerque Metropolitan Area. In this plan the right-of-way and type channel for the Piedras Mercadas Arroyo were discussed. Since that time, Murray-McCormick, now MSM, submitted a drainage report for Homestead Hills East, Taylor Ranch Tract 8, in June 1977 and amended in September 1977, that defined the exact location of the Piedras Mercadas Arroyo, along the south side of Tract 11. Final plans were prepared for the arroyo and a major portion of it has now been constructed. Following that report, MSM prepared the Taylor Ranch Comprehensive Drainage Plan which was submitted to your office in January 1978 and was amended July 12, 1978. We have received no further written communication on it. On October 13, 1978, we furnished AMAFCA with a copy of this report at their request. On February 21st of this year, the City of Albuquerque and AMAFCA signed a Memorandum of Agreement which stated in Item 6 that the City pledges to eliminate the backlog of drainage reports by March 1, 1979. Since we have received no comment letter in regards to this report, we assume that it has been accepted.

We wish now to submit a drainage study on Homestead Hills North that is an amendment to this Overall Drainage Study based on the detailed calculations for this tract. We submitted a copy of the historic runoff versus the proposed runoff in plan form to your office on Thursday, March 29, 1979. As shown by that plan, no water will be drained

toward Taylor Ranch Drive except that which falls on Taylor Ranch Drive. Calculation of this flow shows that 15.6 cfs in the 100-year storm will be drained into the Piedras Mercadas Arroyo where Taylor Ranch crosses it. This flow is well below the 61 cfs shown on said Overall Drainage Study discharging into Taylor Ranch Drive out of Tract 11. As shown on the plan submitted, historically 108 cfs drains from this site in a natural condition, the majority of which flows onto the downstream property owner to the east. By our proposed plan, we show this flow to be reduced to 71 cfs where it discharges at a proposed concrete rundown at the southeast corner of subject site. The street at this location will carry up to 95 cfs with the velocity of only 6 ft./sec., at a depth of only 8" or .67 of a foot at a 1% slope. The depth times this velocity is equal to 4, which is well below the floodway criteria of 5. This calculation indicates adequate capacity within the street to handle this quantity of flow.

At our meeting at 1:30 on Wednesday, March 28, you also brought up the point that development could not occur on this tract due to the fact that there was no downstream drainage easement or drainage right-of-way for the Piedras Mercadas Arroyo. At that time you stated that this was the policy. Since we are reducing the flow that drains into this arroyo, below the historic, and flows are already concentrated at this location in the Piedras Mercadas Arroyo, we would like to know when this policy was implemented and by whose authority. According to the Memorandum of Agreement previously noted between AMAFCA and the City, in Item 9 it states "that it is not the intent of the drainage regulation to dictate a total solution at any cost; rather the intent is to require an economically reasonable degree of compliance." If the owner is required to secure drainage easements or wait until they are secured all the way to the River from this site before he can develop, he will be faced with an unreasonably economical solution.

In conclusion, the major purpose of this letter and the scheduled meeting is to clarify some of these concepts so that the owner may develop this tract in a reasonable manner. Your attention to these matters will be deeply appreciated, and if you have any questions please feel free to contact me.

Very truly yours,

MEURER, SERAFINI AND MEURER, INC.

Jeryl D. Hart

Jeryl D. Hart, Jr., P.E.
Project Manager

JDH:dw

cc: Mr. Don Greene, Bellamah
Mr. Thomas Burlison, Bellamah
Mr. Richard Heller, City Engineer
Mr. Rich Leonard, AMAFCA

Encls.

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
David Rusk

April 23, 1979

Mr. Carl A. Tebbens
Meurer, Serafini and Meurer
2601 Wyoming N.E., Suite F
Albuquerque, New Mexico 87110

Subject: Taylor Ranch, Tract 11

Dear Carl:

After submission of the drainage report and storm drainage proposal for Taylor Ranch, Tract 11, recommendations and alternatives have been reviewed. This tract, as a great portion of Taylor Ranch, has many problems due to the fact that discharge from the subdivision is not confined to existing watercourses or public drainage ways.

For the above reasons it is imperative that in the development of Tract 11 of Taylor Ranch, one of the following alternatives be pursued to control the drainage:

1. The drainage should be conveyed off of the subject property within a private drainage way conveyed with permission from adjoining property owners until it discharges in a defined natural watercourse. This private way would be maintained by the developer.

2. That adjacent properties be dedicated to the City of Albuquerque or AMAFCA and drainage improvements be constructed until they discharge into an existing watercourse.

The transmission of public waters, those emanating from public streets and drainage ways, are the responsibility of the City of Albuquerque. A review of this problem with the City Attorney reveals that it is the obligation of the City to insure that water can be transmitted from public rights-of-way and drainage easements to water courses in perpituity. For these reasons, we cannot approve Taylor Ranch, Tract 11 for development until such time as the water discharging from the subdivision can be conveyed with no liability for the City of Albuquerque.

Taylor Ranch

AN EQUAL OPPORTUNITY EMPLOYER

Should you have any questions, feel free to contact me anytime.

Very truly yours,

Richard S. Heller

Richard S. Heller
City Engineer

RSH/fs

cc - Gerald Davenport, Director of Municipal Development
John Meyers, Assistant City Attorney
Bruno Conegliano, Assistant City Engineer-Hydrology
Don Greene, Bellamah Homes
V. M. Kimmick, Bellamah Homes

Bruns

MEURER, SERAFINI AND MEURER, INC.
CONSULTING ENGINEERS • SURVEYORS • PLANNERS
2601 WYOMING BLVD., N.E., SUITE F • ALBUQUERQUE, NEW MEXICO 87110 • (505) 292-1936

May 3, 1979

Mr. Richard Heller, City Engineer
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87110

Re: Drainage - Tract 11, Taylor Ranch Homestead Hills North

Dear Dick:

Pursuant to our meeting of Wednesday, May 2, 1979, involving you, Rip Orr, Varne Kimmick, Don Greene, Dick Carter and myself, I would like to recommend the following as a solution to the drainage for the subject tract.

In order to discharge drainage to the east in a manner as similar as possible to the historic sheet flow, it is recommended that several discharge points be located along the east boundary of the subject development.

Butterfield Trail will be designed to drain to the east thereby discharging runoff conveyed in Wagon Mound Drive, Independence Drive and Golden Spike Drive. The 100-year storm frequency runoff will be approximately 40 cfs, which historically sheet flowed off the site between Calle Nortena and Butterfield Trail.

Drainage generated in the southern portion of the proposed development will be discharged through two temporary drainage easements, one on Lot 33 adjacent to Lot 32 and one on Lot 35 adjacent to Lot 36. A third discharge point will be between Lots 36 and 37 by means of conveying flows in a standard drainage rundown constructed within a 10' drainage right-of-way.

Within the two drainage easements, runoff will be conveyed in a 3' wide, 6" deep Vee shaped stabilized swale graded such that the flows can be adequately handled within the easement. Curb cuts will allow flows to enter the temporary easements and plastic pipes will be constructed under the sidewalk to convey the flow.

Wells Fargo Trail and Sundance Trail will form a low point at the location of the drainage right-of-way; however, as much water as possible will be directed to the two easements.

The temporary easements will be located totally on one lot in order to avoid conflict with walls, etc.

At such time as the necessary steps have been taken to allow free discharge to the east in the Piedras Marcadas Arroyo, the temporary easements will be vacated, the curb openings rebuilt, the pipes plugged, and the entire storm runoff discharged into the right-of-way.

I believe the above drainage solution satisfactorily addresses the City's concern of discharging runoff as close to historic discharge as possible.

We submit this report for your approval and would appreciate your concurrence at your earliest convenience.

Very truly yours,

MEURER, SERAFINI AND MEURER, INC.

Carl A. Tebbens, P.E.
Vice President

Approval:

Richard S. Heller
City Engineer

CAT:dw

cc: Mr. Dick Carter, AMBELL
Mr. Varne Kimmick, AMBELL

MEURER, SERAFINI AND MEURER, INC.

CONSULTING ENGINEERS • SURVEYORS • PLANNERS

2601 WYOMING BLVD., N.E., SUITE F • ALBUQUERQUE, NEW MEXICO 87110 • (505) 292-1936

May 16, 1979

RECEIVED
MAY 17 1979
CITY ENGINEER

Mr. Richard Heller
City Engineer
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87103

Re: Homestead Hills North

Dear Mr. Heller:

Enclosed are three copies of the drainage study for the above referenced project. This study is being transmitted to you for your review and approval or comments.

Should you have any questions or comments please contact me.

Very truly yours,

MEURER, SERAFINI AND MEURER, INC.

Frank Krim

Frank Krim
Project Engineer

cc: Mr. Dick Carter, Bellamah

FK:dw

Builders/realtors/developers
commercial & residential

Bellamah Corporation

Bruna

October 2, 1979

RECEIVED
OCT 05 1979
CITY ENGINEER

Mr. Richard Heller, City Engineer
City of Albuquerque
City Engineer's Office
P. O. Box 1293
Albuquerque, New Mexico 87103

RE: LA MARIPOSA DRAINAGE CHANNEL

Dear Dick:

Attached please find the city request for a preliminary estimate of cost to be prepared for the La Mariposa Drainage Channel in the area of High Range at Taylor Ranch, Unit I and II.

Also attached please find a location map for this project as well as a set of the approved construction drawings as approved by the City Engineer of the City of Albuquerque, Mr. V. M. Kimmick, on July 12, 1978.

Please begin work on this preliminary estimate immediately, as we will be ready to commence construction as soon as it has been prepared.

If there are any further questions, please do not hesitate to contact me.

Very truly yours,

AMBELL, a Partnership
BELLAMAH CORP., a Partner

Thomas J. Di Rito
Development Engineer

TDR/rr

Attachments

6121 Indian School Road, NE / PO Box 3325 / Albuquerque, New Mexico 87190 / (505) 883-3000

October 2, 1979
Date

City Engineer
City of Albuquerque
P.O. Box 1293
Albuquerque, New.Mexico

Gentlemen:

I hereby request that a preliminary estimate of costs be prepared for:

Water Main
Sanitary Sewer
(Storm Sewer)
Street Paving
Alley Paving
Curb & Gutter

(Circled Desired Facility)

to serve the following property:

Lot or Tract Nos. TAYLOR RANCH

Block No. SEE ATTACHED LOCATION MAP

MRGCD Map No. _____

Name of Subdivision LA MARIPOSA DRAINAGE CHANNEL

The above description includes all the property to be served by the facilities, including accessory property, such as: accessory buildings, parking space, or other uses.

I am concerned with the facility extensions as the (agent / owner / leasee) (Circle one) of this property.

The owner of this property is AMBELL, a Partnership - BELLAMAH CORP., a Partner
Name

P. O. BOX 3325, ALBUQUERQUE, NEW MEXICO 87190
Street City State Zip Code

The described property (is / is not) (Circle One) annexed to the City.

THOMAS J. DI RITO, DEVELOPMENT ENGINEER
(Requestor)

P. O. BOX 3325
(Street Address)

ALBUQUERQUE, NEW MEXICO 87190
(City State Zip Code)

(505) 883-3000, EXT. 120
(Telephone Number)


CLIFFS SUBD
UNIT 27
VOLCANO
UNIT 22
THE HIGH RANGE
TAYLOR
RANGY
VOLCANO CLIFFS SUBD UNIT 4
THE HIGH RANGE
TAYLOR
RANGY
TRACT 5
HOMESTEAD
HILLS
TRACT 7
C-1
C-1
HOMESTEAD EAST
ADDITION
TRACT 8-3
MUNICIPAL LIMITS
MUNICIPAL LIMITS
D-11-Z

D-11 D 4

Bellamah
Community
Development

September 19, 1984

Mr. Fred Aguirre
City of Albuquerque
City Engineering Division
400 Marquette, N.W.
Albuquerque, New Mexico 87103

SUBJECT: Lots 33 and 35, Homestead Hills North, DRB Case #84-621

Dear Fred:

Bellamah Community Development hereby guarantees that the curb and gutter improvements for Lots 33 and 35 of Homestead Hills North will be constructed to City of Albuquerque Design standards within a 90 day period from the date of this letter. BCD also agrees to furnish the City of Albuquerque verification and acceptance of said improvements.

