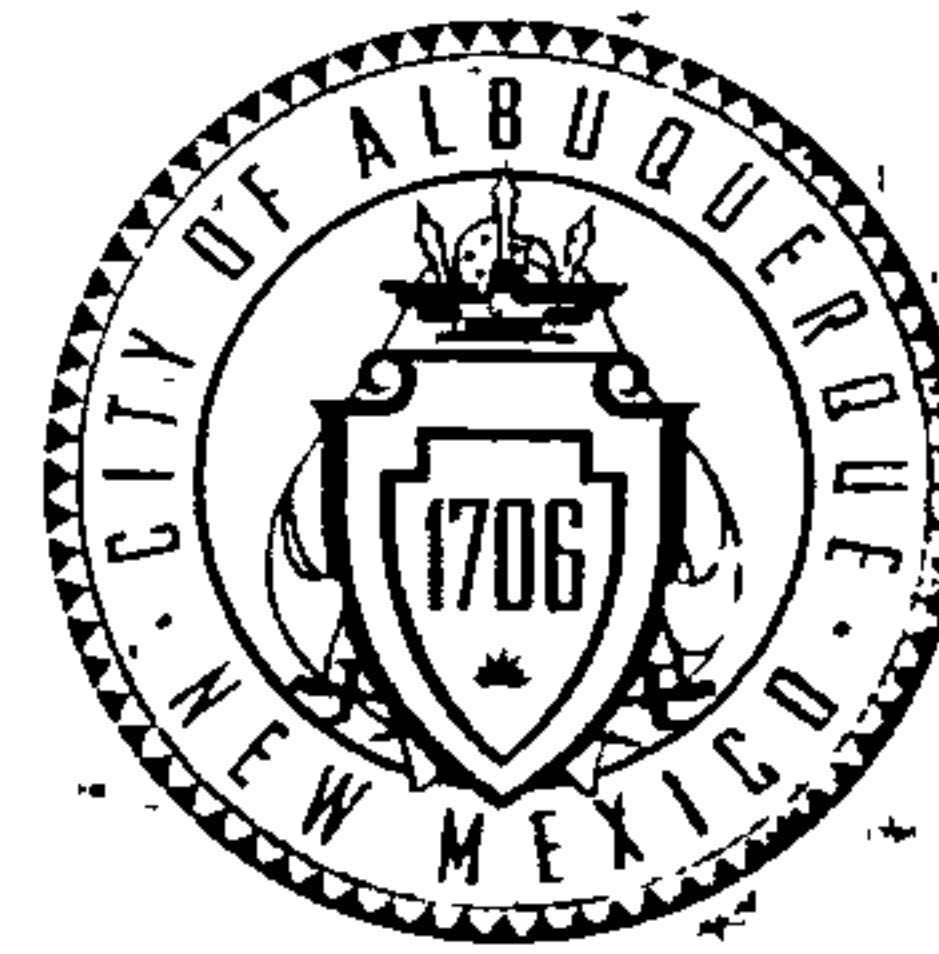


CITY OF ALBUQUERQUE



**Planning Department
Transportation Development Services Section**

April 25, 2013

Daniel Herr, R.A.
Slagle Herr,
413 2nd Street SW
Albuquerque, NM 87102

Re: **Certification for Permanent Certificate of Occupancy (C.O.)**
Richfield Park, Lot 5-A-1, 4545 Alameda Blvd. NE
DRB Project 1005410 (C-17/D120))
Certification Dated 4/17/13

Dear Mr. Herr,

Based upon the information provided in your submittal received 4-17-13, Transportation Development has no objection to the issuance of a Permanent Certificate of Occupancy. This letter serves as a "green tag" from Transportation Development for a Permanent Certificate of Occupancy to be issued by the Building and Safety Division.

If you have any questions, please contact me at (505)924-3991.

Sincerely,

Kristal Metro, P.E.
Traffic Engineer
Development and Building Services
Planning Department

c: Engineer
Hydrology file
CO Clerk

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(Rev. 12/05)

PROJECT TITLE: Richfield Park, Lot 5-A-1 ZONE MAP/DRG. FILE # C-17 / D120
DRB#: 1005410 EPC#: _____ WORK ORDER#: 715482

LEGAL DESCRIPTION: Lot 5A, Richfield Park Subdivision, Albuquerque, NM
CITY ADDRESS: 4545 Alameda Blvd. NE

ENGINEERING FIRM: ISAACSON & ARFMAN, PA CONTACT: Åsa Nilsson-Weber
ADDRESS: 128 MONROE NE PHONE: 268-8828
CITY, STATE: ALBUQUERQUE, NM ZIP CODE: 87108

OWNER: Mechenbier Construction CONTACT: John Mechenbier
ADDRESS: 8500 Washington St. NE Suite A-6 PHONE: _____
CITY, STATE: Albuquerque NM ZIP CODE: 87113

ARCHITECT: Slagle Herr CONTACT: Dan Herr
ADDRESS: 413 2nd Street SW PHONE: 2460870
CITY, STATE: Albuquerque, NM ZIP CODE: 87102

SURVEYOR: SurvTek, Inc. CONTACT: Russ Hugg
ADDRESS: 9384 Valley View Drive NW PHONE: 897-3366
CITY, STATE: Albuquerque, NM ZIP CODE: 87114

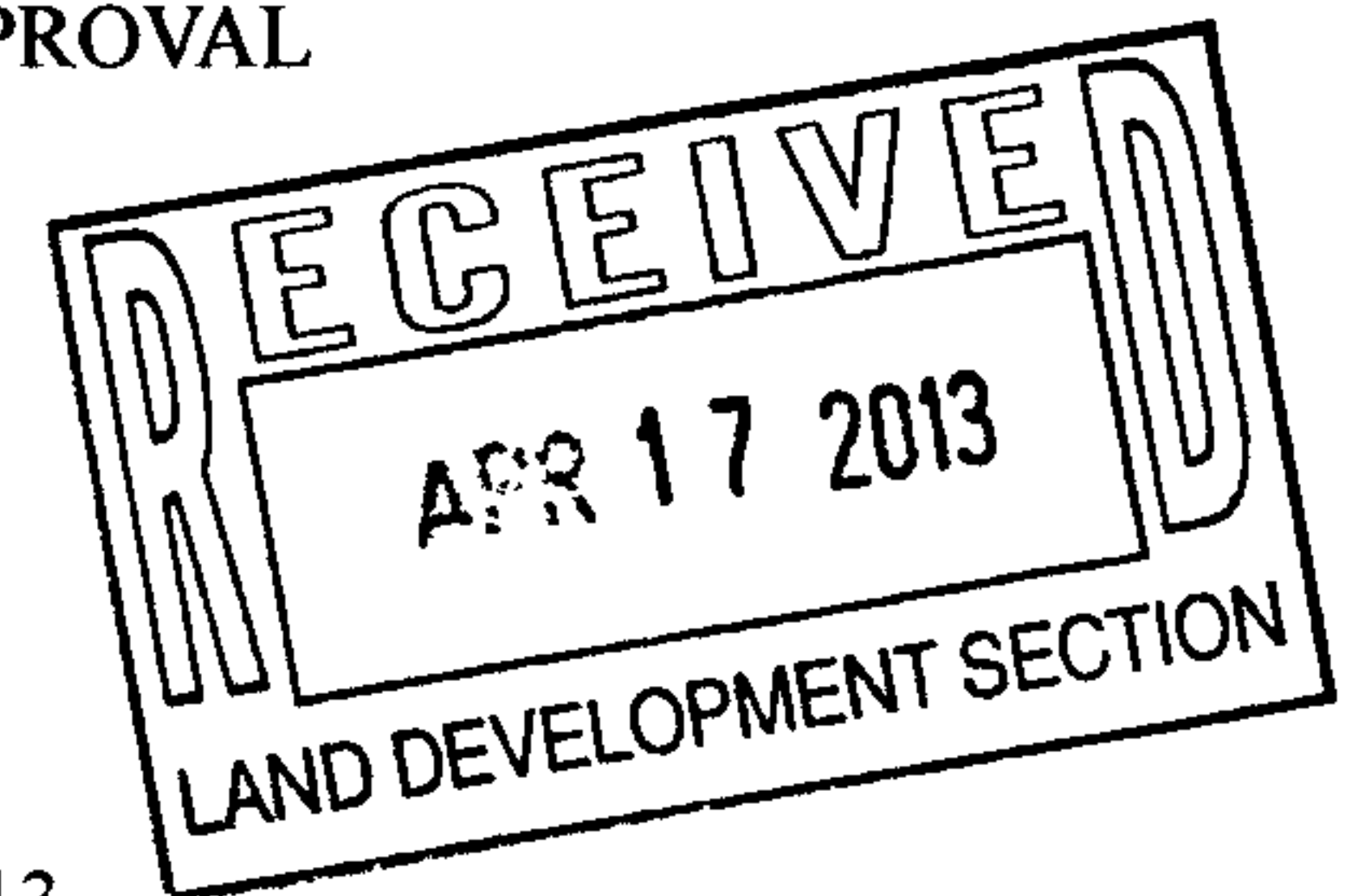
CONTRACTOR: Mechenbier Construction CONTACT: John Mechenbier
ADDRESS: 8500 Washington St. NE Suite A-6 PHONE: 314-7700
CITY, STATE: Albuquerque NM ZIP CODE: 87113

TYPE OF SUBMITTAL:
☐ DRAINAGE REPORT
☐ DRAINAGE PLAN 1st SUBMITTAL
☐ DRAINAGE PLAN RESUBMITTAL
☐ CONCEPTUAL G & D PLAN
☐ GRADING PLAN
☐ EROSION CONTROL PLAN
☐ ENGINEER'S CERT (HYDROLOGY)
☐ CLOMR/LOMR
☐ TRAFFIC CIRCULATION LAYOUT
☐ ENGINEER/ARCHITECT CERT (TCL)
☒ ENGINEER/ARCHITECT CERT (DRB S.P.)
☐ ENGINEER/ARCHITECT CERT (AA)
☐ OTHER (SPECIFY)

CHECK TYPE OF APPROVAL SOUGHT:
☐ SIA/FINANCIAL GUARANTEE RELEASE
☐ PRELIMINARY PLAT APPROVAL
☐ S. DEV. PLAN FOR SUB'D APPROVAL
☐ S. DEV. FOR BLDG. PERMIT APPROVAL
☐ SECTOR PLAN APPROVAL
☐ FINAL PLAT APPROVAL
☐ FOUNDATION PERMIT APPROVAL
☐ BUILDING PERMIT APPROVAL
☒ CERTIFICATE OF OCCUPANCY (PERM)
☐ CERTIFICATE OF OCCUPANCY (TEMP)
☐ GRADING PERMIT APPROVAL
☐ PAVING PERMIT APPROVAL
☐ WORK ORDER APPROVAL
☐ OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED:
☐ YES
☐ NO
☐ COPY PROVIDED

SUBMITTED BY: Dan Herr DATE: April 17, 2013



Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope to the proposed development define the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5) acres and Sector Plans.
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report:** Required for subdivision containing more than ten (10) lots or constituting five (5) acres or more.

FINAL TRAFFIC CERTIFICATION FOR BUILDING PERMIT

RE: RETAIL OFFICE DEVELOPMENT, 4545 ALAMEDA BLVD NE,
ALBUQUERQUE, NM 87113

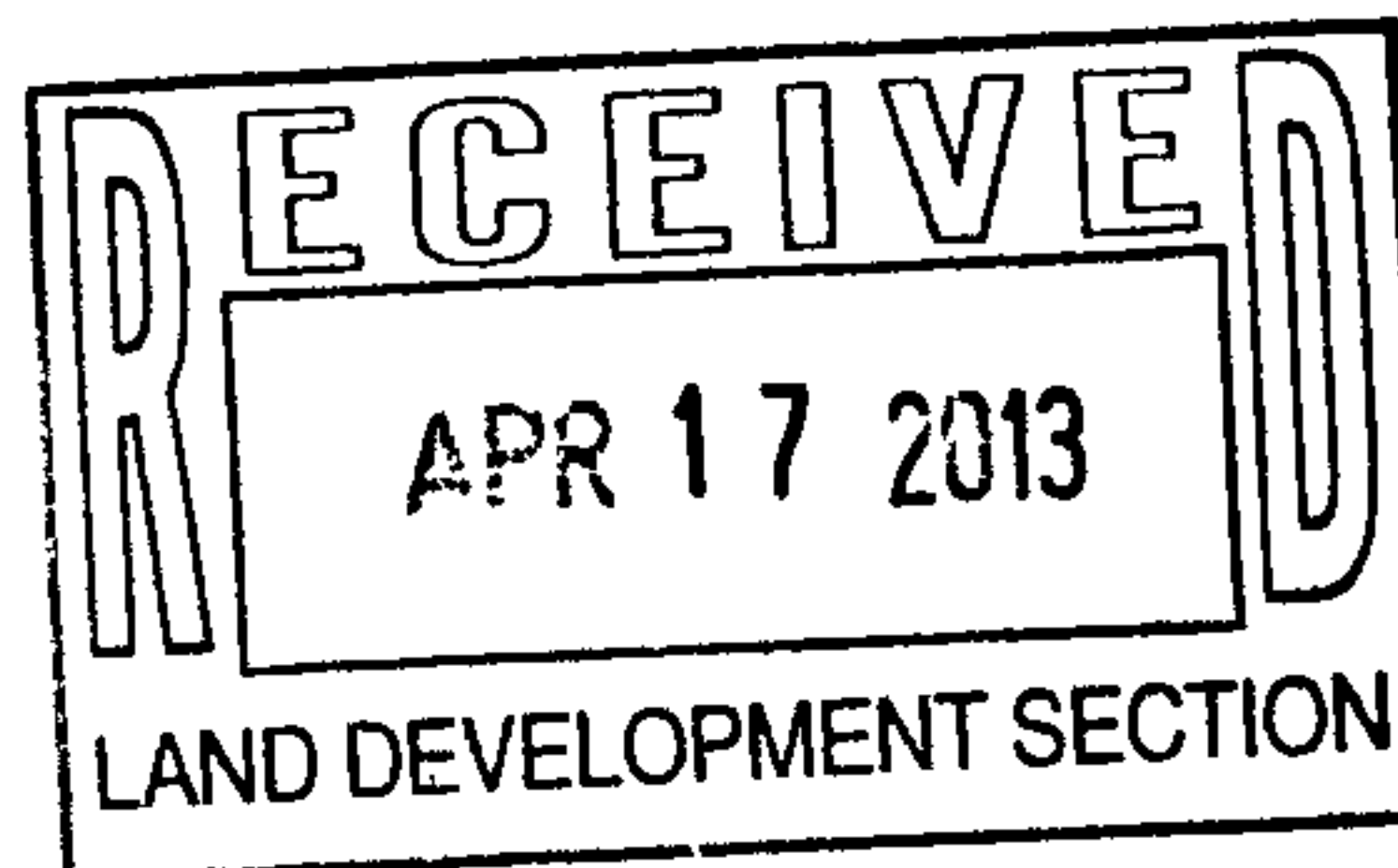
I, Dan Herr, NMRA 3076, of the firm Slagle Herr Architects, hereby certify that this project is in substantial compliance with and in accordance with the design intent of the DRB approved plan dated 8-28-12. I certify that I have personally visited the project site on 4-16-13 and have determined by visual inspection that the survey data provided is representative of actual site conditions and is true and correct to the best of my knowledge and belief. This certification is submitted in support of a request for certificate of occupancy.

The record information presented hereon is not necessarily complete and intended only to verify substantial compliance of the traffic aspects of this project. Those relying on the record document are advised to obtain independent verification of its accuracy before using it for any other purpose.



Dan Herr, Architect

4-17-13
Date



slagle
HERR

CITY OF ALBUQUERQUE



April 11, 2013

Åsa Nilson-Weber, P.E.
Isaacson & Arfman, PA
128 Monroe NE
Albuquerque, NM 87108

Re: Richfield Park Lot 5-A-1
Grading Plan Certification—Accepted
Engineer's Stamp date 8-29-13 (C17/D120)
Certification date 04-10-13

Dear Ms. Nilson-Weber,

Based upon the information provided in the Certification received 04-10-13, the above referenced Certification is acceptable for a release of a Permanent Certificate of Occupancy by Hydrology.

Hydrology is asking for an electronic copy, in .pdf format, of this certification for our PO Box 1293 records. This certification can be e-mailed to Tim Sims: tsims@cabq.gov.

If you have any questions, you can contact me at 924-3986.

Albuquerque

NM 87103

www.cabq.gov

Sincerely,

Curtis Cherne, P.E.
Principal Engineer, Hydrology
Development and Building Services

RR/CC
C: CO Clerk—Katrina Sigala
e-mail or file

DRAINAGE AND TRANSPORTATION INFORMATION SHEET
(Rev. 12/05)

PROJECT TITLE: Richfield Park, Lot 5-A-1 ZONE MAP/DRG. FILE # C-17 / D120
DRB#: 1005410 EPC#: _____ WORK ORDER#: 715482

LEGAL DESCRIPTION: Lot 5A, Richfield Park Subdivision, Albuquerque, NM
CITY ADDRESS: 4545 Alameda Blvd. NE

ENGINEERING FIRM: ISAACSON & ARFMAN, PA CONTACT: Åsa Nilsson-Weber
ADDRESS: 128 MONROE NE PHONE: 268-8828
CITY, STATE: ALBUQUERQUE, NM ZIP CODE: 87108

OWNER: Mechenbier Construction CONTACT: John Mechenbier
ADDRESS: 8500 Washington St. NE Suite A-6 PHONE: _____
CITY, STATE: Albuquerque NM ZIP CODE: 87113

ARCHITECT: _____ CONTACT: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

SURVEYOR: SurvTek, Inc. CONTACT: Russ Hugg
ADDRESS: 9384 Valley View Drive NW PHONE: 897-3366
CITY, STATE: Albuquerque, NM ZIP CODE: 87114

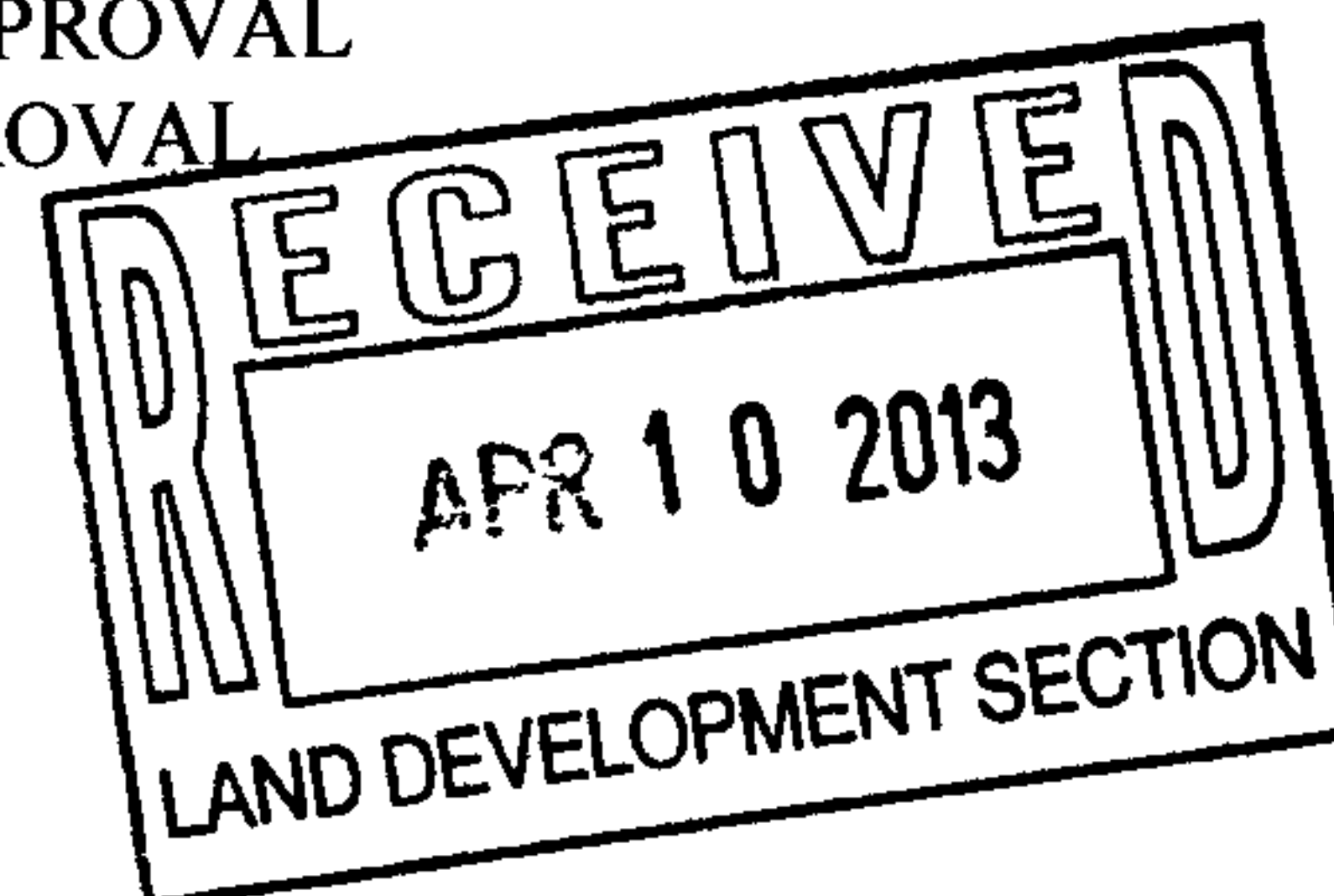
CONTRACTOR: Mechenbier Construction CONTACT: John Mechenbier
ADDRESS: 8500 Washington St. NE Suite A-6 PHONE: 314-7700
CITY, STATE: Albuquerque NM ZIP CODE: 87113

TYPE OF SUBMITTAL:
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____ DRAINAGE PLAN 1st SUBMITTAL
____ DRAINAGE PLAN RESUBMITTAL
____ CONCEPTUAL G & D PLAN
____ GRADING PLAN
____ EROSION CONTROL PLAN
☒ ENGINEER'S CERT (HYDROLOGY)
____ CLOMR/LOMR
____ TRAFFIC CIRCULATION LAYOUT
____ ENGINEER/ARCHITECT CERT (TCL)
____ ENGINEER/ARCHITECT CERT (DRB S.P.)
____ ENGINEER/ARCHITECT CERT (AA)
____ OTHER (SPECIFY)

CHECK TYPE OF APPROVAL SOUGHT:
____ SIA/FINANCIAL GUARANTEE RELEASE
____ PRELIMINARY PLAT APPROVAL
____ S. DEV. PLAN FOR SUB'D APPROVAL
____ S. DEV. FOR BLDG. PERMIT APPROVAL
____ SECTOR PLAN APPROVAL
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____ FOUNDATION PERMIT APPROVAL
____ BUILDING PERMIT APPROVAL
☒ CERTIFICATE OF OCCUPANCY (PERM)
____ CERTIFICATE OF OCCUPANCY (TEMP)
____ GRADING PERMIT APPROVAL
____ PAVING PERMIT APPROVAL
____ WORK ORDER APPROVAL
____ OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED:
☒ YES
____ NO
____ COPY PROVIDED

Jason
235-8014



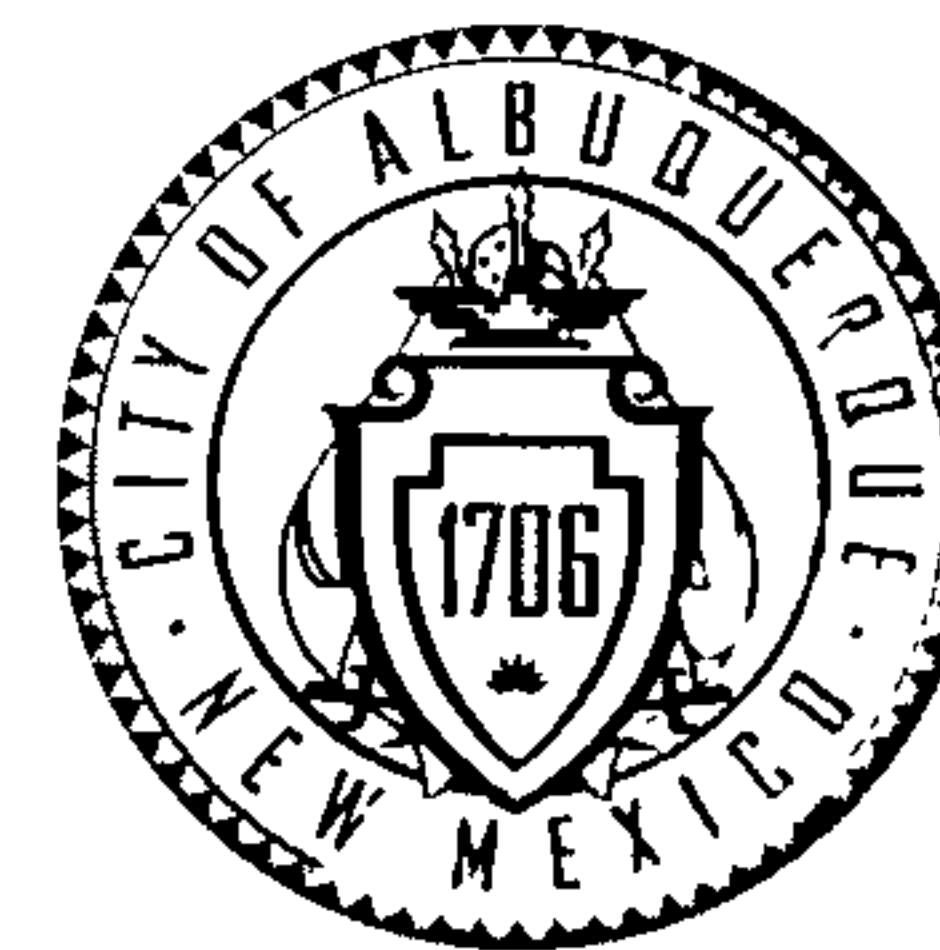
SUBMITTED BY: Åsa Nilsson-Weber DATE: April 10, 2013

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope to the proposed development define the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

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2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report:** Required for subdivision containing more than ten (10) lots or constituting five (5) acres or more.

CITY OF ALBUQUERQUE

PLANNING DEPARTMENT – Development & Building Services



August 31, 2012

Åsa Nilsson-Weber, P.E.
Isaacson & Arfman, P.A.
128 Monroe St. NE
Albuquerque, New Mexico 87108

Re: 4545 Alameda NE–Grading & Drainage Plan
Lot 5A, Richfield Park Subdivision

(C17-D120)
P.E. Stamp: 8-29-12

Dear Ms. Nilsson-Weber,

Based upon the information provided in your submittal received August 30, 2012, the subject Grading and Drainage Plan is approved for Site Development Plan for Building Permit, Grading Permit, Work Order and Building Permit.

Please attach a copy of this approved plan to the Work Order plans and Building Permit plan sets prior to sign-off by Hydrology.

PO Box 1293

Prior to our release of a Certificate of Occupancy, an Engineer's Certification of substantial compliance with this plan will be required, per the DPM checklist.

Albuquerque

Being over 1 acre of disturbed area, this project requires a Storm Water Pollution Prevention Plan (SWPPP) **and** a National Pollutant Discharge Elimination System (NPDES) permit for storm water discharge during construction.

NM 87103

If you have any questions, you may contact me by email at grolson@cabq.gov, or telephone 505-924-3695.

www.cabq.gov

Sincerely,

Gregory R. Olson, P.E.
Senior Engineer

Orig: Drainage file C17/D120
c.pdf Addressee via Email AsaW@iacivil.com
Kathy Verhage, DMD KVerhage@cabq.gov

DRAINAGE AND TRANSPORTATION INFORMATION SHEET
(Rev. 12/05)

PROJECT TITLE: Richfield Park, Lot 5-A-1 ZONE MAP/DRG. FILE # C-17 / D120
DRB#: 1005410 EPC#: _____ WORK ORDER#: 715482

LEGAL DESCRIPTION: Lot 5A, Richfield Park Subdivision, Albuquerque, NM
CITY ADDRESS: 4545 Alameda Blvd. NE

ENGINEERING FIRM: ISAACSON & ARFMAN, PA
ADDRESS: 128 MONROE NE
CITY, STATE: ALBUQUERQUE, NM

CONTACT: Åsa Nilsson-Weber
PHONE: 268-8828
ZIP CODE: 87108

OWNER: Mechenbier Construction
ADDRESS: 8500 Washington St. NE Suite A-6
CITY, STATE: Albuquerque NM

CONTACT: John Mechenbier
PHONE: _____
ZIP CODE: 87113

ARCHITECT: _____
ADDRESS: _____
CITY, STATE: _____

CONTACT: _____
PHONE: _____
ZIP CODE: _____

SURVEYOR: Forstbauer Surveying, LLC
ADDRESS: 4116 Lomas Blvd. NE
CITY, STATE: Albuquerque, NM

CONTACT: Ron Forstbauer
PHONE: _____
ZIP CODE: 87110

CONTRACTOR: Mechenbier Construction
ADDRESS: 8500 Washington St. NE Suite A-6
CITY, STATE: Albuquerque NM

CONTACT: John Mechenbier
PHONE: _____
ZIP CODE: 87113

TYPE OF SUBMITTAL:

☐ DRAINAGE REPORT
☐ DRAINAGE PLAN 1st SUBMITTAL
☒ DRAINAGE PLAN RESUBMITTAL
☐ CONCEPTUAL G & D PLAN
☐ GRADING PLAN
☐ EROSION CONTROL PLAN
☐ ENGINEER'S CERT (HYDROLOGY)
☐ CLOMR/LOMR
☐ TRAFFIC CIRCULATION LAYOUT
☐ ENGINEER/ARCHITECT CERT (TCL)
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☐ ENGINEER/ARCHITECT CERT (AA)
☒ OTHER (SPECIFY) Supplemental Info.

