HYDROLOGY K22/D13 2 PLANS 1 of 2

K22/D13

2 Plans

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

MAYOR
Harry E. Kinney

CHIEF
ADMINISTRATIVE OFFICER
Bob V. Stover

RECEIVED
SEP 24 1985
HYDROLOGY SECTION

(K22/D13)

Water Utilities Department, Planning and Engineering Division

20 September 1985

TO: Bud Ervien, Property Management

FROM: Walter Nickerson, Development Process Section

SUBJECT Release of Utility Easements, Tramhill Place, Vacation Ordinance V-85-73

The Water Utilities Department has neither water or sanitary sewer lines in the vacated Tramhill Place and has no future requirements for water or sanitary sewer lines in the vacated street. Therefore, water and sanitary sewer easements in the vacated Tramhill Place may be released.

I am sure this is the same case with the storm sewer facility but I notice that MDD/Hydrology did not get a copy of the request. By copy of this memo I am requesting that they notify you of their concern, if any.

xc: Mendoza
Ertsgaard
MDD/Hydrology
Tom Mann & Assoc.
Readers f.(9-33)
Tramhill Townhomes (K-22)

DENNEY-GROSS & ASSOCIATES, INC.
CONSULTING ENGINEERS
2400 COMANCHE ROAD N.E.
ALBUQUERQUE, NEW MEXICO 87107
(505) 884-0696

August 16, 1984

Mr. Fred Aguirre
City Hydrologist
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

Re: Tramhill Townhouse Site
DGA Job No. 711.21

Dear Mr. Aguirre:

We have made the following modifications to the Tramhill Townhouse Site drainage plan. The following modifications have been designed in consultation with the Traffic Engineer.

Tramhill Place will be regraded to have no crown section and will have a variable cross slope to the west. The dip has been removed from the road along with the gravel blanket to the ponding area. The new cross slope will create a sheet flow that will enter a catch basin on the west side of the street thus directing the flow to the ponding area via a connecting pipe.

The onsite flow after development has been calculated at 3.1 cfs while the offsite flow that will be handled is 0.34 cfs. The catch basin calculations are as follows:

Onsite Flow Q = 3.1 CFS D = 18" A = 1.767 ft^2

Offsite Flow Q = .34 CFS

Total Flow A = 3.44 CFS

From Plate 22.3 D-1: V = 1.5 FPS D = .4'
From Plate 22.3 D-5: Q = 6 CFS (in gratings)

Use Type "A" catch basin, centerline at STA 0 + 54.50

TC = 24.92 at STA 0 + 54.50
Free Water Surface = 24.92 - 1.33 = 23.59

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HYDROLOGY SECTION

H = 23.59 - 21.0 = 2.59 feet
L = 22.5 feet

From DPM Vol. 2 22.3 D-8 (For D=18"): required head = .2' < 2.59'

$$VEL. = \frac{6}{1.767} = 3.4 \text{ fps}$$

$$V_{Req} = 1.33 + 1.2 \left(\frac{VEL^2}{64.4}\right) + 1.5 = 3.04' \text{ actual depth needed}$$

From DWG K-2-3: Min V depth $= \frac{6.5}{12} + 1.833 + 1.5 = 3.88'$

$V_{Req} = 3.88' > 3.04'$ use V = 3.88'

Invert Depth 21.04

Slope-connection Pipe $\frac{21.04-21}{22.5} = 0.0018'/ft.$

If you have any questions or need further assistance, please feel free to call our office at your convenience.

Very truly yours,

RTWilliams

Richard T. Williams, P.E.

RTW/cbk

Atch:

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AUG 17 1984
HYDROLOGY SECTION

INFORMATION SHEET

PROJECT TITLE Design of Improvements Tramhill Townhouse Site TYPE OF SUBMITTAL Drainage Report

ZONE ATLAS PAGE NO. K-22 -Z13 CITY ADDRESS

LEGAL DESCRIPTION Lots 1-6, Block 1 and Lots 1-6, Block 2, Tract A, Tramhill Townhomes Estates

ENGINEERING FIRM DENNEY GROSS & ASSOCIATES CONTACT Richard T. Williams

ADDRESS 2400 Comanche Road N.E. PHONE 884-0696

OWNER D.A. McCall CONTACT D.A. McCall

ADDRESS 1905 San Mateo N.E. PHONE 265-3649

ARCHITECT Andrade Homes CONTACT Sam Andrade

ADDRESS 4001 Ellison N.E. PHONE 345-9986

SURVEYOR DENNEY-GROSS & ASSOCIATES CONTACT Steve Youtsey

ADDRESS PHONE

CONTRACTOR Same as Architect CONTACT

ADDRESS PHONE

PRE-DESIGN MEETING:

X YES
___ NO
X COPY OF CONFERENCE RECAP SHEET PROVIDED

PLEASE CHECK TYPE OF APPROVAL EXPECTED WITH THIS SUBMITTAL:

___ SKETCH PLAT APPROVAL
___ PRELIMINARY PLAT APPROVAL
___ SITE DEVELOPMENT PLAN APPROVAL
___ FINAL PLAT APPROVAL
___ BUILDING PERMIT APPROVAL
___ CERTIFICATE OF OCCUPANCY APPROVAL
___ ROUGH GRADING PERMIT APPROVAL
X GRADING/PAVING PERMIT APPROVAL
___ OTHER Drainage (SPECIFY)

DATE SUBMITTED: Aug 16, 1984

BY: RT Williams

RECEIVED AUG 17 1984 HYDROLOGY SECTION

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

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

September 28, 1984

Richard T. Williams
Denney-Gross & Associates
2400 Comanche Road, N.E.
Albuquerque, New Mexico 87107

RE: REVISION TO DRAINAGE REPORT TRAMHILL TOWNHOUSE (K22-D13)
RECEIVED AUGUST 17, 1984

Dear Richard:

The above referenced revision, dated August 10, 1984 is approved.

If I can be of further assistance, please contact me at 766-7644.

Sincerely yours,

Carlos A. Montoya
Civil Engineer/Hydrology

CAM/bm

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

June 11, 1984

Mr. Richard T. Williams, PE
Denney-Gross & Associates, Inc.
2400 Comanche Rd. NE
Albuquerque, New Mexico 87107

Ref: Tramhill Townhouse Estate, K22-D13

Dear Mr. Williams:

Consider this a follow up on our teleconference on June 6, 1984. I reviewed your drainage and grading plan and have the following concerns:

1. The plan calls for accepting drainage flows from public Right-of-Way and diverting to private land where it will be detained and control discharged to Copper. This cannot be allowed without both a Maintenance agreement and an Indemnification agreement between the landowner and the City. This will have to be provided prior to plat sign off or infrastructure plan sign off.

2. The street grades proposed will not facilitate abandonment of the pond and the street pavement, curb and gutter and sidewalks will require reconstruction when the pond is removed.

3. Show the property line location in the retaining wall details.

4. Specify on the plans that the berm and pond will be constructed first prior to any other construction to mitigate soil erosion problems.

Please contact me if you need any additional information to assist you in resolving these concerns.

Sincerely,

Fred Aguirre
City Hydrologist

FA/AH/fs

cc: Hydrology File K22-D13
QA File

DENNEY-GROSS & ASSOCIATES, INC.
CONSULTING ENGINEERS
2400 COMANCHE ROAD, N.E.
ALBUQUERQUE, NEW MEXICO 87107
(505) 884-0696

May 10, 1984

RECEIVED
MAY 11 1984
HYDROLOGY SECTION

Mr. Billy J. Goolsby
Design Hydrology Section
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

Re: Revised Submittal for the
Grading and Drainage Plan
for Tramhill Townhomes (K22-D13)
DGA Job No. 711.21

Dear Mr. Goolsby:

Thank you for your courtesy in meeting with me on May 9, 1984 in order to discuss subject project.

In accordance with our conversation, the following changes have been made:

1. The weepholes are correctly drawn through the retaining wall sections;

2. Section "C" is correctly called out;

3. A gravel sump with filter cloth has been shown at the upstream ends of the weepholes;

4. A typical weir section is detailed.

Please contact me if you require additional information.

Very truly yours,

RTWilliams

Richard T. Williams

RTW/cbk

Atch: Information Sheet

INFORMATION SHEET

PROJECT TITLE Design of Improvements Tramhill Townhouse Site TYPE OF SUBMITTAL Drainage Report

ZONE ATLAS PAGE NO. K-22 CITY ADDRESS

LEGAL DESCRIPTION Lots 1-6, Block 1 and Lots 1-6, Block 2, Tract A, Tramhill Townhomes Estates

ENGINEERING FIRM DENNEY-GROSS & ASSOC. CONTACT Richard T. Williams

ADDRESS 2400 Comanche Road N.E. PHONE 884-0696

OWNER D. A. McCall CONTACT D. A. McCall

ADDRESS 1905 San Mateo N.E. PHONE 265-3649

ARCHITECT Andrade Homes CONTACT Sam Andrade

ADDRESS 4001 Ellison N.E. PHONE 345-9986

SURVEYOR DENNEY-GROSS & ASSOCIATES CONTACT Steve Youtsey

ADDRESS 2400 Comanche Road N.E. PHONE 884-0696

CONTRACTOR Same as Architect CONTACT

ADDRESS PHONE

PRE-DESIGN MEETING:

X YES
___ NO
X COPY OF CONFERENCE RECAP SHEET PROVIDED

PLEASE CHECK TYPE OF APPROVAL EXPECTED WITH THIS SUBMITTAL:

___ SKETCH PLAT APPROVAL
___ PRELIMINARY PLAT APPROVAL
___ SITE DEVELOPMENT PLAN APPROVAL
___ FINAL PLAT APPROVAL
___ BUILDING PERMIT APPROVAL
___ CERTIFICATE OF OCCUPANCY APPROVAL
___ ROUGH GRADING PERMIT APPROVAL
X GRADING/PAVING PERMIT APPROVAL
X OTHER Drainage (SPECIFY)

RECEIVED
MAY 11 1984
HYDROLOGY SECTION

DATE SUBMITTED: MAY 10, 1984

BY: RTWilliams
Richard T. Williams, P.E.

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

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

May 8, 1984

Mr. Rick Williams
Denny-Gross & Associates, Inc.
2400 Comanche Road, NE
Albuquerque, NM 87107

RE: REVISED GRADING AND DRAINAGE PLAN FOR TRAMHILL TOWNHOMES (K22-D13) RECEIVED MAY 3, 1984

Dear Rick,

I do not understand what you have submitted. You have only partially addressed my concerns and led to my confusion. The plan has been revised but there is no revision date. The plan indicates additional sections but there are none shown.

I would strongly suggest that you call for an appointment and discuss what you are trying to do with this submittal.

Should you have any questions or comments, please contact me.

Yours truly,

Billy J. Goolsby

Billy J. Goolsby, P.E.
City/County Flood Plain Admin.

BJG/dlw

DENNEY-GROSS & ASSOCIATES, INC.
CONSULTING ENGINEERS
2400 COMANCHE ROAD, N.E.
ALBUQUERQUE, NEW MEXICO 87107
(505) 884-0896

May 2, 1984

RECEIVED
MAY 03 1984
HYDROLOGY SECTION

Mr. Billy J. Goolsby, P.E.
City of Albuquerque
Design Hydrology Section
P.O. Box 1293
Albuquerque, NM 87103

Re: Revised Submittal for the Grading and Drainage Plan for Tramhill Townhomes (K22-D-13)
DGA Job No. 711.21

Dear Mr. Goolsby:

We are resuming work on this project and request that the approval process be resumed.

Our responses to your comments dated April 13, 1984 are as follows.

1a. We have included a retaining wall section with a 1/2 pipe CMP drain. The drain is designed to accept off-site flows from the property to the east and convey them to the north or south, as appropriate.

Flows diverted to the north will discharge at the west end of the north retaining wall, south of station 0+85±. The flow will cross public right-of-way for approximately 12 feet, then go down the wheelchair ramp at the southeast corner of Copper Avenue and Tramhill Place and enter Copper Avenue. The portion of the public right-of-way over which off-site flows may be expected to cross will be covered with a six-inch gravel blanket in order to protect against erosion. The peak flow to be expected is 0.81 cfs.