Sincerely,

BELLAMAH COMMUNITY DEVELOPMENT

D. T. Robertson
Senior Vice President and
Regional Manager

DTR:rl

INTER-OFFICE MEMORANDUM
MUNICIPAL DEVELOPMENT DEPARTMENT

ENGINEERING

- ☐ Administration
- ☐ Capital Implementation
- ☐ Code Administration
- ☐ Engineering
- ☐ Information
- ☐ Planning
- ☐ Renewal & Rehabilitation
- ☐ Other

- ☐ City Engineer
- ☒ Asst. City Engineer-Design
- ☐ Asst. City Engineer-Field
- ☒ Asst. City Engineer-Hydrology
- ☐ Chief City Surveyor
- ☐ Office Coordinator
- ☐ Secretary

ATTENTION:

For Your:

- ☐ Approval
- ☐ Circulation
- ☐ Comment & Return
- ☐ Files
- ☐ Handling
- ☐ Information
- ☐ Investigation & Report
- ☐ Signature

Response Requested by:

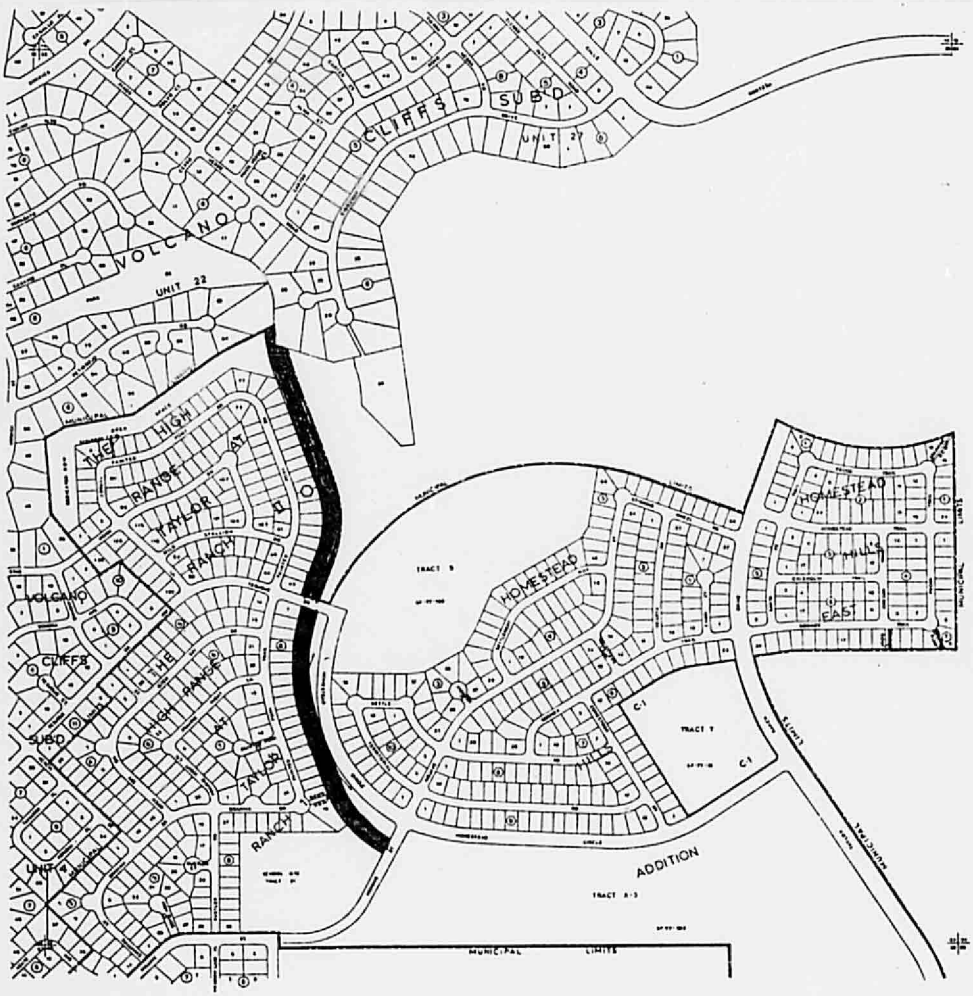
REMARKS:

Copy to Bob for action

Copy to Bruno for comment.

cc: Rip

10/5/79 ☐ _____ ☐ _____
Date City Engineer


VOLCANO CLIFFS SUBD
UNIT 22
UNIT 2
VOLCANO CLIFFS SUBD
UNIT 4
THE HIGH RANCH AT TAYLOR RANCH
TAYLOR RANCH
TRACT 3
HOMESTEAD
HOMESTEAD EAST
TRACT 7
C-1
C-1
ADDITION
TRACT A-3
MUNICIPAL LIMITS
MUNICIPAL LIMITS

D-11-Z

October 2, 1979
Date

City Engineer
City of Albuquerque
P.O. Box 1293
Albuquerque, New.Mexico

Gentlemen:

I hereby request that a preliminary estimate of costs be prepared for:

Water Main
Sanitary Sewer
(Storm Sewer)
Street Paving
Alley Paving
Curb & Gutter

(Circled Desired Facility)

to serve the following property:

Lot or Tract Nos. TAYLOR RANCH

Block No. SEE ATTACHED LOCATION MAP

MRGCD Map No. _____

Name of Subdivision LA MARIPOSA DRAINAGE CHANNEL

The above description includes all the property to be served by the facilities, including accessory property, such as: accessory buildings, parking space, or other uses.

I am concerned with the facility extensions as the (agent / owner / leasee) (Circle one) of this property.

The owner of this property is AMBELL, a Partnership - BELLAMAH CORP., a Partner
Name

P. O. BOX 3325, ALBUQUERQUE, NEW MEXICO 87190
Street City State Zip Code

The described property (is / is not) (Circle One) annexed to the City.

THOMAS J. DI RITO, DEVELOPMENT ENGINEE
(Requestor)

P. O. BOX 3325
(Street Address)

ALBUQUERQUE, NEW MEXICO 87190
(City State Zip Code)

(505) 883-3000, EXT. 120
(Telephone Number)

Builders/realtors/developers
commercial & residential

Bellamah Corporation

October 2, 1979

RECEIVED
OCT 05 1979
CITY ENGINEER

Mr. Richard Heller, City Engineer
City of Albuquerque
City Engineer's Office
P. O. Box 1293
Albuquerque, New Mexico 87103

RE: LA MARIPOSA DRAINAGE CHANNEL

Dear Dick:

Attached please find the city request for a preliminary estimate of cost to be prepared for the La Mariposa Drainage Channel in the area of High Range at Taylor Ranch, Unit I and II.

Also attached please find a location map for this project as well as a set of the approved construction drawings as approved by the City Engineer of the City of Albuquerque, Mr. V. M. Kimmick, on July 12, 1978.

Please begin work on this preliminary estimate immediately, as we will be ready to commence construction as soon as it has been prepared.

If there are any further questions, please do not hesitate to contact me.

Very truly yours,

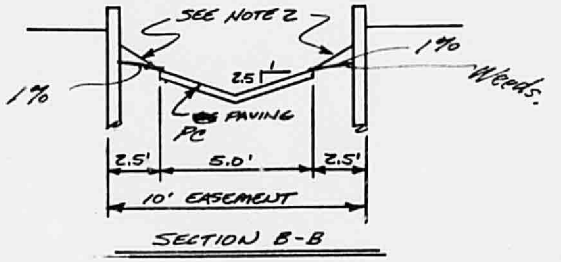
AMBELL, a Partnership
BELLAMAH CORP., a Partner

Thomas J. Di Rito
Development Engineer

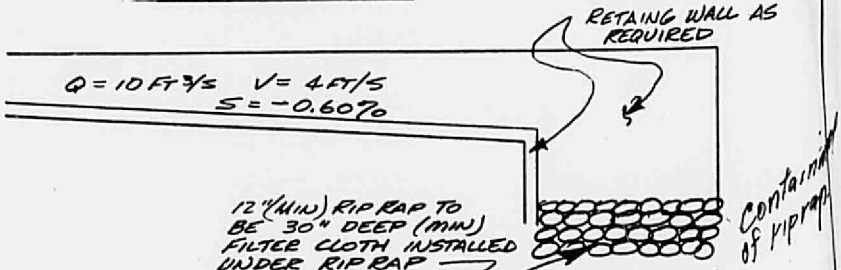
TDR/rr

Attachments

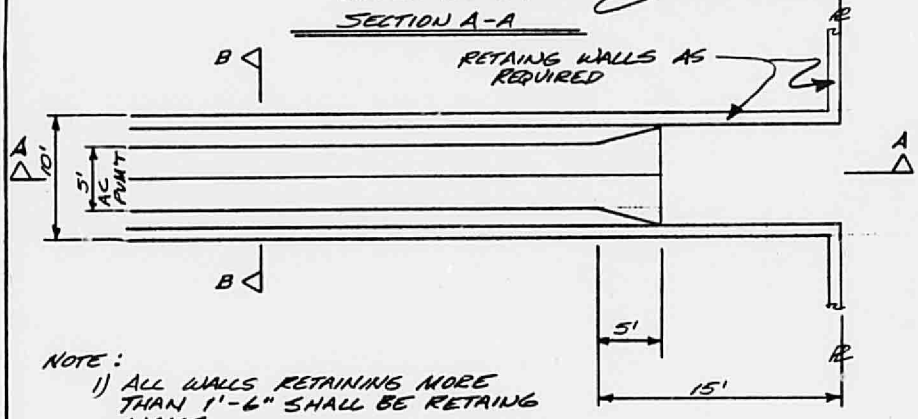
6121 Indian School Road NE / PO Box 3325 / Albuquerque, New Mexico 87190 / (505) 883-3000



SECTION B-B



SECTION A-A

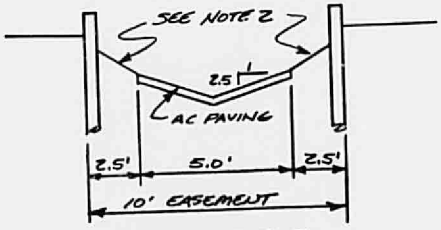


NOTE:

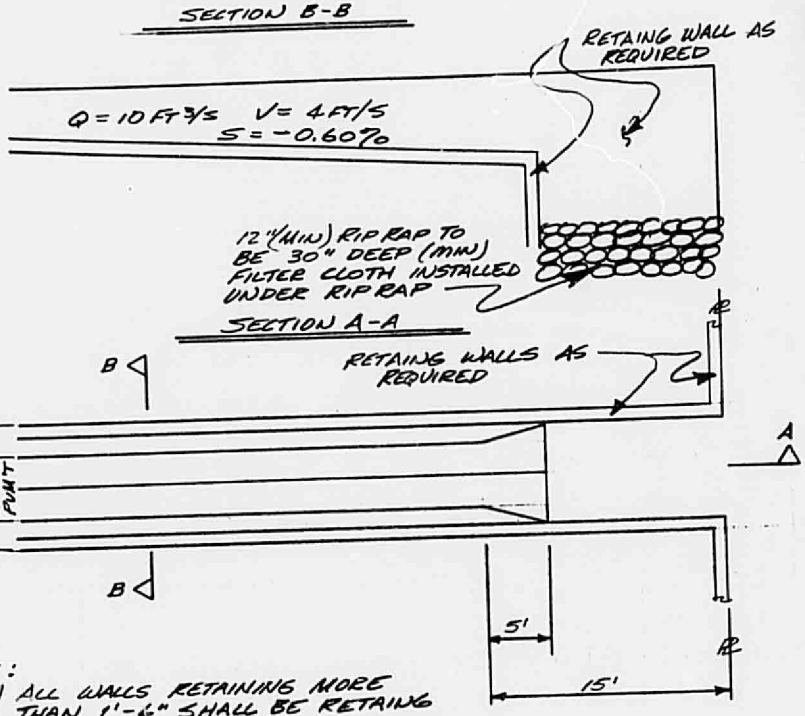
1) ALL WALLS RETAINING MORE THAN 1'-6" SHALL BE RETAING WALLS
2) MAX SLOPE TO BE 2 HORIZONTAL TO 1 VERTICAL.
3) GARDEN WALLS BUILT BY OTHERS
4) RETAING WALLS TO BE BUILT BY DEVELOPERS.

MEURER, SERAFINI AND MEURER, INC.
CONSULTING ENGINEERS • SURVEYORS • PLANNERS
2601 WYOMING BOULEVARD • SUITE F • ALBUQUERQUE, NEW MEXICO 87110 • (505) 292-1936

JOB NO. B120063 DATE 3-11-80
PROJECT TRACT 11, DRAINAGE EASEMENTS SCALE NTS



SECTION B-B



NOTE:

1) ALL WALLS RETAINING MORE THAN 1'-6" SHALL BE RETAING WALLS
2) MAX SLOPE TO BE 2 HORIZONTAL TO 1 VERTICAL.
3) GARDEN WALLS BUILT BY OTHERS
4) RETAING WALLS TO BE BUILT BY DEVELOPERS.