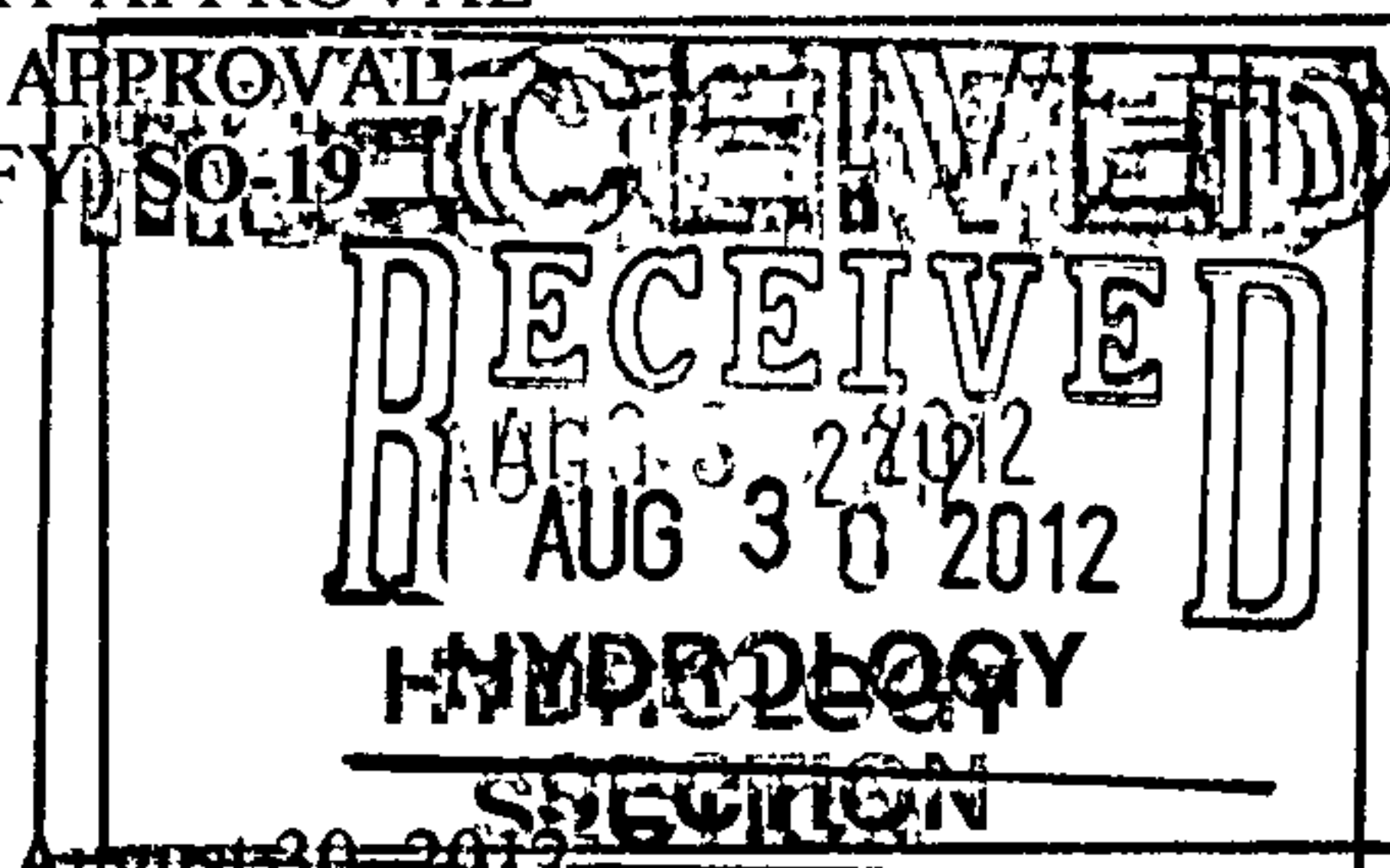
CHECK TYPE OF APPROVAL SOUGHT:

☐ SIA/FINANCIAL GUARANTEE RELEASE
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☒ S. DEV. FOR BLDG. PERMIT APPROVAL
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☐ CERTIFICATE OF OCCUPANCY (TEMP)
☒ GRADING PERMIT APPROVAL
☐ PAVING PERMIT APPROVAL
☐ WORK ORDER APPROVAL
☐ OTHER (SPECIFY) _____

WAS A PRE-DESIGN CONFERENCE ATTENDED:

☒ YES
☐ NO
☐ COPY PROVIDED

SUBMITTED BY: Åsa Nilsson-Weber DATE: August 30, 2012



Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope to the proposed development define the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

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3. **Drainage Report:** Required for subdivision containing more than ten (10) lots or constituting five (5) acres or more.

Olson, Greg R.

From: Asa Nilsson-Weber [asaw@iacivil.com]
Sent: Thursday, August 30, 2012 1:46 PM
To: Olson, Greg R.; 'Bryan Bobrick'
Cc: Biazar, Shahab
Subject: RE: C17-D120 Richfield Park Lot 5A -- Responses
Attachments: image001.png; image005.jpg

Greg,

Here are some additional photos that will help show that the proposed wall is not changing the existing flow pattern. As part of the recent milling overlay, the property owner to the east graded a defined berm transitioning to a swale at the northwest corner of his property. This was probably done to prevent "developed" flow from passing onto our client's property.

Because the adjacent property has been partially developed and graded to deflect flows to the north per the master drainage plan, the proposed wall at the east side of our site should not be considered as deflecting historic offsite flow. We believe that since the historic flow pattern has been altered by the adjacent development, the adjacent property owner is responsible for that flow and how it is routed per the master drainage plan.

Attached are additional photos showing the existing offsite swale directing flows to the north.





Swale looking north
property corner

Berm/swale looking west at NE

Hopefully these photos clarify your question. Please let us know if you need further information.

Thank you.

Åsa Nilsson-Weber, P.E.
Principal / Vice President



Isaacson & Arfman, P.A.
Consulting Engineering Associates
128 Monroe St. N.E.
Albuquerque, NM 87108
Phone: (505)268-8828
Fax: (505)268-2632
asaw@iacivil.com

From: Olson, Greg R. [mailto:grolson@cabq.gov]
Sent: Thursday, August 30, 2012 11:13 AM
To: Bryan Bobrick
Cc: AsaW@iacivil.com; Olson, Greg R.; Biazar, Shahab
Subject: RE: C17-D120 Richfield Park Lot 5A -- Responses

Bryan,

The photo attached only shows from mid-lot to the south. Do you have any photos to the north, or topo to show where the drainage goes, after it is deflected by the small berm in the photo, or if that berm (post millings) continues all the way to the NE corner of Lot 5A, and on out to Columbine Street?

Waterproofing the wall may be a good investment for the wall owner, but it does not address the issue of where the deflected flows will go, and how they enter the R/W downstream.

If you can document that the flows from Lot D1A are already directed north, and do not enter Lot 5A, then at least this Drainage Plan can reasonably deflect liability for those future flows going north along the new wall.

Thanks,

Greg

924-3994

From: Bryan Bobrick [mailto:bryanb@iacivil.com]

Sent: Wednesday, August 29, 2012 2:19 PM

To: Olson, Greg R.

Cc: AsaW@iacivil.com

Subject: RE: C17-D120 Richfield Park Lot 5A "Verbal NO"

Greg,

We have taken care of items 2a through 2d from your review comments. As part of the resubmittal, we included the attached photo (see below) in our response letter. This photo shows the adjacent property to the east has been 'developed' to some extent. We included the following explanation in our resubmittal letter:

1. No offsite flow passes to the property from the east. The photo below shows the east property graded with asphalt millings to serve as an overflow parking area (by others). A deflection berm at the joint property line deflects sheetflow to the north to follow the required drainage path for Parcel C1-D. In addition, a perimeter wall proposed as part of the Lot 5A construction which will also serve to deflect offsite flow.

The existing topo contours show a minor slope from south to north. The photo shows a small deflection berm. In addition, I have discussed the concern with John Mechenbier and he has agreed to waterproof the bottom rows of blocks. Will this suffice?



Thanks,

Bryan J. Bobrick
Project Manager

Isaacson & Arfman, P.A.
 Consulting Engineering Associates
 128 Monroe St. N.E.
 Albuquerque, NM 87108
 Phone: (505)268-8828
 Fax: (505)268-2632
bryanb@iacivil.com

From: Olson, Greg R. [mailto:groolson@cabq.gov]
Sent: Wednesday, August 29, 2012 10:57 AM
To: AsaW@iacivil.com
Cc: Olson, Greg R.; BryanB@iacivil.com
Subject: C17-D120 Richfield Park Lot 5A "Verbal NO"

Per our phone conversation this AM, the Grading & Drainage plan for this site is generally acceptable, but cannot be approved until the following exceptions are addressed:

1. The proposed wall on the east boundary appears to block offsite flows from Lot D1A, which may pond behind the wall, or be directed northerly along the property line. Contours shown suggest that these channelized flows (which by the Drainage Master Plan should go to Columbine Road) may cross over into the east side of Lot 6, north of your site. Provide more detail as to how these offsite flows will be routed after construction of the wall. If offsite grading is required to deal with this situation, we will require written permission from the owners of the offsite parcel(s).
2. Address drafting details on the plans as follows:
 - a. Sh. CG-101: Key Note 2 should include a width for the Sidewalk Culvert.
 - b. Sh. CG-101: Provide Flow arrows in the swale along the west side of the lot.
 - c. Sh. CG-101: Call out a curb opening and width at the low point in the driving lane south curb approx. 60' ENE of the SW corner of the site (at El. 9.0).
 - d. Sh. CG-501: The lower of the two Headwall A Details appears to represent Headwall B.
Please clarify/re-label.

Please give me a call or email if you have any questions.

Thanks,
Greg Olson
 924-3994

Olson, Greg R.

From: Bryan Bobrick [bryanb@iacivil.com]
Sent: Wednesday, August 29, 2012 2:19 PM
To: Olson, Greg R.
Cc: AsaW@iacivil.com
Subject: RE: C17-D120 Richfield Park Lot 5A "Verbal NO"

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Thanks,

Bryan J. Bobrick
Project Manager
 Jackson & Arfman, P.A.
 Consulting Engineering Associates
 128 Monroe St. N.E.
 Albuquerque, NM 87108
 Phone: (505) 268-8828
 Fax: (505) 268-2632
bryanb@iacivil.com

Olson, Greg R.

From: Olson, Greg R.
Sent: Wednesday, August 29, 2012 10:57 AM
To: 'AsaW@iacivil.com'
Cc: Olson, Greg R.; 'BryanB@iacivil.com'
Subject: C17-D120 Richfield Park Lot 5A "Verbal NO"

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Thanks,

Greg Olson
924-3994

DRAINAGE AND TRANSPORTATION INFORMATION SHEET
(Rev. 12/05)

PROJECT TITLE: Richfield Park, Lots 5A ZONE MAP/DRG. FILE # C-17 / D120
DRB#: 1005410 EPC#: _____ WORK ORDER#: 715482

LEGAL DESCRIPTION: Lot 5A, Richfield Park Subdivision, Albuquerque, NM
CITY ADDRESS: 4545 Alameda Blvd. NE

ENGINEERING FIRM: ISAACSON & ARFMAN, PA CONTACT: Åsa Nilsson-Weber
ADDRESS: 128 MONROE NE PHONE: 268-8828
CITY, STATE: ALBUQUERQUE, NM ZIP CODE: 87108

OWNER: Mechenbier Construction CONTACT: John Mechenbier
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CITY, STATE: Albuquerque NM ZIP CODE: 87113

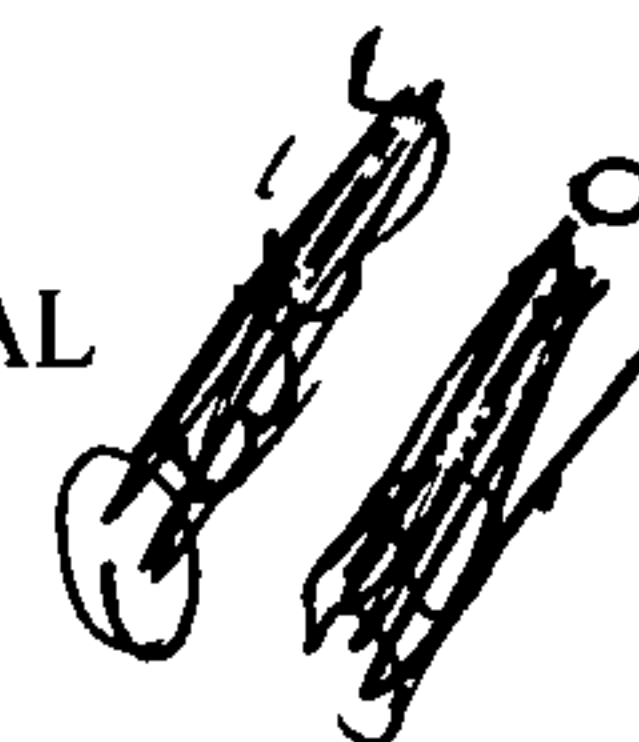
ARCHITECT: _____ CONTACT: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

SURVEYOR: Forstbauer Surveying, LLC CONTACT: Ron Forstbauer
ADDRESS: 4116 Lomas Blvd. NE PHONE: _____
CITY, STATE: Albuquerque, NM ZIP CODE: 87110

CONTRACTOR: Mechenbier Construction CONTACT: John Mechenbier
ADDRESS: 8500 Washington St. NE Suite A-6 PHONE: _____
CITY, STATE: Albuquerque NM ZIP CODE: 87113

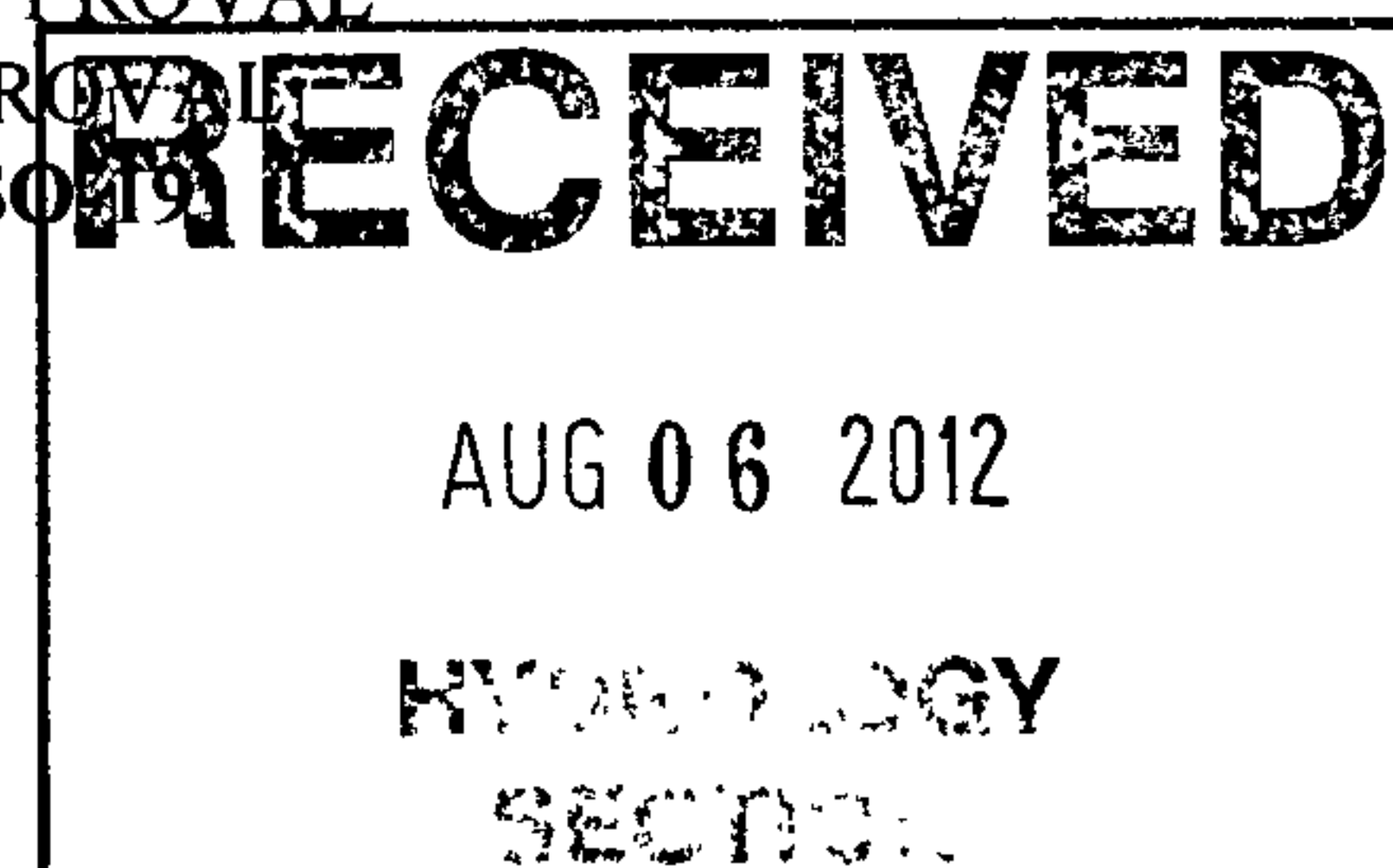
TYPE OF SUBMITTAL:
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☐ DRAINAGE PLAN 1st SUBMITTAL
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☐ ENGINEER/ARCHITECT CERT (AA)
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☐ FINAL PLAT APPROVAL
☐ FOUNDATION PERMIT APPROVAL
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☐ CERTIFICATE OF OCCUPANCY (TEMP)
☒ GRADING PERMIT APPROVAL
☐ PAVING PERMIT APPROVAL
☐ WORK ORDER APPROVAL
☐ OTHER (SPECIFY) _____



WAS A PRE-DESIGN CONFERENCE ATTENDED:
☒ YES
☐ NO
☐ COPY PROVIDED

SUBMITTED BY: Åsa Nilsson-Weber DATE: August 6, 2012



Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope to the proposed development define the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5) acres and Sector Plans.
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report:** Required for subdivision containing more than ten (10) lots or constituting five (5) acres or more.

AUGUST 3, 2012

SUPPLEMENTAL INFORMATION

FOR

RICHFIELD PARK, LOT 5A

BY



ISAACSON & ARFMAN, P.A.

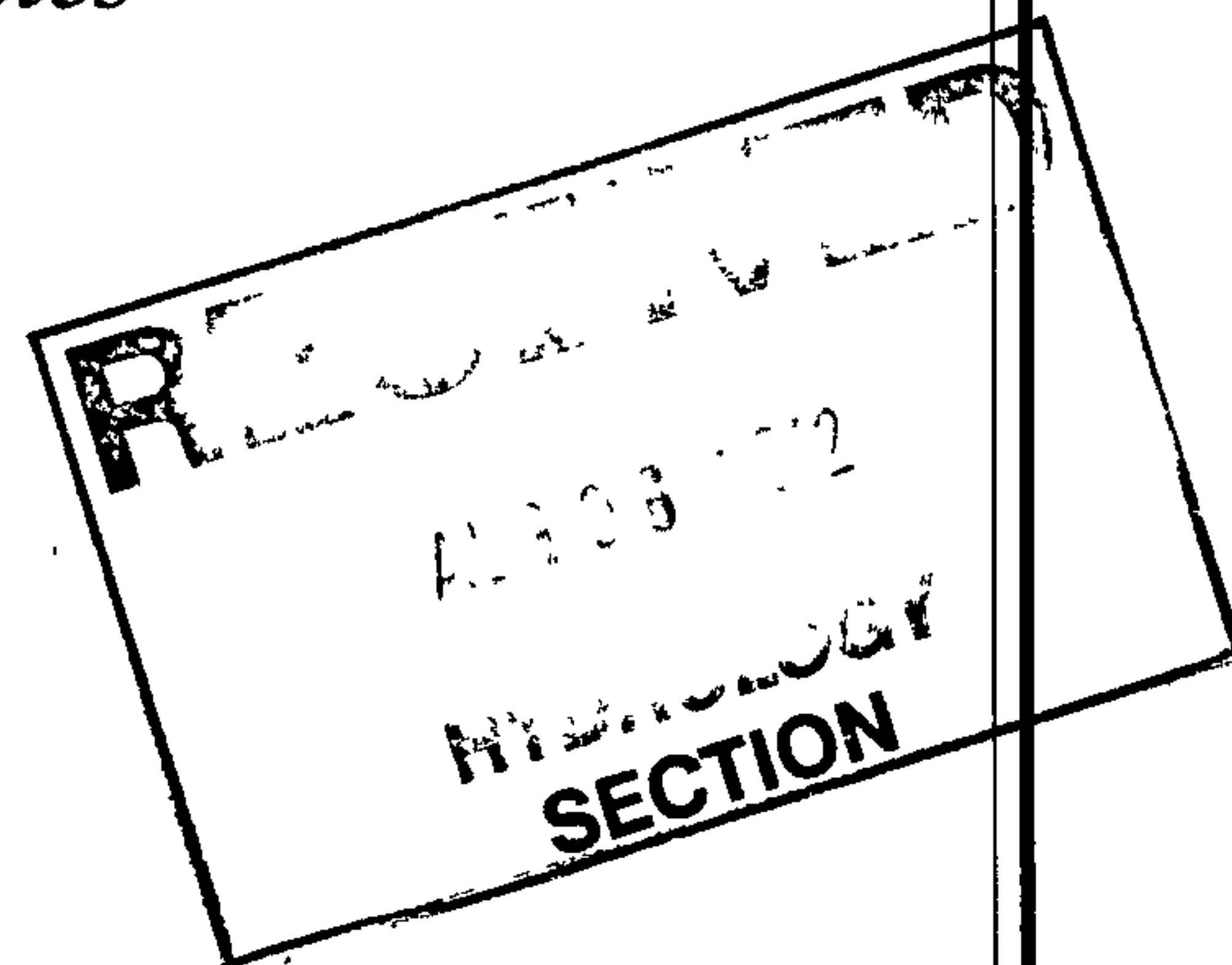
Consulting Engineering Associates



Thomas O. Isaacson, PE & LS

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- AHYMO Summary Table
- Basin Areas used in AHYMO
- AHYMO run
 - Developed Conditions
 - 100-year 6-hour storm
- Pond 1 Volume calculations used in AHYMO
- Pond 1 Orifice Equations
- Pond 2 Volume calculations used in AHYMO
- Pond 2 Orifice Equation

*S*****

*S RICHFIELD PARK, LOT 5A
 *S DEVELOPED CONDITIONS
 *S 100-YR, 6-HR STORM
 *S 1918P.DAT
 *S JULY 2012
 *S BY GENNY DONART
 *S ISAACSON & ARFMAN, P.A.

*S*****

START

TIME= 0.00

RAINFALL TYPE= 1 NOAA 14

RAIN6= 2.370

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1	NOTATION
*S BASIN B2											
COMPUTE NM HYD	B2	-	1	0.00048	1.28	0.050	1.97645	1.530	4.195	PER IMP=	88.00
*S BASIN B3											
COMPUTE NM HYD	B3	-	2	0.00093	2.50	0.100	2.01991	1.530	4.216	PER IMP=	92.00
*S BASIN B4											
COMPUTE NM HYD	B4	-	3	0.00081	2.19	0.087	1.99822	1.530	4.195	PER IMP=	90.00
*S ADD LANDSCAPE AREA 7 & B3											
ADD HYD	B3.1	1& 2	11	0.00140	3.78	0.150	2.00482	1.530	4.209		
*S POND 1 (BASIN B3)											
ROUTE RESERVOIR	B3.2	11	20	0.00140	2.89	0.150	2.00429	1.620	3.216	AC-FT=	0.032
*S ADD POND 1 & B4											
ADD HYD	B4.1	20& 3	21	0.00222	4.78	0.236	1.99754	1.570	3.368		
*S POND 2 (BASIN B4)											
*S *****AP1*****											
ROUTE RESERVOIR	B4.2	21	30	0.00222	4.09	0.236	1.99754	1.670	2.880	AC-FT=	0.023
*S BASIN B1											
*S *****AP2*****											
COMPUTE NM HYD	B1	-	4	0.00070	1.87	0.074	1.97645	1.530	4.175	PER IMP=	88.00
*S BASIN LA1											
COMPUTE NM HYD	LA1	-	5	0.00008	0.16	0.004	0.98469	1.540	3.090	PER IMP=	0.00
*S BASIN LA2											
COMPUTE NM HYD	LA2	-	6	0.00005	0.10	0.003	0.98469	1.540	3.216	PER IMP=	0.00
*S BASIN LA3											
COMPUTE NM HYD	LA3	-	7	0.00008	0.16	0.004	0.98469	1.540	3.090	PER IMP=	0.00
*S BASIN O1											
COMPUTE NM HYD	O1	-	8	0.00003	0.09	0.003	1.80983	1.530	4.414	PER IMP=	72.00
FINISH											

BASIN AREAS			
PROJECT NAME	RICHFIELD PARK, LOT 5A		
PROJECT #	1918		
BASIN ID	AREA (sf)	AREA (Ac)	AREA (sq. mi.)
<i>Existing</i>			
		-	-
		-	-
		-	-
TOTAL AREA =	0.00	-	-
<i>Proposed</i>			
B2	13,229.99	0.3037	0.000475
B3	25,873.47	0.5940	0.000928
B4	22,680.47	0.5207	0.000814
B1	19,495.02	0.4475	0.000699
LA1	2,201.32	0.0505	0.000079
LA2	1,375.58	0.0316	0.000049
LA3	2,216.13	0.0509	0.000079
O1	894.68	0.0205	0.000032
		-	-
		-	-
		-	-
		-	-
		-	-
		-	-
		-	-
		-	-
		-	-
		-	-
		-	-
		-	-
TOTAL AREA =	87,966.66	2.0194	0.003155

AHYMO PROGRAM (AHYMO-S4) - Version: S4.01a - Rel: 01a
RUN DATE (MON/DAY/YR) = 08/01/2012
START TIME (HR:MIN:SEC) = 09:13:31 USER NO.= AHYMO_Temp_User:20122010
INPUT FILE = M:\PROJECT DOCUMENTS\1900-1999\1918\CALCS\1918p.DAT

*S*****
*S RICHFIELD PARK, LOT 5A
*S DEVELOPED CONDITIONS
*S 100-YR, 6-HR STORM
*S 1918P.DAT
*S JULY 2012
*S BY GENNY DONART
*S ISAACSON & ARFMAN, P.A.
*S*****

START RAINFALL BEGINS AT 0.0 HRS
RAINFALL TYPE=1 RAIN QUARTER=1.06 RAIN ONE=1.77
RAIN SIX=2.37 RAIN DAY=2.68 DT=0.01HR

6-HOUR RAINFALL DIST. - BASED ON NOAA ATLAS 14 FOR CONVECTIVE AREAS (NM & AZ) - D1
DT = 0.010000 HOURS END TIME = 6.000000 HOURS