Flows diverted to the south will enter the south end of Tramhill Place through a sidewalk culvert with a steel plate top. These off-site flows will be routed through the detention pond into Copper Avenue. The peak flow to be expected is 0.34 cfs. This scheme will eliminate the modification of off-site flows on the property to the south that our previous submittals proposed.

3. Flows generated over Tramhill Place can be expected to have a peak discharge rate of 1.35 cfs. We propose to accept these flows in the detention pond as if they were generated on private property, and the pond has been sized accordingly. These flows eventually discharge to the intersection of Copper and Chelwood Park, which is in the 100-year flood hazard area. It is desirable to control as much of the discharge to this point as possible.

The three lots which are proposed to free discharge into the alley and thence to the south have been removed from the contributing drainage area to the intersection of Copper and Chelwood Park. We have previously outlined the routing of these flows to the I-40 drainage channel for you. In no place do these flows enter a 100-year flood hazard area. The sum of the peak flows from these three lots is 0.87 cfs, which is less than the 1.35 cfs generated over Tramhill Place that we are proposing to route through the pond.

4. We have changed the fence detail to indicate a four-foot chain link fence. The pond liner is called out as 1-1/2" ACSC.

5. City standard drawing K-11-2 pertains to channel linings, which are not proposed for this project. At your direction, we have designed the retaining wall with weepholes on ten-foot centers.

6. The spot elevations to which you refer were taken on the adjacent property. We have no authority to propose their modification.

Please contact me if you require additional information.

Very truly yours,

RTWilliams

Richard T. Williams, P.E.

RTW/cbk

Atch:

INFORMATION SHEET

Design of Improvements

PROJECT TITLE Tramhill Townhouse Site TYPE OF SUBMITTAL Drainage Report

ZONE ATLAS PAGE NO. K-22 CITY ADDRESS

LEGAL DESCRIPTION Lots 1-6, Block 1 and Lots 1-6, Block 2, Tract A, Tramhill Townhomes Estates

ENGINEERING FIRM DENNEY-GROSS & ASSOCIATES CONTACT Richard T. Williams

ADDRESS 2400 Comanche Road N.E. PHONE 884-0696

OWNER D.A. McCall CONTACT D.A. McCall

ADDRESS 1905 San Mateo N.E. PHONE 265-3649

ARCHITECT Andrade Homes CONTACT Sam Andrade

ADDRESS 4001 Ellison N.E. PHONE 345-9986

SURVEYOR DENNEY-GROSS & ASSOCIATES CONTACT Steve Youtsey

ADDRESS PHONE

CONTRACTOR Same as Architect CONTACT

ADDRESS PHONE

PRE-DESIGN MEETING:

X YES
___ NO
X COPY OF CONFERENCE RECAP SHEET PROVIDED

PLEASE CHECK TYPE OF APPROVAL EXPECTED WITH THIS SUBMITTAL:

___ SKETCH PLAT APPROVAL
___ PRELIMINARY PLAT APPROVAL
___ SITE DEVELOPMENT PLAN APPROVAL
___ FINAL PLAT APPROVAL
___ BUILDING PERMIT APPROVAL
___ CERTIFICATE OF OCCUPANCY APPROVAL
___ ROUGH GRADING PERMIT APPROVAL
X GRADING/PAVING PERMIT APPROVAL
___ OTHER Drainage (SPECIFY)

RECEIVED
MAY 03 1984
ECOLOGY SECTION

DATE SUBMITTED: MAY 3, 1984

BY: RT Williams

DENNEY-GROSS & ASSOCIATES, INC.
CONSULTING ENGINEERS
2400 COMANCHE ROAD, N.E.
ALBUQUERQUE, NEW MEXICO 87107
(505) 884-0896

April 18, 1984

RECEIVED
APR 20 1984
RECEIVED

Mr. Billy J. Goolsby, P.E.
Design Hydrology Section
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

Re: Revised Submittal for the Grading and Drainage Plan for Tramhill Townhomes (K22-D13)
DGA Job No. 711.21

Dear Mr. Goolsby:

Thank you for your comments dated April 13, 1984, regarding subject project.

We have suspended work on this project until further notice. At that time, we will respond to your comments and proceed toward approval.

Very truly yours,

RTWilliams

Richard T. Williams, P.E.

RTW/cbk

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

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

April 13, 1984

Mr. Richard Williams
Denney-Gross & Associates, Inc.
2400 Comanche Road NE
Albuquerque, NM 87107

REF: REVISED SUBMITTAL FOR THE GRADING AND DRAINAGE PLAN FOR TRAMHILL TOWNHOMES (K22-D13) RECEIVED APRIL 2, 1984

Dear Rick:

I have reviewed the above referenced submittal and will respond to your addressing my comments:

1a. It may be true that these off-site flows historically crossed Public R/W; however, these flows were sheet flow for the most part. Your plan calls for collecting these flows against the retaining wall and diverting the concentrated flows along this wall outside the property to discharge across the sidewalk into Tramhill Place. 1) The concentrated flow along the retaining wall jeopardizes the structural stability of the wall. 2) These concentrated flows crossing the sidewalk may cause erosion against the sidewalk or undermine it and cause failure. Also, the sediments will be washed into the street. The City does not wish to accept this maintenance responsibility.

1b. Okay. Please provide prior to release of building permit.

2. Okay. Justification was not provided but I will accept the reduction.

3. The on-site discharge may be insignificant to you but, what impact will it have when added into the diverted off-site flows to the south property parking lot and into the alley. The development to the south also contributes to the alley. How much is coming in from this development? What about other areas to the south?

4. It does not appear that the proposed fence will keep children out of the pond. Most kids could go right through the two (2) foot space in the fence. Also, I can't find any indication or details for the proposed pond liner.

5. The standard City detail for weepholes is located on K-11-2 and they are to be on 10 foot centers, or per the standard.

6. The spot elevations along the southern portion of the east property line are the same (30.7) which indicates this area to be flat. How will it drain if there isn't any grade difference to the south or the north?

Should you have any questions or any comments, please feel free to call me at 766-7644.

Yours truly,

Billy J. Goolsby

Billy J. Goolsby, PE
City/County Flood Plain Admin.

BJG:mrk

DENNEY-GROSS & ASSOCIATES, INC.
CONSULTING ENGINEERS
2400 COMANCHE ROAD, N.E.
ALBUQUERQUE, NEW MEXICO 87107
(505) 884-0696

April 2, 1984

Mr. Billy J. Goolsby, P.E.
Design Hydrology Section
123 Central N.W.
Albuquerque, NM 87102

Re: Grading and Drainage Plan for
Tramhill Townhomes (K22-D13)
DGA Job No. 711.21

Dear Mr. Goolsby:

Thank you for your letter of March 29, 1984, in which you gave comments regarding subject project. Specific responses to your comments are as follows.

1. Off-Site Flows:

The existing contours do not indicate this to be true. The existing flow for the most part and was sheet flow for you are concentrating the flow to drain along the rear property line.

a. The flow generated on the lot to the east of subject project that is diverted to the north into Copper Avenue has historically crossed public right-of-way on the surface. We propose no modification. Discharge of these flows will presumably be controlled when this lot is developed;

b. The adjacent property owner has been contacted regarding the diversion to the south onto the adjacent parking lot. We are expecting written concurrence from him. As soon as we receive it, we will forward a copy to you.

2. The peak discharge into Copper of 1.34 cfs is composed of the following elements:

a. 0.29 cfs each from Lots 2 and 3, Block 1. Total 0.58 cfs;

b. 0.76 cfs from the ponding area.

APR 02 1984
HYDROLOGY SECTION

As discussed in the text of subject plan, we consider free discharge of flows from these two lots into the alley and thence into Copper Avenue to be the only practical way to manage the drainage of these lots.

We have enclosed a hydrograph on which we developed the required storage volume for the ponding area using one 4" PVC outlet. This volume is 4,254 cf, as compared with

the originally proposed 3,186 cf. As you know, the 3,186 cf pond is a tight fit on Lot 1, Block 1. Provision of a larger ponding volume appears to us to be impractical.

For the above reasons, we selected a combined peak discharge rate of 1.34 cfs into Copper Avenue. This is less than the peak undeveloped discharge rate of 2.06 cfs, thereby helping to alleviate the flooding problem at the intersection of Copper Avenue and Chelwood Park Boulevard.

3. Lots 4-6 of Block 1 drain into the alley on the west side of subject property and thence to the south at a peak rate of 0.29 cfs each, or 0.87 cfs total. Again, we consider free discharge of flows from these three lots into the alley to be the only practical way to manage the drainage of these lots. The capacity of the alley way is difficult to determine, as the section varies from point to point throughout its length of approximately 950 feet. In any event, this peak rate of discharge can hardly be considered significant.

What about the sites downstream already contributing

The flows get to Chelwood Park Boulevard from the alley by entering Lomas Verdes Avenue. From Lomas Verdes Avenue, the flows can branch off into Chico Road (or by way of La Charles Drive into Chico Road), Turquoise Avenue, or Mountainview Avenue. Each of these streets intersects with Chelwood Park Boulevard downstream of the 100-year flood hazard zone at the intersection of Chelwood Park Boulevard and Copper Avenue. From Chelwood Park Boulevard, they enter the I-40 drainage channel. The flows will not cross any private property. We have enclosed a copy of zone atlas page K-22-Z showing the routing of these flows.

4. The water surface elevation in the pond is 5721.0 feet MSL. We have indicated this on the drawing. Fencing has been included. We have not been able to develop the required pond volume without extending the water surface closer than 15 feet to a proposed structure; thus, the pond will be lined below elevation 5721.0. We have indicated this on the drawing. The water surface is not closer than 10 feet to the edge of pavement of Copper Avenue.

where?

5. We cannot find the City Standard you refer to. Please reference it for us for our future use. Two-inch PVC weep holes on 50-foot centers have been included in the retaining wall.

K-15

6. Analysis of proposed spot elevations at the back of the lots on the east side of Tramhill Place indicates that water collected in this area will not pond against the structures.

We are enclosing two blue-line prints which contain the above revisions. You will also note that curb and return elevations have been modified. Please contact me should you require additional information.

Very truly yours,

RTWilliams

Richard T. Williams, P.E.

RTW/cbk

Enclosures

ENGINEERS PLANNERS PHOTOGRAMMETRISTS

BOHANNAN-HUSTON INC.

4125 CARLISLE BLVD., N.E. ALBUQUERQUE, NEW MEXICO 87107 505 881-2000

March 13, 1981

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

04-38

Re: Tramhill Townhomes Drainage

Dear Mr. Heller:

In accordance with our conversation concerning drainage changes on Tramhill Townhomes, I am enclosing revised Plate II and supporting calculations. The drainage changes consist of the following:

All lots on the west side of the subdivision will be allowed to drain the back portion of the lots and house ponds to the alley directly west of the property boundary. The front portion of the lots will drain to detention ponds as originally designed. The increased 100-year developed flow to the alley is 0.82 cfs.

The east part of the subdivision will be redesigned to allow the back yards to drain to Tramhill Place. House pads will be changed to allow a drainage path for rainfall from the back yard to the detention ponds originally designed. This redesign will increase the 100-year developed flow to Tramhill Place by 0.82 cfs. Plate II shows the redesigned lots for the east side of the subdivision and the flow paths for the entire site.

Total flow in Tramhill Place will increase from 2.48 cfs to 3.30 cfs. The western alley will experience an increase of 0.82 cfs. Both the western alley and Tramhill Place will discharge their flow to Copper Avenue. Total flow discharged to Copper Avenue will be 4.12 cfs, 0.82 cfs from the western alley and 3.30 cfs from Tramhill Place. This flow is an increase of 1.64 cfs over the 100-year undeveloped flow, and should not adversely affect property downstream.

If you have any questions, please feel free to contact Ron Booth or me at this office.

Sincerely yours,

Michial M. Emery, P.E.
Vice President

Enclosure

cc: Mr. Steve Steele

RGB/js
Job No. 1 940 4

RSH RGB
MO
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ESS
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COUN
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FILE
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RECEIVED
MAR 17 1981
CITY ENGINEER

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

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

March 29, 1984

Mr. Richard Williams
Denney-Gross & Associates, Inc.
2400 Comanche Road NE
Albuquerque, NM 87107

REF: GRADING AND DRAINAGE PLAN FOR TRAMHILL TOWNHOMES (K22-D13)
RECEIVED MARCH 12, 1984

Dear Rick:

I have reviewed the above referenced plan and forward the following comments:

1. Off-site flows:

   a. How is it proposed for the flow diverted to the north to be discharged into Copper Avenue? It should not cross Public R/W on the surface. How will the R/W be protected against erosion?

   b. The diversion to the south onto the adjacent parking lot will need written concurrence with the adjacent property owner.