MEURER, SERAFINI AND MEURER, INC.
CONSULTING ENGINEERS • SURVEYORS • PLANNERS
2601 WYOMING BOULEVARD • SUITE F • ALBUQUERQUE, NEW MEXICO 87110 • (505) 292-1936

JOB NO. 8120063 DATE 3-11-80
PROJECT TRACT 11, DRAINAGE EASEMENTS SCALE NTS

DRAINAGE REPORT

FOR

HOMESTEAD HILLS NORTH
(TRACT 11, TAYLOR RANCH)

ALBUQUERQUE, NEW MEXICO



MEURER, SENAPATI AND MEURER, INC.

2501 Wyoming Boulevard, N.E.
Albuquerque, New Mexico 87112
(505) 292-1915

DRAINAGE REPORT

FOR

HOMESTEAD HILLS NORTH
(TRACT 11, TAYLOR RANCH)

ALBUQUERQUE, NEW MEXICO

RECEIVED
MAY 17 1979
CITY ENGINEERS

Prepared By

Meurer, Serafini and Meurer, Inc.
2601 Wyoming Boulevard N.E.
Albuquerque, New Mexico 87110

(505) 292-1936

May 16, 1979

TABLE OF CONTENTS

	Page No.
PURPOSE AND SCOPE	1
SITE LOCATION & TOPOGRAPHY	1
DESIGN CRITERIA	2
ESTIMATED RUNOFF UNDEVELOPED STATE	2
ESTIMATED RUNOFF DEVELOPED STATE	3
EXPLANATION OF RESULTS	4
RECOMMENDATIONS	6
SUMMARY	7

APPENDIX

Appendix 1	Composite Runoff Coefficient
Appendix 2	Ponding Requirement
Appendix 3	Runoff Computations
Appendix 4	Agreement Letter
Figure I	Developed Drainage Conditions
Figure II	Typical Lot Drainage
Figure III	Time of Concentration of Small Drainage Basins
Figure IV	Intensity Duration Frequency Curves
Figure V	Offsite & Undeveloped Drainage

DRAINAGE REPORT

HOMESTEAD HILLS NORTH
(TRACT 11, TAYLOR RANCH)

PURPOSE AND SCOPE

AMBELL, a joint venture of AMDEC and Dale Bellamah Land Company, is currently developing lands located on the western Albuquerque Metropolitan Area known as Taylor Ranch. Taylor Ranch is a many faceted development, master planned concept which includes single family, multi-family, parks, schools, and commercial areas. Homestead Hills North is a single family subdivision containing 182 lots.

The purpose of this report is to present a plan for controlling surface runoff from the said subdivision in a manner acceptable to the Albuquerque Metropolitan Arroyo Flood Control Authority and the Albuquerque City Engineer's office.

SITE LOCATION AND TOPOGRAPHY

Homestead Hills North is located within Section 28, T. 11 N., R. 2 E., N.M.P.M. The lands to the south are developed in the name of Homestead Hills East. Lands on all other sides are currently undeveloped. The Piedras Marcadas south branch diversion channel is located on the south side of this development.

The soil of the site is generally comprised of eolian sand and gravel. The natural ground slopes from northwest to southeast with several small swales. Ground cover consists mainly of rabbitbrush, cactus, native grass and sand and gravel.

DESIGN CRITERIA

In analyzing the storm runoff, the Rational Formula, Q = CIA is used.

Where:

Q = Runoff quantity in cubic feet/second.

A = Contributing area in acres.

I = Intensity in inches/hour for a duration equal to the time of accumulation (duration) measured in minutes and obtained from Figure IV, Intensity Duration Frequency Curves, Albuquerque Area 1961. (Note: Where a Time Concentration (Tc) is less than ten minutes from Figure III, the intensity value, derived from a Tc equal to ten minutes is employed.)

C = Runoff Coefficient (No Unit). This coefficient represents the integrated effects of infiltration, detention storage, evaporation, retention, flow routing, and interception which all affect the time distribution and peak rate of runoff.

ESTIMATED RUNOFF UNDEVELOPED STATE:

Drainage within the boundary of the site is basically overland flow with some small swales. The drainage naturally exits the area at a number of locations along the east boundary line. Flows discharge from the site as sheet flow in some areas and as slightly more concentrated flows in some areas. The historic flows are shown on Table 1. Offsite flows from offsite areas to the north and west will be intercepted by the subject development and can easily be carried through the project.

For the purposes of this report the offsite flows into Homestead Hills North have been developed based on existing conditions and are shown below. Provisions are being made to carry these offsite flows through the development by means of intercepting flows by construction of Taylor Ranch Drive on the west and Calle Nortena Drive on the north.

The total runoff in the undeveloped state forms the basis for comparison with flows in the developed state.

TABLE 1

RUNOFF IN UNDEVELOPED STATE FOR HOMESTEAD HILLS NORTH

Drainage Basin	Elev. Diff.	Length of Flow	Tc Min.	I100 yr. In./Hr.	C	Area Ac.	Q C.F.S.
UD-1	62	1270	(10)	(5.4)	.40	6.03	13.0
UD-2	64	1300	(10)	(5.4)	.40	11.90	25.7
UD-3	77	1600	(10)	(5.4)	.40	12.17	26.3
UD-4	57.5	1600	(10)	(5.4)	.40	14.69	31.7
UD-5	16.0	870	(10)	(5.4)	.40	2.19	4.7

Summation UD-1 through UD-5 = 101.40 C.F.S.

ESTIMATED RUNOFF DEVELOPED STATE

As development occurs, the area of impervious surfaces increases and thereby the amount of runoff also increases. To offset this increase, onsite restrictions of flows must be incorporated into the development. While this can take different forms, the most practical solution for this type of development is to utilize on-lot ponding. The contributing area to the backyard ponding includes the backyard, sideyard, and in a majority of cases, one-half of the roof area due to the popularity of the pitched roof concept. The area drained to

to the street includes the front yard, driveway, sidewalk-parkway areas, and one-half the roof area. This approach will satisfy A.M.A.F.C.A.'s requirement that the runoff rate from the developed tract not exceed the runoff rate from the tract in its natural state.

The runoff coefficients for the various surfaces are as follows:

Streets, Walks and Drives	C = 0.9
Roofs	C = 0.9
Lawns, Sandy Soils (Average 2 to 7%)	C = 0.4

The runoff in the developed state is shown in Appendix 3.

EXPLANATION OF RESULTS

Undeveloped Runoff:

Onsite - Total Flow = 101.40 C.F.S.

Developed Runoff:

Onsite - Total Flow = 78.00 C.F.S.

As shown above, the development of this project, including lot ponding, will not increase the storm runoff from that occurring in the natural undeveloped state.

Storm runoff from OS-1 and OS-2 will be intercepted by Taylor Ranch Drive and Calle Nortena Drive respectively. Flow entering Taylor Ranch Drive will be conveyed south to the south branch of the Piedras Marcadas Arroyo. Flows conveyed in Calle Nortena Drive will discharge into an already natural arroyo to the east. The discharge of flows from Calle Nortena Drive will be very similar to the historic conditions.

Drainage to be discharged from the development will be accomplished as described below. The concept for discharging runoff has been approved by the City Engineer in a letter dated May 3, 1979.

In order to discharge drainage to the east in a manner as similar as possible to the historic sheet flow, it is recommended that several discharge points be located along the east boundary of the subject development.

Butterfield Trail will be designed to drain to the east thereby discharging runoff conveyed in Wagon Mound Drive, Independence Drive and Golden Spike Drive. The 100-year storm frequency runoff will be approximately 10 cfs, which historically sheet flowed off the site between Calle Nortena and Butterfield Trail.

Drainage generated in the southern portion of the proposed development will be discharged through two temporary drainage easements, one on Lot 33 adjacent to Lot 32 and one on Lot 35 adjacent to Lot 36. A third discharge point will be between Lots 36 and 37 by means of conveying flows in a standard drainage rundown constructed within a 10' drainage right-of-way.

Within the two drainage easements, runoff will be conveyed in a 3' wide, 6" deep Vee shaped stabilized swale graded such that the flows can be adequately handled within the easement. Curb cuts will allow flows to enter the temporary easements and 1/4" deck plating will be constructed over the temporary swales at the sidewalk to provide safe pedestrian traffic.

Wells Fargo Trail and Sundance Trail will form a low point at the location of the drainage right-of-way. Flows being discharged down each temporary drainage easement will be approximately 10 cfs.

The temporary easements will be located totally on one lot in order to avoid conflict with walls, etc.

At such time as the necessary steps have been taken to allow free discharge to the east in the Piedras Marcadas Arroyo, the temporary easements will be vacated, the curb openings and sidewalks will be rebuilt and the entire storm runoff discharged into the right-of-way.

All the developed runoff from the Homestead Hills North will be collected by the streets within the development and be transported to the east and southeast, then discharged at four locations as described above.

RECOMMENDATIONS

The following recommendations are made to enable the developer on this site and the local government to complete this project within the design criteria:

1. The ponding areas in each backyard would be best situated toward the rear of the yard. There should be a minimum of five foot (5') buffer zone between the rear property lines and the edge of the pond. This will protect any walls which might be constructed. In no case should ponded waters be allowed to stand against the wall or house foundation.
2. Ponds should average 6" deep and the minimum surface area should not be less than 22% of the total area drained into the pond. All lots on the site have been ponded wherever it is practical.
3. Flows within the streets of the development are distributed enough so that no one street assumes a critical burden in

carrying capacities. However, no street should be graded at less than 0.4% slope in order to insure adequate carrying capacities.

4. Runoff from OS-1 and OS-2 will be intercepted by Taylor Ranch Drive and Calle Nortena Drive. Those offsite flows will then be conveyed to respective water courses. Rip-rap or an equivalent energy dissipator should be constructed at the east end of Calle Nortena for erosion protection.
5. Discharge from the development will be to the east and southeast through two temporary drainage easements and two rights-of-way in order to simulate as nearly as practicable the historic flows. The conceptual manner of discharge has been approved by the City Engineer in a letter dated May 3, 1979.

SUMMARY

The subject property, by utilizing backyard ponding, will contribute no more surface runoff to surrounding areas than that which existed before development.

In conclusion, the development of this site will not have an adverse effect on the drainage characteristics of this area, and runoff can be developed safely with no harm to life or property.

Prepared by:

Frank Krim

FRANK KRIM

Under the supervision of

Jeryl D. Hart

JERYL HART, JR.

JERYL D. HART, JR. NEW MEXICO 6788 REGISTERED PROFESSIONAL ENGINEER

APPENDIX 1

APPENDIX 1

COMPOSITE RUNOFF COEFFICIENT

Undeveloped Land

C = 0.40

Developed Land

Typical Lot Area

Gross Area 55.04 Acres

Average Lot Area (~~48~~ 182 Lots) 7820 ft.^{2}

Typical Lot Width 68 Ft.

Ponded Lots (Area draining from lot, including 1/2 street)

C = 0.90

Streets & Walk Area	20' x 68' =	1360 sq.ft.
Roof Area	25' x 50' =	1250 sq.ft.
Driveway	20' x 25' =	500 sq.ft.
Total Impervious Area		3110 sq.ft.

C = 0.40

Front Landscaping	(FRONT YARD + 4'x68' PLANTER AREA @ FRONT)	1008 sq.ft.
Side Yards	9' x 25 x 2 =	450' sq.ft.
Total Pervious Area		1458' sq.ft.