0.0000	0.0008	0.0016	0.0024	0.0032	0.0040	0.0048
0.0056	0.0064	0.0072	0.0081	0.0090	0.0099	0.0107
0.0116	0.0125	0.0134	0.0143	0.0153	0.0163	0.0172
0.0182	0.0192	0.0202	0.0212	0.0221	0.0232	0.0244
0.0255	0.0266	0.0277	0.0288	0.0299	0.0310	0.0331
0.0356	0.0381	0.0406	0.0431	0.0456	0.0481	0.0507
0.0533	0.0560	0.0588	0.0616	0.0644	0.0672	0.0700
0.0728	0.0756	0.0786	0.0816	0.0846	0.0876	0.0907
0.0937	0.0967	0.0997	0.1028	0.1060	0.1091	0.1123
0.1154	0.1186	0.1217	0.1249	0.1281	0.1313	0.1346
0.1379	0.1412	0.1445	0.1478	0.1511	0.1544	0.1580
0.1617	0.1653	0.1689	0.1726	0.1762	0.1798	0.1835
0.1874	0.1915	0.1955	0.1996	0.2037	0.2077	0.2118
0.2159	0.2203	0.2254	0.2305	0.2356	0.2408	0.2459
0.2510	0.2561	0.2612	0.2681	0.2750	0.2818	0.2887
0.2955	0.3024	0.3093	0.3161	0.3248	0.3344	0.3440
0.3536	0.3632	0.3728	0.3824	0.3920	0.4032	0.4176
0.4320	0.4464	0.4608	0.4753	0.4897	0.5041	0.5185
0.5434	0.5683	0.5931	0.6180	0.6429	0.6678	0.6926
0.7175	0.7700	0.8363	0.9026	0.9688	1.0351	1.1014
1.1677	1.2339	1.2904	1.3271	1.3639	1.4006	1.4373
1.4741	1.5108	1.5475	1.5843	1.6027	1.6212	1.6397
1.6581	1.6766	1.6950	1.7135	1.7320	1.7459	1.7575
1.7691	1.7807	1.7924	1.8040	1.8156	1.8273	1.8377
1.8458	1.8538	1.8619	1.8699	1.8780	1.8861	1.8941
1.9022	1.9081	1.9140	1.9199	1.9258	1.9317	1.9376
1.9435	1.9494	1.9543	1.9588	1.9633	1.9677	1.9722
1.9767	1.9811	1.9856	1.9899	1.9937	1.9975	2.0014
2.0052	2.0091	2.0129	2.0167	2.0206	2.0240	2.0275
2.0309	2.0344	2.0378	2.0413	2.0447	2.0482	2.0513
2.0542	2.0571	2.0600	2.0629	2.0658	2.0687	2.0716
2.0744	2.0771	2.0798	2.0825	2.0852	2.0879	2.0905
2.0932	2.0959	2.0985	2.1011	2.1037	2.1063	2.1089
2.1115	2.1141	2.1167	2.1184	2.1196	2.1208	2.1219
2.1231	2.1243	2.1255	2.1267	2.1279	2.1290	2.1302
2.1313	2.1325	2.1336	2.1348	2.1359	2.1371	2.1381
2.1392	2.1403	2.1414	2.1424	2.1435	2.1446	2.1456
2.1467	2.1477	2.1488	2.1498	2.1509	2.1519	2.1529
2.1540	2.1550	2.1560	2.1570	2.1580	2.1590	2.1601
2.1611	2.1621	2.1631	2.1640	2.1650	2.1659	2.1669
2.1678	2.1688	2.1698	2.1707	2.1716	2.1726	2.1735
2.1744	2.1753	2.1763	2.1772	2.1781	2.1790	2.1799
2.1808	2.1817	2.1827	2.1836	2.1845	2.1854	2.1863
2.1871	2.1880	2.1888	2.1897	2.1905	2.1914	2.1923
2.1931	2.1940	2.1948	2.1956	2.1965	2.1973	2.1981
2.1990	2.1998	2.2006	2.2015	2.2023	2.2031	2.2039
2.2047	2.2055	2.2064	2.2072	2.2079	2.2087	2.2095
2.2103	2.2111	2.2118	2.2126	2.2134	2.2142	2.2149
2.2157	2.2165	2.2172	2.2180	2.2187	2.2195	2.2203
2.2210	2.2218	2.2225	2.2233	2.2240	2.2247	2.2255
2.2262	2.2270	2.2277	2.2284	2.2292	2.2299	2.2306
2.2314	2.2321	2.2328	2.2335	2.2342	2.2350	2.2357
2.2364	2.2371	2.2378	2.2385	2.2392	2.2399	2.2406
2.2413	2.2420	2.2427	2.2434	2.2441	2.2448	2.2455
2.2462	2.2469	2.2476	2.2483	2.2490	2.2496	2.2503
2.2510	2.2517	2.2524	2.2530	2.2537	2.2544	2.2551

2.2557	2.2564	2.2570	2.2577	2.2584	2.2590	2.2597
2.2604	2.2610	2.2617	2.2623	2.2630	2.2636	2.2643
2.2649	2.2656	2.2662	2.2669	2.2675	2.2681	2.2688
2.2694	2.2701	2.2707	2.2713	2.2720	2.2726	2.2732
2.2739	2.2745	2.2751	2.2757	2.2764	2.2770	2.2776
2.2782	2.2788	2.2795	2.2801	2.2807	2.2813	2.2819
2.2825	2.2831	2.2837	2.2844	2.2850	2.2856	2.2862
2.2868	2.2874	2.2880	2.2886	2.2892	2.2898	2.2904
2.2910	2.2916	2.2922	2.2927	2.2933	2.2939	2.2945
2.2951	2.2957	2.2963	2.2968	2.2974	2.2980	2.2986
2.2992	2.2997	2.3003	2.3009	2.3015	2.3020	2.3026
2.3032	2.3037	2.3043	2.3049	2.3054	2.3060	2.3066
2.3071	2.3077	2.3083	2.3088	2.3094	2.3099	2.3105
2.3111	2.3116	2.3122	2.3127	2.3133	2.3138	2.3144
2.3149	2.3155	2.3160	2.3166	2.3171	2.3176	2.3182
2.3187	2.3193	2.3198	2.3204	2.3209	2.3214	2.3220
2.3225	2.3230	2.3236	2.3241	2.3246	2.3252	2.3257
2.3262	2.3268	2.3273	2.3278	2.3283	2.3289	2.3294
2.3299	2.3304	2.3309	2.3315	2.3320	2.3325	2.3330
2.3335	2.3341	2.3346	2.3351	2.3356	2.3361	2.3366
2.3371	2.3376	2.3381	2.3387	2.3392	2.3397	2.3402
2.3407	2.3412	2.3417	2.3422	2.3427	2.3432	2.3437
2.3442	2.3447	2.3452	2.3457	2.3462	2.3467	2.3472
2.3477	2.3481	2.3486	2.3491	2.3496	2.3501	2.3506
2.3511	2.3516	2.3521	2.3525	2.3530	2.3535	2.3540
2.3545	2.3550	2.3554	2.3559	2.3564	2.3569	2.3574
2.3578	2.3583	2.3588	2.3593	2.3597	2.3602	2.3607
2.3612	2.3616	2.3621	2.3626	2.3630	2.3635	2.3640
2.3644	2.3649	2.3654	2.3658	2.3663	2.3668	2.3672
2.3677	2.3682	2.3686	2.3691	2.3695	2.3700	

*

*S BASIN B2

COMPUTE NM HYD ID=1 HYD NO=B2 AREA=0.000475 SQ MI
 PER A=0 PER B=3 PER C=9 PER D=88
 TP=-0.1333 HR MASS RAIN=-1

K = 0.072649HR TP = 0.133300HR K/TP RATIO = 0.545000 SHAPE CONSTANT, N = 7.106428
 UNIT PEAK = 1.6503 CFS UNIT VOLUME = 0.9924 B = 526.28 P60 = 1.7700
 AREA = 0.000418 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.010000

K = 0.111742HR TP = 0.133300HR K/TP RATIO = 0.838274 SHAPE CONSTANT, N = 4.251926
 UNIT PEAK = 0.15891 CFS UNIT VOLUME = 0.9119 B = 371.63 P60 = 1.7700
 AREA = 0.000057 SQ MI IA = 0.38750 INCHES INF = 0.93500 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.010000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA B2

RUNOFF VOLUME = 1.97645 INCHES = 0.0501 ACRE-FEET
 PEAK DISCHARGE RATE = 1.28 CFS AT 1.530 HOURS BASIN AREA = 0.0005 SQ. MI.

*S BASIN B3

COMPUTE NM HYD ID=2 HYD NO=B3 AREA=0.000928 SQ MI
 PER A=0 PER B=3 PER C=5 PER D=92
 TP=-0.1333 HR MASS RAIN=-1

K = 0.072649HR TP = 0.133300HR K/TP RATIO = 0.545000 SHAPE CONSTANT, N = 7.106428
 UNIT PEAK = 3.3707 CFS UNIT VOLUME = 0.9962 B = 526.28 P60 = 1.7700
 AREA = 0.000854 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.010000

K = 0.115244HR TP = 0.133300HR K/TP RATIO = 0.864543 SHAPE CONSTANT, N = 4.111334
 UNIT PEAK = 0.20190 CFS UNIT VOLUME = 0.9309 B = 362.53 P60 = 1.7700
 AREA = 0.000074 SQ MI IA = 0.40625 INCHES INF = 0.98750 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.010000

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA B3

RUNOFF VOLUME = 2.01991 INCHES = 0.1000 ACRE-FEET
 PEAK DISCHARGE RATE = 2.50 CFS AT 1.530 HOURS BASIN AREA = 0.0009 SQ. MI.

*S BASIN B4
 COMPUTE NM HYD ID=3 HYD NO=B4 AREA=0.000814 SQ MI
 PER A=0 PER B=3 PER C=7 PER D=90
 TP=-0.1333 HR MASS RAIN=-1

K = 0.072649HR TP = 0.133300HR K/TP RATIO = 0.545000 SHAPE CONSTANT, N = 7.106428
 UNIT PEAK = 2.8923 CFS UNIT VOLUME = 0.9956 B = 526.28 P60 = 1.7700
 AREA = 0.000733 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.010000

K = 0.113143HR TP = 0.133300HR K/TP RATIO = 0.848782 SHAPE CONSTANT, N = 4.194368
 UNIT PEAK = 0.22468 CFS UNIT VOLUME = 0.9369 B = 367.93 P60 = 1.7700
 AREA = 0.000081 SQ MI IA = 0.39500 INCHES INF = 0.95600 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.010000

*S ADD LANDSCAPE AREA 7 & B3
 ADD HYD ID=11 HYD NO=B3.1 ID I=1 ID II=2
 PRINT HYD ID=11 CODE=1

HYDROGRAPH FROM AREA B3.1

RUNOFF VOLUME = 2.00482 INCHES = 0.1500 ACRE-FEET
 PEAK DISCHARGE RATE = 3.78 CFS AT 1.530 HOURS BASIN AREA = 0.0014 SQ. MI.

* ROUTE THROUGH POND
 * DISCHARGE THROUGH 2 - 6" PIPES
 *S POND 1 (BASIN B3)
 ROUTE RESERVOIR ID=20 HYD NO=B3.2 INFLOW ID=11 CODE=10
 OUTFLOW(CFS) STORAGE(AF) ELEV(FT)

0	0	5108.0
0.01	0.005613	5108.5
1.40	0.016477	5109.0
2.90	0.032283	5109.5

* * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
0.00	0.00	5108.00	0.000	0.00
0.10	0.00	5108.00	0.000	0.00
0.20	0.00	5108.00	0.000	0.00
0.30	0.00	5108.00	0.000	0.00
0.40	0.00	5108.00	0.000	0.00
0.50	0.00	5108.00	0.000	0.00
0.60	0.00	5108.00	0.000	0.00
0.70	0.06	5108.01	0.000	0.00
0.80	0.17	5108.10	0.001	0.00
0.90	0.22	5108.25	0.003	0.00
1.00	0.27	5108.42	0.005	0.01
1.10	0.36	5108.55	0.007	0.16
1.20	0.52	5108.62	0.008	0.35
1.30	0.83	5108.70	0.010	0.57
1.40	1.63	5108.85	0.013	0.99
1.50	3.66	5109.22	0.023	2.05
1.60	3.14	5109.49	0.032	2.87
1.70	1.88	5109.40	0.029	2.61
1.80	1.19	5109.19	0.023	1.98
1.90	0.82	5109.01	0.017	1.43
2.00	0.58	5108.83	0.013	0.93
2.10	0.43	5108.73	0.011	0.64
2.20	0.34	5108.66	0.009	0.47
2.30	0.27	5108.62	0.008	0.35
2.40	0.22	5108.60	0.008	0.28
2.50	0.14	5108.57	0.007	0.21

2.60	0.09	5108.55	0.007	0.14
2.70	0.07	5108.53	0.006	0.10
2.80	0.06	5108.52	0.006	0.08
2.90	0.05	5108.52	0.006	0.06
3.00	0.05	5108.52	0.006	0.06
3.10	0.04	5108.51	0.006	0.05
3.20	0.04	5108.51	0.006	0.04
3.30	0.04	5108.51	0.006	0.04
3.40	0.04	5108.51	0.006	0.04
3.50	0.04	5108.51	0.006	0.04
3.60	0.03	5108.51	0.006	0.04
3.70	0.03	5108.51	0.006	0.03
3.80	0.03	5108.51	0.006	0.03
3.90	0.03	5108.51	0.006	0.03
4.00	0.03	5108.51	0.006	0.03
4.10	0.03	5108.51	0.006	0.03
4.20	0.03	5108.51	0.006	0.03
4.30	0.03	5108.51	0.006	0.03
4.40	0.03	5108.51	0.006	0.03
4.50	0.03	5108.51	0.006	0.03
4.60	0.03	5108.51	0.006	0.03
4.70	0.03	5108.51	0.006	0.03
4.80	0.03	5108.51	0.006	0.03
4.90	0.03	5108.51	0.006	0.03
5.00	0.03	5108.51	0.006	0.03
5.10	0.03	5108.51	0.006	0.03
5.20	0.03	5108.51	0.006	0.03
5.30	0.03	5108.51	0.006	0.03
5.40	0.03	5108.51	0.006	0.03
5.50	0.03	5108.51	0.006	0.03

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
5.60	0.03	5108.51	0.006	0.03
5.70	0.04	5108.51	0.006	0.03
5.80	0.04	5108.51	0.006	0.04
5.90	0.04	5108.51	0.006	0.04
6.00	0.04	5108.51	0.006	0.04
6.10	0.03	5108.51	0.006	0.04
6.20	0.01	5108.51	0.006	0.02
6.30	0.00	5108.50	0.006	0.01
6.40	0.00	5108.50	0.006	0.01
6.50	0.00	5108.49	0.006	0.01
6.60	0.00	5108.48	0.005	0.01
6.70	0.00	5108.48	0.005	0.01
6.80	0.00	5108.47	0.005	0.01
6.90	0.00	5108.46	0.005	0.01
7.00	0.00	5108.46	0.005	0.01
7.10	0.00	5108.45	0.005	0.01
7.20	0.00	5108.44	0.005	0.01
7.30	0.00	5108.44	0.005	0.01
7.40	0.00	5108.43	0.005	0.01
7.50	0.00	5108.42	0.005	0.01
7.60	0.00	5108.42	0.005	0.01
7.70	0.00	5108.41	0.005	0.01
7.80	0.00	5108.41	0.005	0.01
7.90	0.00	5108.40	0.004	0.01
8.00	0.00	5108.39	0.004	0.01
8.10	0.00	5108.39	0.004	0.01
8.20	0.00	5108.38	0.004	0.01
8.30	0.00	5108.38	0.004	0.01
8.40	0.00	5108.37	0.004	0.01
8.50	0.00	5108.37	0.004	0.01
8.60	0.00	5108.36	0.004	0.01
8.70	0.00	5108.36	0.004	0.01
8.80	0.00	5108.35	0.004	0.01
8.90	0.00	5108.35	0.004	0.01
9.00	0.00	5108.34	0.004	0.01
9.10	0.00	5108.33	0.004	0.01
9.20	0.00	5108.33	0.004	0.01
9.30	0.00	5108.33	0.004	0.01
9.40	0.00	5108.32	0.004	0.01
9.50	0.00	5108.32	0.004	0.01
9.60	0.00	5108.31	0.003	0.01
9.70	0.00	5108.31	0.003	0.01
9.80	0.00	5108.30	0.003	0.01

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
9.90	0.00	5108.30	0.003	0.01
10.00	0.00	5108.29	0.003	0.01
10.10	0.00	5108.29	0.003	0.01
10.20	0.00	5108.29	0.003	0.01
10.30	0.00	5108.28	0.003	0.01
10.40	0.00	5108.28	0.003	0.01
10.50	0.00	5108.27	0.003	0.01
10.60	0.00	5108.27	0.003	0.01
10.70	0.00	5108.26	0.003	0.01
10.80	0.00	5108.26	0.003	0.01
10.90	0.00	5108.26	0.003	0.01
11.00	0.00	5108.25	0.003	0.01
11.10	0.00	5108.25	0.003	0.00

PEAK DISCHARGE = 2.888 CFS - PEAK OCCURS AT HOUR 1.62
 MAXIMUM WATER SURFACE ELEVATION = 5109.496
 MAXIMUM STORAGE = 0.0322 AC-FT INCREMENTAL TIME= 0.010000HRS

PRINT HYD ID=20 CODE=1

HYDROGRAPH FROM AREA B3.2

RUNOFF VOLUME = 2.00429 INCHES = 0.1500 ACRE-FEET
 PEAK DISCHARGE RATE = 2.89 CFS AT 1.620 HOURS BASIN AREA = 0.0014 SQ. MI.

*S ADD POND 1 & B4
 ADD HYD ID=21 HYD NO=B4.1 ID I=20 ID II=3
 PRINT HYD ID=21 CODE=1

HYDROGRAPH FROM AREA B4.1

RUNOFF VOLUME = 1.99754 INCHES = 0.2362 ACRE-FEET
 PEAK DISCHARGE RATE = 4.78 CFS AT 1.570 HOURS BASIN AREA = 0.0022 SQ. MI.

* ROUTE THROUGH POND
 * DISCHARGE THROUGH 18" x 6" OPENING
 *S POND 2 (BASIN B4)
 *S *****AP1*****
 ROUTE RESERVOIR ID=30 HYD NO=B4.2 INFLOW ID=21 CODE=10
 OUTFLOW(CFS) STORAGE(AF) ELEV(FT)

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
0.00	0.00	5106.50	0.000	0.00
0.10	0.00	5106.50	0.000	0.00
0.20	0.00	5106.50	0.000	0.00
0.30	0.00	5106.50	0.000	0.00
0.40	0.00	5106.50	0.000	0.00
0.50	0.00	5106.50	0.000	0.00
0.60	0.00	5106.50	0.000	0.00
0.70	0.04	5106.51	0.000	0.02
0.80	0.10	5106.52	0.000	0.09
0.90	0.13	5106.53	0.000	0.12
1.00	0.16	5106.54	0.000	0.15
1.10	0.37	5106.58	0.001	0.29
1.20	0.65	5106.65	0.001	0.57
1.30	1.05	5106.75	0.002	0.92
1.40	1.94	5106.94	0.004	1.62
1.50	4.17	5107.37	0.011	2.83
1.60	4.69	5107.89	0.021	3.88
1.70	3.70	5107.97	0.022	4.04
1.80	2.67	5107.70	0.017	3.53
1.90	1.90	5107.31	0.010	2.67
2.00	1.27	5107.00	0.004	1.84

* * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
0.00	0.00	5106.50	0.000	0.00
0.10	0.00	5106.50	0.000	0.00
0.20	0.00	5106.50	0.000	0.00
0.30	0.00	5106.50	0.000	0.00
0.40	0.00	5106.50	0.000	0.00
0.50	0.00	5106.50	0.000	0.00
0.60	0.00	5106.50	0.000	0.00
0.70	0.04	5106.51	0.000	0.02
0.80	0.10	5106.52	0.000	0.09
0.90	0.13	5106.53	0.000	0.12
1.00	0.16	5106.54	0.000	0.15
1.10	0.37	5106.58	0.001	0.29
1.20	0.65	5106.65	0.001	0.57
1.30	1.05	5106.75	0.002	0.92
1.40	1.94	5106.94	0.004	1.62
1.50	4.17	5107.37	0.011	2.83
1.60	4.69	5107.89	0.021	3.88
1.70	3.70	5107.97	0.022	4.04
1.80	2.67	5107.70	0.017	3.53
1.90	1.90	5107.31	0.010	2.67
2.00	1.27	5107.00	0.004	1.84

2.10	0.89	5106.77	0.002	1.00
2.20	0.66	5106.70	0.002	0.72
2.30	0.51	5106.65	0.001	0.55
2.40	0.41	5106.62	0.001	0.44
2.50	0.29	5106.59	0.001	0.32
2.60	0.19	5106.56	0.001	0.22
2.70	0.14	5106.54	0.000	0.16
2.80	0.11	5106.53	0.000	0.12
2.90	0.10	5106.53	0.000	0.10
3.00	0.08	5106.52	0.000	0.09
3.10	0.08	5106.52	0.000	0.08
3.20	0.07	5106.52	0.000	0.07
3.30	0.06	5106.52	0.000	0.06
3.40	0.06	5106.52	0.000	0.06
3.50	0.06	5106.52	0.000	0.06
3.60	0.06	5106.52	0.000	0.06
3.70	0.05	5106.51	0.000	0.05
3.80	0.05	5106.51	0.000	0.05
3.90	0.05	5106.51	0.000	0.05
4.00	0.05	5106.51	0.000	0.05
4.10	0.05	5106.51	0.000	0.05
4.20	0.05	5106.51	0.000	0.05
4.30	0.05	5106.51	0.000	0.05
4.40	0.05	5106.51	0.000	0.05
4.50	0.05	5106.51	0.000	0.05
4.60	0.05	5106.51	0.000	0.05
4.70	0.05	5106.51	0.000	0.05
4.80	0.05	5106.51	0.000	0.05
4.90	0.05	5106.51	0.000	0.05
5.00	0.05	5106.51	0.000	0.05
5.10	0.05	5106.51	0.000	0.05
5.20	0.05	5106.51	0.000	0.05
5.30	0.05	5106.51	0.000	0.05
5.40	0.05	5106.51	0.000	0.05
5.50	0.05	5106.51	0.000	0.05

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
5.60	0.05	5106.52	0.000	0.05
5.70	0.06	5106.52	0.000	0.06
5.80	0.06	5106.52	0.000	0.06
5.90	0.06	5106.52	0.000	0.06
6.00	0.06	5106.52	0.000	0.06
6.10	0.05	5106.52	0.000	0.06
6.20	0.03	5106.51	0.000	0.04
6.30	0.02	5106.51	0.000	0.02
6.40	0.01	5106.50	0.000	0.01
6.50	0.01	5106.50	0.000	0.01
6.60	0.01	5106.50	0.000	0.01
6.70	0.01	5106.50	0.000	0.01
6.80	0.01	5106.50	0.000	0.01
6.90	0.01	5106.50	0.000	0.01
7.00	0.01	5106.50	0.000	0.01
7.10	0.01	5106.50	0.000	0.01
7.20	0.01	5106.50	0.000	0.01
7.30	0.01	5106.50	0.000	0.01
7.40	0.01	5106.50	0.000	0.01
7.50	0.01	5106.50	0.000	0.01
7.60	0.01	5106.50	0.000	0.01
7.70	0.01	5106.50	0.000	0.01
7.80	0.01	5106.50	0.000	0.01
7.90	0.01	5106.50	0.000	0.01
8.00	0.01	5106.50	0.000	0.01
8.10	0.01	5106.50	0.000	0.01
8.20	0.01	5106.50	0.000	0.01
8.30	0.01	5106.50	0.000	0.01
8.40	0.01	5106.50	0.000	0.01
8.50	0.01	5106.50	0.000	0.01
8.60	0.01	5106.50	0.000	0.01
8.70	0.01	5106.50	0.000	0.01
8.80	0.01	5106.50	0.000	0.01
8.90	0.01	5106.50	0.000	0.01
9.00	0.01	5106.50	0.000	0.01
9.10	0.01	5106.50	0.000	0.01
9.20	0.01	5106.50	0.000	0.01
9.30	0.01	5106.50	0.000	0.01

9.40	0.01	5106.50	0.000	0.01
9.50	0.01	5106.50	0.000	0.01
9.60	0.01	5106.50	0.000	0.01
9.70	0.01	5106.50	0.000	0.01
9.80	0.01	5106.50	0.000	0.01
9.90	0.01	5106.50	0.000	0.01
10.00	0.01	5106.50	0.000	0.01
10.10	0.01	5106.50	0.000	0.01
10.20	0.01	5106.50	0.000	0.01
10.30	0.01	5106.50	0.000	0.01
10.40	0.01	5106.50	0.000	0.01
10.50	0.01	5106.50	0.000	0.01
10.60	0.01	5106.50	0.000	0.01
10.70	0.01	5106.50	0.000	0.01
10.80	0.01	5106.50	0.000	0.01
10.90	0.01	5106.50	0.000	0.01
11.00	0.01	5106.50	0.000	0.01
11.10	0.00	5106.50	0.000	0.01

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
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11.20	0.00	5106.50	0.000	0.00
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PEAK DISCHARGE = 4.087 CFS - PEAK OCCURS AT HOUR 1.67
 MAXIMUM WATER SURFACE ELEVATION = 5107.999
 MAXIMUM STORAGE = 0.0230 AC-FT INCREMENTAL TIME= 0.010000HRS

PRINT HYD ID=20 CODE=1

HYDROGRAPH FROM AREA B3.2

RUNOFF VOLUME = 2.00429 INCHES = 0.1500 ACRE-FEET
 PEAK DISCHARGE RATE = 2.89 CFS AT 1.620 HOURS BASIN AREA = 0.0014 SQ. MI.

```
f
*S BASIN B1
*S *****AP2*****
COMPUTE NM HYD ID=4 HYD NO=B1 AREA=0.000699 SQ MI
PER A=0 PER B=3 PER C=9 PER D=88
TP=-0.1333 HR MASS RAIN=-1
```

K = 0.072649HR TP = 0.133300HR K/TP RATIO = 0.545000 SHAPE CONSTANT, N = 7.106428
 UNIT PEAK = 2.4285 CFS UNIT VOLUME = 0.9947 B = 526.28 P60 = 1.7700
 AREA = 0.000615 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.010000

K = 0.111742HR TP = 0.133300HR K/TP RATIO = 0.838274 SHAPE CONSTANT, N = 4.251926
 UNIT PEAK = 0.23385 CFS UNIT VOLUME = 0.9402 B = 371.63 P60 = 1.7700
 AREA = 0.000084 SQ MI IA = 0.38750 INCHES INF = 0.93500 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.010000

PRINT HYD ID=4 CODE=1

HYDROGRAPH FROM AREA B1

RUNOFF VOLUME = 1.97645 INCHES = 0.0737 ACRE-FEET
 PEAK DISCHARGE RATE = 1.87 CFS AT 1.530 HOURS BASIN AREA = 0.0007 SQ. MI.

```
*S BASIN LA1
COMPUTE NM HYD ID=5 HYD NO=LA1 AREA=0.000079 SQ MI
PER A=0 PER B=18 PER C=82 PER D=0
TP=-0.1333 HR MASS RAIN=-1
```

K = 0.109781HR TP = 0.133300HR K/TP RATIO = 0.823564 SHAPE CONSTANT, N = 4.335641
 UNIT PEAK = 0.22340 CFS UNIT VOLUME = 0.9367 B = 376.96 P60 = 1.7700
 AREA = 0.000079 SQ MI IA = 0.37700 INCHES INF = 0.90560 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.010000

PRINT HYD ID=5 CODE=1

HYDROGRAPH FROM AREA LA1

RUNOFF VOLUME = 0.98469 INCHES = 0.0041 ACRE-FEET
PEAK DISCHARGE RATE = 0.16 CFS AT 1.540 HOURS BASIN AREA = 0.0001 SQ. MI.

*S BASIN LA2

COMPUTE NM HYD ID=6 HYD NO=LA2 AREA=0.000049 SQ MI
PER A=0 PER B=18 PER C=82 PER D=0
TP=-0.1333 HR MASS RAIN=-1

K = 0.109781HR TP = 0.133300HR K/TP RATIO = 0.823564 SHAPE CONSTANT, N = 4.335641
UNIT PEAK = 0.13857 CFS UNIT VOLUME = 0.9002 B = 376.96 P60 = 1.7700
AREA = 0.000049 SQ MI IA = 0.37700 INCHES INF = 0.90560 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.010000

PRINT HYD ID=6 CODE=1

HYDROGRAPH FROM AREA LA2

RUNOFF VOLUME = 0.98469 INCHES = 0.0026 ACRE-FEET
PEAK DISCHARGE RATE = 0.10 CFS AT 1.540 HOURS BASIN AREA = 0.0000 SQ. MI.

*S BASIN LA3

COMPUTE NM HYD ID=7 HYD NO=LA3 AREA=0.000079 SQ MI
PER A=0 PER B=18 PER C=82 PER D=0
TP=-0.1333 HR MASS RAIN=-1

K = 0.109781HR TP = 0.133300HR K/TP RATIO = 0.823564 SHAPE CONSTANT, N = 4.335641
UNIT PEAK = 0.22340 CFS UNIT VOLUME = 0.9367 B = 376.96 P60 = 1.7700
AREA = 0.000079 SQ MI IA = 0.37700 INCHES INF = 0.90560 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.010000

PRINT HYD ID=7 CODE=1

HYDROGRAPH FROM AREA LA3

RUNOFF VOLUME = 0.98469 INCHES = 0.0041 ACRE-FEET
PEAK DISCHARGE RATE = 0.16 CFS AT 1.540 HOURS BASIN AREA = 0.0001 SQ. MI.

*S BASIN O1

COMPUTE NM HYD ID=8 HYD NO=O1 AREA=0.000032 SQ MI
PER A=0 PER B=0 PER C=28 PER D=72
TP=-0.1333 HR MASS RAIN=-1

K = 0.072649HR TP = 0.133300HR K/TP RATIO = 0.545000 SHAPE CONSTANT, N = 7.106428
UNIT PEAK = 0.90963E-01CFS UNIT VOLUME = 0.8853 B = 526.28 P60 = 1.7700
AREA = 0.000023 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.010000

K = 0.104739HR TP = 0.133300HR K/TP RATIO = 0.785737 SHAPE CONSTANT, N = 4.569324
UNIT PEAK = 0.26315E-01CFS UNIT VOLUME = 0.8716 B = 391.50 P60 = 1.7700
AREA = 0.000009 SQ MI IA = 0.35000 INCHES INF = 0.83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.010000

PRINT HYD ID=8 CODE=1

HYDROGRAPH FROM AREA O1

RUNOFF VOLUME = 1.80983 INCHES = 0.0031 ACRE-FEET
PEAK DISCHARGE RATE = 0.09 CFS AT 1.530 HOURS BASIN AREA = 0.0000 SQ. MI.