2. The two 4" drains for the pond have not been justified. You indicate that a total of 1.34 cfs is to be discharged to Copper Avenue. How was it determined that this should be the allowable discharge rate?

3. Where do the flows in the alley go? How will they impact the existing capacity and flows in the alley way? It was stated that they would get to Chelwood Park Boulevard. How do they get there? Will they cross any private property?

4. What will be the water surface elevation in the pond? Depth over 18" will require fencing. The water surface cannot be closer than 15 feet to a structure or 10 feet to the pavement of a street.

5. Weepholes per City standard are required in retaining walls with previous surface on the high side.

6. Will the water collected at the back of the lots on the east side of Tramhill Place pond against the structures?

Should you have any questions or comments, please contact me at 766-7644.

Yours truly,

Billy J. Goolsby

Billy J. Goolsby, PE
City/County Flood Plain Admin.

BJG:mrk

CITY OF ALBUQUERQUE
MUNICIPAL DEVELOPMENT DEPARTMENT
ENGINEERING DIVISION

HYDROLOGY SECTION PROJ. NO. K-22 DATE: 2/14/84

PLANNING DIVISION NO. _____

CONFERENCE RECAP

SUBJECT: Trambill Townhomes Estates

ATTENDANCE: WHO	REPRESENTING
Rick Williams	DGA
Billy Goolsby	City

FINDINGS: ① Drainage Plan per DPM
② Flooding on Copper. Therefore controlled discharge required to Copper. Other solutions will be entertained if demonstrated that downstream capacity exists (Also, Public R/W & easements to warrant alternate discharge point).
③ Erosion control plan required for the period of construction.
④ "Construction Within Public R/W" document required if utilized.
⑤ Financial Securities required for Infrastructure Improvements

The undersigned agrees that the above findings are summarized accurately and are only subject to change if further investigation reveals that they are not reasonable or that they are based on inaccurate information.

SIGNED: Billy J. Goolsby SIGNED: RW Williams

TITLE: ~~EE~~ CE/Hydrology TITLE: _____

DATE: 2/14/84 DATE: FEB 14, 1984

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

September 20, 1979

Mr. Michael Emery
Bohannan-Huston, Inc.
4125 Carlisle Boulevard, NE
Albuquerque, New Mexico 87107

SUBJECT: TRAMHILL TOWNHOUSES DRAINAGE REPORT

Dear Mr. Emery:

The revised drainage report and your letter regarding the referenced project have been reviewed and found to reply in a satisfactory manner to the questions raised. The drainage report is therefore hereby approved. The grading plans must bear clear indication that the wall heights will be in compliance with the zoning requirements as stipulated by your letter and the alley grades must be acceptable to this office.

Very truly yours,

Richard S. Heller
City Engineer

RSH:BC:bm
CC: R. E. Leonard w/attachments
Bruno Conegliano
Drainage File

BOHANNAN-HUSTON INC.
4125 CARLISLE BLVD., N.E. ALBUQUERQUE, NEW MEXICO 87107 505 881-2000

September 17, 1979

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

Re: Tramhill Townhomes Drainage Report

Dear Mr. Heller:

Enclosed is the updated drainage report for the above-referenced project. A vicinity map has been included to aid in locating the site and to show the watersheds affecting the site.

A temporary drainage easement from the adjacent property owner to the east, five feet wide, paralleling the east boundary of Tramhill Townhomes is being negotiated.

The two foot deep channel, referenced in your letter, happens to be an existing alley gutter encroaching into the property. The vicinity map indicates the apartment complex south of Tramhill Townhomes, drains south and not through the alley as suggested by your letter.

The narrowing of this alley to fit into the alley right-of-way, will be accomplished to match the existing grades on the alley. The backyards, as stated in the text, act as ponds. I believe your comment referencing the ponds being one half foot higher than the rear lot lines is referring to the patio pad elevations. The patio elevations are typically one half foot higher than the rear lot lines. As for the volumes of the ponds, the tabulation on Sheet 7 indicates the depths of the ponds and the area from the grading plan would give the volume of the ponds.

The wall heights are of standard masonary block construction and are proposed to be above the rear lot line elevations.

Finally, the plat is being revised to include the ponding easements located in the front of all the lots. This will insure the drainage facility will remain and will not be altered.

If there are any questions concerning this letter or the project, please contact Ron R. Bohannan or me of this office. We look forward to receiving approval of the report and plan set in the near future.

Sincerely yours,

Michial M. Emery

Michial M. Emery, P.E.
Vice President

Enclosures

cc: Mr. Steve Steele

RRB/js
Job No. 79-036

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

September 11, 1979

Mr. Michael Emery
Bohannan-Huston, Inc.
4125 Carlisle Boulevard, NE
Albuquerque, New Mexico 87107

REFERENCE: TRAMHILL TOWNHOUSES DRAINAGE REPORT

Dear Mr. Emery:

Section 6 of the AMAFCA Resolution requires that the watersheds affecting the parcel of land which is to be developed be clearly identified and the runoff potentially affecting the parcel be quantified. No vicinity map has been supplied identifying the location of this parcel, and only after searching in the Planning Department files I was able to identify the correct location of the property which is located some 200 feet west of Tramway and not east of Tramway as indicated in the Drainage Report.

I also note that said report gives little consideration to the external flows. In particular, I cannot accept the blocking of said external flows coming from the east without: (1) a specific agreement or concurrence from the adjacent property owner, (2) the construction of a temporary diversionary facility in an appropriately dedicated temporary drainage easement.

Further, I note that the topographic map submitted indicates the existence of a two foot deep channel existing within this parcel east of the alley along Block 16 of Foothills Estates Subdivision which serves apparently for the conveyance of the drainage of the apartment complex south of this project. No quantification of this offsite flow has been supplied nor what provisions will be made, if any, for its control.

It will also be necessary to verify with Mr. Bob Kielich whether the proposed grades in the alley west of this development are compatible with other City plans and your building elevations. In particularly, I note that it appears that it is your proposal to raise by one foot the grades of the alley at the northwest corner. While the general concept for the provision of drainage within the parcel seems acceptable, the grading plans submitted are not adequate for construction, inspection and verification of the ponding facilities provided.

The ponds are shown as located adjacent to the townhouses while it is desirable to have them removed from the foundations to avoid potential damages. I also note that the ponds are shown to be elevated by half a foot in respect to the elevation of the rear lot lines along the east side of the property, which doesn't quite make sense. Further, the volumes and dimensions of the ponds to be provided is not stipulated nor the height of the garden or retaining walls which are to be constructed. I further note that the four ponds which will serve two adjacent properties must be covered by a private easement to prevent any one of the owners from altering the drainage facility supplied.

If you have any questions, please feel free to call me or Mr. Conegliano.

Very truly yours,

Richard S. Heller

Richard S. Heller
City Engineer

RSH:BC:bm
CC: Richard Leonard, AMAFCA
Bruno Conegliano
Drainage File

BOHANNAN-HUSTON INC.
4125 CARLISLE BLVD., N.E. ALBUQUERQUE, NEW MEXICO 87107 505 881-2000

July 9, 1979

Mr. Bruno Conegliano
City Hydrologist
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

RECEIVED
JUL 12 1979
CITY ENGINEER

Re: Tramhill Drainage Report

Dear Mr. Conegliano:

Enclosed is the drainage report for the Tramhill Townhouses.

If you wish to discuss this report, please contact Ron R. Bohannan of this office.

Sincerely,

Kelly Carpenter

Kelly Carpenter
Chief Planner

Enclosure

cc: Mr. Steve Steele

KEC/mnb
Job No. 79-036

BLOCK 2

LOTS 1, 2, 3, 4, 5, 6 DRAIN TO FRONT DETENTION PONDS

TOTAL AREA TO DRAIN TO TRAMHILL PLACE

LOT #	AREA
1	1900 ft²
2	1305 ft²
3	1233 ft²
4	1102 ft²
5	1406 ft²
6	1443 ft²
TOTAL	8289 ft² = 0.19 AC

Q = CIA

= .80 (5.40) (0.19 AC)

= 0.82 CFS

TOTAL AREA TO DRAIN TO ALLEY

BLOCK 1

LOTS 1, 2, 3, 4, 5, 6

PROJECT NAME TRAMHILL TOWNHOMES SHEET 1 OF

PROJECT NO. BY RGM DATE

SUBJECT DRAINAGE CH'D DATE

LOT #	AREA
1	1658 ft²
2	1305 ft²
3	1247 ft²
4	1102 ft²
5	1443 ft²
6	1443 ft²
TOTAL	8198 ft² = 0.19

Q = CIA

= .80(5.42) 0.19

= 0.82 cfs

PROJECT NAME TRAMHOL TOWNHOMES SHEET 2 OF

PROJECT NO. BY RGB DATE

SUBJECT DRAINAGE CH'D DATE

DRAINAGE REPORT

TRAMHILL TOWNHOMES ESTATES

Prepared For

D. A. McCall

March 1984

DGA Job No. 711.21

Prepared By

DENNEY-GROSS & ASSOCIATES, INC.
Consulting Engineers
2400 Comanche Road, N.E.
Albuquerque, New Mexico 87107

INFORMATION SHEET

PROJECT TITLE Design of Improvements Tramhill Townhouse Site TYPE OF SUBMITTAL Drainage Report

ZONE ATLAS PAGE NO. K-22-D13 CITY ADDRESS

LEGAL DESCRIPTION Lots 1-6, Block 1 and Lots 1-6, Block 2, Tract A, Tramhill Townhomes Estates

ENGINEERING FIRM DENNEY-GROSS & ASSOCIATES CONTACT Richard T. Williams

ADDRESS 2400 Comanche Road N.E. PHONE 884-0696

OWNER D.A. McCall CONTACT D.A. McCall

ADDRESS 1905 San Mateo N.E. PHONE 265-3649

ARCHITECT Andrade Homes CONTACT Sam Andrade

ADDRESS 4001 Ellison N.E. PHONE 345-9986

SURVEYOR DENNEY-GROSS & ASSOCIATES CONTACT Steve Youtsey

ADDRESS PHONE

CONTRACTOR Same as Architect CONTACT

ADDRESS PHONE

PRE-DESIGN MEETING:

X YES
___ NO
X COPY OF CONFERENCE RECAP SHEET PROVIDED

PLEASE CHECK TYPE OF APPROVAL EXPECTED WITH THIS SUBMITTAL:

___ SKETCH PLAT APPROVAL
___ PRELIMINARY PLAT APPROVAL
___ SITE DEVELOPMENT PLAN APPROVAL
___ FINAL PLAT APPROVAL
___ BUILDING PERMIT APPROVAL
___ CERTIFICATE OF OCCUPANCY APPROVAL
___ ROUGH GRADING PERMIT APPROVAL
X GRADING/PAVING PERMIT APPROVAL
___ OTHER Drainage (SPECIFY)

DATE SUBMITTED:

BY:

RECEIVED
MAR 12 1984
HYDROLOGY SECTION

CITY OF ALBUQUERQUE
MUNICIPAL DEVELOPMENT DEPARTMENT
ENGINEERING DIVISION

HYDROLOGY SECTION PROJ. NO. K-22 DATE: 2/14/84

PLANNING DIVISION NO. _____

CONFERENCE RECAP

SUBJECT: Tranquill Townhomes Estates

ATTENDANCE: WHO	REPRESENTING
Rick Williams	DGA
Billy Goolsby	City

FINDINGS: ① Drainage Plan per DPM
② Flooding on Copper. Therefore controlled discharge required to Copper. Other solutions will be entertained if demonstrated that downstream capacity exists (Also, Public R/W & easements to warrant alternate discharge point).
③ Erosion control plan required for the period of construction.
④ "Construction Within Public R/W" document required if utilized.
⑤ Financial Securities required for Infrastructure Improvements

The undersigned agrees that the above findings are summarized accurately and are only subject to change if further investigation reveals that they are not reasonable or that they are based on inaccurate information.