Impervious Area	3110 sq.ft.	0.68 @ 0.90	0.61
Pervious Area	1458 sq.ft.	0.32 @ 0.40	0.13
Total Area	4568 sq.ft.		0.74

Composite Runoff Coefficient = 0.74

AREA A-1 3.0 ACRES

STREET AREA = 0.43 Ac

SIDEWALK AREA=0.09 Ac

DRIVEWAY AREA=0.16 Ac

PATIO AREA = 0.01

1/2 ROOF AREA (8 EA.) 25x50 = 0.23Ac

FULL ROOF AREA (6 EA.) 50x50=0.34Ac

TOTAL IMPERVIOUS AREA 1.26 Ac. @ 42 % x .9 = .38

TOTAL PERVIOUS AREA 1.74 Ac. @ 58 % x .4 = .23

.61

AREA A-2 2.1 ACRES

STREET AREA = 0.31Ac

SIDEWALK AREA=0.08Ac

DRIVEWAY AREA 0.13Ac

PATIO AREA = 0.01Ac

1/2 ROOF AREA (5.5 EA.) 25x50= 0.16Ac

FULL ROOF AREA (5.5 EA.) 50x50 = 0.32Ac

TOTAL IMPERVIOUS AREA 1.01 Ac. @ 48 % x .9 = .43

TOTAL PERVIOUS AREA 1.00 Ac. @ 48 % x .4 = .19

.62

B-1

AREA B-1 3.8 ACRES

STREET AREA =0.69 Ac

SIDEWALK AREA=0.16Ac

DRIVEWAY AREA=0.24Ac

PATIO AREA = 0.03Ac

1/2 ROOF AREA (11 EA.) 25x50=0.32Ac

FULL ROOF AREA (10 EA.) 50x50=0.57

TOTAL IMPERVIOUS AREA 2.01 Ac. @ 53 % x .9 = .48

TOTAL PERVIOUS AREA 1.79 Ac. @ 47 % x .4 = .19

.67

B-2

AREA B-2 3.1 ACRES

STREET AREA = 0.67Ac

SIDEWALK AREA=0.16Ac

DRIVEWAY AREA=0.26Ac

PATIO AREA = 0.01Ac

1/2 ROOF AREA (20 EA.) 25x50 = 0.57

FULL ROOF AREA (1 EA.) 50x50 = 0.06

TOTAL IMPERVIOUS AREA 1.73 Ac. @ 56 % x .9 = .50

TOTAL PERVIOUS AREA 1.37 Ac. @ 44 % x .4 = .18

.68

A-3 ✓

AREA 1.2 ACRES

STREET AREA = 0.20Ac

SIDEWALK AREA=0.04Ac

DRIVEWAY AREA=0.08Ac

PATIO AREA = 0.01Ac

1/2 ROOF AREA (3 EA.) 25x50 = 0.09Ac

FULL ROOF AREA (3 EA.) 50x50 = 0.17Ac

TOTAL IMPERVIOUS AREA .59 Ac. @ 49 % x .9 = .44

TOTAL PERVIOUS AREA .61 Ac. @ 31 % x .4 = .20

.64

A-4 ✓

AREA 1.6 ACRES

STREET AREA=0.37Ac

SIDEWALK AREA=0.08Ac

DRIVEWAY AREA=0.06Ac

PATIO AREA = 0.01Ac

1/2 ROOF AREA (5 EA.) 25x50 = 0.14

FULL ROOF AREA (2.5 EA.) 50x50 = 0.14

TOTAL IMPERVIOUS AREA .80 Ac. @ 50 % x .9 = .45

TOTAL PERVIOUS AREA .80 Ac. @ 50 % x .4 = .20

.65

AREA I-2 3.7 ACRES

STREET AREA .366 Ac

SIDEWALK AREA .17 Ac

DRIVEWAY AREA 21'x 20'x25' = .24 Ac

PATIO AREA 7 x 100SF = .02

1/2 ROOF AREA (14 EA.) 25x50 = .40 Ac

FULL ROOF AREA (7 EA.) 50x50 = .40

TOTAL IMPERVIOUS AREA 1.89 Ac. @ .51 % x .9 = 0.459

TOTAL PERVIOUS AREA 1.81 Ac. @ .49 % x .4 = 0.196

0.66

AREA H-1 0.9 ACRES

STREET AREA = 0.20Ac

SIDEWALK AREA = 0.05Ac

DRIVEWAY AREA = 0.11Ac

PATIO AREA ———

1/2 ROOF AREA (6 EA.) 25x50 = 0.17Ac

FULL ROOF AREA (EA.)

TOTAL IMPERVIOUS AREA .53 Ac. @ 59 % x .9 = .53

TOTAL PERVIOUS AREA .37 Ac. @ 41 % x .4 = .15

.68

AREA _____ _____ ACRES

STREET AREA

SIDEWALK AREA

DRIVEWAY AREA

PATIO AREA

1/2 ROOF AREA (EA.)

FULL ROOF AREA (EA.)

TOTAL IMPERVIOUS AREA _____ Ac. @ _____ % x .9 =

TOTAL PERVIOUS AREA _____ Ac. @ _____ % x .4 =

AREA G-2 1.4 ACRES

STREET AREA = 0.37Ac

SIDEWALK AREA = 0.09 Ac

DRIVEWAY AREA = 0.07Ac

PATIO AREA _____

1/2 ROOF AREA (6.5 EA.) 25x50 = 0.19Ac

FULL ROOF AREA (1 EA.) 0.06Ac

TOTAL IMPERVIOUS AREA .78 Ac. @ 56 % x .9 = .50

TOTAL PERVIOUS AREA .62 Ac. @ 44 % x .4 = .18

.68

AREA I-1 1.2 ACRES

STREET AREA = 0,24Ac

SIDEWALK AREA = 0.06 Ac

DRIVEWAY AREA = 0.09 Ac

PATIO AREA _____

1/2 ROOF AREA (8 EA.) 25x50 = 0.23A.

FULL ROOF AREA (EA.)

TOTAL IMPERVIOUS AREA .62 Ac. @ 52 % x .9 = .47

TOTAL PERVIOUS AREA .58 Ac. @ 48 % x .4 = .19

.66

AREA _____ _____ ACRES

STREET AREA

SIDEWALK AREA

DRIVEWAY AREA

PATIO AREA

1/2 ROOF AREA (EA.)

FULL ROOF AREA (EA.)

TOTAL IMPERVIOUS AREA _____ Ac. @ _____ % x .9 =

TOTAL PERVIOUS AREA _____ Ac. @ _____ % x .4 =

B-3

AREA B-3 1.1 ACRES

STREET AREA = 0.29 Ac

SIDEWALK AREA = 0.06 Ac

DRIVEWAY AREA = 0.05 Ac

PATIO AREA = 0.005 Ac

1/2 ROOF AREA (3 EA.) 25 x 50 = 0.09 Ac

FULL ROOF AREA (2 EA.) 50 x 50 = 0.11 Ac

TOTAL IMPERVIOUS AREA .61 Ac. @ 55 % x .9 = .50

TOTAL PERVIOUS AREA .49 Ac. @ 45 % x .4 = .18

.68

A-5

AREA A-5 3.3 ACRES

STREET AREA = 0.48 Ac

SIDEWALK AREA 0.11 Ac

DRIVEWAY AREA 0.17 Ac

PATIO AREA = 0.02 Ac

1/2 ROOF AREA (11 EA.) 25 x 50 = 0.32 Ac

FULL ROOF AREA (6 EA.) 50 x 50 = 0.34 Ac

TOTAL IMPERVIOUS AREA 1.44 Ac. @ 44 % x .9 = .40

TOTAL PERVIOUS AREA 1.86 Ac. @ 56 % x .4 = .22

.62

AREA D-1 .8 ACRES

STREET AREA = 0.22 Ac

SIDEWALK AREA = 0.04 Ac

DRIVEWAY AREA -

PATIO AREA = 0.01 Ac

1/2 ROOF AREA (3 EA.) 20 x 25 = 0.07

FULL ROOF AREA (EA.)

TOTAL IMPERVIOUS AREA 0.34 Ac. @ .43 % x .9 = .39

TOTAL PERVIOUS AREA 0.46 Ac. @ .57 % x .4 = .23

.62

AREA A-11 E-14 E-15 2 ACRES

STREET AREA = 0.29 Ac

SIDEWALK AREA = 0.07 Ac

DRIVEWAY AREA = 0.13 Ac

PATIO AREA = 0.01 Ac

1/2 ROOF AREA (4.5 EA.) 25x50 = 0.13 Ac.

FULL ROOF AREA (6 EA.) 50x50 = 0.34 Ac

TOTAL IMPERVIOUS AREA .97 Ac. @ 49 % x .9 = .44

TOTAL PERVIOUS AREA 1.03 Ac. @ 52 % x .4 = .21

.65

AREA F-1 2.4 ACRES

STREET AREA = 0.42 Ac

SIDEWALK AREA = 0.10 Ac

DRIVEWAY AREA = 0.17 Ac

PATIO AREA = 0.01 Ac

1/2 ROOF AREA (11 EA.) 25x50 = .32

FULL ROOF AREA (3 EA.) 50x50 = .17

TOTAL IMPERVIOUS AREA 1.19 Ac. @ 50 % x .9 = .45

TOTAL PERVIOUS AREA 1.21 Ac. @ 50 % x .4 = .20

.65

AREA G-1 1.1 ACRES

STREET AREA = 0.18 Ac

SIDEWALK AREA = 0.05 Ac

DRIVEWAY AREA = 0.09 Ac

PATIO AREA ——

1/2 ROOF AREA (7 EA.) 25x50 = 0.20 Ac

FULL ROOF AREA (1 EA.) 50x50 = 0.06 Ac

TOTAL IMPERVIOUS AREA .58 Ac. @ 53 % x .9 = .47

TOTAL PERVIOUS AREA .52 Ac. @ 47 % x .4 = .19

.66

APPENDIX 2

APPENDIX 2

Ponding Requirements

1/2 Roof Area	(0.9)	25'x50' =	1250 □'
Patio Area	(0.9)	10'x10' =	100 □'
Rear Lawn Area	(0.4)	40x68 = 2720-100 =	2620 □'
Side Yards	(0.4)	9x25x2 =	450 □'
Total Area Draining to Pond			4420 □'

Runoff Coefficient

Impervious Area:

C = $0.90 \frac{1350}{4420} = 0.27$

Pervious Area:

C = $0.40 \frac{3070}{4420} = 0.28$

Composite C = 0.55

Pond Volume Requirements:

100-year storm precipitation = 2.4 inches

Volume = Runoff Coefficient x Area x Precipitation

V = 2.4/12 x 0.55 x 4420 □' = 486.20 ft^3

Depth of Pond 0.50 ft. (6")

Minimum area of pond = 972.40 □'

Pond area as a percentage of area drained = 22 %

NON-PONDED LOTS

C = .90

STREET AREA	20' x 68'	=	1360 □'
ROOF AREA	50' x 50'	=	2500 □'
DRIVEWAY	20' x 25'	=	500 □'
PATIO	10' x 10'	=	100 □'
TOTAL IMPERVIOUS AREA		=	4460 □'

C = .40

AVG LOT AREA	=	7820 □'
LESS ROOF AREA	−	2500 □'
LESS DRIVEWAY	−	500 □'
LESS STREET AREA	−	1360 □'
LESS PATIO AREA	−	100 □'
		3360 □'

IMPERVIOUS AREA	4460 □'	0.57 @ 0.90 =	0.51
PERVIOUS AREA	3360 □'	0.43 @ 0.40 =	0.17
TOTAL AREA	7820 □'	100% =	0.68

APPENDIX 3

APPENDIX 3

RUNOFF COMPUTATIONS

Sheet No. _____

Project: HOMESTEAD HILL No. -

Drainage Area No. A-1

Area = 3.0 *acres

Maximum Overland Flow: L = 180' S = .01

Maximum Channel Flow:

Channel No. 1 L = 475 S = .0393

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: 10 min.

Channel No. 1 Flow:

Omit Velocity = 1.6 ft/sec; Time = $\frac{180}{1.6 \times 60}$ = 1.9 min.

Channel No. 2 Flow:

Velocity = 4.0 ft/sec; Time = $\frac{475}{4.0 \times 60}$ = 2.0 min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Total Accumulation Time: T = ~~13.9~~ 12.0 min.

I = _____ = _____ = $tc = \frac{189}{13.9+25}$

Q = CIA = (.61) (4.86) (3) = 8.9 c.f.s.

Date: _____

WEIGHTED RUNOFF COEFFICIENT

Comp. by: _____

Checked by: _____

___ % Ponded @ ___ ____

___ % Non-Ponded @ ___ ____

___ % _____ @ ___ ____

100 % TOTAL ____

* LESS PONDING

Copy #3

RUNOFF COMPUTATIONS

Sheet No. _____

Project: HOMESTEAD HILLS No

Drainage Area No. A-2

Area = 2.1 acres

Maximum Overland Flow: L = 180' S = .01

Maximum Channel Flow:

Channel No. 1 L = 400 S = .0367

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: 10 min.

Channel No. 1 Flow:

Velocity = 3.8 ft/sec; Time = $\frac{400}{3.8 \times 60}$ = 1.75 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Total Accumulation Time: $T_c = 11.75 + 25$ T = 11.75 min.

I = _____ = _____ = _____

Q = CIA = (.62) (5.14) (2.1) = 6.7 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

RUNOFF COMPUTATIONS

Sheet No. _____

Project: HOMESTEAD HILLS No. 1

Drainage Area No. ~~A-5~~ A-3

Area = 1.2 acres

Maximum Overland Flow: L = 200' S = .01

Maximum Channel Flow:

Channel No. 1 L = 170' S = .0376

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: 10 min.

Channel No. 1 Flow:

Velocity = 3.9 ft/sec; Time = $\frac{170}{3.9 \times 60}$ = 0.7 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Total Accumulation Time: T = 10.7 min.

I = _____ = _____ = $t_c = \frac{164}{10.7+25}$

Q = CIA = (.64) (5.29) (1.2) = 4.06 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

RUNOFF COMPUTATIONS

Sheet No. _____

Project: HOMESTEAD HILLS No

Drainage Area No. A-6 A-4'

Area = 1.6 acres

Maximum Overland Flow: L = 60' S = .01

Maximum Channel Flow:

Channel No. 1 L = 460' S = .0353

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: 10 min.