FINISH

NORMAL PROGRAM FINISH

END TIME (HR:MIN:SEC) = 09:13:31

POND VOLUMES POND 1				
(for the AHYMO ROUTE RESERVOIR command)				
RICHFIELD PARK, LOT 5A				
7/30/2012				
ELEV	AREA (SF)	VOLUME (CF)	VOLUME (Ac-ft)	SUM VOL (Ac-ft)
5108	295			
		244.5	0.005612948	
5108.5	683			0.005612948
		473.25	0.010864325	
5109	1210			0.016477273
		653.75	0.015008035	
5109.5	1405			0.031485308

ORIFICE EQUATION - RECTANGULAR

Rectangular Area	108 sq.in.	0.75 sq.ft.				
Width	18 in	1.50 ft				
Height	6 in	0.50 ft				
Headwater Elevation	0.5 feet	0.25	Actual H to centerline of culvert			
C	0.6	C values	Rounded	Sharp	Tube Out	Tube In
g	32.2 f/s^2		0.98	0.61	0.80	0.51

$$Q = C^*A^*((2^*g^*H)^{.5}) = 1.83 \text{ cfs for } 0.75 \text{ sq.ft. orifice}$$

ORIFICE EQUATION - RECTANGULAR

Rectangular Area	108 sq.in.		0.75 sq.ft.			
Width	18	in	1.50	ft		
Height	6	in	0.50	ft		
Headwater Elevation	1	feet	0.75	Actual H to centerline of culvert		
C	0.6		C values	Rounded	Sharp	Tube Out
g	32.2 f/s^2			0.98	0.61	0.80
						0.51

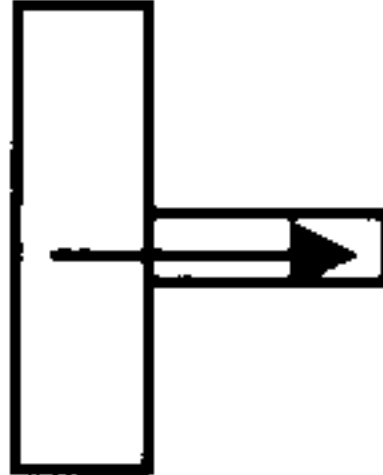
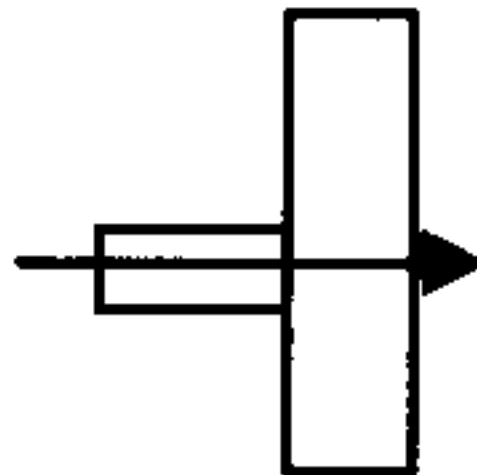
$$Q = C^*A^*((2^*g^*H)^{.5}) = 3.17 \text{ cfs for } 0.75 \text{ sq.ft. orifice}$$

ORIFICE EQUATION - RECTANGULAR

Rectangular Area	108 sq.in.		0.75 sq.ft.			
Width	18	in	1.50	ft		
Height	6	in	0.50	ft		
Headwater Elevation	1.5	feet	1.25	Actual H to centerline of culvert		
C	0.6		C values	Rounded	Sharp	Tube Out
g	32.2 f/s^2			0.98	0.61	0.80
						0.51

$$Q = C^*A^*((2^*g^*H)^{0.5}) = 4.09 \text{ cfs for } 0.75 \text{ sq.ft. orifice}$$

POND VOLUMES POND 2				
(for the AHYMO ROUTE RESERVOIR command)				
RICHFIELD PARK, LOT 5A				
7/30/2012				
ELEV	AREA (SF)	VOLUME (CF)	VOLUME (Ac-ft)	SUM VOL (Ac-ft)
5106.5	5			
		187.5	0.004304408	
5107	745			0.004304408
		390	0.008953168	
5107.5	815			0.013257576
		425	0.009756657	
5108	885			0.023014233

ORIFICE EQUATION - CIRCULAR						
Orifice Diameter	<input type="text" value="8"/>	inches	<input type="text" value="0.67"/>	feet		
Orifice Area	<input type="text" value="50.27"/>	sq.in.	<input type="text" value="0.35"/>	square feet		
Headwater Elevation	<input type="text" value="1"/>	feet	<input type="text" value="0.67"/>	Actual H to centerline of culvert		
C	<input type="text" value="0.61"/>		C values	Rounded	Sharp	Tube Out
g	32.2 f/s^2			0.98	0.61	0.80
						
						
$Q = C \cdot A \cdot ((2 \cdot g \cdot H)^{0.5}) = 1.39 \text{ cfs}$ for 8 in. diameter orifice						

TWO 8" DIA. @ POND 1 OUTLET TO
POND 2 WILL PASS $Q = 1.4 \times 2$
 $= 2.8$

CITY OF ALBUQUERQUE

PLANNING DEPARTMENT – Development & Building Services



June 5, 2012

Fred Arfman, P.E.
Isaacson & Arfman, P.A.
128 Monroe St. NE
Albuquerque, New Mexico 87108

Re: Lot 5A Richfield Park – Conceptual Grading & Drainage Plan (C17-D120)
aka: Lots 4 & 5, Richfield Park Subdiv. (No P.E. Stamp: <Plan dated 5/21/12>)

Dear Arfman,

Based upon the information provided in your submittal received May 22, 2012, and our discussion this morning, the Conceptual Grading and Drainage Plan is acceptable, conditioned upon the following:

1. Offsite flows appear to be possible from the east. We have no record of development on Parcel C1-D to the east of this site. Provide documentation with photos and topography that offsite flows will not enter this site.
2. The concept of Basin 1 discharging to Alameda Blvd. will be allowed, but the peak discharge rate must be kept close to 2 cfs. Building Permit plans should provide details of how the flows are routed through the water harvesting basins in the southern landscaped areas, and what the peak discharge will be at the SW corner of the site. Provide sufficient detail to ensure that flows intended to leave the site through the sidewalk culvert do not overflow the sidewalk or west property line.
3. Provide more detail of how Basins 2 & 3 will be routed through the terraced ponds on the North and West boundaries, and weir or orifice calculations demonstrating the restriction of discharge to 2.11 cfs at the NW corner of the site.
4. This project requires a National Pollutant Discharge Elimination System (NPDES) permit for storm water discharge.

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

If you have any questions, you may contact me by email at grolson@cabq.gov, or telephone 505-924-3695.

Sincerely,

Gregory R. Olson, P.E.
Senior Engineer

Orig: Drainage file C17/D120
c.pdf Addressee via Email FredA@iacivil.com

DRAINAGE AND TRANSPORTATION INFORMATION SHEET
(Rev. 12/05)

PROJECT TITLE: Richfield Park, Lots 5A ZONE MAP/DRG. FILE # C-17 / D120
DRB#: _____ EPC#: _____ WORK ORDER#: _____

LEGAL DESCRIPTION: Lot 5A, Richfield Park Subdivision, Albuquerque, NM
CITY ADDRESS: 4545 Alameda Blvd. NE

ENGINEERING FIRM: ISSACSON & ARFMAN, PA CONTACT: Fred Arfman, PE
ADDRESS: 128 MONROE NE PHONE: 268-8828
CITY, STATE: ALBUQUERQUE, NM ZIP CODE: 87108

OWNER: Mechenbier Construction CONTACT: John Mechenbier
ADDRESS: 8500 Washington St. NE Suite A-6 PHONE: _____
CITY, STATE: Albuquerque NM ZIP CODE: 87113

ARCHITECT: _____ CONTACT: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

SURVEYOR: Forstbauer Surveying, LLC CONTACT: Ron Forstbauer
ADDRESS: 4116 Lomas Blvd. NE PHONE: _____
CITY, STATE: Albuquerque, NM ZIP CODE: 87110

CONTRACTOR: Mechenbier Construction CONTACT: John Mechenbier
ADDRESS: 8500 Washington St. NE Suite A-6 PHONE: _____
CITY, STATE: Albuquerque NM ZIP CODE: 87113

TYPE OF SUBMITTAL:
____ DRAINAGE REPORT
____ DRAINAGE PLAN 1st SUBMITTAL
____ DRAINAGE PLAN RESUBMITTAL
☒ CONCEPTUAL G & D PLAN
____ GRADING PLAN
____ EROSION CONTROL PLAN
____ ENGINEER'S CERT (HYDROLOGY)
____ CLOMR/LOMR
____ TRAFFIC CIRCULATION LAYOUT
____ ENGINEER/ARCHITECT CERT (TCL)
____ ENGINEER/ARCHITECT CERT (DRB S.P.)
____ ENGINEER/ARCHITECT CERT (AA)
☒ OTHER (SPECIFY) SUPPLEMENTAL
DRAINAGE INFORMATION

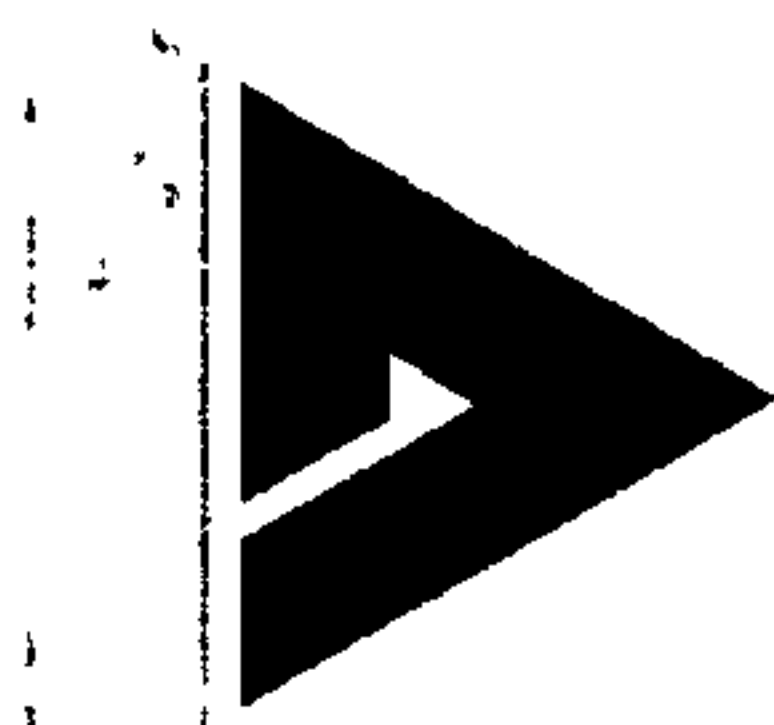
CHECK TYPE OF APPROVAL SOUGHT:
____ SIA/FINANCIAL GUARANTEE RELEASE
____ PRELIMINARY PLAT APPROVAL
☒ S. DEV. PLAN FOR SUB'D APPROVAL
☒ S. DEV. FOR BLDG. PERMIT APPROVAL
____ SECTOR PLAN APPROVAL
____ FINAL PLAT APPROVAL
____ FOUNDATION PERMIT APPROVAL
____ BUILDING PERMIT APPROVAL
____ CERTIFICATE OF OCCUPANCY (PERM)
____ CERTIFICATE OF OCCUPANCY (TEMP)
____ GRADING PERMIT APPROVAL
____ PAVING PERMIT APPROVAL
____ WORK ORDER APPROVAL
____ OTHER (SPECIFY) SO-19

WAS A PRE-DESIGN CONFERENCE ATTENDED:
☒ YES
____ NO
____ COPY PROVIDED

SUBMITTED BY: Fred Arfman, PE DATE: May 21, 2012

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope to the proposed development define the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5) acres and Sector Plans.
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report:** Required for subdivision containing more than ten (10) lots or constituting five (5) acres or more.



Isaacson & Arfman, P.A.

Consulting Engineering Associates

*Thomas O. Isaacson, PE & LS * Fred C. Arfman, PE * Åsa Nilsson-Weber, PE*

May 21, 2012

Mr. Curtis Cherne, PE
City of Albuquerque
Hydrology Dept.

RE: RESUBMITTAL – RICHFIELD PARK LOT 5A

Dear Mr. Cherne,

Attached are two copies of the revised Grading and Drainage Plan for the above-mentioned project.

Although the Drainage Master Plan for the Richfield Park Subdivision prepared by Espey, Juston & Assoc. (1986) permitted free discharge for the majority of properties within Richfield Park Subdivision, there was a noted exception. Lots 2, 3, 4 and 5 were to detain stormwaters on-site and release at a controlled rate of 2.11 cfs/acre to a drainage easement running west along the north ends of the properties. The reduced discharge rate was not based on available capacity in the streets and storm drains but because the drainage easement cross-section limited.

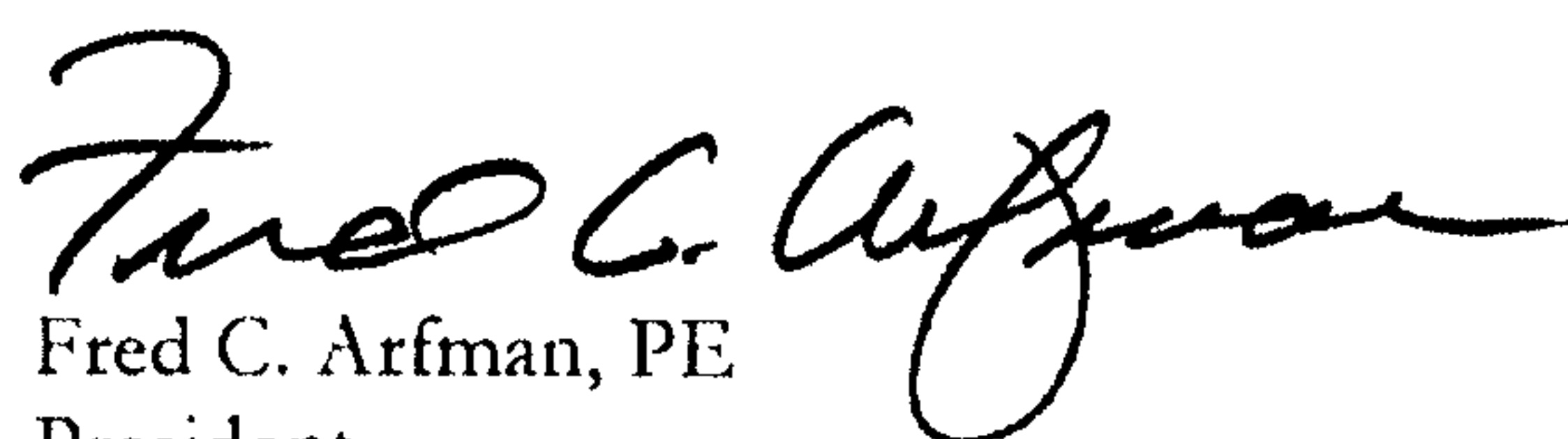
We have made every attempt to abide by the requirements but cannot solve the site without a fenced ponding area (depth greater than 18") and a shallow storm drain system which would not gravity drain (bubble up at outlet – maintenance issue). Both of these solutions are unacceptable because they are visual eyesores, high maintenance and expensive to construct.

We propose permitting a small basin (0.6 acres @ 100-year, 6-hour discharge of 2.7 cfs) to discharge to Alameda Blvd. This small exception would eliminate both the deepened pond and the need for a shallow storm drain system.

The existing 54" dia. storm drain within Alameda adjacent to our site transitions to a 72" diameter pipe just beyond. The reason for this is the extent of upstream basin draining through this system. A proposed increase of 2.7 cfs would represent an insignificant increase to the total. Plus, due to the location of our site, towards the end of the system, it can be assumed that the discharge from this property will pass before the peak. Please don't hesitate to call with any questions or concerns.

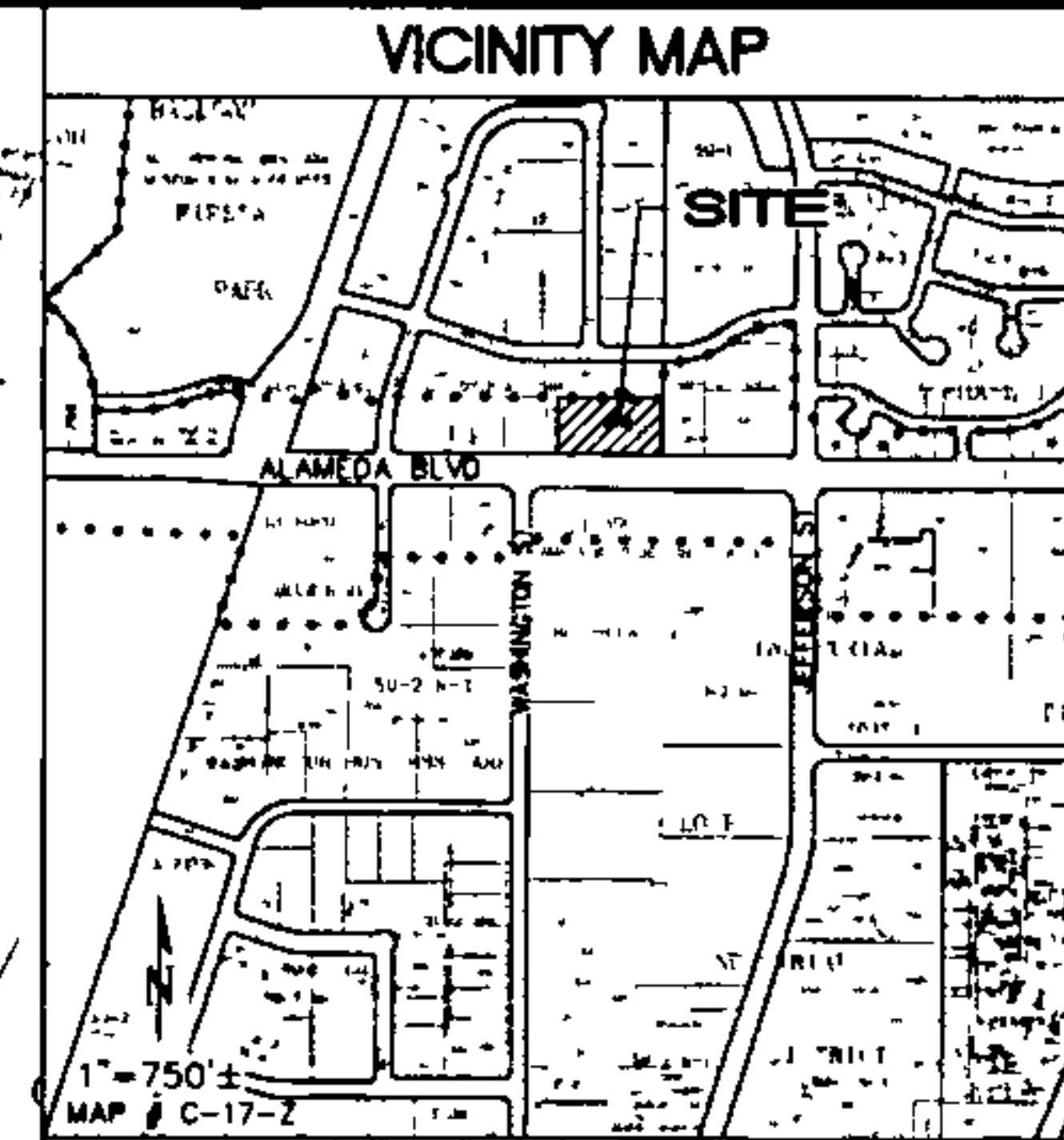
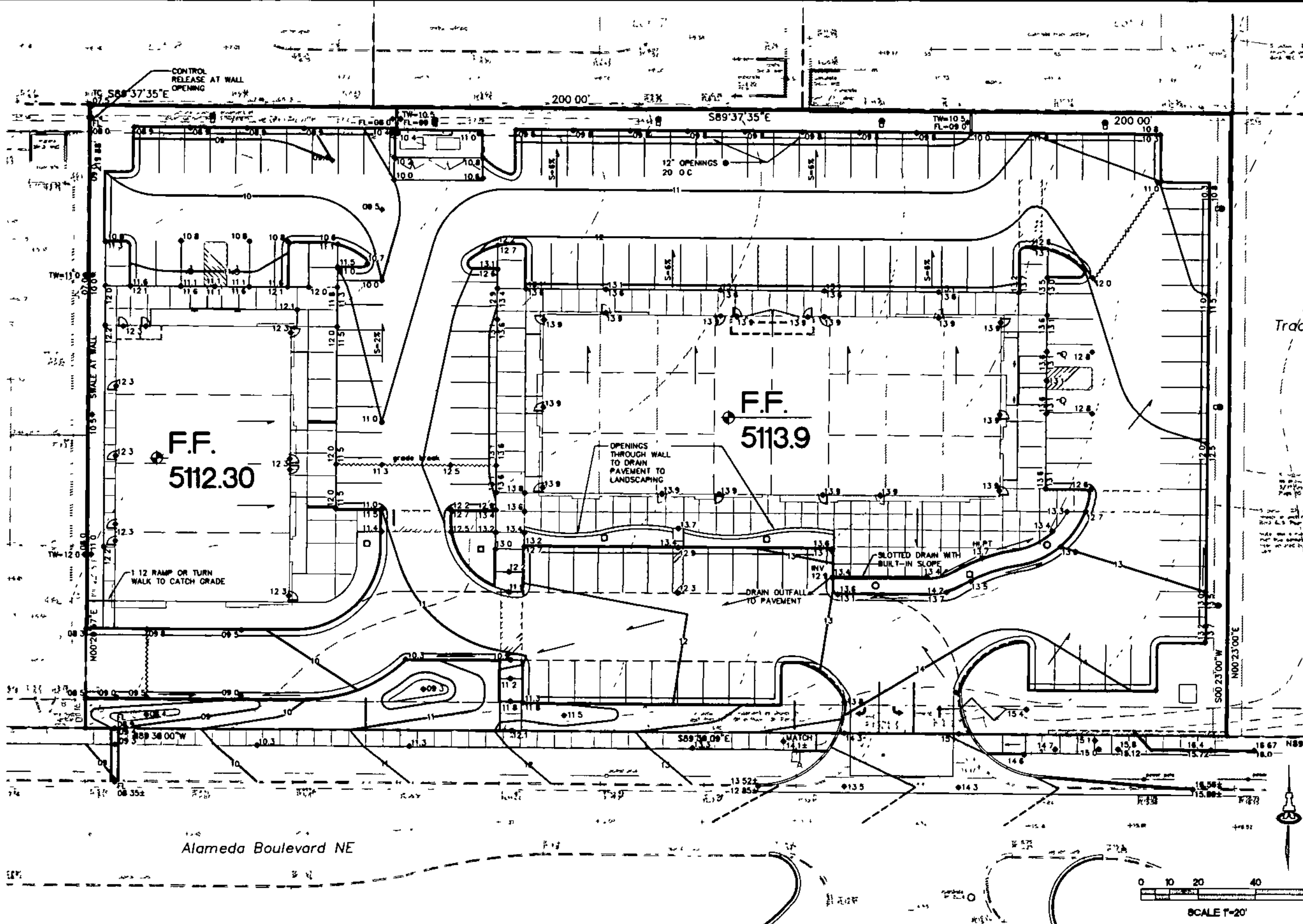
Sincerely,

ISAACSON & ARFMAN, P.A.



Fred C. Arfman, PE
President

FCA/bjb



PROJECT DATA

Legal: Lots 5A, Richfield Park Subdivision
 Address: 4545 Alameda Blvd NE
 Zone: Map 1-17
 Flood Zone: Zone X (Outside 500 Year Flood Zone)
 Offsite Flow: The property is isolated from off-site flow

Existing Conditions:
 The Property, approximately 2.0 acres, is an undeveloped commercial property located in Albuquerque on the North side of Alameda Blvd. west of Washington St. NE. Alameda Blvd borders the property to the south, and developed commercial property borders the property to the north, east and west. The property, which slopes to the northwest at approx. 2% is sparsely covered with native vegetation.

Currently, undeveloped flow drains as sheetflow to the northwest corner and passes into the adjacent developed property via an existing asphalt drainage channel with concrete valley gutter (drainage easement). Flow is then directed west to outlet to Washington Street and passes into existing improved channels which direct flow to an AMAFCA channel.

Proposed Conditions:
 The proposed improvements consist of two commercial office buildings with associated paved parking and landscaping. These improvements will increase the amount of impervious area which will result in an increase in peak rate and volume of runoff.

Per the Master Drainage Plan for the Richfield Park Subdivision prepared by Espey, Huston & Assoc. (1986), lots are to free discharge into the public street system which conveys runoff to the existing AMAFCA channel located along the west boundary of Richfield Park, Tract D-1. An exception to the free discharge limits the peak discharge for Lots 4 and 5 to 2.11 cfs per acre (4.22 cfs total allowable discharge) due to the capacity limitations of the existing drainage channel at the northwest corner of the property.

As shown on the basin exhibit this sheet, the property will be divided into three sub-basins.

Sub-basin 1 will be routed through landscaped water harvesting / detention basins bordering Alameda Blvd. and will discharge excess to Alameda Blvd. at a rate not to exceed 2.7 cfs during the 100-year 6-hour storm event.

Sub-basins 2 and 3 will be detained within the tiered ponding (including adjacent asphalt paving) to release to the west at a maximum of 4.22 cfs. Calculations will be provided to clarify each basins allowable discharge, required detention volume and on-site size.