SIGNED: Billy J. Goolsby SIGNED: RW Williams

TITLE: ~~Sr~~ CE/Hydrology TITLE: _____

DATE: 2/14/84 DATE: FEB 14, 1984

I, Richard T. Williams, hereby certify that the enclosed documents and drawings were prepared under my supervision and are true and correct to the best of my knowledge and belief.

RTWilliams

New Mexico Professional Engineer No. 7309

RICHARD T. WILLIAMS
NEW MEXICO
7309
REGISTERED PROFESSIONAL ENGINEER

INDEX

	Page
Purpose	1
Existing Conditions	1
Proposed Solution	2
Future Improvements	2
Conclusion	3
Appendix A - Computations	
Soils Map	
Flood Hazard Map	
Plate 1 - Existing Conditions	
Plate 2 - Proposed Conditions	

DRAINAGE REPORT

TRAMHILL TOWNHOMES ESTATES

DGA JOB NO. 711.21

I. PURPOSE:

The purpose of this drainage report is to analyze and manage the undeveloped and developed runoff flows resulting from the 6 hour-100 year runoff event according to methodology presented in the City of Albuquerque Development Process Manual.

II. EXISTING CONDITIONS:

Tramhill Townhomes Estates is located on the south side of Copper Avenue N.E. just west of Tramway Boulevard N.E. as shown on the Vicinity Map on Plate 1. The site has an area of 1.15 acres and slopes east to west at about 5 percent.

The first storm sewer downstream from the site runs south along Chelwood Park Boulevard across Copper Avenue and eventually discharges into the I-40 channel. According to the Albuquerque Master Drainage Study, Map K-22, the intersection of Copper Avenue and Chelwood Park Boulevard is presently in the 100-year flood hazard area. Therefore, discharge of storm water generated on-site will be controlled by a ponding area within the development.

The site is not located within a flood plain according to the National Flood Insurance Program Flood Boundary and Floodway Map, City of Albuquerque, panel 31.

The Tramway Boulevard Diversion Channel intercepts all flow east of Tramway Boulevard. This eliminates all off-site flows that would impact the site except for those originating on the tract of land adjacent to the east of the site. These flows are split into north-draining and south-draining elements by a natural divide.

The proposed retaining wall on the east boundary of the site will prevent these flows from crossing the site. The wall will direct the north-draining flows onto Copper Avenue and the south-draining flows into the existing parking lot to the south of the site.

III. PROPOSED SOLUTION:

The site will be bisected in the north-south direction by Tramhill Place, a proposed cul-de-sac. The remaining land between Tramhill Place and the east or west boundaries of the site will be divided into six lots each, for a total of twelve lots.

The six lots to the west of Tramhill Place (Block 1) are on the order of five feet lower at their west ends than at their east ends. Analysis indicates that developed flows from these lots as a result of the 6 hour-100 year storm are 0.29 cfs each, with a runoff volume of 528 ft^3 each. Because of the elevation difference, it is unpractical to drain these lots into Tramhill Place. The site plan does not provide sufficient ponding area of reasonable depth to provide individual drainage ponds for these lots. It is undesirable to carry flows from the southerly lots across the northerly lots and into the main ponding area discussed below.

For the above reasons, we propose free discharging the flows from these lots into the existing alley to the west of the site by means of overflow weirs. A speed bump will be built across the alley on the projection of the property line between Lots 3 and 4. Lots 2 and 3 will drain to the north into Copper Avenue, Lots 4, 5, and 6 will drain to the south, and Lot 1 will be reserved for the main ponding area.

The six lots to the east of Tramhill Place (Block 2) drain naturally into Tramhill Place. Drainage from these lots will be conveyed north on Tramhill Place and west into the main ponding area. A water block on Tramhill Place will keep the flows from entering Copper Avenue. Because of the presence of the water block, the main ponding area is sized to accept flows generated on Tramhill Place as well as on Block 2.

Flows will leave Tramhill Place through a 19-foot laydown on the west curb. They will be conveyed to the pond over a six-inch gravel blanket. The pond discharges into Copper Avenue through two 4" PVC pipes through the curb. The pond is protected by a concrete overflow spillway at the west end.

During construction, erosion on the site will be contained by a two-foot berm adjacent to the back of the sidewalk on Copper.

IV. FUTURE IMPROVEMENTS:

After proposed improvements to the Chelwood Park Boulevard storm sewer are built, an additional dwelling unit will be constructed on the site of the proposed ponding area. Flows from the site will then discharge freely into Copper and thence into the Chelwood Park Boulevard storm sewer.

V. CONCLUSION:

The material contained herein demonstrates a storm water management scheme which will provide the development with a practical and effective plan for handling storm water runoff during times of precipitation.

Approval of this plan is respectfully requested.

DENNEY - GROSS & ASSOCIATES, INC.
ENGINEERS SURVEYORS PLANNERS
2400 COMANCHE ROAD N.E.
ALBUQUERQUE, NEW MEXICO 87107
(505) 884-0696

LOCATION DESIGN of IMPROVEMENTS TRAMHILL TOWNHOUSE SITE

PROJ. NO. 711.21

DATE FEB 14, 1984

DESIGNER RDW

PAGE 1

AREA of SUBDIVISION = 250' x 200' = 50,000 SF = 1.15 AC

AREA LOT 1 BLK 1 = 3961 SF = 0.09 AC
LOT 2 BLK 1 = 3045 SF = 0.07 AC
LOT 3 BLK 1 = 3045 SF = 0.07 AC
LOT 4 BLK 1 = 2923 SF = 0.07 AC
LOT 5 BLK 1 = 3054 SF = 0.07 AC
LOT 6 BLK 1 = 3415 SF = 0.08 AC
LOT 1 BLK 2 = 3961 SF = 0.09 AC
LOT 2 BLK 2 = 3045 SF = 0.07 AC
LOT 3 BLK 2 = 3045 SF = 0.07 AC
LOT 4 BLK 2 = 2923 SF = 0.07 AC
LOT 5 BLK 2 = 3054 SF = 0.07 AC
LOT 6 BLK 2 = 3415 SF = 0.08 AC

TOTAL AREA of LOTS 38,886 SF = 0.89 AC

AREA IN PUBLIC R-O-W (ALL PAVED) = 50,000 - 38,886 = 11,114 SF = 0.26 AC

SOIL SERIES - EtC (EMBUDO - TIJERAS COMPLEX). RUNOFF IS MEDIUM, HAZARD of WATER EROSION IS MODERATE. USED for COMMUNITY DEVELOPMENT, WATERSHED, WILDLIFE HABITAT, AND RANGE. CONTROL of MOISTURE IS REQUIRED for PROPER COMPACTION. (SOIL SURVEY of BERNALILLO COUNTY, N.M., MAP 32 + p. 18).

HYDROLOGIC SOIL GROUP - B (op. cit., p. 77)

0% IMPERVIOUS → C = 0.34
100% IMPERVIOUS → C = 1.00 (DPM VOL 2, p. 22.2 C-1)

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LOCATION
PROJ. NO.
DATE
DESIGNER
PAGE 7

LOT 1 BLK 1 & LOT 1 BLK 2

D.W. = 20' + 16' = 320 SF

TOTAL AREA = 3961 SF

IMPERVIOUS AREA = 1940 + 320 = 2260 SF

PERVIOUS AREA = 3961 - 2260 = 1701 SF

COMPOSITE "C" = $\frac{0.34(1701) + 1.00(2260)}{3961} = 0.72$

LOT 2 BLK 1 & LOT 2 BLK 2

D.W. = 20' + 16' = 320 SF.

TOTAL AREA = 3045 SF

IMPERVIOUS AREA = 1680 + 320 = 2000 SF

PERVIOUS AREA = 3045 - 2000 = 1045 SF

COMPOSITE "C" = $\frac{0.34(1045) + 1.00(2000)}{3045} = 0.77$

LOT 3 BLK 1 & LOT 3 BLK 2

D.W. = 20' + 16' = 320 SF

TOTAL AREA = 3045 SF

IMPERVIOUS AREA = 1680 + 320 = 2000 SF

PERVIOUS AREA = 3045 - 2000 = 1045 SF

COMPOSITE "C" = $\frac{0.34(1045) + 1.00(2000)}{3045} = 0.77$

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LOCATION
PROJ. NO.
DATE
DESIGNER
PAGE 3

LOT 4 BLK 1 & LOT 4 BLK 2
D.W. = 32' x 16' = 512 SF
TOTAL AREA = 2923 SF
IMPERVIOUS AREA = 1362 + 512 = 1874 SF
PERVIOUS AREA = 2923 - 1874 = 1049 SF
COMPOSITE "C" = $\frac{0.34(1049) + 1.00(1874)}{2923} = 0.76$

LOT 5 BLK 1 & LOT 5 BLK 2
D.W. = 20' x 16' = 320 SF
TOTAL AREA = 3054 SF
IMPERVIOUS AREA = 1472 + 320 = 1792 SF
PERVIOUS AREA = 3054 - 1792 = 1262 SF
COMPOSITE "C" = $\frac{0.34(1262) + 1.00(1792)}{3054} = 0.73$

LOT 6 BLK 1 & LOT 6 BLK 2
D.W. = 24' x 16' = 384 SF
TOTAL AREA = 3415 SF
IMPERVIOUS AREA = 1472 + 384 = 1856 SF
PERVIOUS AREA = 3415 - 1856 = 1559 SF
COMPOSITE "C" = $\frac{0.34(1559) + 1.00(1856)}{3415} = 0.70$

APPENDIX A

DENNEY - GROSS & ASSOCIATES, INC.
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LOCATION
PROJ. NO.
DATE
DESIGNER
PAGE 4

6-hr 100 YR RAINFALL = 2.5" (DPM VOL 2, ¶ 22.2 D-1)

ASSUME t_c = 10 MIN

$I = 2.5 \times 6.84 \times 10^{-0.51} = 5.28"$

Q_{100} UNDEVELOPED = $0.34(5.28)(1.15) = 2.06$ CFS

Q_{100} DEVELOPED:

LOT 1 BLK 1 & LOT 1 BLK 2 = $0.72(5.28)\frac{3961(2)}{43560} = 0.69$ CFS

LOT 2 BLK 1 & LOT 2 BLK 2 = $0.77(5.28)\frac{3045(2)}{43560} = 0.57$

LOT 3 BLK 1 & LOT 3 BLK 2 = $0.77(5.28)\frac{3045(2)}{43560} = 0.57$

LOT 4 BLK 1 & LOT 4 BLK 2 = $0.76(5.28)\frac{2923(2)}{43560} = 0.54$

LOT 5 BLK 1 & LOT 5 BLK 2 = $0.73(5.28)\frac{3054(2)}{43560} = 0.54$

LOT 6 BLK 1 & LOT 6 BLK 2 = $0.70(5.28)\frac{3415(2)}{43560} = 0.58$

STREET = $1.00(5.28)\frac{11,114}{43560} = 1.35$

TOTAL 4.84 CFS

V_{100} UNDEVELOPED = $0.34\left(\frac{2.5}{12}\right)(50,000) = 3542$ CF

DENNEY - GROSS & ASSOCIATES, INC.
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LOCATION
PROJ. NO.
DATE
DESIGNER
PAGE 5

$q_p = 0.35$ $V = \frac{1}{2}(.35)(50)(1.0) = 519 \approx 594$

V_{100} DEVELOPED			1035	DURATION = $\frac{2V}{q}$	
LOT 1 BLK 1	=	$0.72(\frac{2.5}{12})(3961)$ =	594 CF OK	57.4	USE 60 MIN
LOT 2 BLK 1	=	$0.77(\frac{2.5}{12})(3045)$ =	488	57.1	USE 60 MIN
LOT 3 BLK 1	=	$0.77(\frac{2.5}{12})(3045)$ =	488	57.1	60
LOT 4 BLK 1	=	$0.76(\frac{2.5}{12})(2923)$ =	463	57.2	60
LOT 5 BLK 1	=	$0.73(\frac{2.5}{12})(3054)$ =	464	57.3	60
LOT 6 BLK 1	=	$0.70(\frac{2.5}{12})(3415)$ =	498	57.2	60
LOT 1 BLK 2	=	$0.72(\frac{2.5}{12})(3961)$ =	594	57.4	60
LOT 2 BLK 2	=	$0.77(\frac{2.5}{12})(3045)$ =	488	57.1	60
LOT 3 BLK 2	=	$0.77(\frac{2.5}{12})(3045)$ =	488	57.1	60
LOT 4 BLK 2	=	$0.76(\frac{2.5}{12})(2923)$ =	463	57.2	60
LOT 5 BLK 2	=	$0.73(\frac{2.5}{12})(3054)$ =	464	57.3	60
LOT 6 BLK 2	=	$0.70(\frac{2.5}{12})(3415)$ =	498	57.2	60
STREET	=	$1.00(\frac{2.5}{12})(11,114)$ =	2,315	57.2	60
TOTAL			8,305 CF		