Channel No. 1 Flow:

Velocity = 3.8 ft/sec; Time = $\frac{460}{3.8 \times 60}$ = 2.02 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Total Accumulation Time: $t_c = \frac{18}{12+25}$ T = 12 min.

I = _____ = _____ = _____

Q = CIA = (.65) (5.11) (1.6) = 5.31 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

RUNOFF COMPUTATIONS

Sheet No. _____

Project: HOMESTEAD HILLS No

Drainage Area No. A-5

Area = 3.3 acres

Maximum Overland Flow: L = 125 S = .01

Maximum Channel Flow:

Channel No. 1 L = 335 S = .0343

Channel No. 2 L = 226 S = .0075

Channel No. 3 L = 125 S = .0407

Accumulation Time

Overland Flow or Inlet Time: 10 min.

Channel No. 1 Flow:

Velocity = 3.7 ft/sec; Time = $\frac{335}{3.7 \times 60}$ = 1.5 min.

Channel No. 2 Flow:

Velocity = 1.8 ft/sec; Time = $\frac{225}{1.8 \times 60}$ = 2.1 min.

Channel No. 3 Flow:

Velocity = 4 ft/sec; Time = $\frac{125}{4 \times 60}$ = .5 min.

Total Accumulation Time: $t_c = \frac{189}{14.1 + 25}$ T = 14.1 min.

I = _____ = _____ = _____

Q = CIA = (.62) (4.83) (3.3) = 9.88 c.f.s.

Date: _____

WEIGHTED RUNOFF COEFFICIENT

Comp. by: _____

Checked by: _____

___ % Ponded @ ___ ____

___ % Non-Ponded @ ___ ____

___ % _____ @ ___ ____

100 % TOTAL ____

RUNOFF COMPUTATIONS

Sheet No. _____

Project: HOMESTEAD HILLS No.

Drainage Area No. ~~A-3 B-4~~

Area = 3.8 acres

Maximum Overland Flow: L = 80' S = .01

Maximum Channel Flow:

Channel No. 1 L = 570 S = .0246

Channel No. 2 L = 260 S = .0283

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: 10 min.

Channel No. 1 Flow:

Velocity = 3.1 ft/sec; Time = $\frac{570}{3.1 \times 60}$ = 3.06 min.

Channel No. 2 Flow:

Velocity = 3.3 ft/sec; Time = $\frac{260}{3.3 \times 60}$ = 1.31 min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\times 60}$ = _____ min.

Total Accumulation Time: T = 14.4 min.

I = _____ = _____ = tc $\frac{185}{14.4+25}$

Q = CIA = (.67) (4.80) (3.8) = 12.22 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

RUNOFF COMPUTATIONS

Sheet No. _____

Project: HOMESTEAD Hills No

Drainage Area No. ~~A-4 B-2~~

Area = 3.1 acres

Maximum Overland Flow: L = 60' S = .01

Maximum Channel Flow:

Channel No. 1 L = 750' S = .0512

Channel No. 2 L = 500' S = .0190

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: 10 min.

Channel No. 1 Flow:

Velocity = 4.5 ft/sec; Time = $\frac{750}{4.5 \times 60}$ = 2.8 min.

Channel No. 2 Flow:

Velocity = 2.8 ft/sec; Time = $\frac{500}{2.8 \times 60}$ = 3.0 min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\times 60}$ = _____ min.

Total Accumulation Time: 18.8 ~~18.8~~ T = 15.8 min.

$1 = \frac{\quad}{\quad} = \frac{\quad}{\quad} = tc$ 15.8+2.5

Q = CIA = (.68) (4.63) (3.1) = 9.76 c.f.s.

Date: _____

WEIGHTED RUNOFF COEFFICIENT

Comp. by: _____

Checked by: _____

___ % Ponded @ ___ ____

___ % Non-Ponded @ ___ ____

___ % _____ @ ___ ____

100 % TOTAL ____

RUNOFF COMPUTATIONS

Sheet No. _____

Project: HOMESTEAD Hills No.

Drainage Area No. A-7 B-3

Area = 1.1 acres

Maximum Overland Flow: L = 50 S = .01

Maximum Channel Flow:

Channel No. 1 L = 150' S = .0190

Channel No. 2 L = 175' S = .0523

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: 5 min.

Channel No. 1 Flow:

Velocity = 2.8 ft/sec; Time = $\frac{150}{2.8 \times 60}$ = 0.9 min.

Channel No. 2 Flow:

Velocity = 4.5 ft/sec; Time = $\frac{175}{4.5 \times 60}$ = 0.7 min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\quad \times 60}$ = _____ min.

Total Accumulation Time: T = 6.60 min.

I = _____ = _____ = $t_c \frac{189}{6.6+25}$

Q = CIA = (.68) (5.48) (1.1) = 4.47 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

RUNOFF COMPUTATIONS

Sheet No. _____

Project: H.H. No (TRACT #11)

Drainage Area No. C-1

Area = 0.85 acres

Maximum Overland Flow: L = _____ S = _____

Maximum Channel Flow:

Channel No. 1 L = 225 S = .04

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: _____ min.

Channel No. 1 Flow:

Velocity = 4.0 ft/sec; Time = $\frac{225}{4.0 \times 60}$ = 1.0 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\times 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\times 60}$ = _____ min.

Total Accumulation Time: T = 1.0 min.

I = _____ = _____ = _____

Q = CIA = (0.64) (7.56) (.85) = 4.11 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

RUNOFF COMPUTATIONS

Sheet No. _____

Project: HOMESTEAD HILLS No

Drainage Area No. A-9 D-1

Area = .8 acres

Maximum Overland Flow: L = 50 S = .01

Maximum Channel Flow:

Channel No. 1 L = 300 S = .0079

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: 3 min.

Channel No. 1 Flow:

Velocity = 1.8 ft/sec; Time = $\frac{300}{1.8 \times 60}$ = 2.8 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Total Accumulation Time: $\frac{189}{5.8+25}$ T = 5.8 min.

I = _____ = _____ = to

Q = CIA = (.62) (6.14) (.8) = 3.05 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

RUNOFF COMPUTATIONS

Sheet No. _____

Project: HOMESTEAD HILLS NO

Drainage Area No. ~~A-H~~ E-1

Area = 2.0 acres

Maximum Overland Flow: L = 125 S = .01

Maximum Channel Flow:

Channel No. 1 L = 300' S = .004

Channel No. 2 L = 50 S = .0067

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: ~~10~~ min.

Channel No. 1 Flow:

Velocity = 1.4 ft/sec; Time = $\frac{300}{1.4 \times 60}$ = 3.6 min.

Channel No. 2 Flow:

Velocity = 1.8 ft/sec; Time = $\frac{50}{1.8 \times 60}$ = .5 min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\times 60}$ = _____ min.

Total Accumulation Time: $\frac{185}{14.1 + 25}$ T = ~~14.1~~ 4.1 min.

I = _____ = $\frac{\quad}{6.49}$ = t_c

Q = CIA = (.65) (~~4.8~~ 6.49) (2) = 6.24 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

RATIONAL METHOD

RUNOFF COMPUTATIONS

Sheet No. _____

Project: _____

Drainage Area No. A-12 F-1

Area = 2.4 acres

Maximum Overland Flow: L = _____ S = _____

Maximum Channel Flow:

Channel No. 1 L = 575 S = 5.0110

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: _____ min.

Channel No. 1 Flow:

Velocity = 2.0 ft/sec; Time = $\frac{575}{2.0 \times 60}$ = 4.8 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Total Accumulation Time: T = 4.8 min.

I = _____ = _____ = _____

Q = CIA = (0.65) (6.34) (2.4) = 9.89 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

RUNOFF COMPUTATIONS

Sheet No. _____

Project: _____

Drainage Area No. A-13 G-1

Area = 1.1 acres

Maximum Overland Flow: L = _____ S = _____

Maximum Channel Flow:

Channel No. 1 L = 200 S = .01

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: _____ min.

Channel No. 1 Flow:

Velocity = 2.0 ft/sec; Time = $\frac{200}{2.0 \times 60}$ = 1.67 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Total Accumulation Time: ~~189~~ 1.67+25 T = 1.67 min.

I = _____ = _____ = tc

Q = CIA = (.66) (7.09) (1.1) = 5.15 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ____

___ % Non-Ponded @ ___ ____

___ % _____ @ ___ ____

100 % TOTAL ____

RUNOFF COMPUTATIONS

Sheet No. _____

Project: _____

Drainage Area No. A-14 G-2

Area = 1.4 acres

Maximum Overland Flow: L = _____ S = _____

Maximum Channel Flow:

Channel No. 1 L = 500 S = 1.18

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: _____ min.

Channel No. 1 Flow:

Velocity = 2.1 ft/sec; Time = $\frac{500}{2.1 \times 60}$ = 3.97 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Total Accumulation Time: $tc = \frac{18}{3.97+25}$ T = 3.97 min.

I = _____ = _____ = _____

Q = CIA = (.68) (6.52) (1.4) = 6.21 c.f.s.

Date: _____

WEIGHTED RUNOFF COEFFICIENT

Comp. by: _____

Checked by: _____

___ % Ponded @ ___ ___

___ % Non-Ponded @ ___ ___

___ % _____ @ ___ ___

100 % TOTAL ___

RUNOFF COMPUTATIONS

Sheet No. _____

Project: _____

Drainage Area No. Ha I-1

Area = _____ acres

Maximum Overland Flow: L = _____ S = _____

Maximum Channel Flow:

Channel No. 1 L = 300 S = 40

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: _____ min.

Channel No. 1 Flow:

Velocity = 1.5 ft/sec; Time = $\frac{300}{1.5 \times 60}$ = 4.2 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Total Accumulation Time: T = _____ min.

I = _____ = _____ = _____

Q = CIA = ( ) ( ) ( ) = _____ c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ____

___ % Non-Ponded @ ___ ____

___ % _____ @ ___ ____

100 % TOTAL ____

RUNOFF COMPUTATIONS

Sheet No. _____

Project: _____

Drainage Area No. E-2

Area = _____ acres

Maximum Overland Flow: L = 100 S = 0.0100

Maximum Channel Flow:

Channel No. 1 L = 320 S = 0.0115

Channel No. 2 L = 560 S = 0.005

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: 10 min.

Channel No. 1 Flow:

Velocity = 2.1 ft/sec; Time = $\frac{320}{2.1 \times 60}$ = 2.54 min.

Channel No. 2 Flow:

Velocity = 1.5 ft/sec; Time = $\frac{560}{1.5 \times 60}$ = 6.22 min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\quad \times 60}$ = _____ min.

Total Accumulation Time: T = 18.8 min.

I = _____ = _____ = _____

Q = CIA = (.6) (5.59) (3.7) = 13.65 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ____

___ % Non-Ponded @ ___ ____

___ % _____ @ ___ ____

100 % TOTAL ____

RATIONAL METHOD

RUNOFF COMPUTATIONS

Sheet No. _____

Project: _____

Drainage Area No. ~~A-16~~ H-1

Area = .9 acres

Maximum Overland Flow: L = _____ S = _____

Maximum Channel Flow:

Channel No. 1 L = 250 S = .0110

Channel No. 2 L = _____ S = _____

Channel No. 3 L = _____ S = _____

Accumulation Time

Overland Flow or Inlet Time: _____ min.

Channel No. 1 Flow:

Velocity = 2.1 ft/sec; Time = $\frac{250}{2.1 \times 60}$ = 1.98 min.

Channel No. 2 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Channel No. 3 Flow:

Velocity = _____ ft/sec; Time = $\frac{\quad}{\text{X } 60}$ = _____ min.

Total Accumulation Time: $t_c = \frac{185}{1.98+25}$ T = 1.98 min.

I = _____ = _____ = _____

Q = CIA = (.68) (7.01) (.9) = 4.29 c.f.s.