LEGEND

- EXISTING SPOT ELEVATION
- EXISTING CONTOUR
- PROPOSED SPOT ELEVATION
- PROPOSED CONTOUR
- FLOW LINE
- FINISHED FLOOR

ISAACSON & ARFMAN, P.A.
 Consulting Engineering Associates
 128 Monroe Street NE
 Albuquerque, New Mexico 87108
 Ph: 505 268 8828 Fax: 505 268 8829
 1818 CG-101.dwg May 21 2012

SHEET NAME

CONCEPTUAL GRADING AND DRAINAGE PLAN

SHEET
CG-101

REVISIONS

NO.	DESCRIPTION
1	Initial Design
2	Revised Design
3	Final Design

SCALE

1" = 20'
 PLAN DATE: MAY 21, 2012

FILENAME

1818 CG-101
 DRAWN BY: J.B.B.

PROPOSED RETAIL/OFFICE BUILDINGS
 LOT 5A RICHFIELD PARK SUBDIVISION
 4545 ALAMEDA BLVD NE
 ALBUQUERQUE, NEW MEXICO 87113

MECHENBER
 CONSULTING ENGINEERS
 1000 UNIVERSITY ST. NE SUITE 1000
 ALBUQUERQUE, NM 87106
 (505) 261-7798
 (505) 261-7799
 Copyright 2012 by MECHENBER CONSULTING ENGINEERS

CALCULATIONS

Calculations: Richfield Park, Lots 4 & 5, May 18, 2012
 Based on: Drainage Design Criteria for City of Albuquerque Section 22.2, DPM Vol 2, dated Jan. 1993

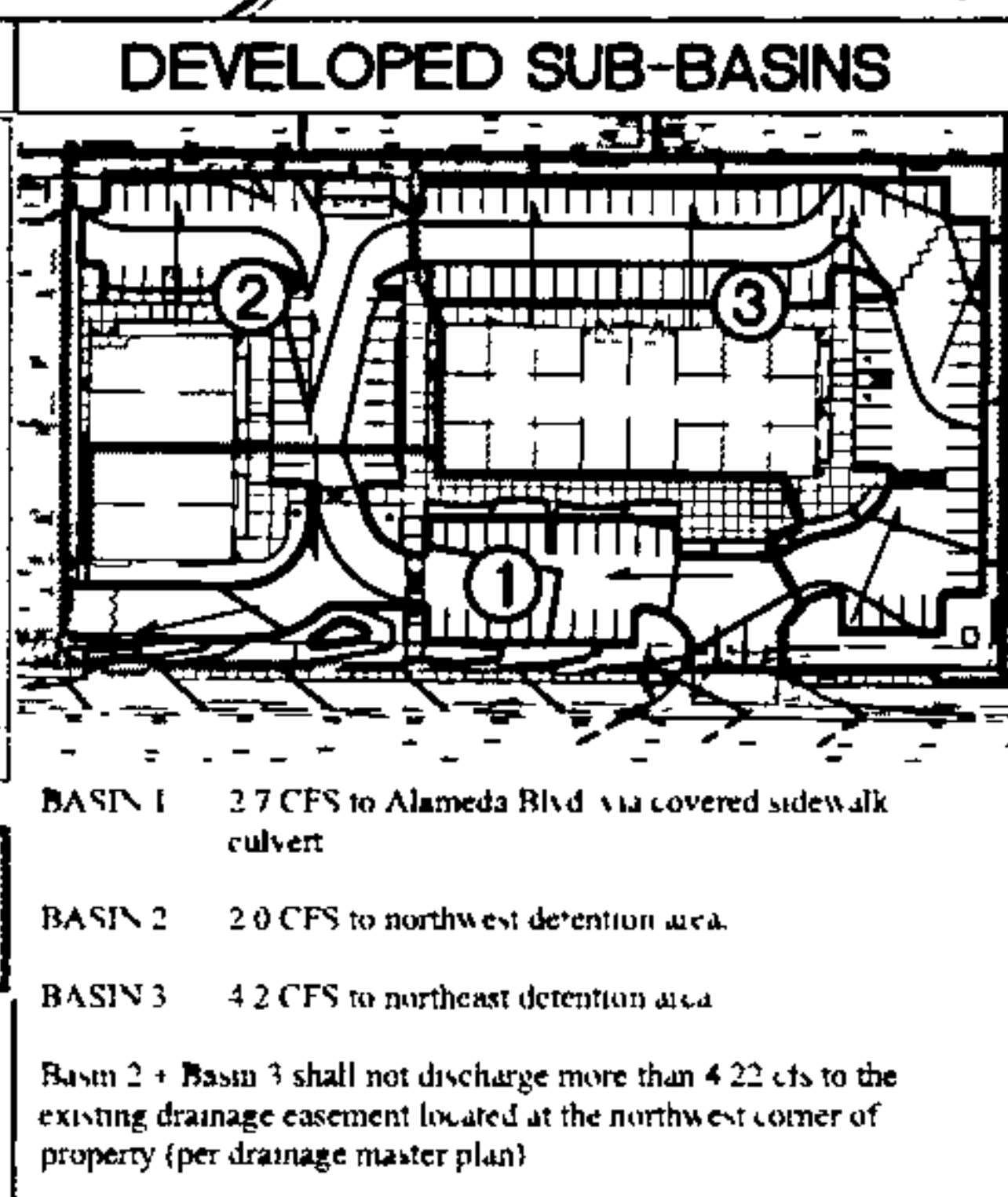
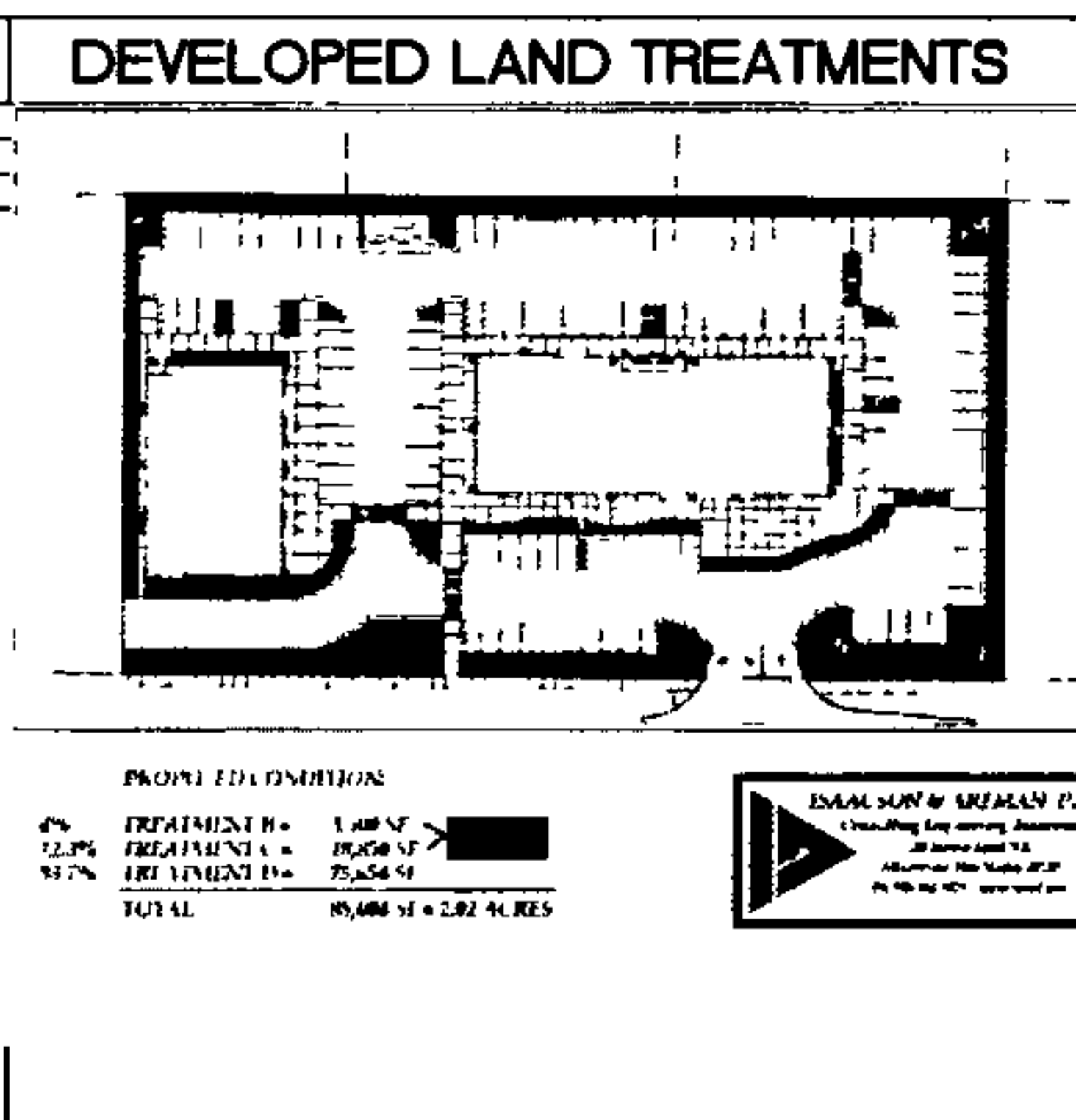
AREA OF SITE			
Area	Area (sq ft)	Area (ac)	% of Total
Area A	0	0	0%
Area B	3580	0.08	4%
Area C	0	0	0%
Area D	0	0	0%
Total Area	3580	0.08	100%

On Site Weighted Excess Precipitation (100-Year 6-Hour Storm)
 Weighted E = $E_A \cdot A_A + E_B \cdot A_B + E_C \cdot A_C + E_D \cdot A_D$
 $E = 0.8$ $E_{avg} = 1.91$

Unweighted Value of Runoff (100-Year 6-Hour Storm)
 $Q_u = 1.4$ $Q_d = 3.14$

For Precipitation Zone:
 $Q_u = 1.4$ $Q_d = 4.0$

Final $Q_p = 3.0$ $Q_d = 3.9$ (1%)



SUB-BASIN CALCULATIONS

BASIN NO.	AREA (sq ft)	PERCENT	Q _u (cfs)	Q _d (cfs)	Q _p (cfs)
1	3580	100%	1.4	3.14	3.0
2	0	0%	0	0	0
3	0	0%	0	0	0
TOTAL	3580	100%	1.4	3.14	3.0

DRAINAGE AND TRANSPORTATION INFORMATION SHEET
(Rev. 12/05)

PROJECT TITLE: Richfield Park, Lots 5A ZONE MAP/DRG. FILE # C-17 / D120
DRB#: _____ EPC#: _____ WORK ORDER#: _____

LEGAL DESCRIPTION: Lot 5A, Richfield Park Subdivision, Albuquerque, NM
CITY ADDRESS: 4545 Alameda Blvd. NE

ENGINEERING FIRM: ISSACSON & ARFMAN, PA CONTACT: Fred Arfman, PE
ADDRESS: 128 MONROE NE PHONE: 268-8828
CITY, STATE: ALBUQUERQUE, NM ZIP CODE: 87108

OWNER: Mechenbier Construction CONTACT: John Mechenbier
ADDRESS: 8500 Washington St. NE Suite A-6 PHONE: _____
CITY, STATE: Albuquerque NM ZIP CODE: 87113

ARCHITECT: _____ CONTACT: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

SURVEYOR: Forstbauer Surveying, LLC CONTACT: Ron Forstbauer
ADDRESS: 4116 Lomas Blvd. NE PHONE: _____
CITY, STATE: Albuquerque, NM ZIP CODE: 87110

CONTRACTOR: Mechenbier Construction CONTACT: John Mechenbier
ADDRESS: 8500 Washington St. NE Suite A-6 PHONE: _____
CITY, STATE: Albuquerque NM ZIP CODE: 87113

TYPE OF SUBMITTAL:

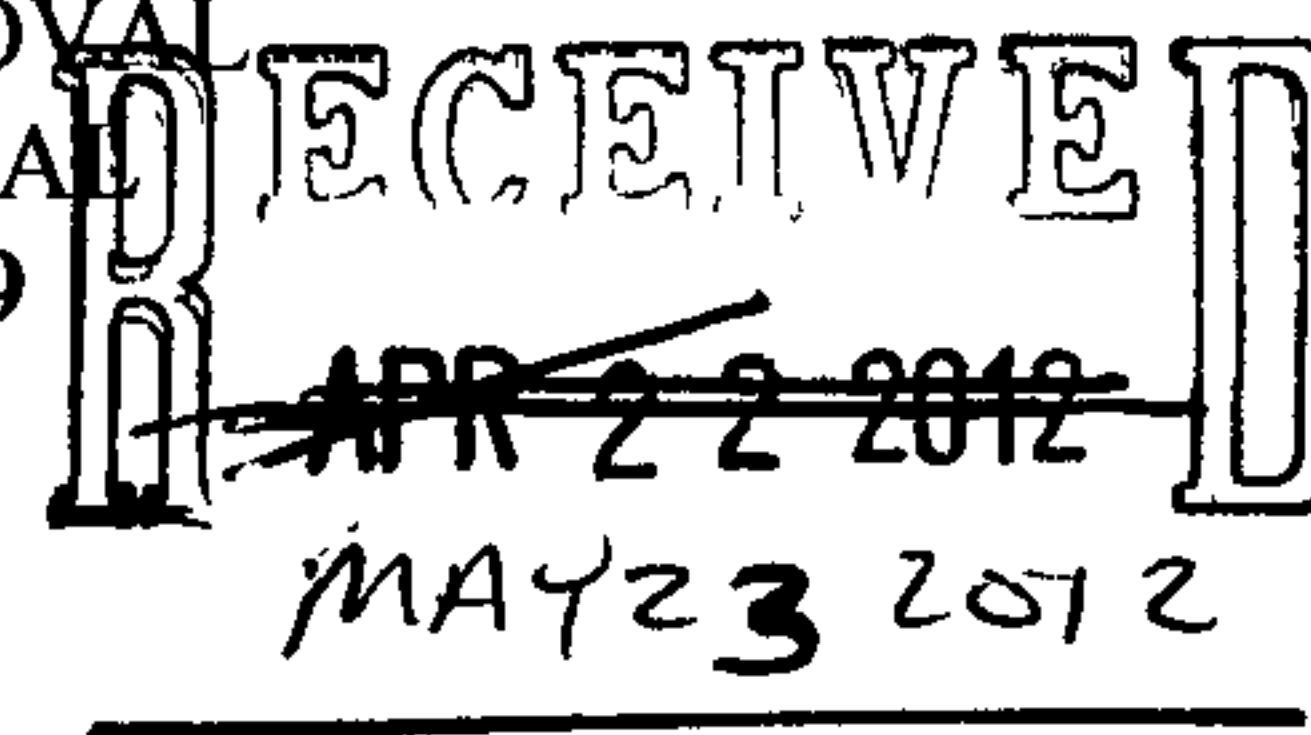
☐ DRAINAGE REPORT
☐ DRAINAGE PLAN 1st SUBMITTAL
☐ DRAINAGE PLAN RESUBMITTAL
☒ CONCEPTUAL G & D PLAN
☐ GRADING PLAN
☐ EROSION CONTROL PLAN
☐ ENGINEER'S CERT (HYDROLOGY)
☐ CLOMR/LOMR
☐ TRAFFIC CIRCULATION LAYOUT
☐ ENGINEER/ARCHITECT CERT (TCL)
☐ ENGINEER/ARCHITECT CERT (DRB S.P.)
☐ ENGINEER/ARCHITECT CERT (AA)
☒ OTHER (SPECIFY) **SUPPLEMENTAL
DRAINAGE INFORMATION**

CHECK TYPE OF APPROVAL SOUGHT:

☐ SIA/FINANCIAL GUARANTEE RELEASE
☐ PRELIMINARY PLAT APPROVAL
☒ S. DEV. PLAN FOR SUB'D APPROVAL
☒ S. DEV. FOR BLDG. PERMIT APPROVAL
☐ SECTOR PLAN APPROVAL
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☐ FOUNDATION PERMIT APPROVAL
☐ BUILDING PERMIT APPROVAL
☐ CERTIFICATE OF OCCUPANCY (PERM)
☐ CERTIFICATE OF OCCUPANCY (TEMP)
☐ GRADING PERMIT APPROVAL
☐ PAVING PERMIT APPROVAL
☐ WORK ORDER APPROVAL
☐ OTHER (SPECIFY) SO-19

WAS A PRE-DESIGN CONFERENCE ATTENDED:

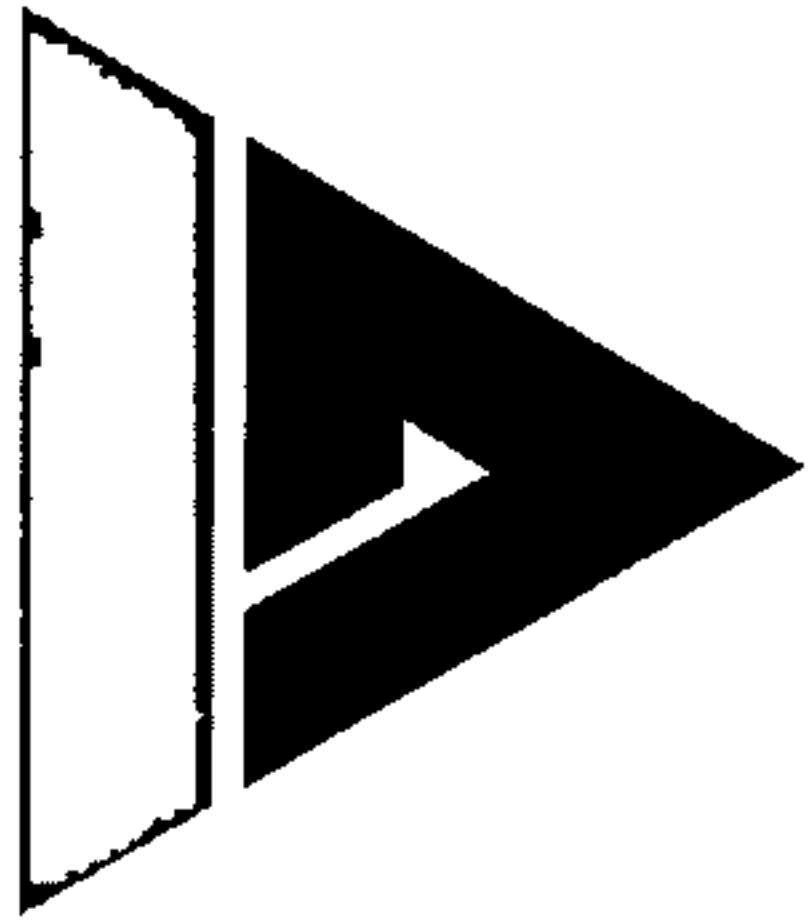
☒ YES
☐ NO
☐ COPY PROVIDED



SUBMITTED BY: Fred Arfman, PE DATE: May 21, 2012

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope to the proposed development define the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5) acres and Sector Plans.
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report:** Required for subdivision containing more than ten (10) lots or constituting five (5) acres or more.



Isaacson & Arfman, P.A.

Consulting Engineering Associates

*Thomas O. Isaacson, PE & LS * Fred C. Arfman, PE * Åsa Nilsson-Weber, PE*

May 21, 2012

Mr. Curtis Cherne, PE
City of Albuquerque
Hydrology Dept.

RE: RESUBMITTAL – RICHFIELD PARK LOT 5A

Dear Mr. Cherne,

Attached are two copies of the revised Grading and Drainage Plan for the above-mentioned project.

Although the Drainage Master Plan for the Richfield Park Subdivision prepared by Espey, Juston & Assoc. (1986) permitted free discharge for the majority of properties within Richfield Park Subdivision, there was a noted exception. Lots 2, 3, 4 and 5 were to detain stormwaters on-site and release at a controlled rate of 2.11 cfs/acre to a drainage easement running west along the north ends of the properties. The reduced discharge rate was not based on available capacity in the streets and storm drains but because the drainage easement cross-section limited.

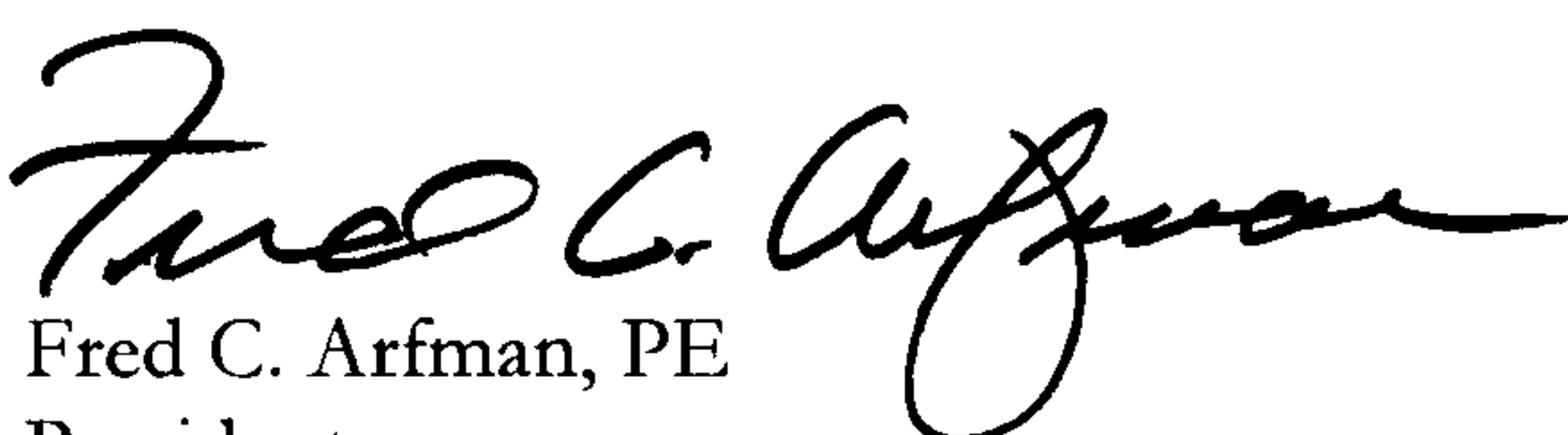
We have made every attempt to abide by the requirements but cannot solve the site without a fenced ponding area (depth greater than 18") and a shallow storm drain system which would not gravity drain (bubble up at outlet – maintenance issue). Both of these solutions are unacceptable because they are visual eyesores, high maintenance and expensive to construct.

We propose permitting a small basin (0.6 acres @ 100-year, 6-hour discharge of 2.7 cfs) to discharge to Alameda Blvd. This small exception would eliminate both the deepened pond and the need for a shallow storm drain system.

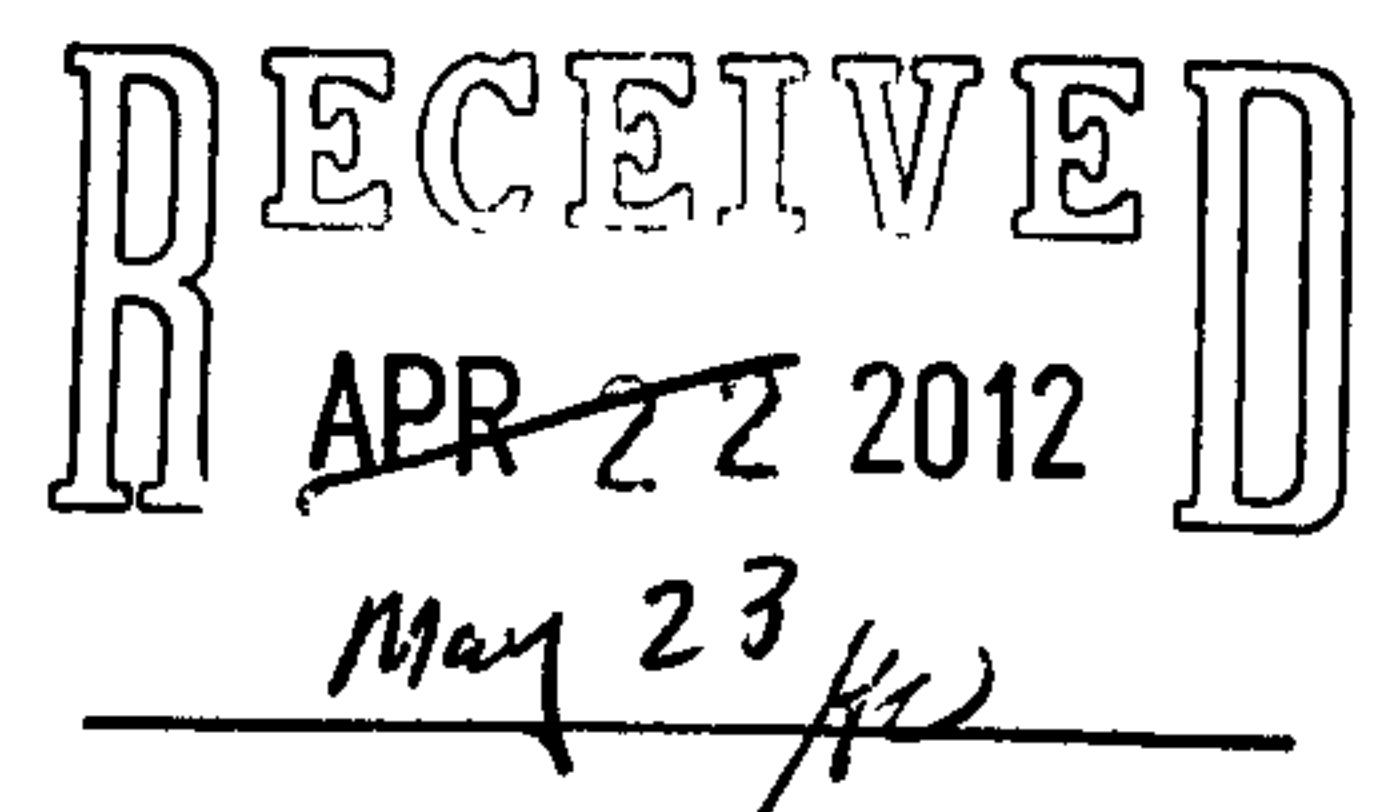
The existing 54" dia. storm drain within Alameda adjacent to our site transitions to a 72" diameter pipe just beyond. The reason for this is the extent of upstream basin draining through this system. A proposed increase of 2.7 cfs would represent an insignificant increase to the total. Plus, due to the location of our site, towards the end of the system, it can be assumed that the discharge from this property will pass before the peak. Please don't hesitate to call with any questions or concerns.

Sincerely,

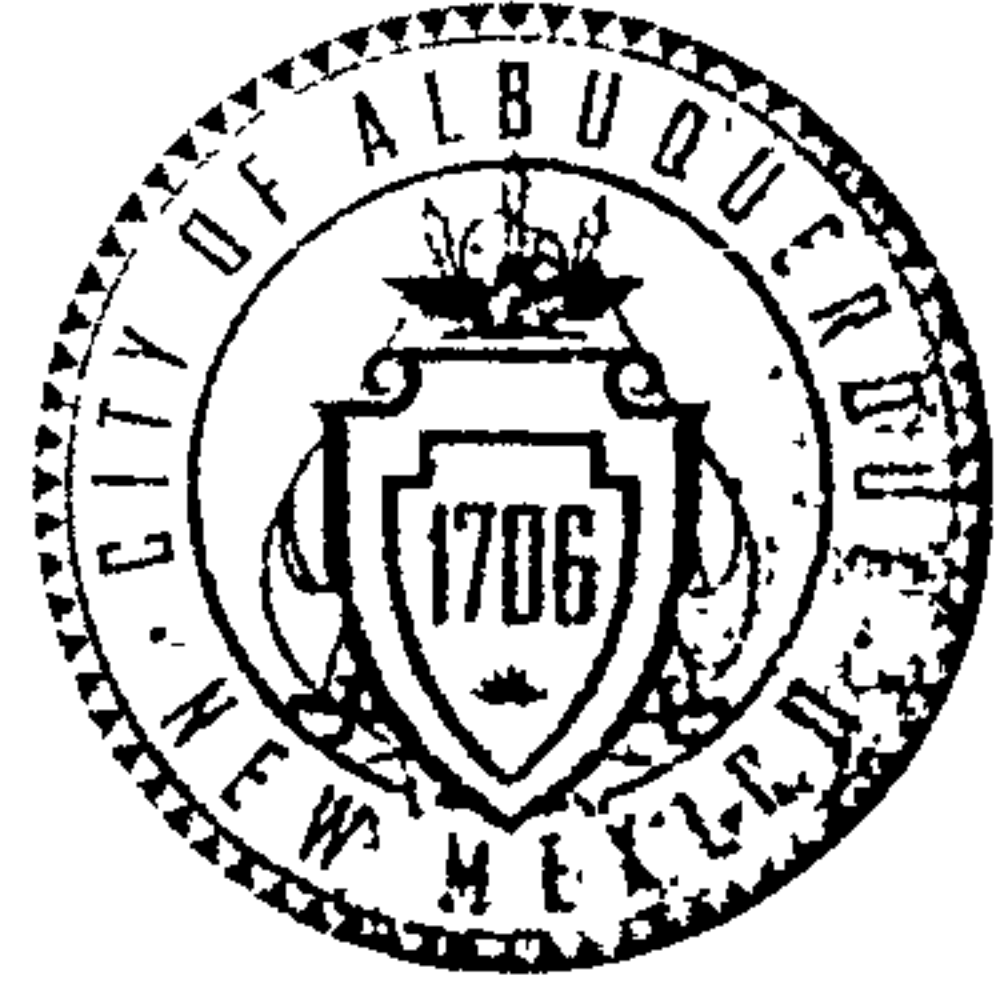
ISAACSON & ARFMAN, P.A.


Fred C. Arfman, PE
President

FCA/bjb



CITY OF ALBUQUERQUE



October 7, 2008

Fred C. Arfman, P.E.
Isaacson & Arfman, P.A.
128 Monroe St. NE
Albuquerque, NM 87108

**Re: Richfield Park Subdivision Lots 4 and 5, Mechenbier Const., Grading and
Drainage Plan**

Engineer's Stamp dated 9-12-08 (C17/D120)

Dear Mr. Arfman,

Based upon the information provided in your submittal received 9-12-08, the above referenced plan is approved for Building Permit. Thank you for submitting an updated plan.

PO Box 1293

This is the plan to certify for release of Certificate of Occupancy.

If you have any questions, you can contact me at 924-3695.

Albuquerque

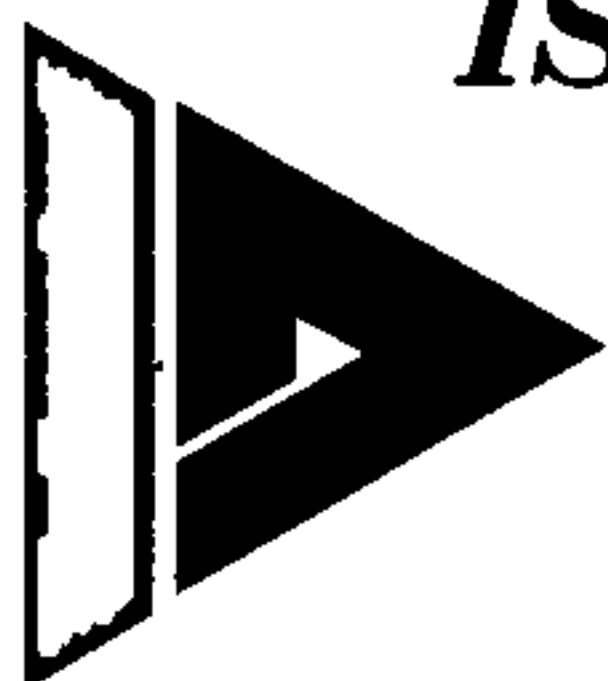
Sincerely,

Curtis A. Cherne, P.E.
Senior Engineer, Planning Dept.
Development and Building Services

NM 87103

www.cabq.gov

C: file



ISAACSON & ARFMAN, P.A.

Consulting Engineering Associates

*Thomas O. Isaacson, PE & LS • Fred C. Arfman, PE
Scott M. McGee, PE*

September 12, 2008

Mr. Brad Bingham, PE
City Hydrologist
City of Albuquerque - Hydrology Section
Development and Building Services
P.O. Box 1293
Albuquerque, NM 87103

RE: Lots 4 & 5 of Richfield Park - (C17-D120)

Dear Brad,

Attached is a revised copy of the drainage and grading plan for the above mentioned project.

Revisions were made to the Alameda Blvd. site entrance drive due to the addition of a deceleration lane required by the NMSHTD. No changes to drainage patterns, discharge rates or volumes were made.