APPENDIX A

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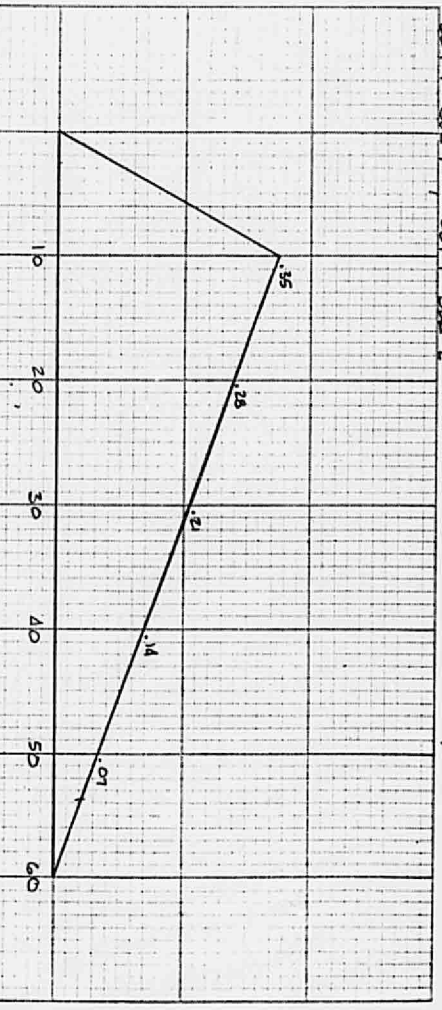
LOCATION
PROJ. NO.
DATE
DESIGNER
PAGE 6

LOT 1 BLK 1 & LOT 1 BLK 2



TIME	AVG RUNOFF RATE	RUNOFF VOLUME	TOTAL RUNOFF VOLUME	DISCHARGE RATE	DISCHARGE VOLUME	TOTAL DISCHARGE VOLUME	STORAGE VOLUME
10	0.18	108	108	.05	30	30	78
20	0.32	192	300			60	240
30	0.25	150	450			90	360
40	0.18	108	558			120	438
50	0.11	66	624			150	474
60	0.04	24	648			180	468

APPENDIX A

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LOCATION _____
PROJ. NO. _____
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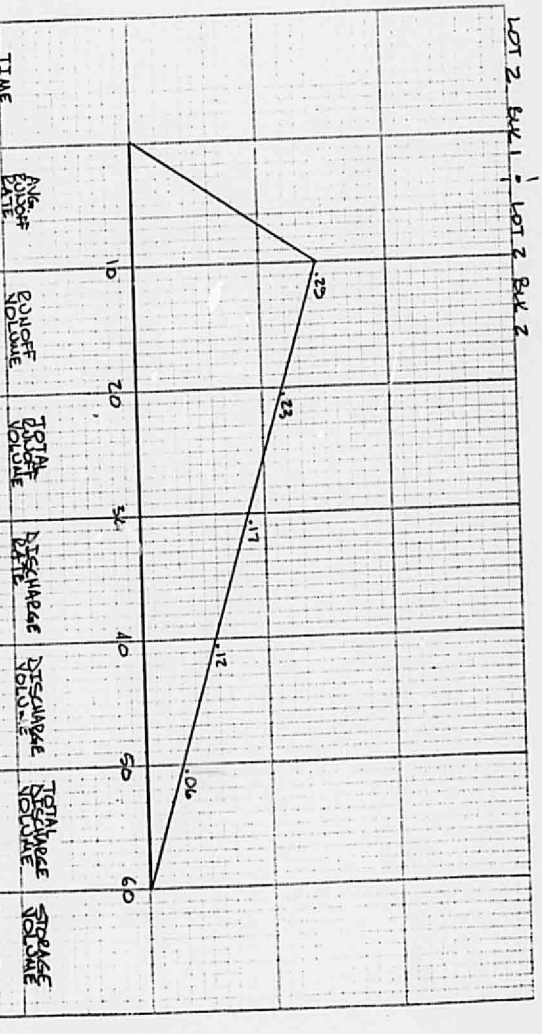
DESIGNER _____
PAGE 1

LOT 2 BLK 1 = LOT 2 BLK 2



TIME	AVG. INFLOW RATE	RUNOFF VOLUME	TOTAL INFLOW VOLUME	DISCHARGE RATE	DISCHARGE VOLUME	TOTAL DISCHARGE VOLUME	STORAGE VOLUME
10	0.15	90	90	.05	30	30	60
20	0.26	156	246			60	186
30	0.20	120	366			90	276
40	0.15	90	456			120	336
50	0.09	54	510			150	360
60	0.03	18	528			180	348

APPENDIX A

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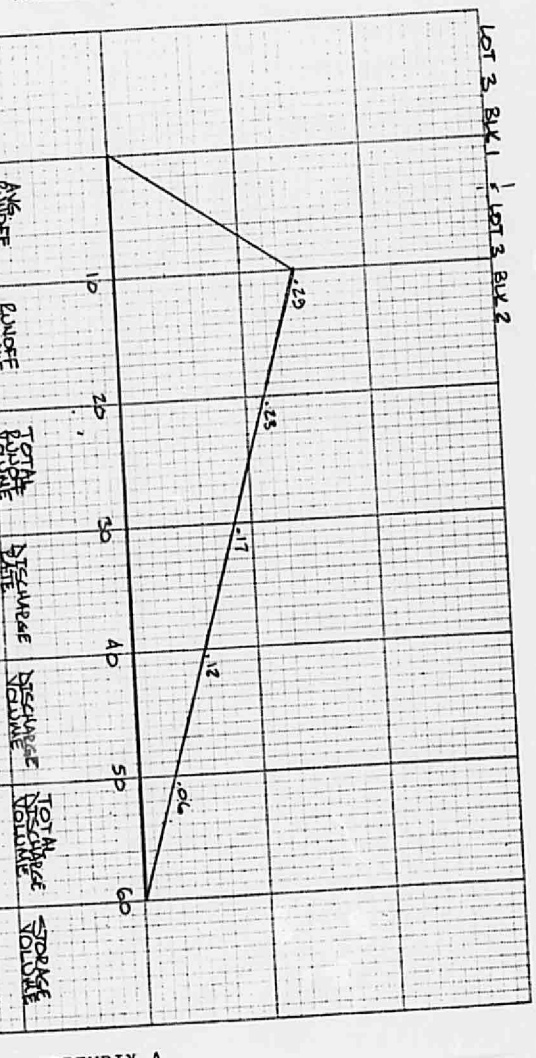
LOCATION
PROJ. NO.
DATE
DESIGNER
PAGE 8

LOT 3, BLK 1 = LOT 3, BLK 2



TIME	AVG. RUNOFF RATE	RUNOFF VOLUME	TOTAL RUNOFF VOLUME	DISCHARGE RATE	DISCHARGE VOLUME	TOTAL DISCHARGE VOLUME	STORAGE VOLUME
10	0.15	90	90	.05	30	30	60
20	0.26	156	246			60	186
30	0.20	120	366			90	276
40	0.15	90	456			120	336
50	0.09	54	510			150	360
60	0.03	18	528			180	348

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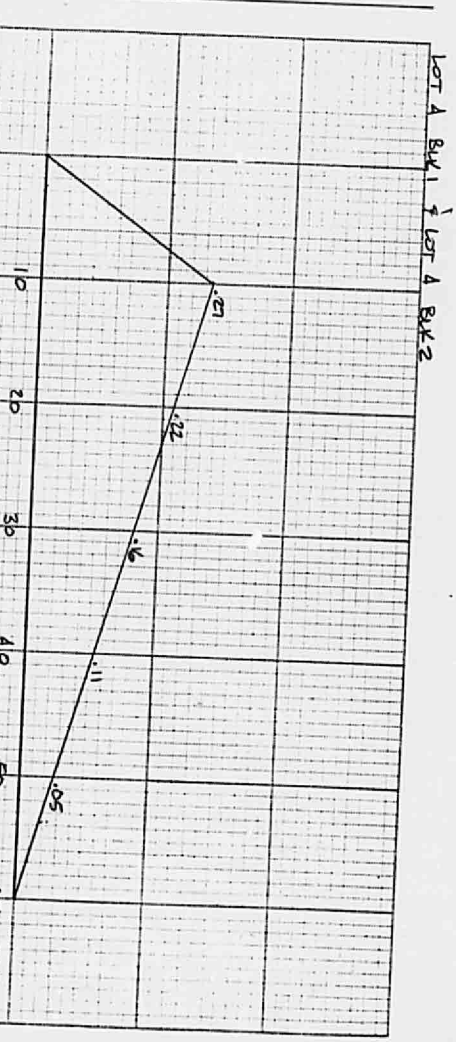
DATE

DESIGNER

PAGE 9

LOT A BLK 1 & LOT A BLK 2



TIME	A% RUNOFF RATE	RUNOFF VOLUME	TOTAL RUNOFF VOLUME	DISCHARGE RATE	DISCHARGE VOLUME	TOTAL DISCHARGE VOLUME	STORAGE VOLUME
10	0.14	84	84	.05	30	30	54
20	0.26	156	240			60	180
30	0.20	120	360			90	270
40	0.14	84	444			120	324
50	0.08	48	492			150	342
60	0.03	18	510			180	330

APPENDIX A

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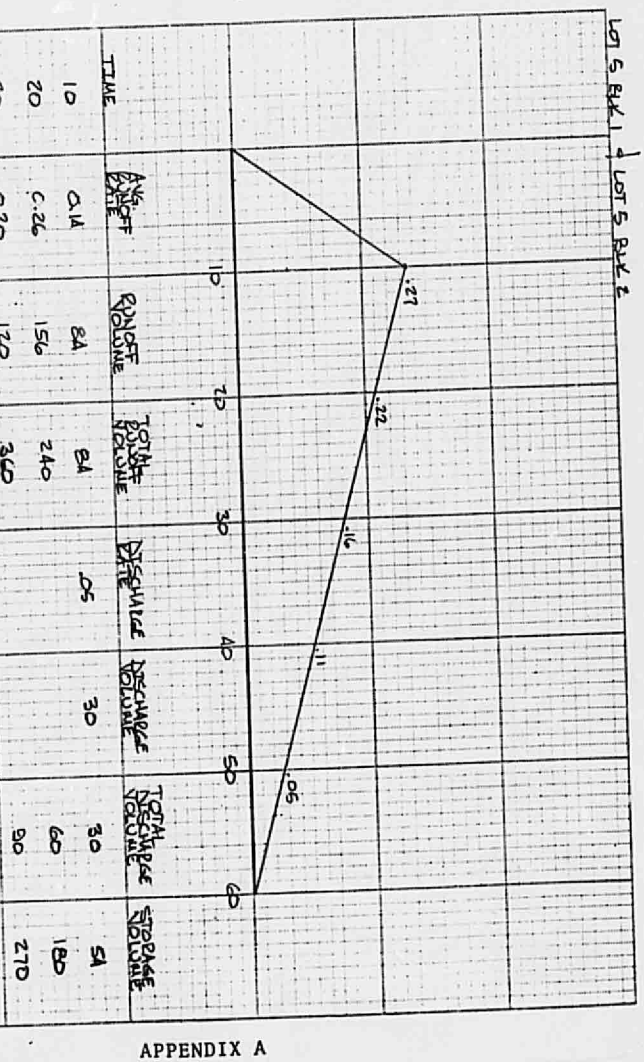
LOCATION
PROJ. NO.
DATE
DESIGNER
PAGE 10

LOT 5 BLK 1 & LOT 5 BLK 2



TIME	AVG. RUNOFF RATE	RUNOFF VOLUME	TOTAL RUNOFF VOLUME	DISCHARGE RATE	DISCHARGE VOLUME	TOTAL DISCHARGE VOLUME	STORAGE VOLUME
10	0.14	84	84	.05	30	30	54
20	0.26	156	240			60	180
30	0.20	120	360			90	270
40	0.14	84	444			120	324
50	0.08	48	492			150	342
60	0.03	18	510			180	330

APPENDIX A

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(505) 884-0695

LOCATION

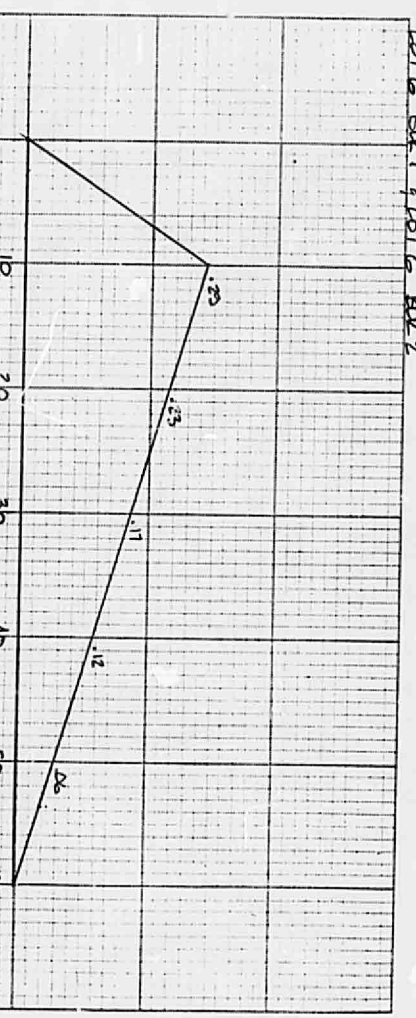
PROJ. NO.