Date: _____

Comp. by: _____

Checked by: _____

WEIGHTED RUNOFF COEFFICIENT

___ % Ponded @ ___ ____

___ % Non-Ponded @ ___ ____

___ % _____ @ ___ ____

100 % TOTAL ____

BDIVISION TAYLOR RANCH NORTH
CATION T.R.
B NO.
ESIGN STORM: YR. RECURRENCE INTERVAL
AJOR STORM: YR.
OMPUTATIONS BY F.K. DATE

RUNOFF COMPUTATIONS
(Rational Method)

PAGE 1 O

Area Designation	A (Acres)	c	c_f	$\bar{c}$ = (c x c_f)	A·$\bar{c}$	ΣA·$\bar{c}$	tc (min)	I (in/hr)	Q = (ΣA·$\bar{c}$) x I cfs	Street capacity cfs	Flow in Pipe cfs	Pipe Dia. in.	Slope %	Length ft.	VEL V fps	Δt (min)	
A-1	3.0			0.61	1.83		12.0	5.11	9.4	175							
A-2	2.1			0.62	1.30		11.75	5.11	6.7	175							
Σ A-1 to A-2						3.13	12.0	5.11	16.0								
A-3	1.2			0.64	0.77		10.7	5.29	4.1	175							
A-4	1.6			0.65	1.04		12.0	5.11	5.3	164			3.53	460		2.02	
Σ A-1 to A-4						4.94	14.0	4.85	23.9								
A-5	3.3			0.62	2.05		14.1	4.83	9.9	175			2.46 2.83	570' 260		3.1 1.3	
Σ A-1 to A-5						6.99	18.5	4.34	30.3								
B-1	3.8			0.67	2.55		14.4	4.80	12.24	150							
B-2	3.1			0.68	2.11		15.8	4.63	9.77	175							

HYDROLOGY D11/D4 2 of 2 12 PLANS

SUBDIVISION TAYLOR RANCH NORTH
LOCATION T.R.
JOB NO.
DESIGN STORM: YR. RECURRENCE INTERVAL
MAJOR STORM: YR.
COMPUTATIONS BY F.K. DATE

RUNOFF COMPUTATIONS
(Rational Method)

Area Designation	A (Acres)	c	c_f	$\bar{c}$ = (c x c_f)	A·$\bar{c}$	$\Sigma A \cdot \bar{c}$	tc (min)	I (in/hr)	Q = ($\Sigma A \cdot \bar{c}$) x I cfs	Street capacity cfs	Flow in Pipe cfs	Pipe Dia. in.	Slope %	Length ft.	VEL V fps	Δt (min)	
Σ B-1 to B-2						4.66	15.8	4.63	21.58								
B-3	1.1			0.68	0.75		6.6	5.98	4.49	175			1.90	150'		0.9	
													3.23	175		0.7	
Σ B-1 to B-3						5.41	17.4	4.46	24.12	75							
Σ A-1 to B-3						12.40	21.5	4.06	50.3	75							
Σ PARTIAL A-1 to B-3						9.52	21.5	4.06	38.65								
C-1	.85			0.64	0.54		1.0	7.56	4.08	175							
Σ PARTIAL A-1 to B-3 + C-1						10.06	22.5	3.98	40.04								
A-1 to B-3 into D-1						2.88	16.9	4.51	13.00								
D-1	.8			0.62	0.50		16.9	4.51	2.26	75			.79	300'		2.8	
E-1	2.0			0.65	1.3	3.38	19.7	4.23	5.50								
Σ D-1 to E-1						4.68	19.7	4.23	19.8								

SUBDIVISION TAYLOR RANCH NORTH
LOCATION T.R.
JOB NO.
DESIGN STORM ____ YR. RECURRENCE INTERVAL
MAJOR STORM ____ YR.
COMPUTATIONS BY F.K. DATE ____

RUNOFF COMPUTATIONS
(Rational Method)

Area Designation	A (Acres)	c	c_f	$\bar{c}$ = (c x c_f)	A·$\bar{c}$	ΣA·$\bar{c}$	tc (min)	I (in/hr)	Q = (ΣA·$\bar{c}$) x i cfs	Street capacity cfs	Flow in Pipe cfs	Pipe Dia. in.	Slope %	Length ft.	VEL V fps	Δt (min)	
F-1	2.4			0.65	1.56		10	5.4	8.42	87						4.8	
Σ D-1 to F-1						6.24	29.7	3.46	21.56								
G-1	1.1			0.66	0.73		1.67	7.09	5.18								
G-2	1.4			0.68	0.95		3.97	6.52	6.19	90							
Σ G-1 to G-2						1.48	3.97	6.52	9.65								
Σ D-1 to G-2						7.72	29.7	3.46	26.71								
LOT 33					2.89	4.83		3.46	10.00								
LOT 35					2.89	1.94		3.46	10.00								
H-1	.9			0.68	0.61		29.7	3.46	2.11	100			0.41	265		3.53	
Σ + H-1						2.55	33.2	3.25	8.29								

BDIVISION TAYLOR RANCH NORTH
CATION T.R.
3 NO.
SIGN STORM YR. RECURRENCE INTERVAL
JOR STORM YR.
MPUTATIONS BY F.K. DATE

RUNOFF COMPUTATIONS
(Rational Method)

PAGE 4 OF

Area Designation	A (Acres)	c	c_f	$\bar{c}$ = (c x c_f)	A·$\bar{c}$	ΣA·$\bar{c}$	tc (min)	I (in/hr)	Q = (ΣA·$\bar{c}$) x I cfs	Street capacity cfs	Flow in Pipe cfs	Pipe Dia. in.	Slope %	Length ft.	VEL V fps	Δt (min)	
I-1	1.2			0.66	0.79		4.2	6.47	5.13	62							
I-2	3.7			0.66	2.44		18.8	4.32	10.50	62							
Σ I-1 to I-2						3.23	18.8	4.32	13.9								
Σ D-1 to I-2						5.78	33.2	3.25	18.8								
FUTURE FLOW						7.72	33.2	3.25	25.09								

APPENDIX 4

APPENDIX 4

MEURER, SERAFINI AND MEURER, INC. CONSULTING ENGINEERS • SURVEYORS • PLANNERS

2601 WYOMING BLVD., N.E., SUITE F • ALBUQUERQUE, NEW MEXICO 87110 • (505) 292-1936

May 3, 1979

Mr. Richard Heller, City Engineer
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87110

Re: Drainage - Tract 11, Taylor Ranch Homestead Hills North

Dear Dick:

Pursuant to our meeting of Wednesday, May 2, 1979, involving you, Rip Orr, Varne Kimmick, Don Greene, Dick Carter and myself, I would like to recommend the following as a solution to the drainage for the subject tract.

In order to discharge drainage to the east in a manner as similar as possible to the historic sheet flow, it is recommended that several discharge points be located along the east boundary of the subject development.

Butterfield Trail will be designed to drain to the east thereby discharging runoff conveyed in Wagon Mound Drive, Independence Drive and Golden Spike Drive. The 100-year storm frequency runoff will be approximately 40 cfs, which historically sheet flowed off the site between Calle Nortena and Butterfield Trail.

Drainage generated in the southern portion of the proposed development will be discharged through two temporary drainage easements, one on Lot 33 adjacent to Lot 32 and one on Lot 35 adjacent to Lot 36. A third discharge point will be between Lots 36 and 37 by means of conveying flows in a standard drainage rundown constructed within a 10' drainage right-of-way.

Within the two drainage easements, runoff will be conveyed in a 3' wide, 6" deep Vee shaped stabilized swale graded such that the flows can be adequately handled within the easement. Curb cuts will allow flows to enter the temporary easements and plastic pipes will be constructed under the sidewalk to convey the flow.

Wells Fargo Trail and Sundance Trail will form a low point at the location of the drainage right-of-way; however, as much water as possible will be directed to the two easements.

The temporary easements will be located totally on one lot in order to avoid conflict with walls, etc.

At such time as the necessary steps have been taken to allow free discharge to the east in the Piedras Marcadas Arroyo, the temporary easements will be vacated, the curb openings rebuilt, the pipes plugged, and the entire storm runoff discharged into the right-of-way.

I believe the above drainage solution satisfactorily addresses the City's concern of discharging runoff as close to historic discharge as possible.

We submit this report for your approval and would appreciate your concurrence at your earliest convenience.

Very truly yours,

MEURER, SERAFINI AND MEURER, INC.

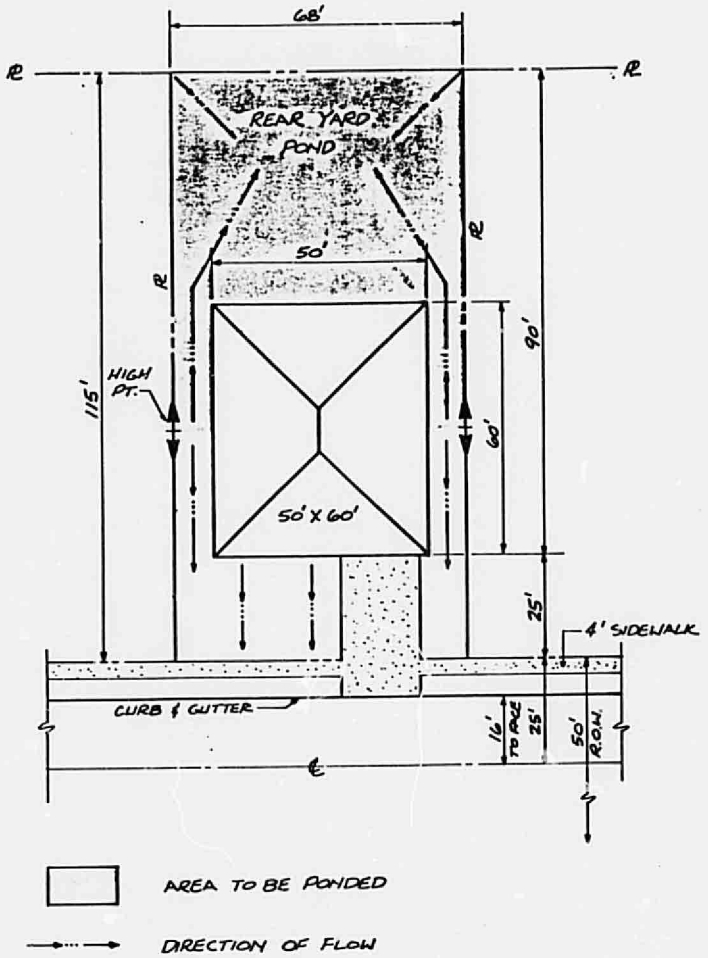
Carl A. Tebbens, P.E.
Vice President

Approval:

Richard S. Heller
City Engineer

CAT:dw

cc: Mr. Dick Carter, AMBELL
Mr. Varne Kimmick, AMBELL

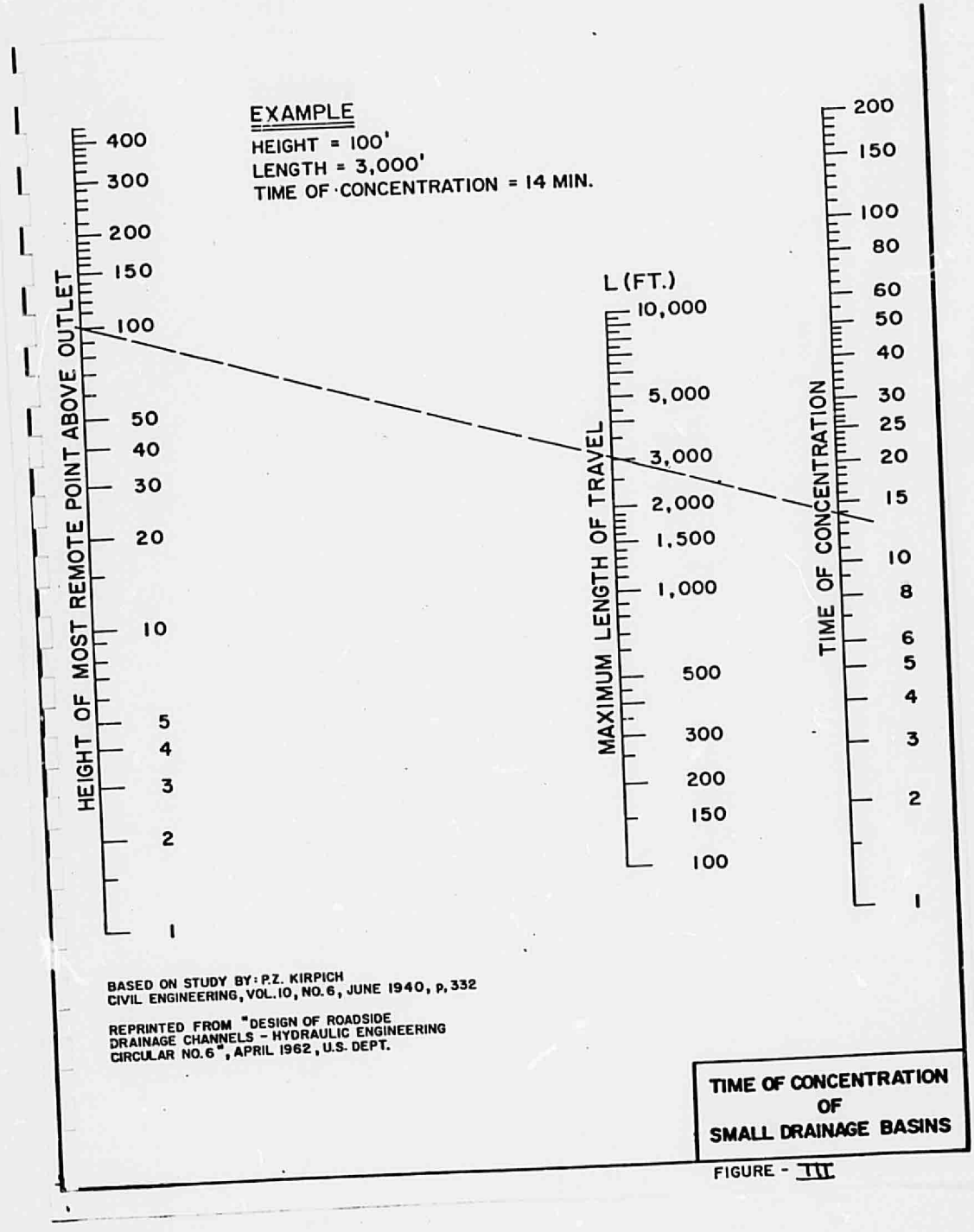


TYPICAL PONDED LOT

SCALE: 1"=30'