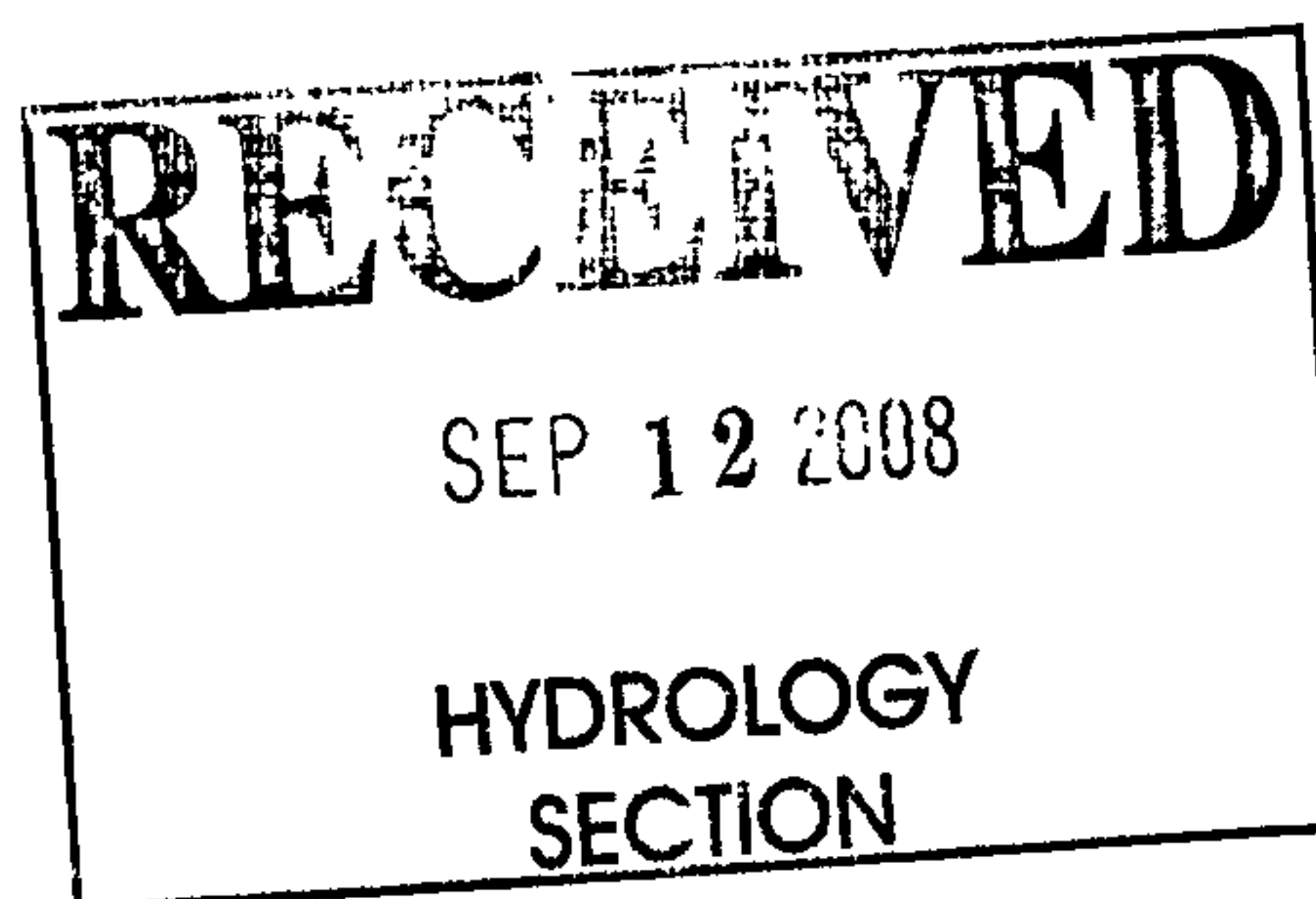
Sincerely,

ISAACSON AND ARFMAN PA

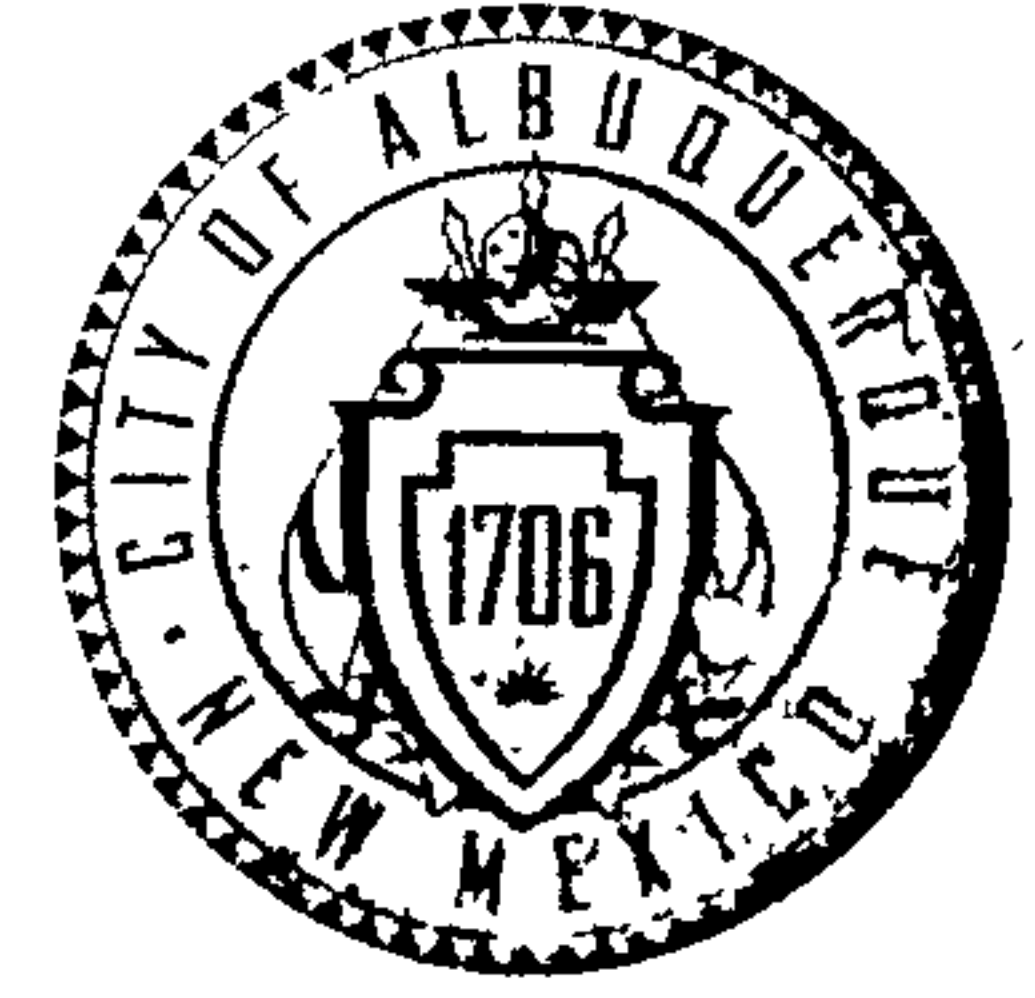
Fred C. Arfman, PE

FCA/bjb

Attachment



CITY OF ALBUQUERQUE



August 11, 2008

Fred C. Arfman, P.E.
Isaacson & Arfman, P.A.
128 Monroe St. NE
Albuquerque, NM 87108

**Re: Richfield Park Subdivision Lots 4 and 5, Grading and Drainage Plan
Engineer's Stamp dated 7-7-08 (C17/D120)**

Dear Mr. Arfman,

Based upon the information provided in your submittal received 7-10-08, the above referenced plan is approved for Building Permit. Thank you for submitting an updated plan.

This is the plan to certify for release of Certificate of Occupancy. When submitting the certification, provide the item Keyed Note 12 was to build.

If you have any questions, you can contact me at 924-3695.

Sincerely,

Curtis A. Cherne, P.E.
Senior Engineer, Planning Dept.
Development and Building Services

C: file

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

DRAINAGE AND TRANSPORTATION INFORMATION SHEET
(Rev. 12/05)

PROJECT TITLE: Richfield Park, Lots 4 and 5 ZONE MAP/DRG. FILE # C-17 / D120
DRB#: _____ EPC#: _____ WORK ORDER#: _____

LEGAL DESCRIPTION: Lots 4 and 5, Richfield Park Subdivision, Albuquerque, NM
CITY ADDRESS: 4545 Alameda Blvd. NE

ENGINEERING FIRM: ISSACSON & ARFMAN, PA
ADDRESS: 128 MONROE NE
CITY, STATE: ALBUQUERQUE, NM

CONTACT: Bryan Bobrick
PHONE: 268-8828
ZIP CODE: 87108

OWNER: Mechenbier Construction
ADDRESS: 8500 Washington St. NE Suite A-6
CITY, STATE: Albuquerque NM

CONTACT: John Mechenbier
PHONE: _____
ZIP CODE: 87113

ARCHITECT: _____
ADDRESS: _____
CITY, STATE: _____

CONTACT: _____
PHONE: _____
ZIP CODE: _____

SURVEYOR: Forstbauer Surveying, LLC
ADDRESS: 4116 Lomas Blvd. NE
CITY, STATE: Albuquerque, NM

CONTACT: Ron Forstbauer
PHONE: _____
ZIP CODE: 87110

CONTRACTOR: Mechenbier Construction
ADDRESS: 8500 Washington St. NE Suite A-6
CITY, STATE: Albuquerque NM

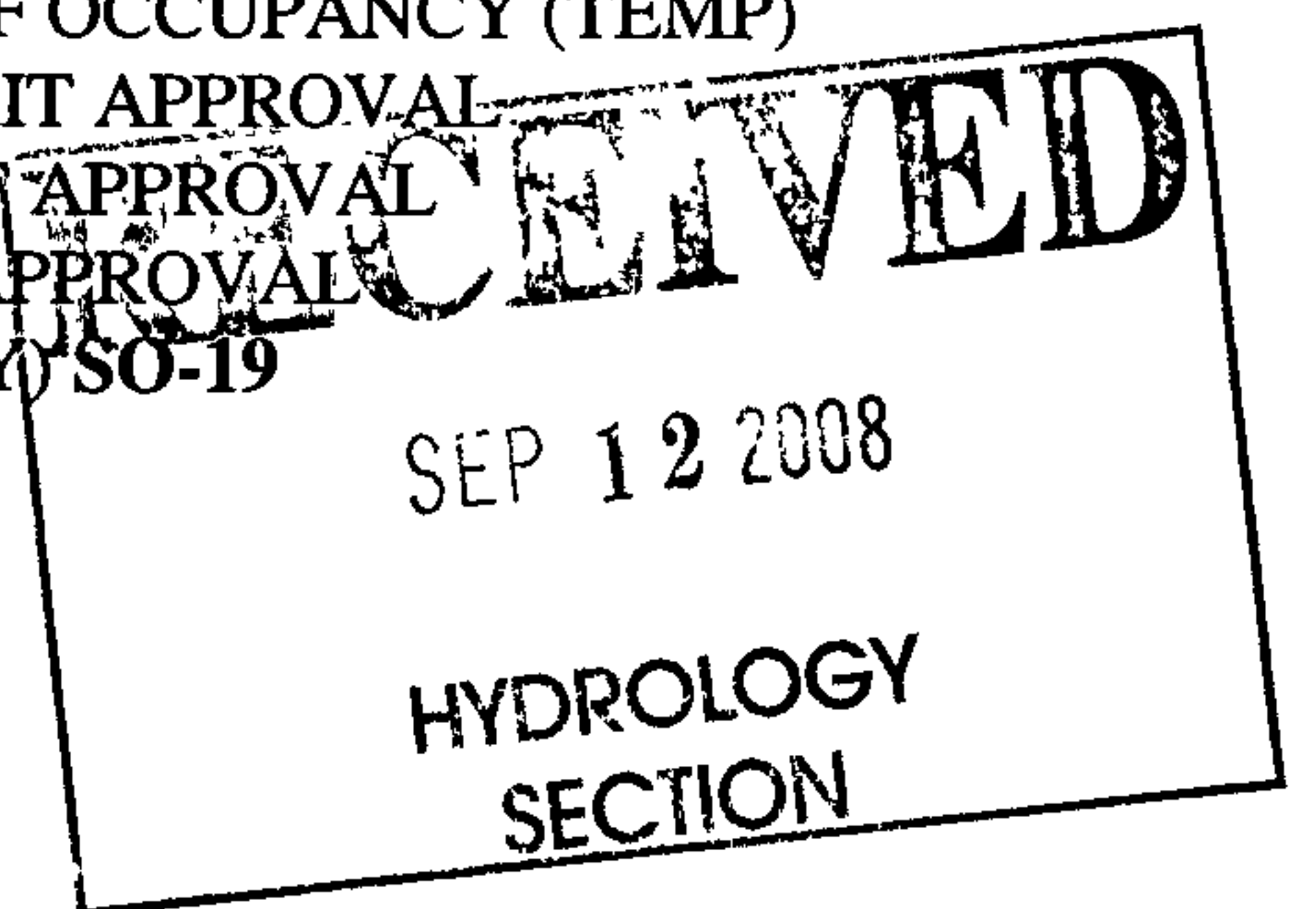
CONTACT: John Mechenbier
PHONE: _____
ZIP CODE: 87113

TYPE OF SUBMITTAL:
____ DRAINAGE REPORT
____ DRAINAGE PLAN 1st SUBMITTAL
☒ DRAINAGE PLAN RESUBMITTAL
____ CONCEPTUAL G & D PLAN
____ GRADING PLAN
____ EROSION CONTROL PLAN
____ ENGINEER'S CERT (HYDROLOGY)
____ CLOMR/LOMR
____ TRAFFIC CIRCULATION LAYOUT
____ ENGINEER/ARCHITECT CERT (TCL)
____ ENGINEER/ARCHITECT CERT (DRB S.P.)
____ ENGINEER/ARCHITECT CERT (AA)
____ OTHER (SPECIFY) _____

CHECK TYPE OF APPROVAL SOUGHT:
____ SIA/FINANCIAL GUARANTEE RELEASE
____ PRELIMINARY PLAT APPROVAL
____ S. DEV. PLAN FOR SUB'D APPROVAL
____ S. DEV. FOR BLDG. PERMIT APPROVAL
____ SECTOR PLAN APPROVAL
____ FINAL PLAT APPROVAL
____ FOUNDATION PERMIT APPROVAL
☒ BUILDING PERMIT APPROVAL
____ CERTIFICATE OF OCCUPANCY (PERM)
____ CERTIFICATE OF OCCUPANCY (TEMP)
____ GRADING PERMIT APPROVAL
____ PAVING PERMIT APPROVAL
____ WORK ORDER APPROVAL
____ OTHER (SPECIFY) SO-19

WAS A PRE-DESIGN CONFERENCE ATTENDED:
____ YES
____ NO
____ COPY PROVIDED

Det. 2.11

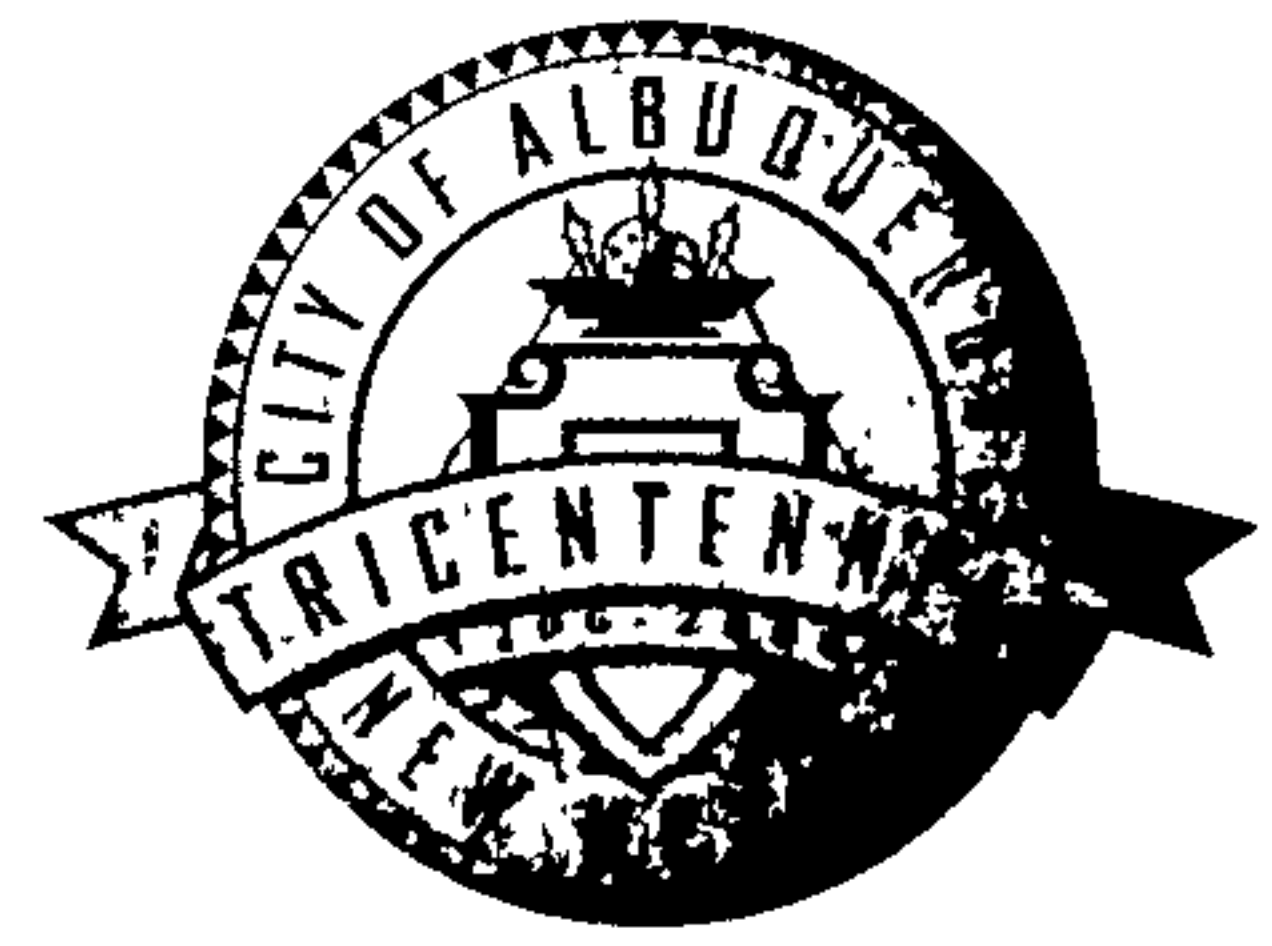


SUBMITTED BY: BRYAN BOBRICK DATE: September 12, 2008

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope to the proposed development define the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

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2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report:** Required for subdivision containing more than ten (10) lots or constituting five (5) acres or more.

CITY OF ALBUQUERQUE



August 13, 2007

Fred C. Arfman, P.E.
Isaacson and Arfman, P.A.
128 Monroe NE
Albuquerque, NM 87108

Re: Lots 4 & 5 of Richfield Park, Undated letter titled "Response to Comments"

Dear Mr. Arfman,

Thank you for providing the additional information pertaining to the proposed development at the subject site. However, I must respectfully disagree with some of the statements presented in the subject letter.

My understanding of the Richfield Park Master Drainage plan is that the free discharge allowance is specific to the lots that drain directly to Columbine and / or Washington. Lots 4 and 5 do not have direct frontage on nor access to either of those streets. Because of this, the private easement across the northern portion of the site was established during the platting process.

P.O. Box 1293

Furthermore, when the State Highway Department installed the storm drain in Alameda, that pipe was sized to accept only the flows associated with the **10-year rainfall**, not the 100-year event as is currently required for new developments. As such, that storm drain is already overloaded and cannot accept any additional flows.

Albuquerque

New Mexico 87103

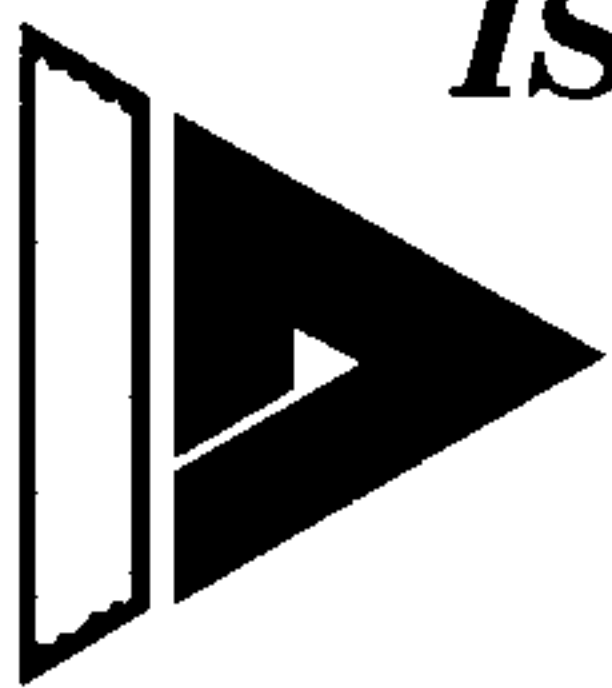
If you believe that this information to be in error, please provide a downstream loading and pipe capacity analysis with the appropriate calculations along with excerpts from the original report to indicate the appropriate revisions as they pertain to this specific site. That information should include a revised plan containing, among other items, a scale and north arrow.

www.cabq.gov

Sincerely,

Jeremy Hoover, P.E., C.F.M.
Senior Engineer
Hydrology Section
Development and Building Services

cc: file (C17-D120)



ISAACSON & ARFMAN, P.A.

Consulting Engineering Associates

*Thomas O. Isaacson, PE & LS • Fred C. Arfman, PE
Scott M. McGee, PE*

Mr. Jeremy Hoover, P.E., C.F.M.
Senior Engineer
City of Albuquerque - Hydrology Section
Development and Building Services

RE: Response to Comments: Lots 4 & 5 of Richfield Park (C17-D120)

Dear Mr. Hoover,


Thank you for your review comments dated August 13, 2007.

Based on your comments, the following revisions have been made to the Grading and Drainage Plan and Supplemental Drainage Information:

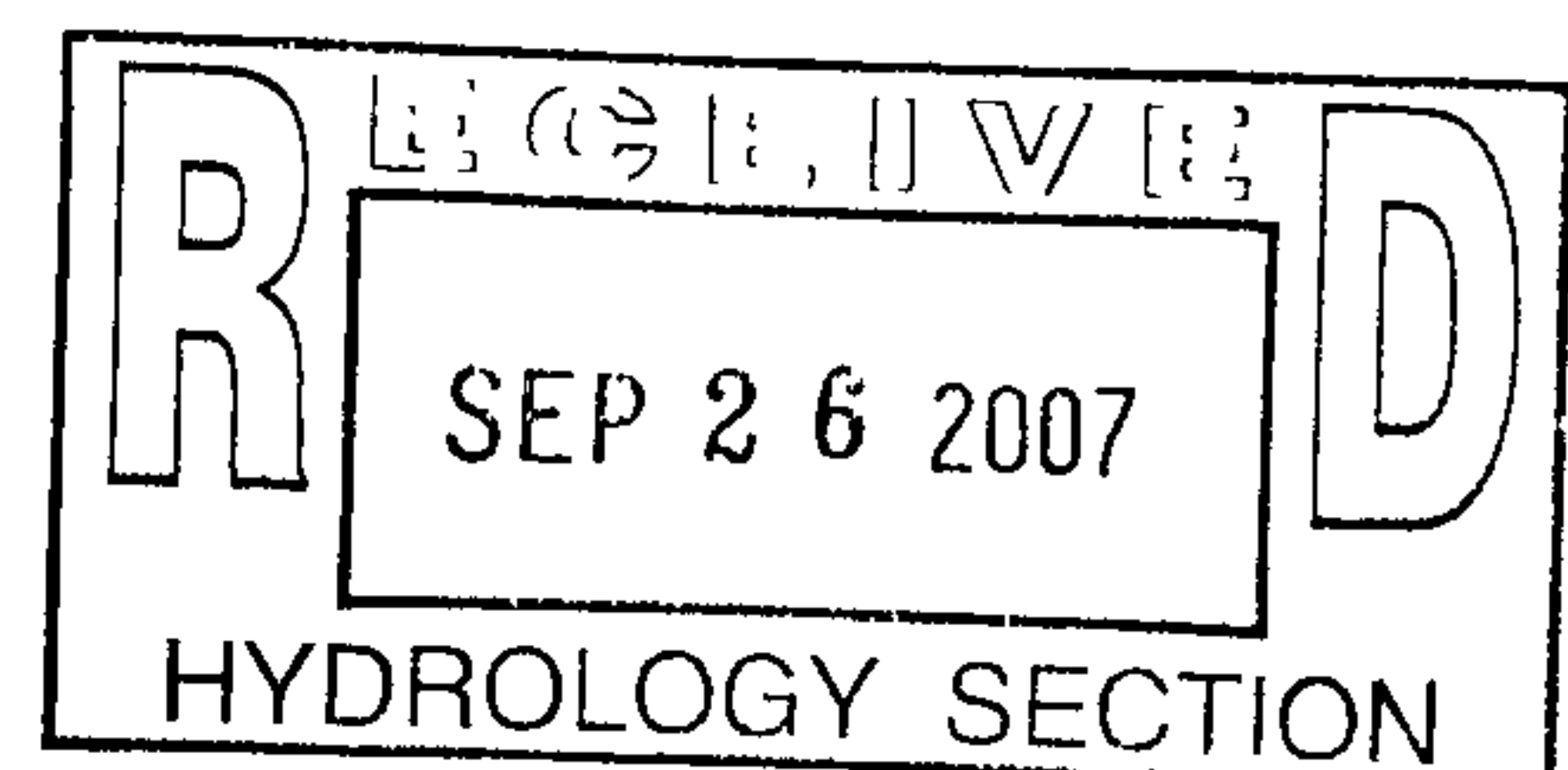
1. No developed flow will be released to Alameda Blvd.
2. On-site water harvesting ponds will be utilized in the landscaping adjacent to Alameda Blvd. These ponds are sized to contain the 100-year, 6-hour volume for their respective sub-basins.
3. Ponding will be constructed along the west and north boundaries of the proposed parking to capture all developed runoff from the major basin. A 'V' notch weir will be constructed to release a maximum of 4.22 cfs (the approved discharge rate) for the 100-year, 6-hour storm event.

Please don't hesitate to contact me at 268-8828 with any questions or comments.