DATE

DESIGNER

PAGE 11

LOT 6 BLK 1 & LOT 6 BLK 2



TIME	AVG. RUNOFF RATE	RUNOFF VOLUME	TOTAL RUNOFF VOLUME	DISCHARGE RATE	DISCHARGE VOLUME	TOTAL DISCHARGE VOLUME	STORAGE VOLUME
10	0.15	90	90	.05	30	30	60
20	0.25	150	240			60	180
30	0.19	114	354			90	264
40	0.14	84	438			120	318
50	0.08	48	486			150	336
60	0.03	18	504			180	324

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LOCATION
PROJ. NO.
DATE
DESIGNER
PAGE 12

GENERAL DRAINAGE SCHEME

1. DRAIN DOWNHILL LOTS (BLK 1) TO REAR, FREE DISCHARGE INTO ALLEY THROUGH WEIR. LOTS 2 & 3 DRAIN TO NORTH, LOTS 4-6 DRAIN TO SOUTH. 0.29 CFS EACH LOT.

2. DRAIN UPHILL LOTS (BLK 2) AND TRANHILL PLACE TO POND AT N. END of BLOCK 1. DISCHARGE POND INTO COPPER THROUGH CURB.

DISCHARGE RATE for 4" PVC PIPE: ($n = 0.009$, $S = 0.02$)

$A = \pi \frac{d^2}{4} = \pi \frac{(0.33)^2}{4} = 0.086\ ft^2$

$WP = \pi d = \pi(.33) = 1.04\ ft$

$r = \frac{A}{WP} = \frac{0.086}{1.04} = 0.083$

$Q = \frac{1.486}{n} A r^{\frac{2}{3}} S^{\frac{1}{2}} = \frac{1.486}{0.009}(0.086)(0.083)^{\frac{2}{3}}(0.02)^{\frac{1}{2}} = 0.38\ cfs$

USE 2-4" PVC PIPES ($Q = 0.76$ cfs)

DISCHARGE INTO COPPER $= 0.76 + 0.29 + 0.29 = 1.34$ cfs

< 2.06 CFS ($= Q_{100}$ UNDEVELOPED) (FROM P.1)

$Q = C_d \sqrt{2gh}$

$= (0.6)(.086)\sqrt{(64.4)(2)} = 0.58$

$Q_{OUT} = 1.16$

LOCATION _____ PROJ. NO. _____ DATE _____ DESIGNER _____ PAGE 12

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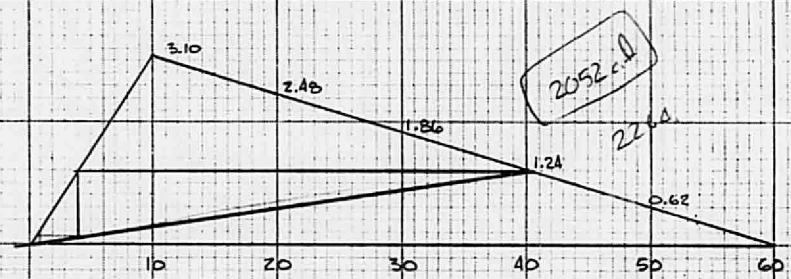
MAIN PONDING AREA

$$Q_p = \frac{0.69 + 0.57 + 0.57 + 0.54 + 0.54 + 0.58}{2} + 1.35 = 3.10 \text{ CFS}$$



TIME	AVG. RUNOFF RATE	RUNOFF VOLUME	TOTAL RUNOFF VOLUME	DISCHARGE RATE	DISCHARGE VOLUME	TOTAL DISCHARGE VOLUME	STORAGE VOLUME
10	1.55	930	930	0.76	456	456	474
20	2.79	1,674	2,604			912	1,692
30	2.17	1,302	3,906			1,368	2,538
40	1.55	930	4,836			1,824	3,012
50	0.93	558	5,394			2,280	3,114 ←
60	0.31	186	5,580			2,736	2,844

APPENDIX A

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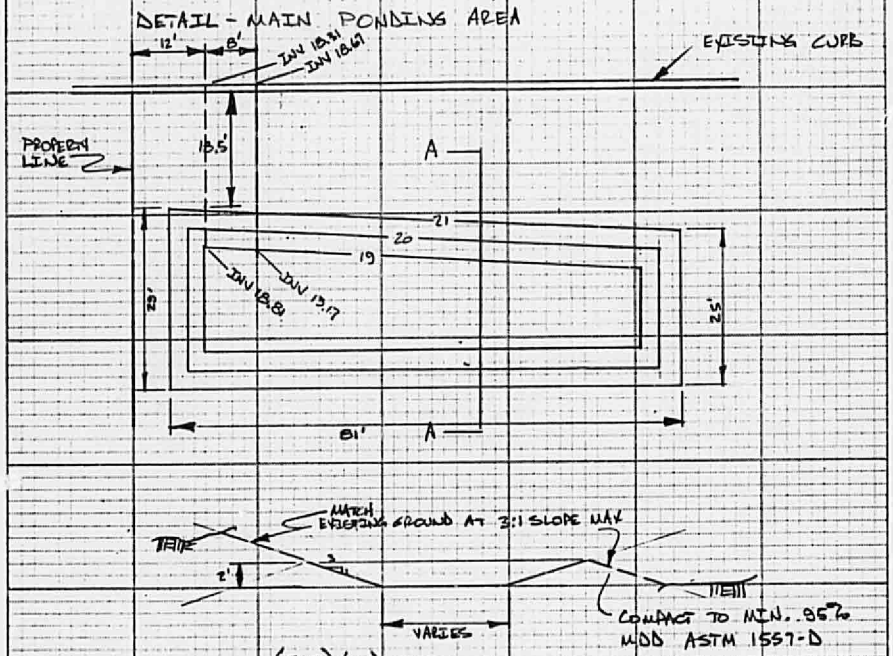
LOCATION
PROJ. NO.
DATE
DESIGNER
PAGE 1A

DETAIL - MAIN PONDING AREA



AREA 19 CONTOUR $= \frac{(17+13)}{2}(65) = 1035$ SF

AREA 20 CONTOUR $= \frac{(23+19)}{2}(75) = 1575$

AREA 21 CONTOUR $= \frac{(23+25)}{2}(81) = 2187$

VOL (END AREA METHOD) $= \frac{A_{19}+A_{20}}{2}(1) + \frac{A_{20}+A_{21}}{2}(1)$

$= \frac{A_{19}+2A_{20}+A_{21}}{2} = \frac{1035+2(1575)+2187}{2} = 3186$ CF

>3114 ok

APPENDIX A

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LOCATION
PROJ. NO.
DATE
DESIGNER
PAGE 15

COMPUTATION - EMERGENCY SPILLWAY:

$Q = 3.10$ CFS (p. 14)

$Q = CLH^{\frac{3}{2}}$

USE $C = 2.6$, $L = 16'$

$H = \left(\frac{3.10}{2.6(16)}\right)^{\frac{2}{3}} = 0.18$ USE $H = 0.2'$

COMPUTATION - WATER BLOCK IN TRAMHILL PLACE

FLOW INTO POND = 3.10 cfs

USE $n = 0.017$ (PAVING)

$S = \frac{25.40 - 24.50}{30} = 0.0300$

$Q = \frac{1.486}{n} A r^{\frac{2}{3}} S^{\frac{1}{2}} \Rightarrow A r^{\frac{2}{3}} = \frac{Qn}{1.486 S^{\frac{1}{2}}} = \frac{3.10(.017)}{1.486(.03)^{\frac{1}{2}}} = 0.205$

USE 19' WIDTH, 0.05' DEPTH

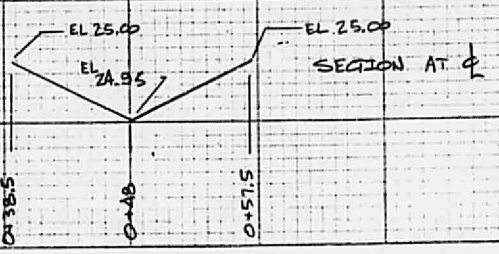
$A = 19(.05) = 0.95$ SF

$WP = 9.5$

$r = \frac{A}{WP} = \frac{0.95}{9.5} = 0.100$

$A r^{\frac{2}{3}} = 0.95(0.100)^{\frac{2}{3}} = 0.205$

$Q = \frac{1.486}{0.017}(0.95)(0.100)^{\frac{2}{3}}(.03)^{\frac{1}{2}} = 3.10$ cfs OK



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LOCATION
PROJ. NO.
DATE
DESIGNER
PAGE 16

COMPUTATION for DRAINAGE WEIR - BLK 1, LOTS 2-6

$Q_{DES} = 0.29$ cfs (SEE HYDROGRAPHS, SHEETS 7-11)

$Q = CLH^{\frac{3}{2}}$

USE $L = 2'$, $C = 2.6$

$H = \left(\frac{Q}{CL}\right)^{\frac{2}{3}} = \left[\frac{0.29}{2.6(2)}\right]^{\frac{2}{3}} = 0.15$ USE $H = 0.2'$

LOT	CREST ELEV
2	22.40
3	22.80
4	24.00
5	24.00
6	23.90

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LOCATION
PROJ. NO.
DATE
DESIGNER
PAGE 17

OFF-SITE ANALYSIS

C = 0.34 (SEE CALCULATIONS, p. 1)

I = 5.28" (SEE CALCULATIONS, p. 4)

PORTION WHICH DRAINS TO SOUTH:

UNDEVELOPED

A = (140 x 60) + (250 x 60) = 23,400 SF = 0.54 AC

Q = CIA = 0.34(5.28)(0.54) = 0.97 cfs

DISCHARGE POINT - SW CORNER of SITE (FLOWS INTO EXISTING ALLEY, THENCE SOUTH. EVENTUALLY ENTERS CHELWOOD PARK BLVD. STORM SEWER).

NOTE: 140 x 60 IS for SOUTHERLY DRAINAGE from PARCEL ADJACENT TO EAST (UPHILL) SIDE of SITE. 250 x 60 IS for PORTION of SITE THAT PRESENTLY DRAINS SOUTH.

DEVELOPED

A = 140 x 60 = 8400 SF = 0.19 AC

Q = 0.34(5.28)(0.19) = 0.34 cfs

DISCHARGE POINT - SE CORNER of SITE (FLOWS INTO EXISTING PARKING LOT, THENCE TO EXISTING ALLEY AS ABOVE).

NET EFFECT of DEVELOPMENT - DISCHARGE IS REDUCED from 0.97 CFS TO 0.34 CFS. DISCHARGE POINT IS CHANGED FROM SW CORNER TO SE CORNER of SITE.