MEURER, SERAFINI AND MEURER, INC.
CONSULTING ENGINEERS • SURVEYORS • PLANNERS
2601 WYOMING BOULEVARD • SUITE F • ALBUQUERQUE NEW MEXICO 87110 • (505) 292 1936

FIGURE NO. II

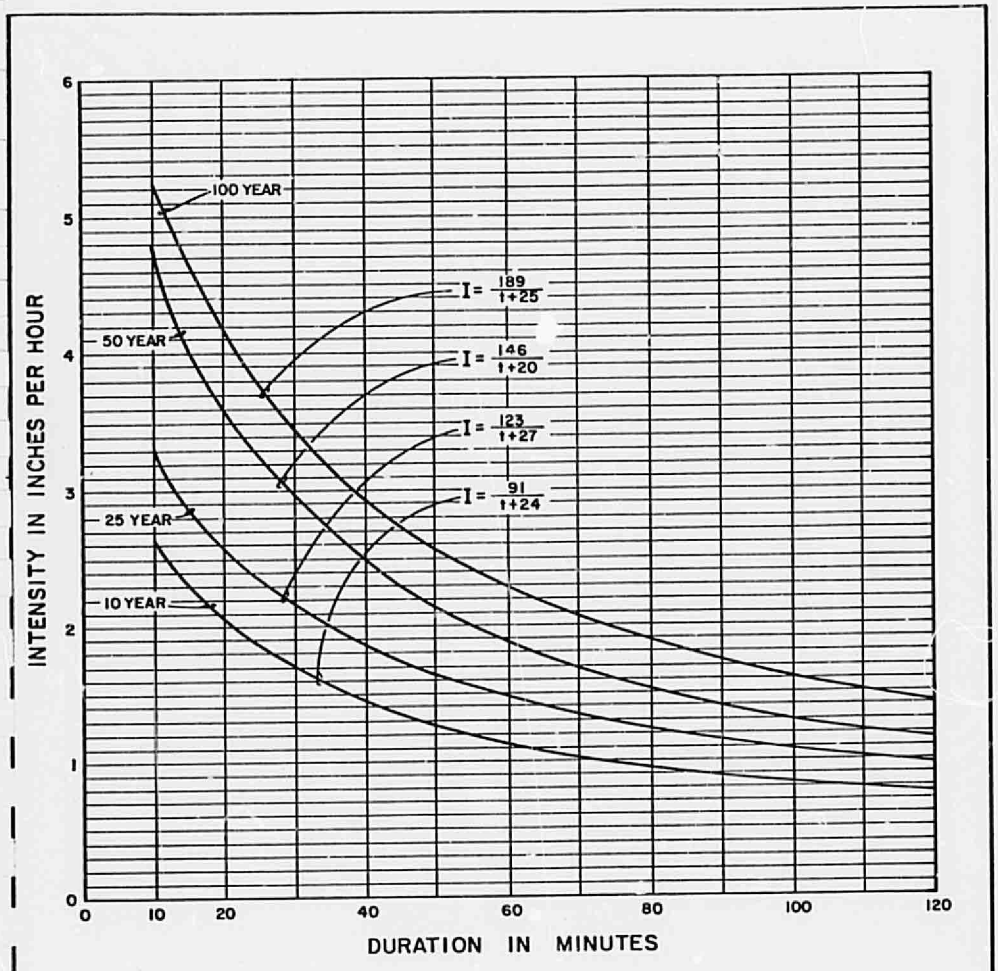


BASED ON STUDY BY: P.Z. KIRPICH
CIVIL ENGINEERING, VOL. 10, NO. 6, JUNE 1940, p. 332

REPRINTED FROM "DESIGN OF ROADSIDE DRAINAGE CHANNELS - HYDRAULIC ENGINEERING CIRCULAR NO. 6", APRIL 1962, U.S. DEPT.

TIME OF CONCENTRATION OF SMALL DRAINAGE BASINS

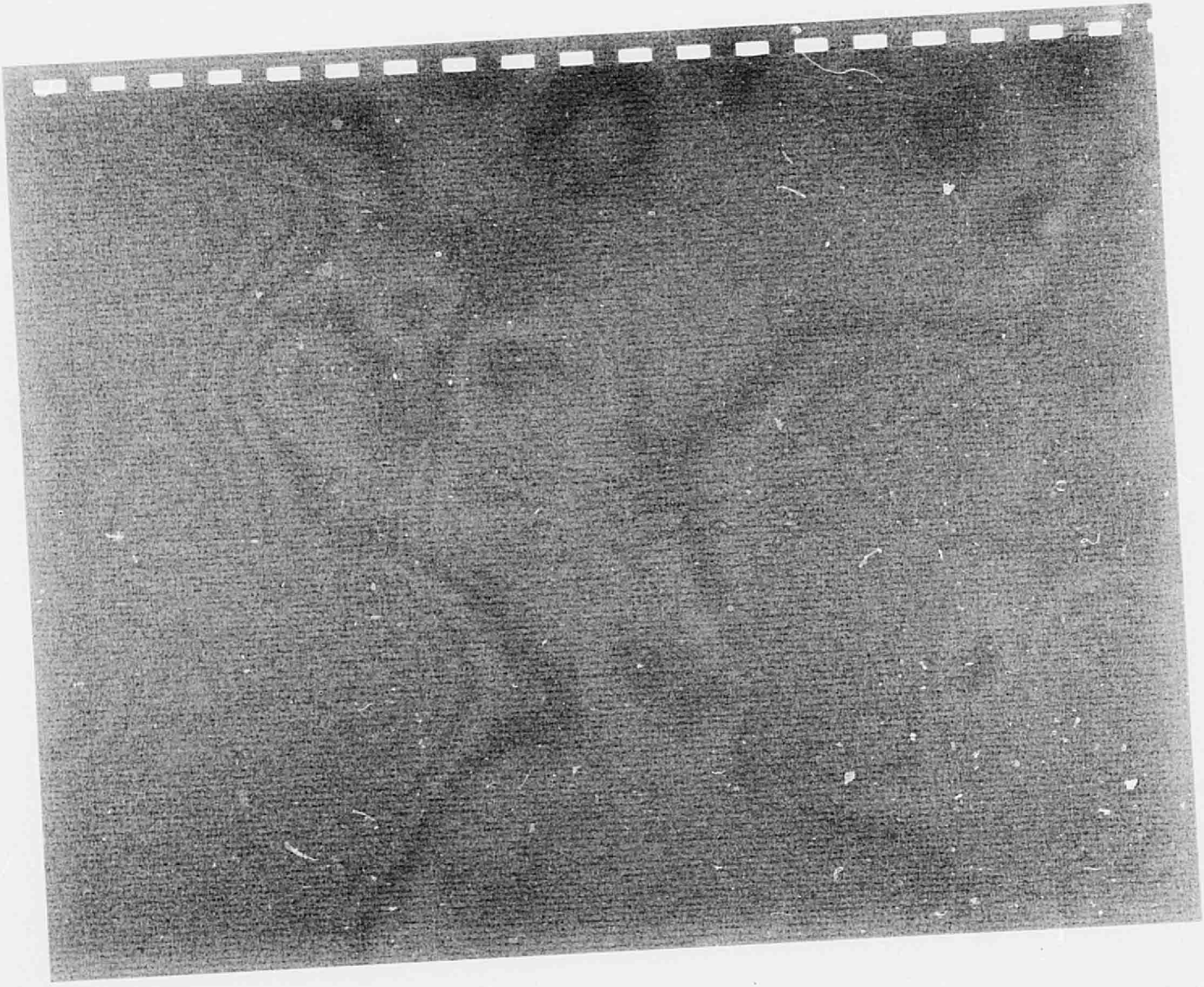
FIGURE - III



MASTER PLAN OF DRAINAGE
PREPARED BY:
GORDON HERKENHOFF & ASSOCIATES
ALBUQUERQUE, NEW MEXICO

INTENSITY DURATION FREQUENCY CURVES
(ALBUQUERQUE AREA, 1961)

FIGURE - IV





HYDROLOGY ○ D11/D4 2 of 2 ○ 12 PLANS

SUBDIVISION: TAYLOR RANCH NORTH
LOCATION: T.R.
JOB NO.
DESIGN STORM: YR. RECURRENCE INTERVAL
MAJOR STORM: YR.
COMPUTATIONS BY: F.K. DATE:

RUNOFF COMPUTATIONS
(Rational Method)

Area Designation	A (Acres)	c	c_f	$\bar{c}$ = (c x c_f)	A·$\bar{c}$	ΣA·$\bar{c}$	tc (min)	I (in/hr)	Q = (ΣA·$\bar{c}$) x I cfs	Street capacity cfs	Flow in Pipe cfs	Pipe Dia. in.	Slope %	Length ft.	VEL V fps	Δt (min)	
Σ A-1 to B-2						4.66	15.8	4.63	21.58								
B-3	1.1			0.68	0.75		6.6	5.98	4.49	175			1.90	150'		0.9	
													3.23	175		0.7	
Σ B-1 to B-3						5.41	17.4	4.46	24.12	75							
Σ A-1 to B-3						12.40	21.5	4.06	50.3	75							
Σ PARTIAL A-1 to B-3						9.52	21.5	4.06	38.65								
C-1	.85			0.64	0.54		1.0	7.56	4.08	175							
Σ PARTIAL A-1 to B-3 + C-1						10.06	22.5	3.98	40.04								
A-1 to B-3 into D-1						2.88	16.9	4.51	13.00								
D-1	.8			0.62	0.50		16.9	4.51	2.26	75			.79	300'		2.8	
E-1	2.0			0.65	1.3	3.38	19.7	4.23	5.50								
Σ D-1 to E-1						4.68	19.7	4.23	19.8								

SUBDIVISION TAYLOR RANCH NORTH
LOCATION T. 2.
JOB NO.
DESIGN STORM ____ YR. RECURRENCE INTERVAL
MAJOR STORM ____ YR.
COMPUTATIONS BY F.K. DATE

RUNOFF COMPUTATIONS
(Rational Method)

PAGE 3 OF

Area Designation	A (Acres)	c	c_f	$\bar{c}$ = (c×c_f)	A·$\bar{c}$	$\Sigma A \cdot \bar{c}$	tc (min)	I (in/hr)	Q = ($\Sigma A \cdot \bar{c}$) x i cfs	Street capacity cfs	Flow in Pipe cfs	Pipe Dia. in.	Slope %	Length ft.	VEL V fps	Δt (min)
F-1	2.4			0.65	1.56		10	5.4	8.42	87						4.8
Σ D-1 to F-1						6.24	29.7	3.46	21.56							
G-1	1.1			0.66	0.73		1.67	7.09	5.18							
G-2	1.4			0.68	0.95		3.97	6.52	6.19	90						
Σ G-1 to G-2						1.48	3.97	6.52	9.65							
Σ D-1 to G-2						7.72	29.7	3.46	26.71							
LOT 33					2.89	4.83		3.46	10.00							
LOT 35					2.89	1.94		3.46	10.00							
H-1	.9			0.68	0.61		29.7	3.46	2.11	100			0.41	265		3.53
Σ + H-1						2.55	33.2	3.25	8.29							

BDIVISION: TAYLOR RANCH NORTH
CATION: T.R.
B NO.
SIGN STORM: YR. RECURRENCE INTERVAL
JOR STORM: YR.
MPUTATIONS BY: F.K. DATE:

RUNOFF COMPUTATIONS
(Rational Method)

Area Designation	A (Acres)	c	c_f	$\bar{c}$ = (c×c_f	A·$\bar{c}$	ΣA·$\bar{c}$	tc (min)	I (in/hr)	Q = (ΣA·$\bar{c}$)×I cfs	Street capacity cfs	Flow in Pipe cfs	Pipe Dia. in.	Slope %	Length ft.	VEL V fps	∆t (min)	
I-1	1.2			0.66	0.79		4.2	6.47	5.13	62							
I-2	3.7			0.66	2.44		18.8	4.32	10.50	62							
Σ I-1 to I-2						3.23	18.8	4.32	13.9								
Σ D-1 to I-2						5.78	33.2	3.25	18.8								
FUTURE FLOW						7.72	33.2	3.25	25.09								

APPENDIX 4

APPENDIX 4

MEURER, SERAFINI AND MEURER, INC. CONSULTING ENGINEERS • SURVEYORS • PLANNERS

2601 WYOMING BLVD., N.E., SUITE F • ALBUQUERQUE, NEW MEXICO 87110 • (505) 292-1936

May 3, 1979

Mr. Richard Heller, City Engineer
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87110

Re: Drainage - Tract 11, Taylor Ranch Homestead Hills North

Dear Dick:

Pursuant to our meeting of Wednesday, May 2, 1979, involving you, Rip Orr, Varne Kimmick, Don Greene, Dick Carter and myself, I would like to recommend the following as a solution to the drainage for the subject tract.