Sincerely,



Bryan J. Bobrick
ISAACSON AND ARFMAN PA



C-17/D120

DRAINAGE AND TRANSPORTATION INFORMATION SHEET
(Rev. 12/05)

PROJECT TITLE: Richfield Park, Lots 4 and 5 ZONE MAP/DRG. FILE # C-17 / D120
DRB#: _____ EPC#: _____ WORK ORDER#: _____

LEGAL DESCRIPTION: Lots 4 and 5, Richfield Park Subdivision, Albuquerque, NM
CITY ADDRESS: 4545 Alameda Blvd. NE

ENGINEERING FIRM: ISSACSON & ARFMAN, PA CONTACT: Bryan Bobrick
ADDRESS: 128 MONROE NE PHONE: 268-8828
CITY, STATE: ALBUQUERQUE, NM ZIP CODE: 87108

OWNER: Mechenbier Construction CONTACT: John Mechenbier
ADDRESS: 8500 Washington St. NE Suite A-6 PHONE: _____
CITY, STATE: Albuquerque NM ZIP CODE: 87113

ARCHITECT: _____ CONTACT: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

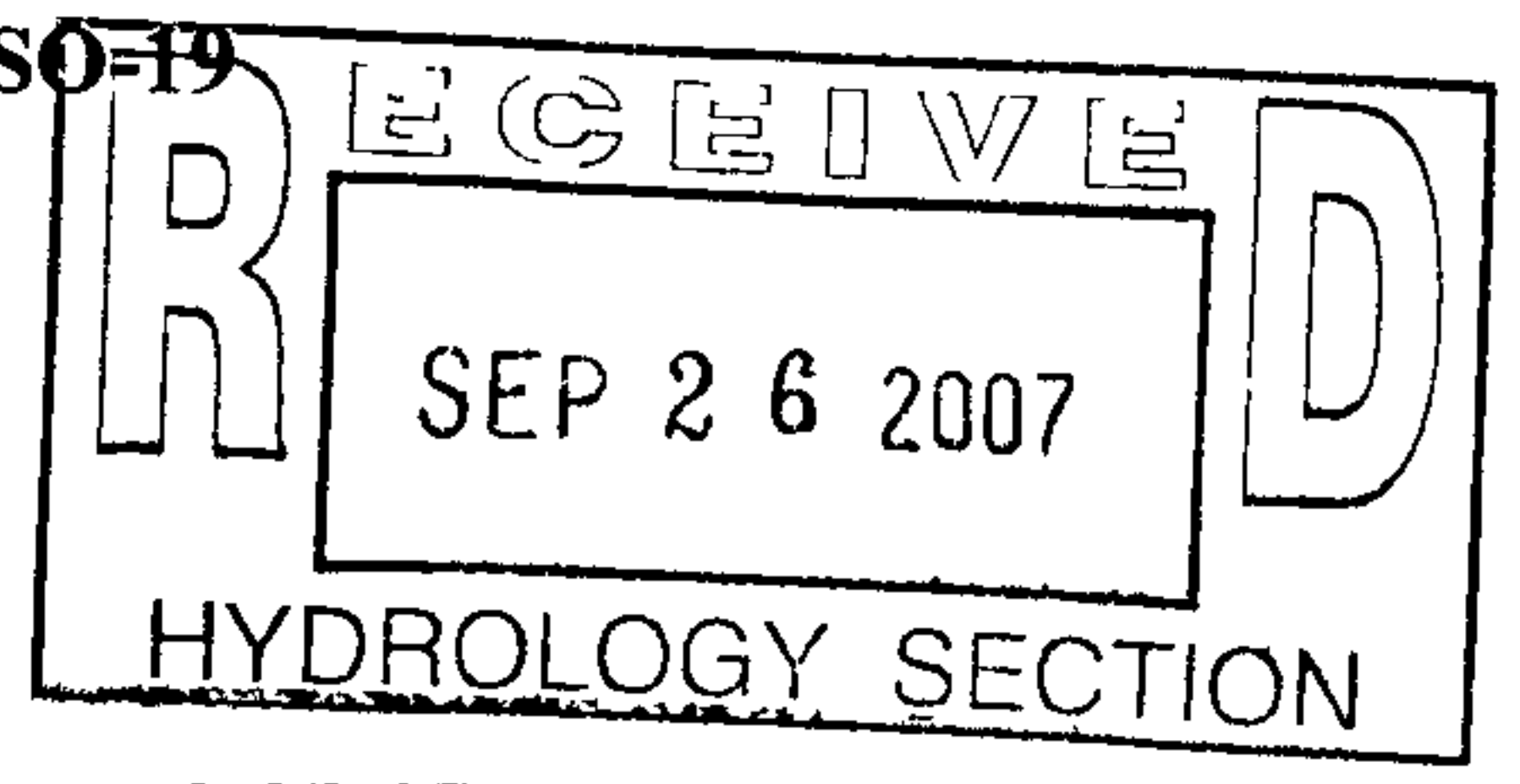
SURVEYOR: Forstbauer Surveying, LLC CONTACT: Ron Forstbauer
ADDRESS: 4116 Lomas Blvd. NE PHONE: _____
CITY, STATE: Albuquerque, NM ZIP CODE: 87110

CONTRACTOR: Mechenbier Construction CONTACT: John Mechenbier
ADDRESS: 8500 Washington St. NE Suite A-6 PHONE: _____
CITY, STATE: Albuquerque NM ZIP CODE: 87113

TYPE OF SUBMITTAL:
☒ DRAINAGE REPORT
☐ DRAINAGE PLAN 1st SUBMITTAL
☒ DRAINAGE PLAN RESUBMITTAL
☐ CONCEPTUAL G & D PLAN
☐ GRADING PLAN
☐ EROSION CONTROL PLAN
☐ ENGINEER'S CERT (HYDROLOGY)
☐ CLOMR/LOMR
☐ TRAFFIC CIRCULATION LAYOUT
☐ ENGINEER/ARCHITECT CERT (TCL)
☐ ENGINEER/ARCHITECT CERT (DRB S.P.)
☐ ENGINEER/ARCHITECT CERT (AA)
☐ OTHER (SPECIFY) _____

CHECK TYPE OF APPROVAL SOUGHT:
☐ SIA/FINANCIAL GUARANTEE RELEASE
☐ PRELIMINARY PLAT APPROVAL
☐ S. DEV. PLAN FOR SUB'D APPROVAL
☐ S. DEV. FOR BLDG. PERMIT APPROVAL
☐ SECTOR PLAN APPROVAL
☐ FINAL PLAT APPROVAL
☐ FOUNDATION PERMIT APPROVAL
☒ BUILDING PERMIT APPROVAL
☐ CERTIFICATE OF OCCUPANCY (PERM)
☐ CERTIFICATE OF OCCUPANCY (TEMP)
☐ GRADING PERMIT APPROVAL
☐ PAVING PERMIT APPROVAL
☐ WORK ORDER APPROVAL
☐ OTHER (SPECIFY) SO-19

WAS A PRE-DESIGN CONFERENCE ATTENDED:
☐ YES
☐ NO
☐ COPY PROVIDED



SUBMITTED BY: BRYAN BOBRICK DATE: 9-27-07

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope to the proposed development define the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5) acres and Sector Plans.
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report:** Required for subdivision containing more than ten (10) lots or constituting five (5) acres or more.

CITY OF ALBUQUERQUE



July 20, 2007

Fred C. Arfman, P.E.
Isaacson and Arfman, P.A.
128 Monroe NE
Albuquerque, NM 87108

Re: Lots 4 & 5 of Richfield Park, Engineer's Stamp Dated 7-9-07 (C17-D120)

Dear Mr. Arfman,

Based upon the information provided in your submittal received July 10, 2007, additional revision is necessary. Specifically, the pond volume provided is inadequate given the development parameters described.

The hydrograph included in the report shows the flow parameters for **Basin 2**. This generates 6.51 of the 8.94 cfs from the whole site. The allowable runoff volume shown on that graph is based on a total allowable site discharge at a rate of 4.22 cfs. The remaining 2.43 cfs from Basin 1 is not included therein. If constructed as proposed, site discharge would be 6.65 cfs which exceeds the allowable flow of 2.11 cfs / acre. Given the proposed land treatment percentages, your minimum pond volume should be on the order of 5,800 ft³. Please revisit your calculations as well as the pond geometry.

If you have any questions or need additional information, feel free to contact me at 924-3990.

Sincerely,

Jeremy Hoover, P.E., C.F.M.
Senior Engineer
Hydrology Section
Development and Building Services

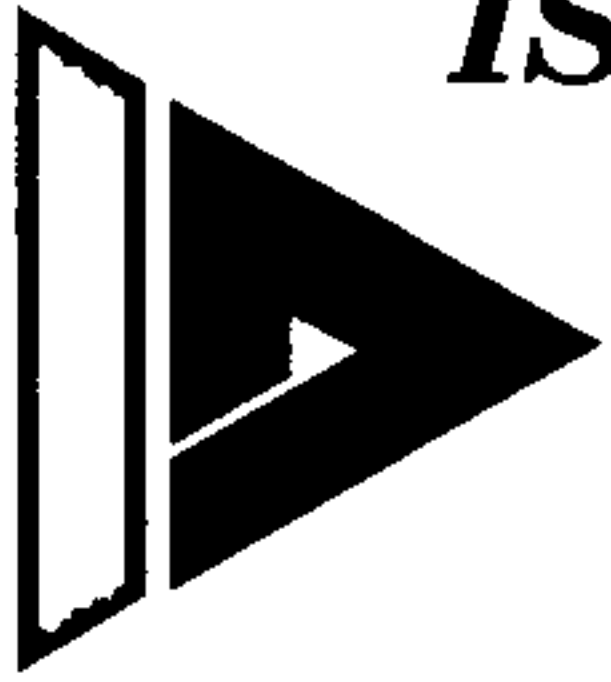
cc: file (C17-D120)

P.O. Box 1293

Albuquerque

New Mexico 87103

www.cabq.gov



ISAACSON & ARFMAN, P.A.

Consulting Engineering Associates

*Thomas O. Isaacson, PE & LS • Fred C. Arfman, PE
Scott M. McGee, PE*

Mr. Jeremy Hoover, P.E., C.F.M.
Senior Engineer
City of Albuquerque - Hydrology Section
Development and Building Services

RE: Response to Comments: Lots 4 & 5 of Richfield Park (C17-D120)

Dear Mr. Hoover,

Thank you for your review comments dated July 20, 2007. In your letter, you asked that we revisit the calculations for the site discharge and pond volume provided on our Grading and Drainage Plan.

This project is unusual in that the site is (as are all sites within the Richfield Park Subdivision) permitted free discharge to the surrounding streets per the approved Master Drainage Plan for the Richfield Park Subdivision prepared by Espey, Huston & Assoc. (1986). For Lots 4 and 5, an exception occurs because the drainage path through the property limits the ability to surface drain to the surrounding streets.

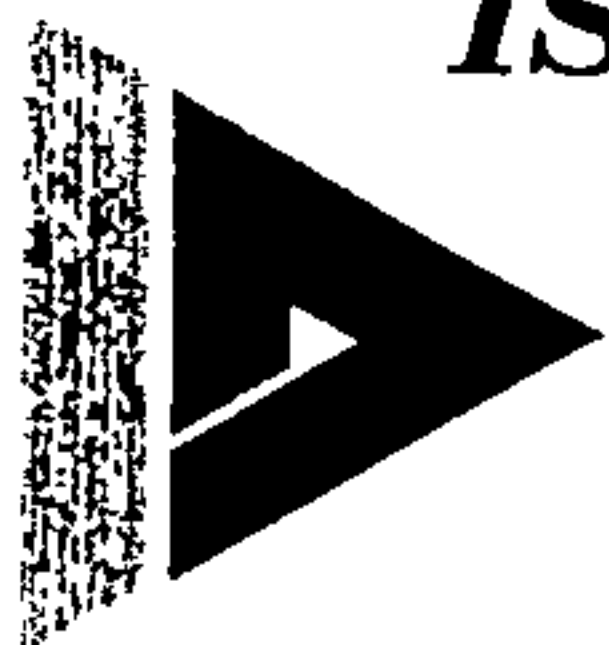
The existing channel within the drainage easement at the northwest corner of the property was constructed with a drainage design capacity of 2.11 cfs per acre. Our site is two acres permitting 4.22 cfs to enter the channel.

Therefore, the Basin 1 flows which free discharge to the surrounding street have no impact on the 4.22 cfs permitted to drain to the northwest channel. The calculations and pond volume provided are correct based on the Master Plan criteria.

Hopefully, this clarifies the calculations and pond volume. Please don't hesitate to call me or Fred Arfman at 268-8828 with any questions or comments.

Sincerely,

Bryan J. Bobrick
ISAACSON AND ARFMAN PA



ISAACSON & ARFMAN, P.A.

Consulting Engineering Associates

*Thomas O. Isaacson, PE & LS • Fred C. Arfman, PE
Scott M. McGee, PE*

9/26/07
A. Marchant

Mr. Jeremy Hoover, P.E., C.F.M.
Senior Engineer
City of Albuquerque - Hydrology Section
Development and Building Services

RE: Response to Comments: Lots 4 & 5 of Richfield Park (C17-D120)

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Sincerely,



Bryan J. Bobrick
ISAACSON AND ARFMAN PA

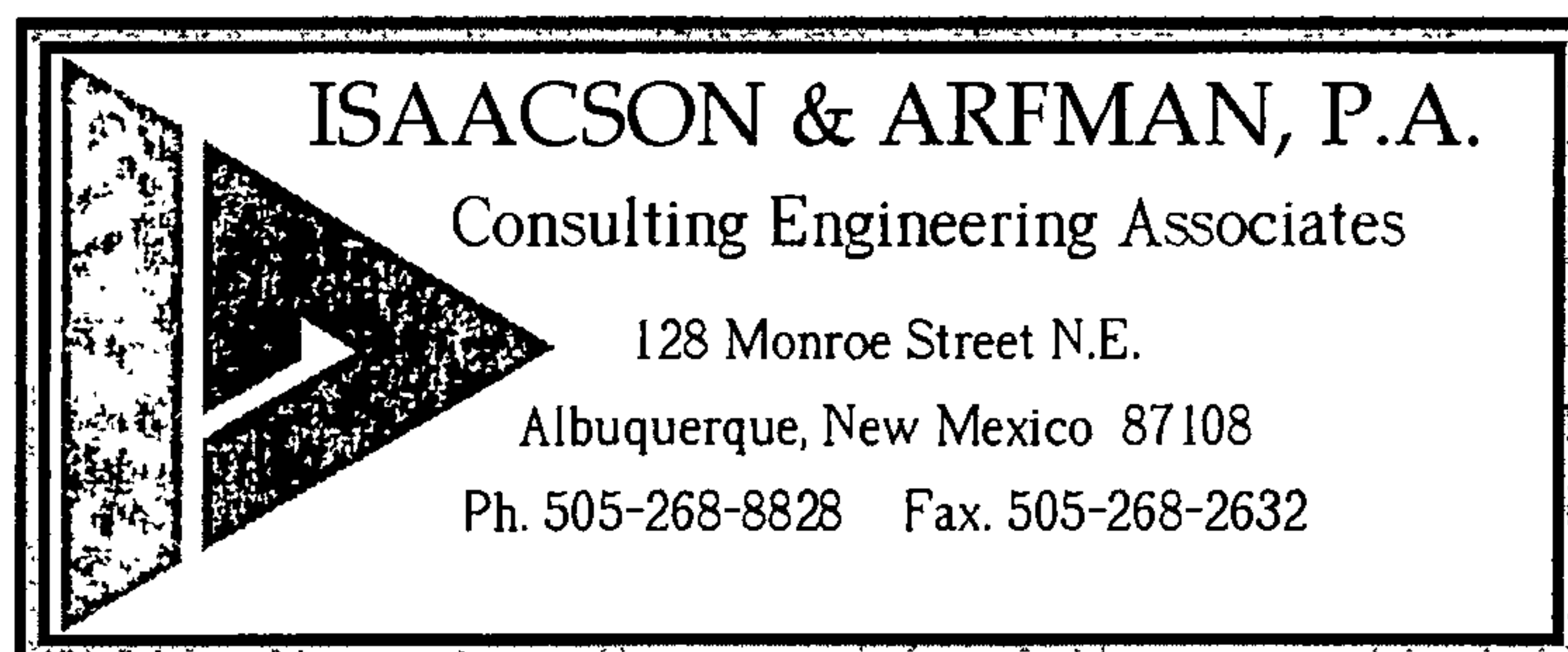
SEPTEMBER 26, 2007

SUPPLEMENTAL DRAINAGE INFORMATION

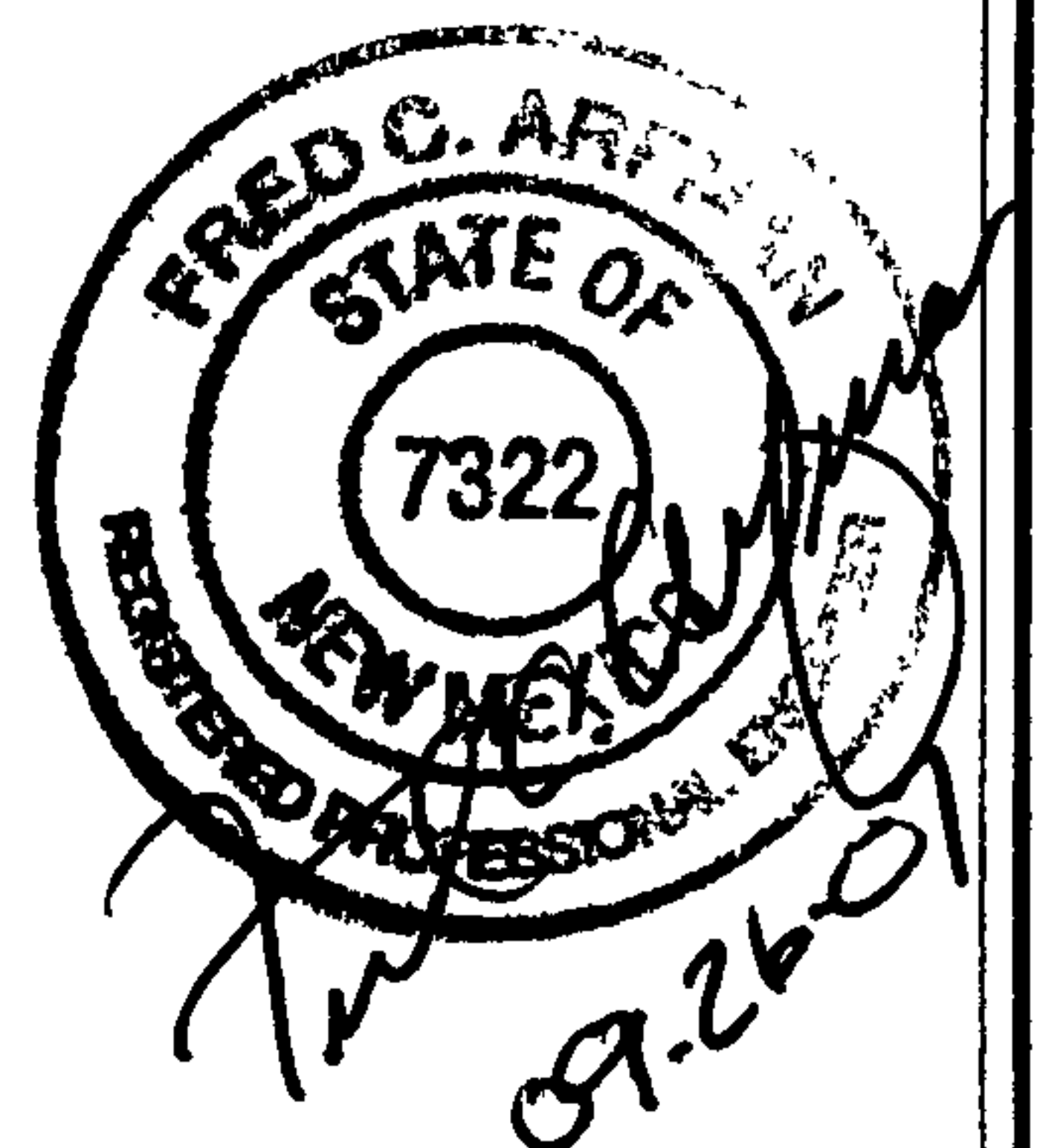
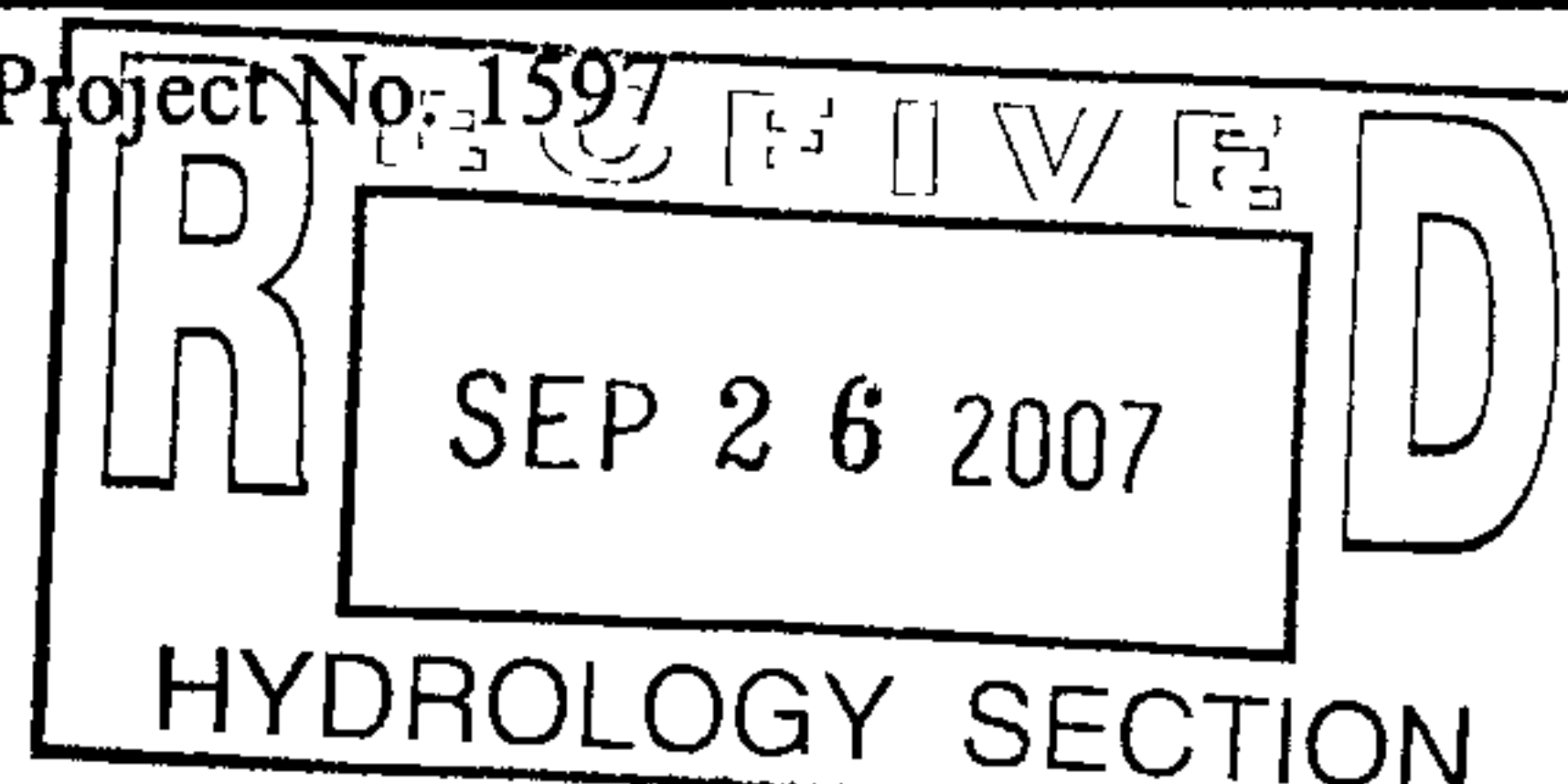
FOR

RICHFIELD PARK SUBDIVISION
LOTS 4 AND 5

BY



I&A Project No. 1597



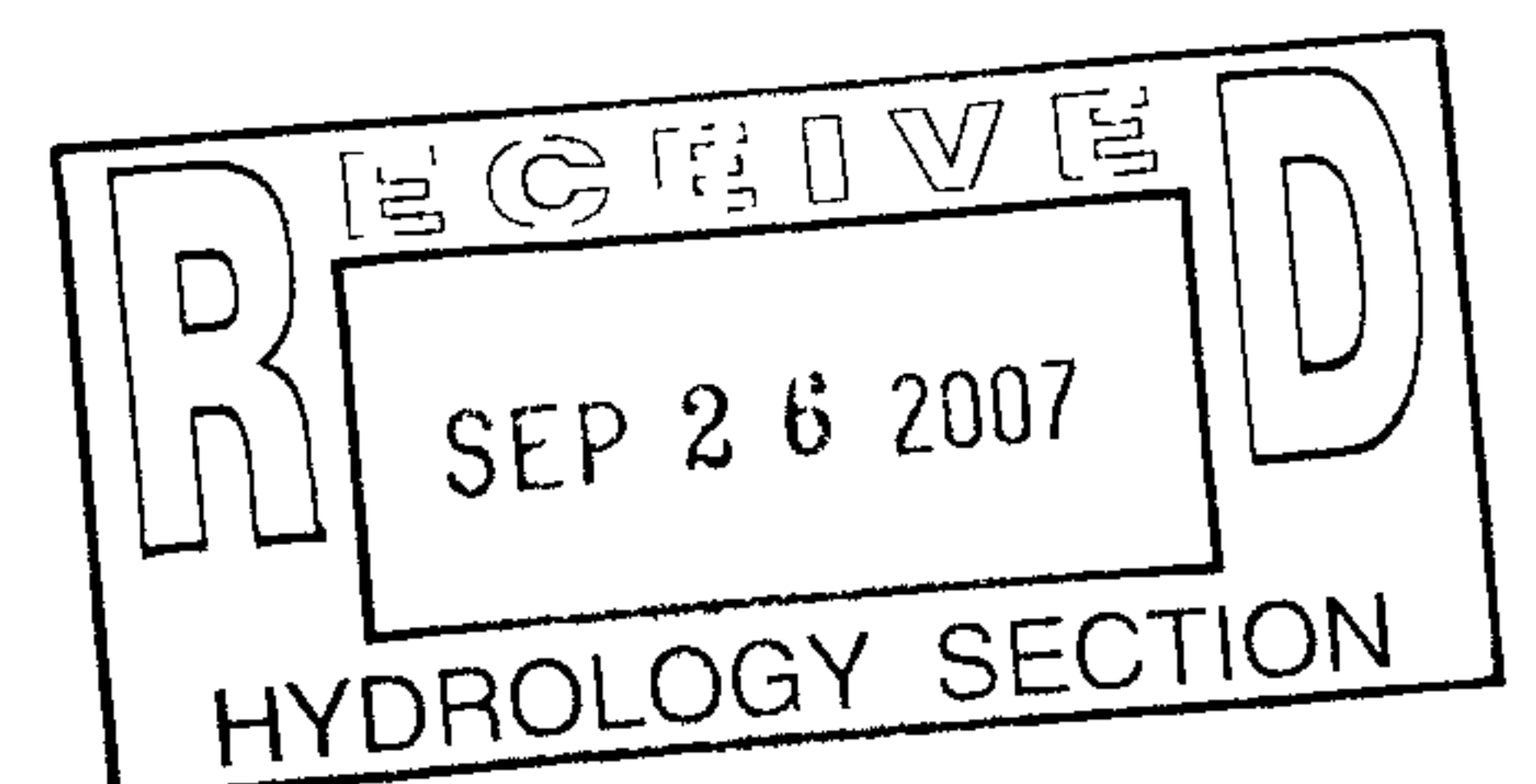
RICHFIELD PARK LOTS 4 AND 5
DRAINAGE SUMMARY
25-Sep-07

I&A Project No. 1597
Owner: Mechenbier Construction
Legal: Lots 4 and 5, Richfield Park Subdivision
Address: 4545 Alameda Blvd. NE
Zone Map: C-17
Flood Zone: Zone X (Outside 500 Year Flood Zone) FIRM.#136
Offsite Flow: The property is isolated from off-site flow.

Existing Conditions:

The Property, approximately 2.0 acres, is an undeveloped commercial property located in Albuquerque on the North side of Alameda Blvd. west of Washington St. NE. Alameda Blvd. borders the property to the south, and developed commercial property borders the property to the north, east and west. The property, which slopes to the northwest at approx. 2%, is sparsely covered with native vegetation.

Currently, undeveloped flow drains as sheetflow to the northwest corner and passes into the adjacent developed property via an existing asphalt drainage channel with concrete valley gutter (drainage easement). Flow is then directed west to outlet to cross Washington Street and pass into existing improved channels which direct flow to an AMAFCA channel. .



Proposed Conditions:

The proposed improvements consist of a commercial office building with associated paved parking and landscaping. These improvements will increase the amount of impervious area which will result in an increase in peak rate and volume of runoff.

Per the Master Drainage Plan for the Richfield Park Subdivision prepared by Espey, Huston & Assoc. (1986), all lots are to free discharge into the public street system which conveys runoff to the existing AMAFCA channel located along the west boundary of Richfield Park, Tract D-1. An exception to the free discharge limits the peak discharge for Lots 4 and 5 to 2.11 cfs per acre due to the capacity limitations of the existing drainage channel at the northwest corner of the property.

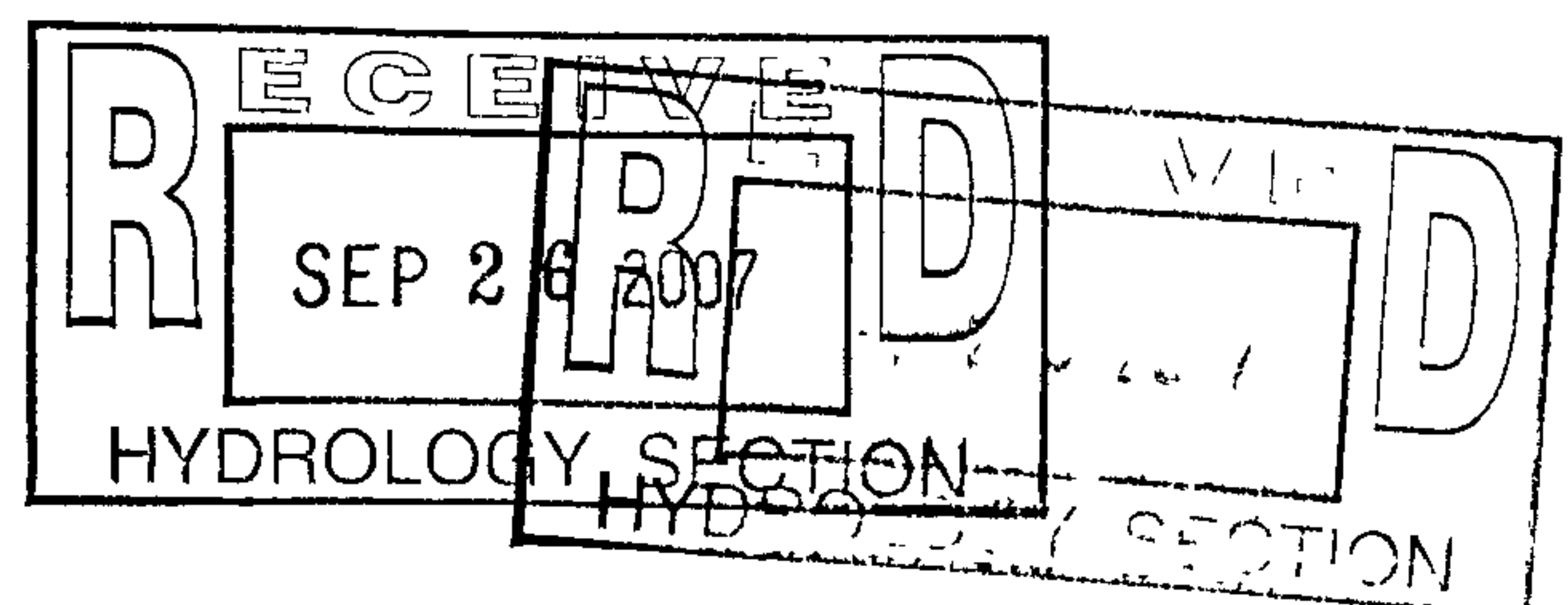
As shown on the plan, the property will be divided into three sub-basins:

Sub-basin 1 consisting of the landscaped area and walks on the south side of the proposed building will be collected within water harvesting basins sized to capture the 100-year, 6-hour storm event. $Q=0.67$ cfs, $V=998$ CF.