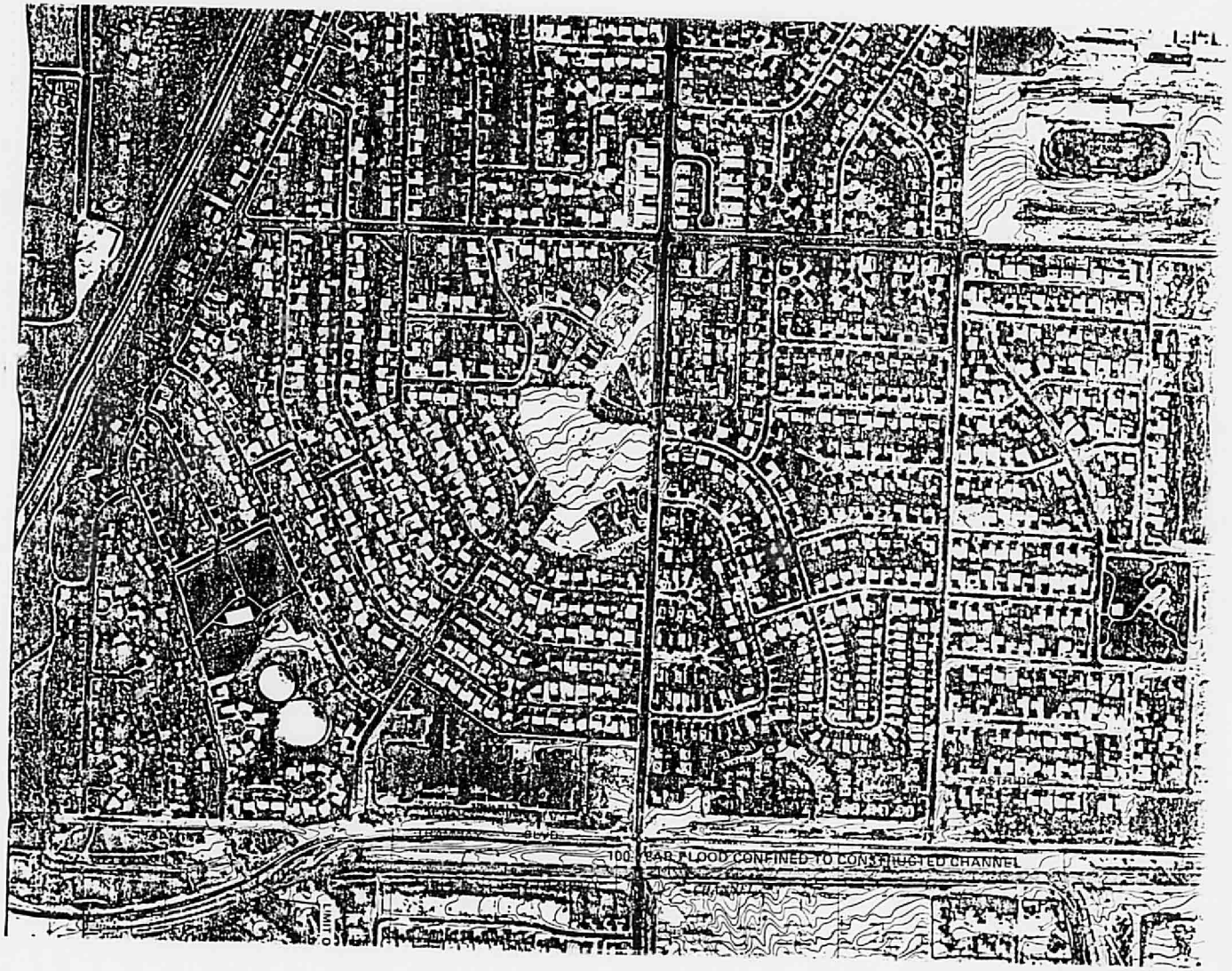
PORTION WHICH DRAINS TO NORTH:

A = 140 x 140 = 19,600 SF = 0.45 AC

Q = 0.34(5.28)(0.45) = 0.81 cfs

THIS PORTION DISCHARGES DIRECTLY INTO COPPER AND IS NOT AFFECTED BY DEVELOPMENT.

FLOOD HAZARD MAP


100-YEAR FLOOD CONFINED TO CONSTRUCTED CHANNEL
CHANNEL
BLVD
EASTRIDGE
LIMITS OF

SOILS MAP

DRAINAGE REPORT
FOR
TRAMHILL TOWNHOUSES

BOHANNAN-HUSTON INC.

4125 CARLISLE BOULEVARD, NORTHEAST, ALBUQUERQUE, NEW MEXICO 87107 (505) 881-2000

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ALBUQUERQUE, NEW MEXICO 87107
(505) 884-0695

LOCATION TRANHILL TOWNHOUSES

PROJ. NO. 711.21

DATE MAY 10, 1984

DESIGNER PTW

PAGE 1

DETAIL of WEIR SECTION

$Q = CLH^{3/2} \Rightarrow H = \left(\frac{Q}{CL}\right)^{2/3}$, $Q = 0.23$ CFS, $C = 2.6$, $L = 10" = 0.83'$

$H = \left(\frac{0.23}{2.6(.83)}\right)^{2/3} = 0.26 < 0.37$ OK

HYDROLOGY K22/D13 2 PLANS 2 of 2

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ALBUQUERQUE, NEW MEXICO 87107
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LOCATION TRAMHILL TOWNHOMES (K 22-D13)
PROJ. NO. 711.21
DATE MAY 1, 1984
DESIGNER RTW
PAGE 1

SEE p. 17, ORIGINAL CALCULATIONS for DETERMINATION of OFFSITE FLOWS.

$S_{NORTH} = \frac{32.30 - 31.10}{126} = 0.0095$ ← USE for DESIGN

$S_{NORTH} = \frac{31.10 - 27.50}{80} = 0.0450$

$S_{SOUTH} = \frac{32.30 - 30.20}{74} = 0.0284$ ← USE for DESIGN

$S_{SOUTH} = \frac{30.20 - 26.67}{123} = 0.0291$

USE CMP ½ PIPE DRAIN ($n = 0.025$)

$Ar^{\frac{2}{3}} = \frac{Qn}{1.486\, s^{\frac{1}{2}}}$

NORTH SIDE : $Ar^{\frac{2}{3}} = \frac{0.81(0.025)}{1.486(0.0095)^{\frac{1}{2}}} = 0.14$

TRY 12" DIAMETER (NOMINAL)

$A = \frac{\pi(1)^2}{4} = 0.7854 \div 2 = 0.393$

$WP = \frac{\pi}{2} = 1.57$

$r = \frac{0.393}{1.57} = 0.250$

$Ar^{\frac{2}{3}} = 0.393(0.250)^{\frac{2}{3}} = 0.156 > 0.14$ OK

SOUTH SIDE : $Ar^{\frac{2}{3}} = \frac{0.34(0.025)}{1.486(0.0284)^{\frac{1}{2}}} = 0.03$

12" DIAMETER OK

LOCATION _____

PROJ. NO. _____

DATE _____

DESIGNER _____

PAGE _____

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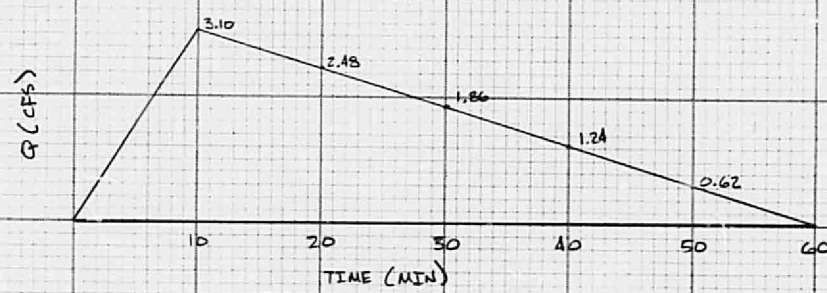
(505) 884-0695

MAIN PONDING AREA - 1 - 4" PVC OUTLET

Q_p = 3.10 cfs (from HYDROGRAPH, p. 13, ORIGINAL REPORT)

Q_D = 0.38 cfs (from P.12, ORIGINAL REPORT)



TIME	AVG RUNOFF RATE	RUNOFF VOLUME	TOTAL RUNOFF VOLUME	DISCHARGE RATE	DISCHARGE VOLUME	TOTAL DISCHARGE VOLUME	STORAGE VOLUME
10	1.55	930	930	0.38	228	228	702
20	2.79	1,674	2,604			456	2,148
30	2.17	1,302	3,906			684	3,222
40	1.55	930	4,836			912	3,924
50	0.93	558	5,394			1,140	4,254 ←
60	0.31	186	5,580			1,368	4,212

DRAINAGE REPORT
FOR
TRAMHILL TOWNHOUSES

DRAINAGE REPORT
FOR
TRAMHILL TOWNHOUSES

Zone Atlas Sheet K–22–Z

June, 1979

PREPARED BY

Bohannan–Huston, Inc.
4125 Carlisle Blvd., N.E.
Albuquerque, NM 87107

_____

Date Submitted

Approved for Drainage Concept

_____

Bruno Conegliano
Job No. 79-036

DRAINAGE REPORT
FOR
TRAMHILL TOWNHOUSES

Zone Atlas Sheet K–22–Z

June, 1979

PREPARED FOR

Mr. Steve Steele
Associate Broker
Execu-Systems
5505 Montgomery, N.E.
Albuquerque, NM 87109

PREPARED BY

Bohannan–Huston, Inc.
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Albuquerque, NM 87107

STATE OF NEW MEXICO
MICHIAL M.
EMERY
No. 5194
REGISTERED PROFESSIONAL ENGINEER

Michial M. Emery, P.E.
N.M.P.E. No. 5194

TABLE OF CONTENTS

Purpose . . . . . .

Location and Description . . . . . .

Upland Conditions . . . . . .

Developed Conditions . . . . . .

Recommendations and Conclusions . . . . . .

Appendix A

Calculations

1. Chart 1 . . . . . Page 7 of 10

2. Table 1 and 2 . . . . . Page 9 of 10

PLATE I Grading Plan and Existing Topo

PLATE II Developed Drainage

DRAINAGE REPORT
FOR
TRAMHILL TOWNHOUSES

PURPOSE

The purpose of this drainage report is to analyze and address the pre-developed and developed run-off flows resulting in the 100-year rainfall event.

LOCATION AND DESCRIPTION

The parcel sits approximately 200-feet west of Tramway Boulevard on the south side of Copper. The site consists of natural vegetation with a 6% east to west cross slope in the present state.

UPLAND CONDITIONS

In analyzing the upland conditions, the assumption of the Tramway Boulevard Diversion Channel intercepting all flow east of Tramway was made on the basis of the contract for the construction of said diversion being let on May 1, 1979. This eliminates all upland flow that would impact the property except for that originating on the adjacent tract of land. The flow from the adjacent parcel of land at present sheet flows to the east side of Tramhill Townhouses. This is insignificant flow and should be handled at the time that the adjacent parcel is developed. In the interim a retaining wall will be proposed along the east side of Tramhill Townhouses to retain the sheet flows from entering the Tramhill Townhouse site.

The site presently discharges 2.48 CFS as sheet flow along the west edge of the site, as shown on Plate I. At the west edge, a 20-foot wide existing alley intercepts this flow and conveys the water north to Copper and thence down Copper.

DEVELOPED CONDITIONS

The development of Tramhill Townhouses will result in the hardening of .83 acres of the 1.15 acre site into impervious area. This increase in imprevious area results in a developed discharge of 4.96 CFS from the total site.

To adhere to Albuquerque Metropolitan Arroyo Flood Control Authority Resolution 1972-2, a combination of total retention and control discharge will be proposed.

All the lots in Tramhill Subdivision are proposed split level, with the splits appearing in the conceptual grading plan, shown on Plate I. The drainage solution as mentioned, consists of retention and control discharge. From the split of all the townhouses to the rear yard, a total retention solution is proposed. Shown in the calculations is the depths of each pond and the freeboard to the pad elevation for all lots. The second part of the solution involves routing the flows from the split of the

house forward to the street and garage to detention ponds, in the form of planters, (see Plate II). As shown in the calculations, Tramhill Place and the drive pads were allowed to discharge totally free of any drainage controls. This discharge amounted to approximately 1.02 CFS.