In order to discharge drainage to the east in a manner as similar as possible to the historic sheet flow, it is recommended that several discharge points be located along the east boundary of the subject development.

Butterfield Trail will be designed to drain to the east thereby discharging runoff conveyed in Wagon Mound Drive, Independence Drive and Golden Spike Drive. The 100-year storm frequency runoff will be approximately 40 cfs, which historically sheet flowed off the site between Calle Nortena and Butterfield Trail.

Drainage generated in the southern portion of the proposed development will be discharged through two temporary drainage easements, one on Lot 33 adjacent to Lot 32 and one on Lot 35 adjacent to Lot 36. A third discharge point will be between Lots 36 and 37 by means of conveying flows in a standard drainage rundown constructed within a 10' drainage right-of-way.

Within the two drainage easements, runoff will be conveyed in a 3' wide, 6" deep Vee shaped stabilized swale graded such that the flows can be adequately handled within the easement. Curb cuts will allow flows to enter the temporary easements and plastic pipes will be constructed under the sidewalk to convey the flow.

Wells Fargo Trail and Sundance Trail will form a low point at the location of the drainage right-of-way; however, as much water as possible will be directed to the two easements.

The temporary easements will be located totally on one lot in order to avoid conflict with walls, etc.

At such time as the necessary steps have been taken to allow free discharge to the east in the Piedras Marcadas Arroyo, the temporary easements will be vacated, the curb openings rebuilt, the pipes plugged, and the entire storm runoff discharged into the right-of-way.

I believe the above drainage solution satisfactorily addresses the City's concern of discharging runoff as close to historic discharge as possible.

We submit this report for your approval and would appreciate your concurrence at your earliest convenience.

Very truly yours,

MEURER, SERAFINI AND MEURER, INC.

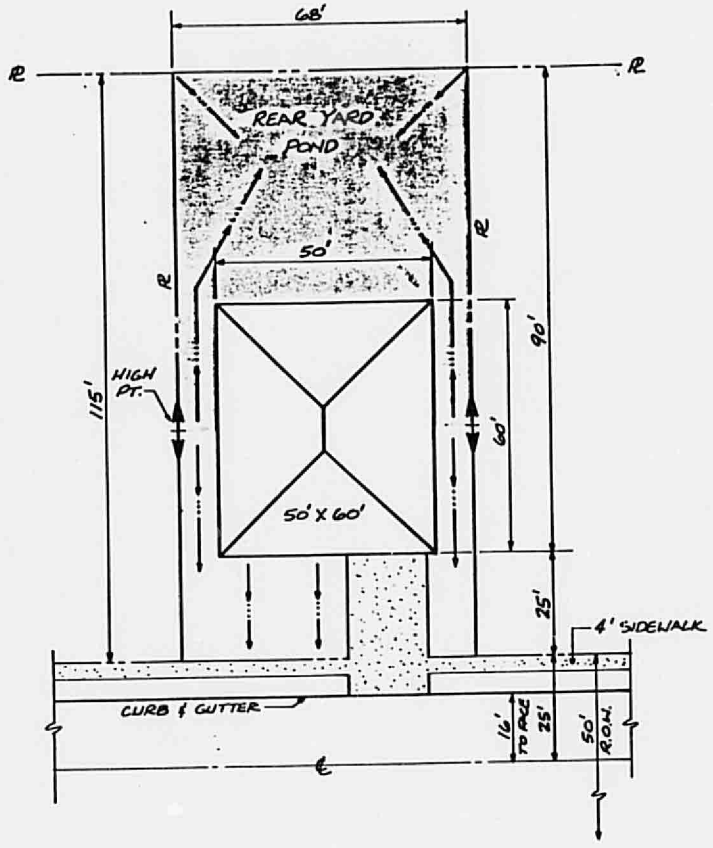
Carl A. Tebbens, P.E.
Vice President

Approval:

Richard S. Heller
City Engineer

CAT:dw

cc: Mr. Dick Carter, AMBELL
Mr. Varne Kimmick, AMBELL

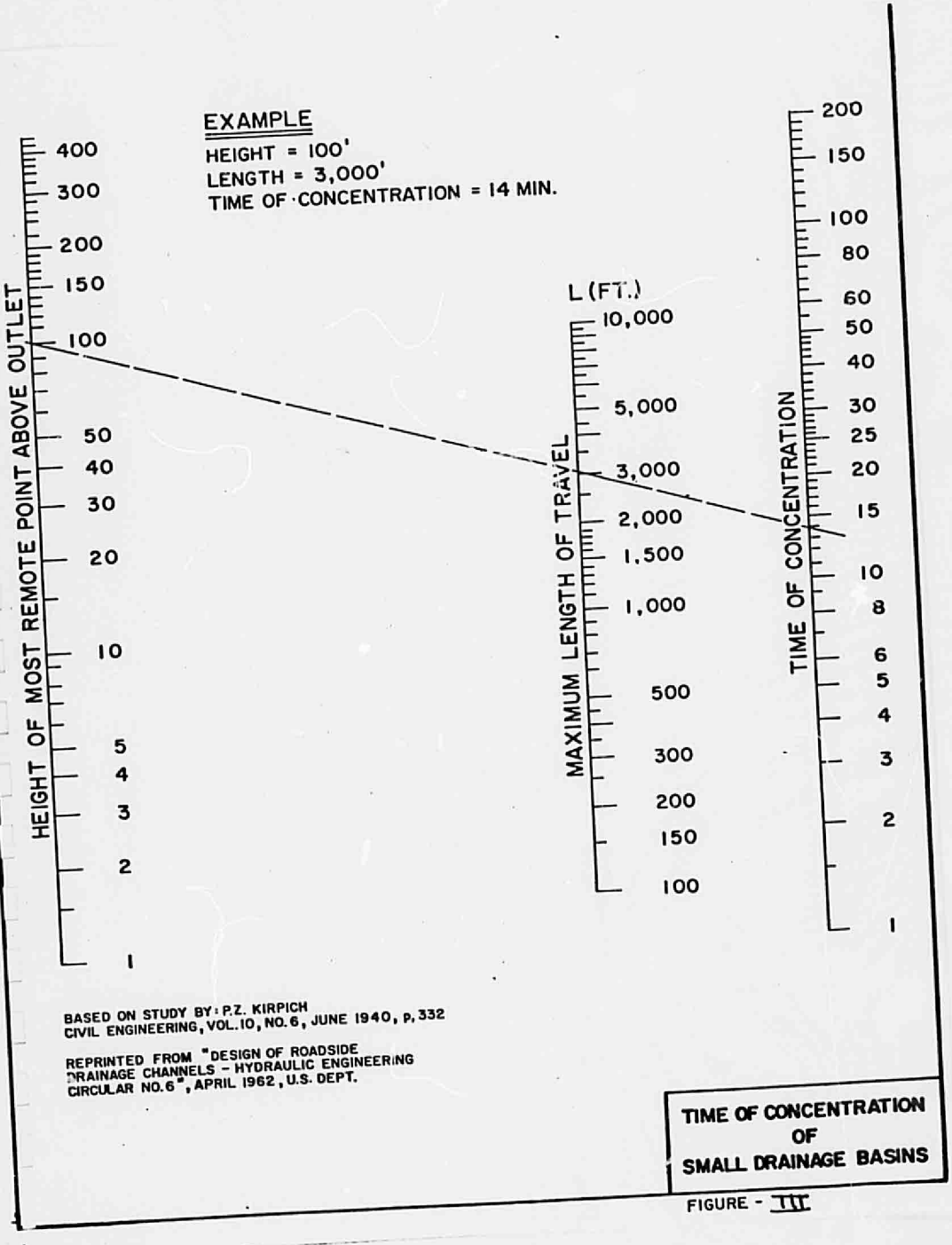


TYPICAL PONDED LOT

SCALE: 1" = 30'

MEURER, SERAFINI AND MEURER, INC.
CONSULTING ENGINEERS • SURVEYORS • PLANNERS
2601 WYOMING BOULEVARD • SUITE F • ALBUQUERQUE NEW MEXICO 87110 • (505) 292 1936

FIGURE NO. II

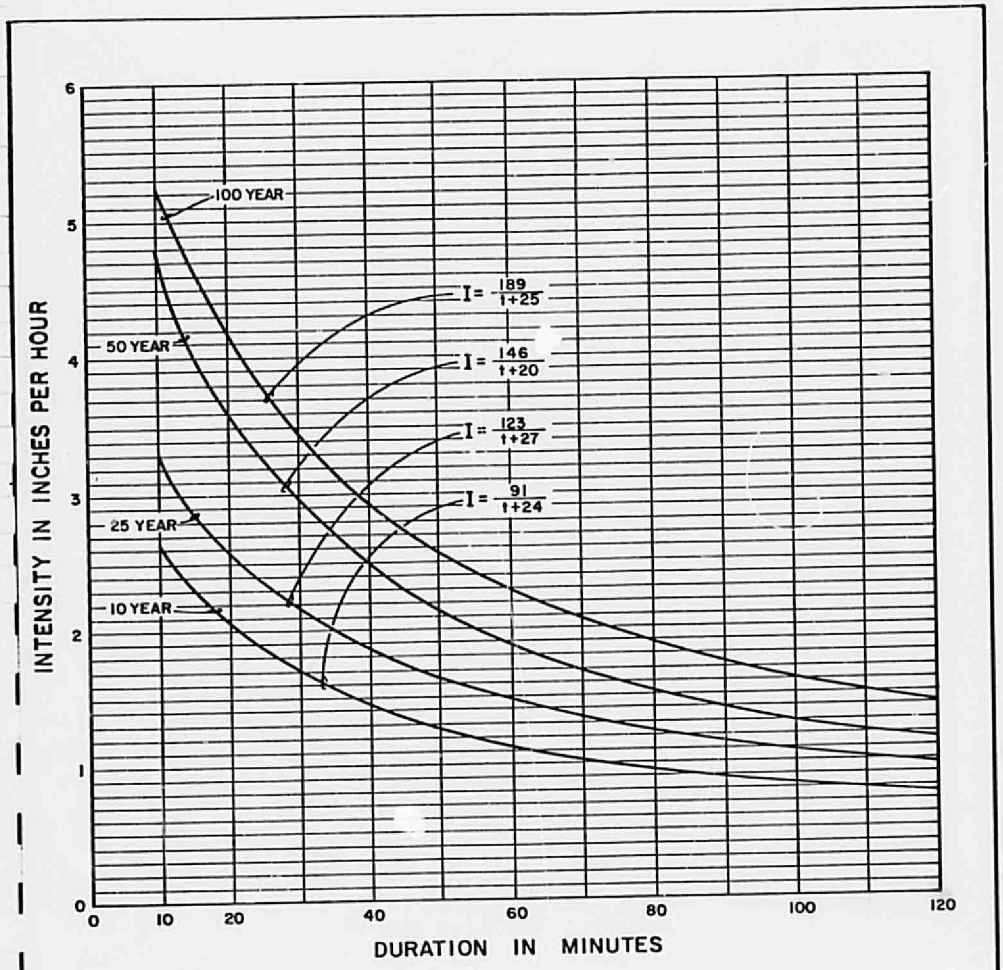


BASED ON STUDY BY: P.Z. KIRPICH
CIVIL ENGINEERING, VOL. 10, NO. 6, JUNE 1940, p. 332

REPRINTED FROM "DESIGN OF ROADSIDE DRAINAGE CHANNELS - HYDRAULIC ENGINEERING CIRCULAR NO. 6", APRIL 1962, U.S. DEPT.

TIME OF CONCENTRATION OF SMALL DRAINAGE BASINS

FIGURE - III



MASTER PLAN OF DRAINAGE
PREPARED BY:
GORDON HERKENHOFF & ASSOCIATES
ALBUQUERQUE, NEW MEXICO

INTENSITY DURATION FREQUENCY CURVES
(ALBUQUERQUE AREA, 1961)

FIGURE - IV