Subtracting the flow from Tramhill Place from the predeveloped flow rate leaves 1.46 CFS to discharge from the eight control discharge ponds located around the site. Dividing by the eight ponds, results in the .18 CFS control discharge from each pond.

To determine the maximum amount of storage required to route the flow through the pond, the American Public Works Association Modified Rational Formula was used. The tabulation is listed in Table 1 and 2 in calculations. The result of that calculation was that the planters with two houses draining to them, shown on Plate II, require 178 Ft^3 of detention storage and the ponds having only one house draining requires 50 Ft^3 of detention storage. The control discharge ponds may have any type of configuration as long as the volume is maintained and the flow routed from the roof and garage to the control discharge ponds. In addition, the control discharge pond must have a control weir of the dimension shown in the calculations to insure discharge of only .18 CFS from each pond.

RECOMMENDATIONS AND CONCLUSIONS

The conclusion of this report is that if the following recommendations be implemented to avoid the aggravation of any potential downstream flooding hazard.

1. Grade the entire backyard flat and pond all the water from the center split of the house to the rear yard.

2. Drain the water from the center split of the house forward and route it into one of the eight proposed control discharge ponds.

3. Construct a 2-foot retaining wall on the east property line to control the upland drainage flows.

4. Insure a control weir, 0.75 feet long by 0.2 feet high is maintained on all control discharge ponds.

Assumptions.

1. All flow from the roof and garage area be routed into the joint ponding area (see plate for locations) or to the back yard.

2. Upland drainage from tract A-1 filed Feb 30, 1979 be ponded against a retaining wall along the east side the parcel in question.

3. That the upland flow above Tramway club will be eliminated with the construction of the Tramway channel in the Lomas Basin which set for to bid on May 1, 1979.

4. The road dimension is 30 feet face of curb-to-face of curb with no sidewalk on either side of the street. Included is a 42' radius cul-de-sac

PROJECT NAME	Tramhill Townhomes	SHEET 1	OF
PROJECT NO	79 036	BY R.E.	DATE 5/1/79
SUBJECT	Drainage Report	CH'D	DATE

Lots 1 Blocks 1 & 2

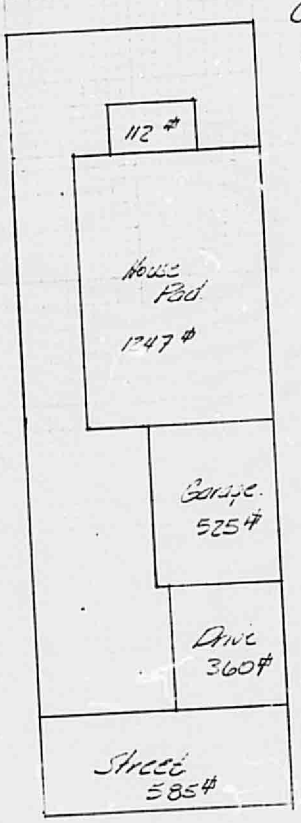
Total Area: 39x125' = 4875 #

Paved Area: 2829.00

Composit C factor

2046 (.40) + 2829.95 / 4875

= .72



PROJECT NAME Trautwill Townhouses SHEET 2 OF

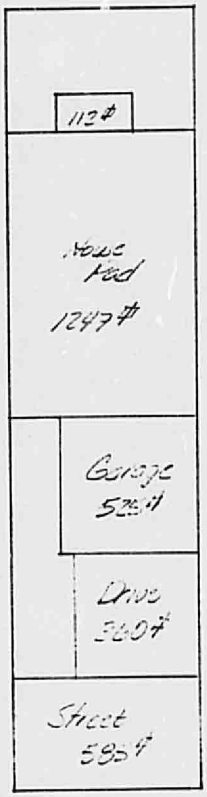
PROJECT NO. TA-036 BY RRB DATE 6/30/99

SUBJECT Drainage Report CH'D DATE

Lots 2,3,4 Blocks 1 & 2

Total Area = 3625 #

Paved Area = 2829 #



Find composite C for runoff rate.

796 (.40) + 2829 (.95) / 3625

= .83

PROJECT NAME Trailhill Townhouse SHEET ____ OF ____

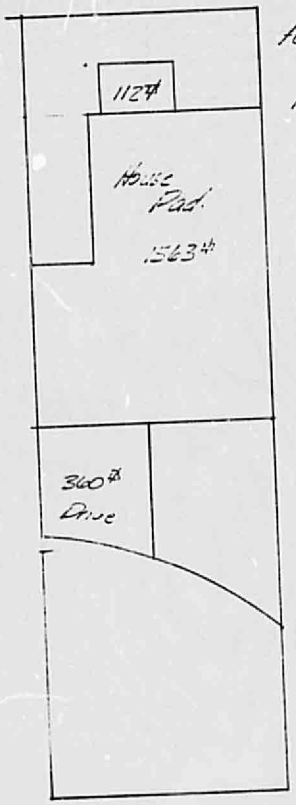
PROJECT NO. 79.036 BY RAS DATE 4/24/79

SUBJECT Drainage Report CH'D ____ DATE ____

Lots 5,6; Blocks 1 & 2
Total Area: 37 x 125 = 4625 #
Paved Area = 3419 #

Find composite C for runoff value

1206 (.4) + 3419 (.95) / 4625
= .81



PROJECT NAME Trumbull Townhouse SHEET 4 OF
PROJECT NO. 77-032 BY W.C. DATE
SUBJECT CH'D DATE

Undeveloped flow.

No upland flow enters into calculations, use 10 min time of concentration which gives intensity of 5.4 in/hr. from Master Plan for Drainage 1963

Undeveloped flow.

$Q = CIA$ $\quad C = .40$

$I = \frac{189}{T_c + 25} = \frac{189}{35} = 5.40$ in/hr.

$A = \frac{250' \times 200'}{43560} = 1.15$ acres.

$Q = (.40)(5.40)(1.15) = 2.48$ cfs

Developed flow

$C = 13692(.40) + 36308(.95) / 50{,}000 =$

$C = .80$

$Q = (.80)(5.40)(1.15) = 4.96$ cfs

PROJECT NAME		SHEET 5	OF
PROJECT NO.	79-030	BY	DATE
SUBJECT		CH'D	DATE

Drainage Solution

The solution to this problem must take into account a two fold solution. First all water falling from the split of the house to the rear of the house will be totally ponded. Second the front split will be routed through a common control discharge pond in the front. This leaves only the roof, Tranquill Place, and drive pond to discharge directly onto Copper

Area of paved surface from drive pond on Tranquill Place that will discharge directly

$\frac{8690}{43560}$ # = .20 acre

$Q = CIA$

$= (.95)(5.40)(.20) =$

$= \underline{1.02}$ cfs

2.48 cfs − 1.02 cfs = 1.46 cfs from front pond to discharge into street in control discharge solution

Area of paved surface to be ponded in order for total retention

$\frac{18,000}{43560} = .41$ acres

Total volume = 2.8 inches $\frac{(.41)}{12} = .10$ acre ft.

PROJECT NAME	Tranquill Terrace	SHEET	OF
PROJECT NO.	72-032	BY	DATE
SUBJECT		CH'D	DATE

Average depth of pond to back yards. Backyards act as entire pond. Ponding area is from the spill [illegible]

Block #	lot #	Depth	Freeboard to Pad
1	1	.45'	.55'
	2	.45'	.55'
	3	.45'	.55'
	4	1.25'	.75'
	5	.63'	.37'
	6	.63'	.37'
2	1	.45'	1.90'
	2	.45	4.90'
	3	.45'	2.03'
	4	1.25'	1.23'
	5	.63'	2.88'
	6	.63'	2.88'

Control discharge ponds will be located in the planters provided in the front of the units. The total number of ponds will be eight with the discharge of the entire total from all ponds. This is an approximate discharge of .18 cfs per pond. The depths of ponds will vary according to the size and configuration of the planters. For purposes of the drainage report a typical pond [illegible] be used to calculate the storage [illegible] the planter.

Using the smallest dimension that would be used for pond area for the ponds that are two lots, would be 20'x10' or 200 sq ft. See [illegible]

PROJECT NAME Trambell Townhouses SHEET 7 OF
PROJECT NO. 77-036 BY KKK DATE 9-27-78
SUBJECT CH'D DATE

for location of these ponds. The smallest size of pond that only drains one house would be 20'x7' or 140 square feet. To determine the depth of flow through ponds a flood routing technique used by the APWA will be used. The two results are tabulated in Tables 1 & 2.

Ponding Requirement for ponds that drain two ponds with control discharge depth of pond is

$\frac{178 ft^3}{200 ft} = .89 ft.$ Single $\frac{20}{140} = .14 ft$

Ponding Requirement for total reduction with two ponds is

$\frac{1016 ft}{200} = 5.08 ft.$

Use Control Discharge solution with roof & garage draining to the planter by way of the scupper. Planters must retain a minimum of 200 cu ft. on front planters and 50 cu ft for planters that drain only one house.

<u>Control Discharge Opening</u>

Discharge from opening must be .18cfs

$Q = CLH^{3/2}$ where C=

$H = .20 ft$

$Q = .18 cfs$

$C = 2.75$

$L = \frac{Q}{CH^{3/2}} = \frac{.18}{2.75(.20)^{3/2}}$

$L = 0.75 ft.$

For configuration of weir see figure 1.

PROJECT NAME	Tranquil Townhouse	SHEET 5	OF
PROJECT NO.	77-036	BY RKE	DATE 6/23/77
SUBJECT	Drainage Report	CH'D	DATE

Area one house

Storm Duration Tc (min)	Storm intensity $I = \frac{121}{Tc+25}$	Runoff Rate $Qc = CIA$	Runoff Volume $Vr = 60Tc\,Qc$	Infiltration Rate $Qi = CIA$	Infiltration Volume $Vi = 60Tc\,Qi$	Net Volume $Vn = Vr - Vi$
5	6.30	.44 cfs	141.6	.13 cfs	54.0	93.61
10	5.40	.42 cfs	253.0		108.0	145.05
15	4.73	.37 cfs	332.1		162.0	170.1
20	4.20	.33	393.6		216.0	177.6
25	3.78	.30	442.8		270.0	172.8
30	3.44	.27	483.0		324.0	159.0
35						

Total Volume falling in 2 hr. = 2.83 $4356\ ft^2 \times \frac{2.8}{12} = 1016\ ft^3$

Area one house = .05 acre Table 2 C = .30

5	6.30	.25	73.3	.18	54.0	19.8
10	5.40	.21	126.5		108.0	18.5
15	4.73	.18	166.0		162.0	4.0
⋮						
35						

Total Volume falling in 6 hr 2.8 in. $2176\ ft^2 \times \frac{2.8}{12} = 508.\ ft^3$

PROJECT NAME
PROJECT NO.
SUBJECT
SHEET 7 OF
BY DATE
CH'D DATE

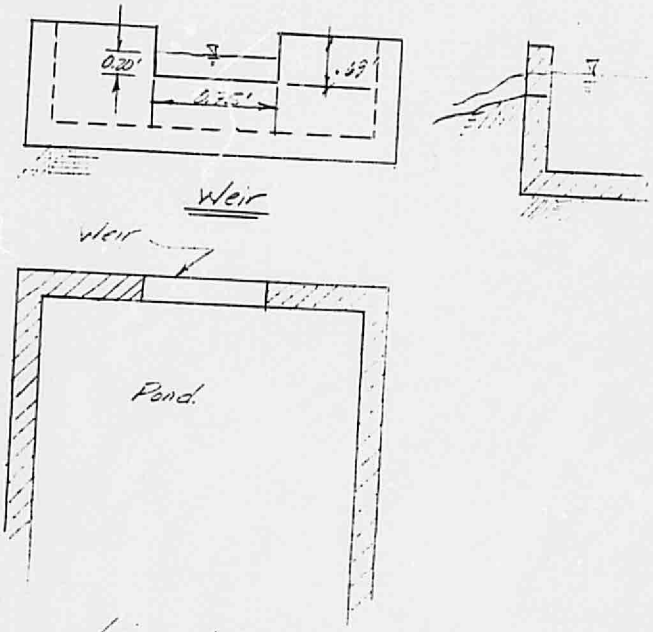


figure 1

PROJECT NAME Trantwell Townhouses SHEET 10 OF
PROJECT NO. 79-036 BY J.J.K. DATE 6/30/80
SUBJECT Drainage Report CHD DATE