Sub-basin 2 consisting of the landscaped area at the southeast corner of the property will be collected within a water harvesting basin sized to capture the 100-year, 6-hour storm event. $Q=0.12$ cfs, $V=155$ CF.

Sub-basin 3 consisting of 100% of the roof, all pavement and the remainder of the landscaped areas will generate 8.0 cfs. Because only 4.22 cfs is allowed to discharge to the northwest channel, a 6313 cf detention area (minimum) will be required (see attached hydrograph).

No discharge will pass to Alameda Blvd.



CALCULATIONS: Richfield Park - Lots 4 & 5 : Sept. 24, 2007

Based on Drainage Design Criteria for City of Albuquerque Section 22.2, DPM, Vol 2, dated Jan., 1993

ON-SITE

AREA OF SITE:	88004	SF	=	2.0	Ac.
---------------	-------	----	---	-----	-----

HISTORIC FLOWS:

On-Site Historic Land Condition

Area a	=	0	SF
Area b	=	88004	SF
Area c	=	0	SF
Area d	=	0	SF
Total Area	=	88004	SF

DEVELOPED FLOWS:

On-Site Developed Land Condition

Area a	=	0	SF
Area b	=	8800	SF
Area c	=	6650	SF
Area d	=	72554	SF
Total Area	=	88004	SF

EXCESS PRECIP:

Precip. Zone 2

Ea	=	0.53
Eb	=	0.78
Ec	=	1.13
Ed	=	2.12

On-Site Weighted Excess Precipitation (100-Year, 6-Hour Storm)

$$\text{Weighted E} = \frac{EaAa + EbAb + EcAc + EdAd}{Aa + Ab + Ac + Ad}$$

Historic E	=	0.78 in.	Developed E	=	1.91 in.
------------	---	----------	-------------	---	----------

On-Site Volume of Runoff: $V_{360} = E \cdot A / 12$

Historic V_{360}	=	5720	CF	Developed V_{360}	=	14016	CF
--------------------	---	------	----	---------------------	---	-------	----

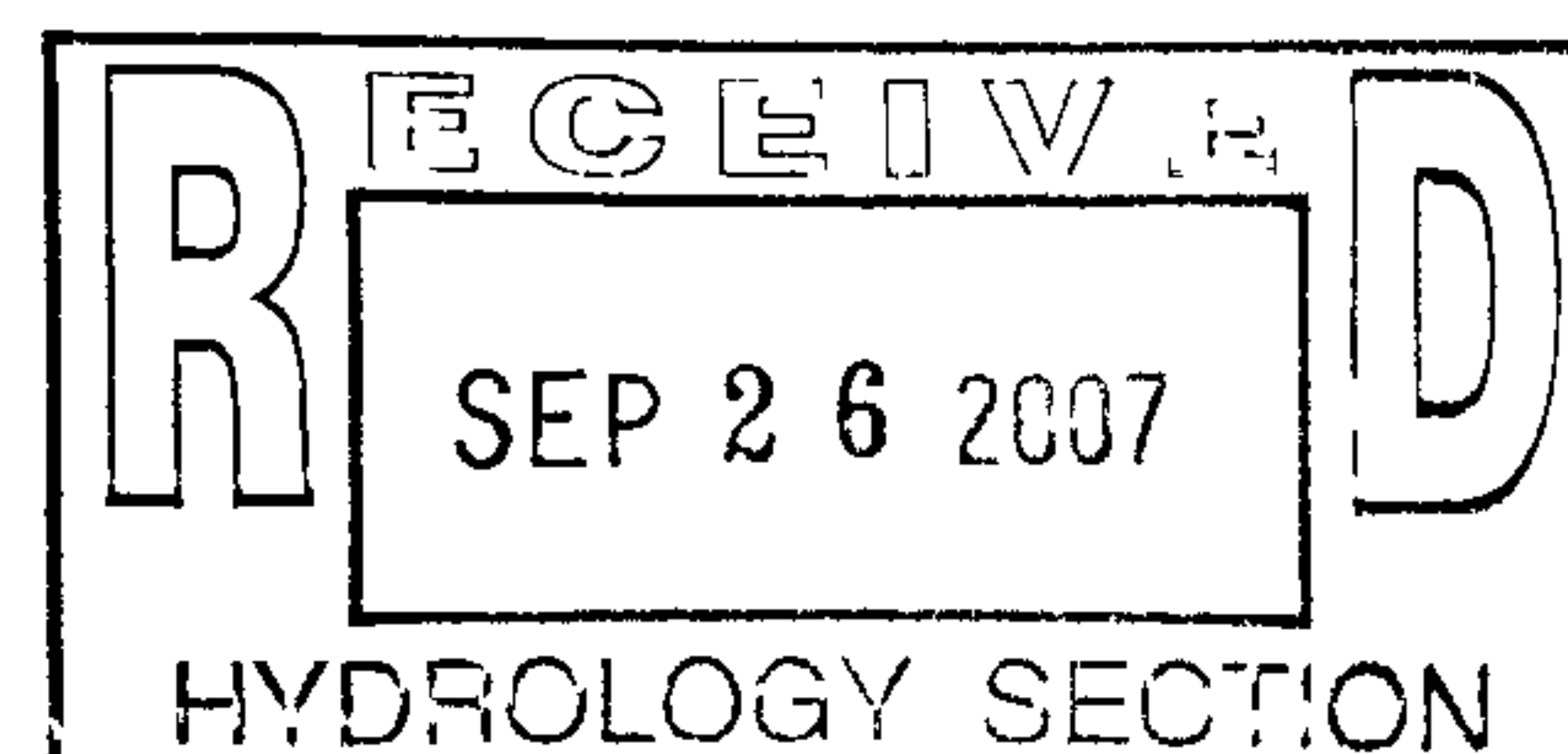
On-Site Peak Discharge Rate: $Q_p = Q_{pa}Aa + Q_{pb}Ab + Q_{pc}Ac + Q_{pd}Ad / 43,560$

For Precipitation Zone 2

Q_{pa}	=	1.56	Q_{pc}	=	3.14
Q_{pb}	=	2.28	Q_{pd}	=	4.70

Historic Q_p	=	4.6	CFS	Developed Q_p	=	8.8	CFS
----------------	---	-----	-----	-----------------	---	-----	-----

The overall site consists of 2.02029384756657 acre(s) located in Zone 2 which is designated as properties between the Rio Grande River and San Mateo Blvd.. The 100-year, 6-hour historic discharge is 4.6 cfs. The proposed developed discharge is 8.8 cfs.



BASIN NO.	1	DESCRIPTION	SOUTH LANDSCAPING - WATER HARVESTING
Area of basin flows =	7600	SF	= 0.2 Ac.

The following calculations are based on Treatment areas as shown in table to the right

Sub-basin Weighted Excess Precipitation (see formula above)

Weighted E = 1.58 in.

Sub-basin Volume of Runoff (see formula above)

V360 = 998 CF

Sub-basin Peak Discharge Rate: (see formula above)

Qp = 0.67 cfs

TREATMENT

A = 0%

B = 0%

C = 55%

D = 45%

BASIN NO.	2	DESCRIPTION	SOUTHEAST LANDSCAPING - WATER HARVESTING
Area of basin flows =	1646	SF	= 0.0 Ac.

The following calculations are based on Treatment areas as shown in table to the right

Sub-basin Weighted Excess Precipitation (see formula above)

Weighted E = 1.13 in.

Sub-basin Volume of Runoff (see formula above)

V360 = 155 CF

Sub-basin Peak Discharge Rate: (see formula above)

Qp = 0.12 cfs

TREATMENT

A = 0%

B = 0%

C = 100%

D = 0%

BASIN NO.	3	DESCRIPTION	BUILDING / PARKING TO POND
Area of basin flows =	78758	SF	= 1.8 Ac.

The following calculations are based on Treatment areas as shown in table to the right

Sub-basin Weighted Excess Precipitation (see formula above)

Weighted E = 1.97 in.

Sub-basin Volume of Runoff (see formula above)

V360 = 12950 CF

Sub-basin Peak Discharge Rate: (see formula above)

Qp = 8.0 cfs

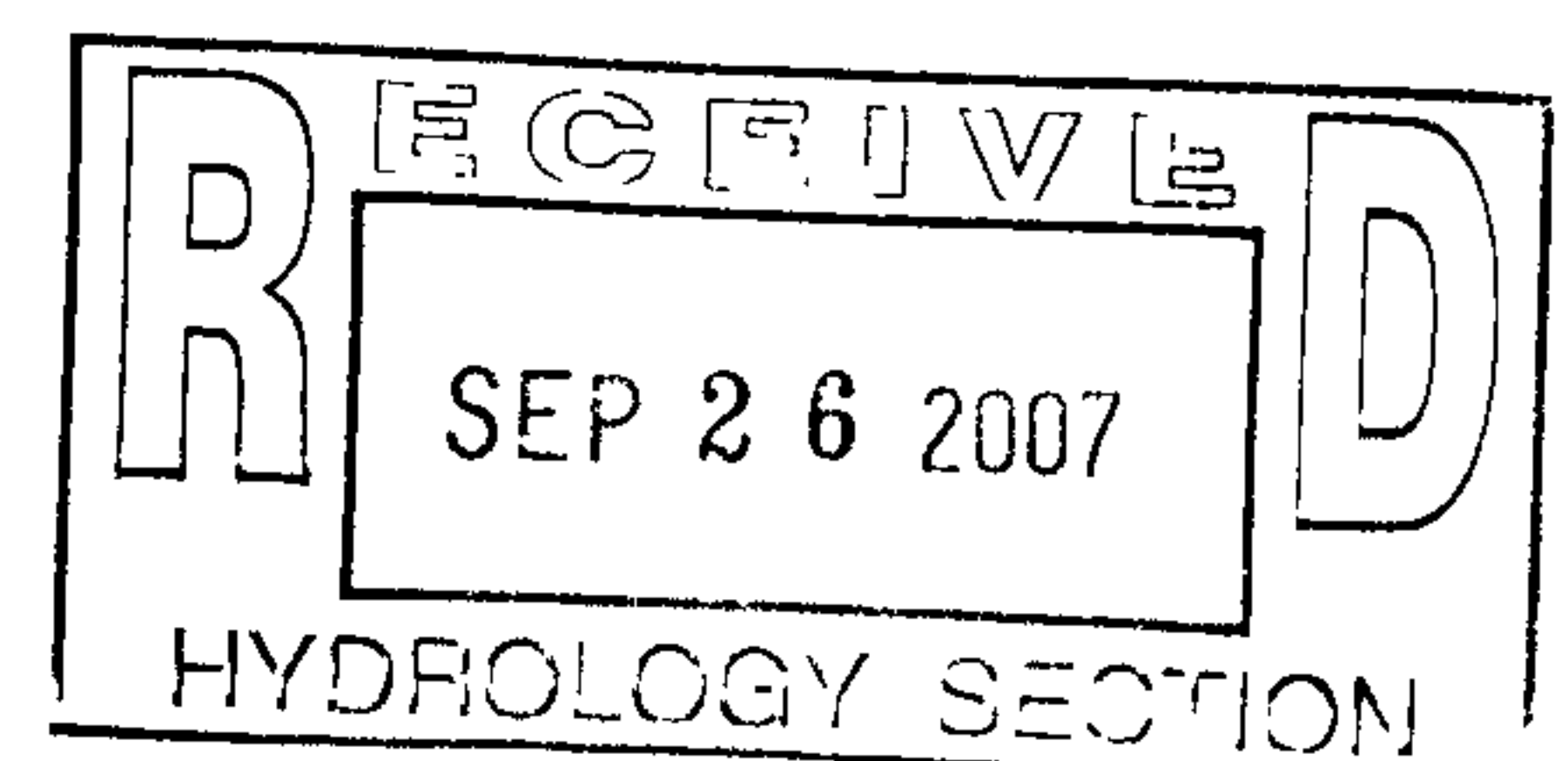
TREATMENT

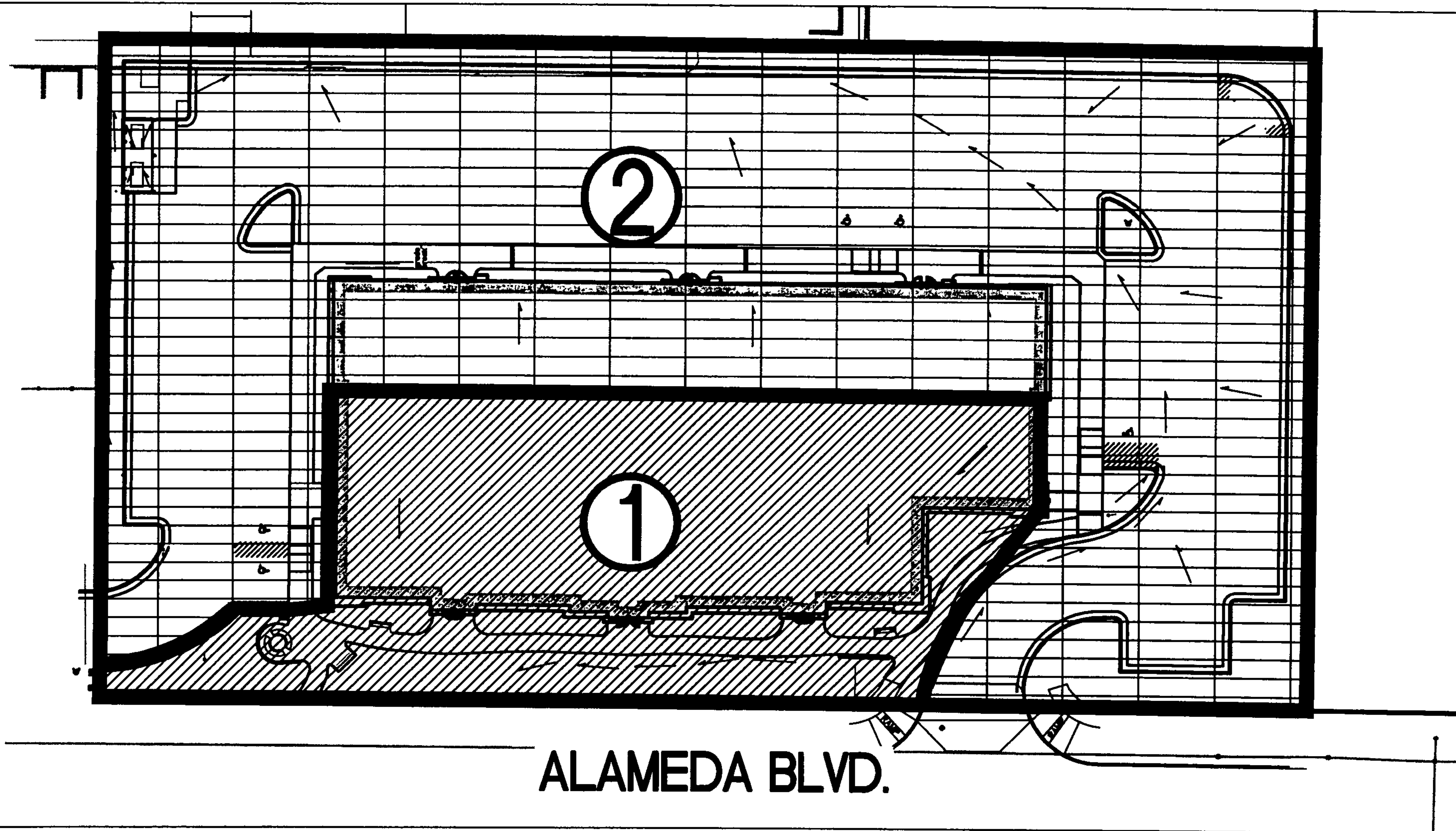
A = 0%

B = 8%

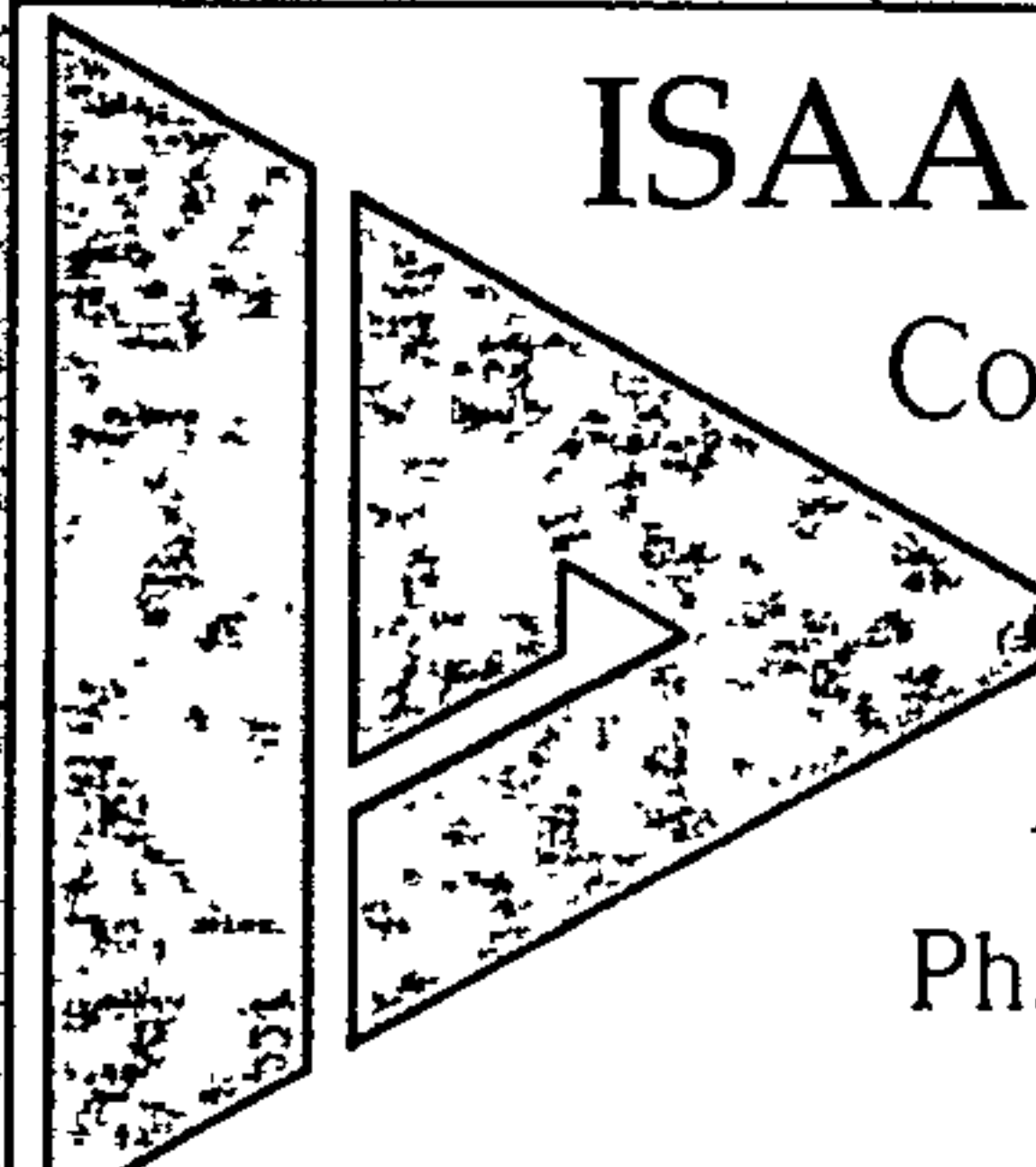
C = 4%

D = 88%





RICHFIELD PARK LOTS 4 + 5 SUB-BASIN MAP



ISAACSON & ARFMAN, P.A.
Consulting Engineering Associates
128 Monroe Street N.E.
Albuquerque, New Mexico 87108
Ph. 505-268-8828 Fax. 505-268-2632
1597CNTR.dwg Jul 09,2007

Hydrograph

CALCULATIONS: Richfield Park - Lots 4 & 5 : ='DPM Calculations'!C6
HYDROGRAPH FOR SMALL WATERSHED
DPM SECTION 22-2 * PAGE A-13/14

Base time, t_B , for a small watershed hydrograph is,

$$t_B = (2.107 * E * AT / QP) - (0.25 * AD / AT)$$

Where

E	=	1.91 inches
AT	=	2.02 acres
AD	=	1.67 acres
QP	=	8.8 cfs

t_B	=	0.72 hours
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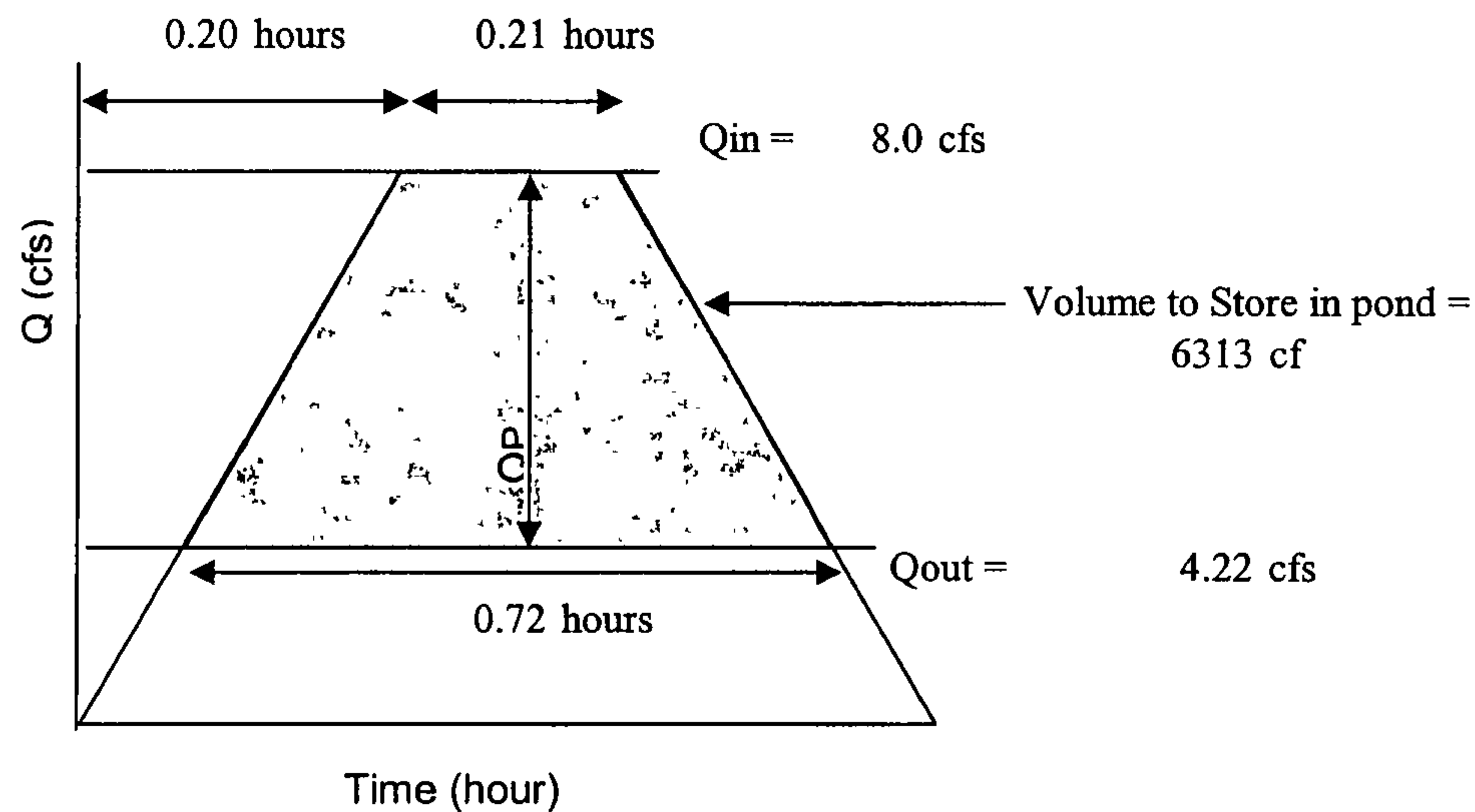
E is the excess precipitation in inches (from DPM TABLE A-8), QP is the peak flow, AD is the area (acres) of treatment D, and AT is the total area in acres. Using the time of concentration, t_C (hours), the time to peak in hours is:

$$t_P = (0.7 * t_C) + ((1.6 - (AD / AT)) / 12)$$

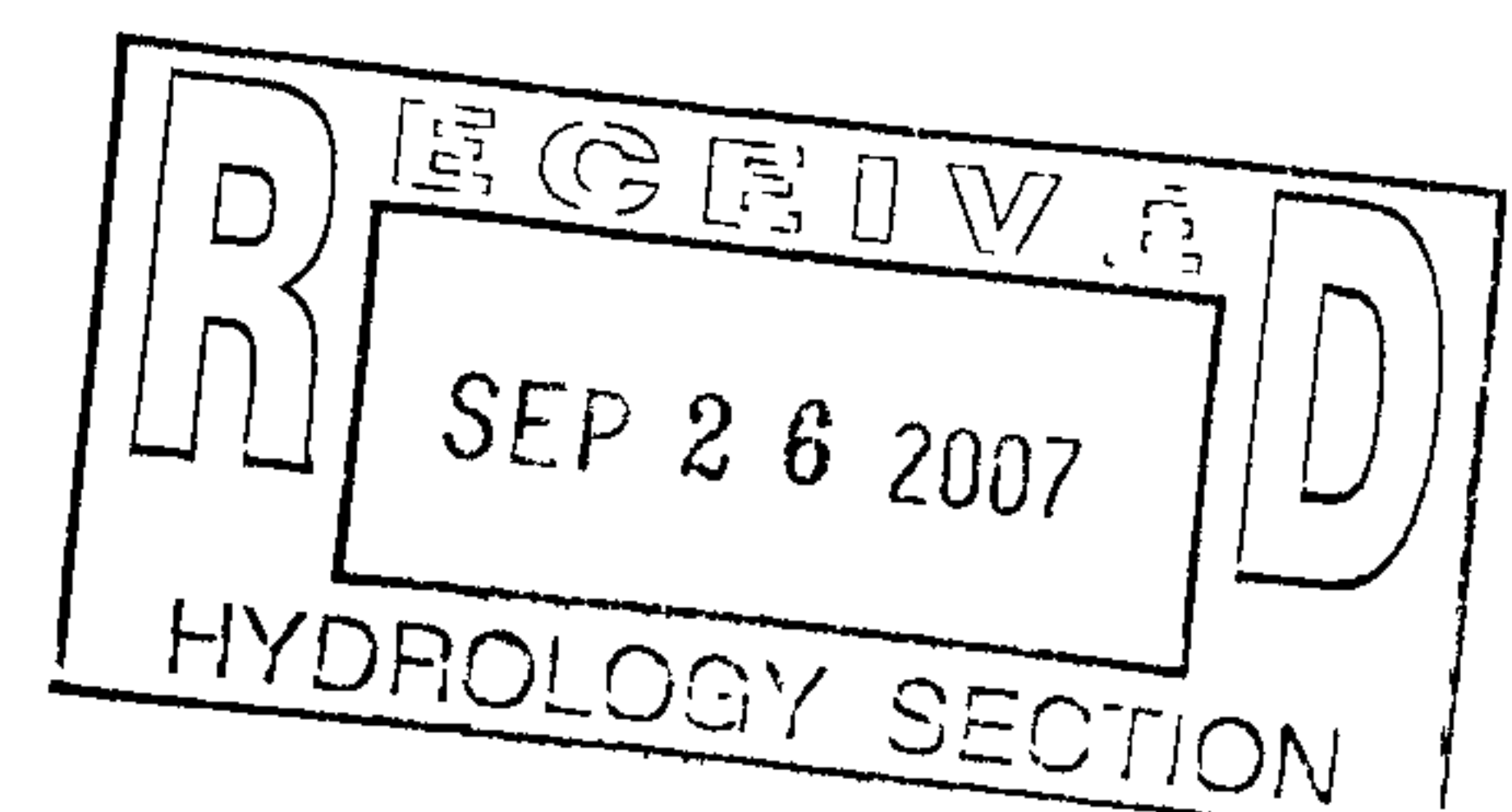
Where t_C = 0.20 hours

t_P = 0.20 hours

Continue the peak for $0.25 * AD / AT$ hours. When AD is zero, the hydrograph will be triangular. When AD is not zero, the hydrograph will be trapezoidal. see the graph below:



INFLOW / OUTFLOW HYDROGRAPH



PROPOSED POND CALCULATIONS - SUB-BASIN 1 WATER HARVESTING BASIN

LANDSCAPE POND VOLUME 1A		
CONTOUR	AREA	VOL (CF)
5111.0	964	
5110.0	280	622
5109.5	28	77
		0
Pond Volume		
699		

Pond Volume Required	998	CF
Pond Volume Proposed	1147	CF

LANDSCAPE POND VOLUME 1B		
CONTOUR	AREA	VOL (CF)
5109.0	532	
5108.0	215	374
5107.5	84	75
		0
Pond Volume		
448		

PROPOSED POND CALCULATIONS - SUB-BASIN 2 WATER HARVESTING BASIN

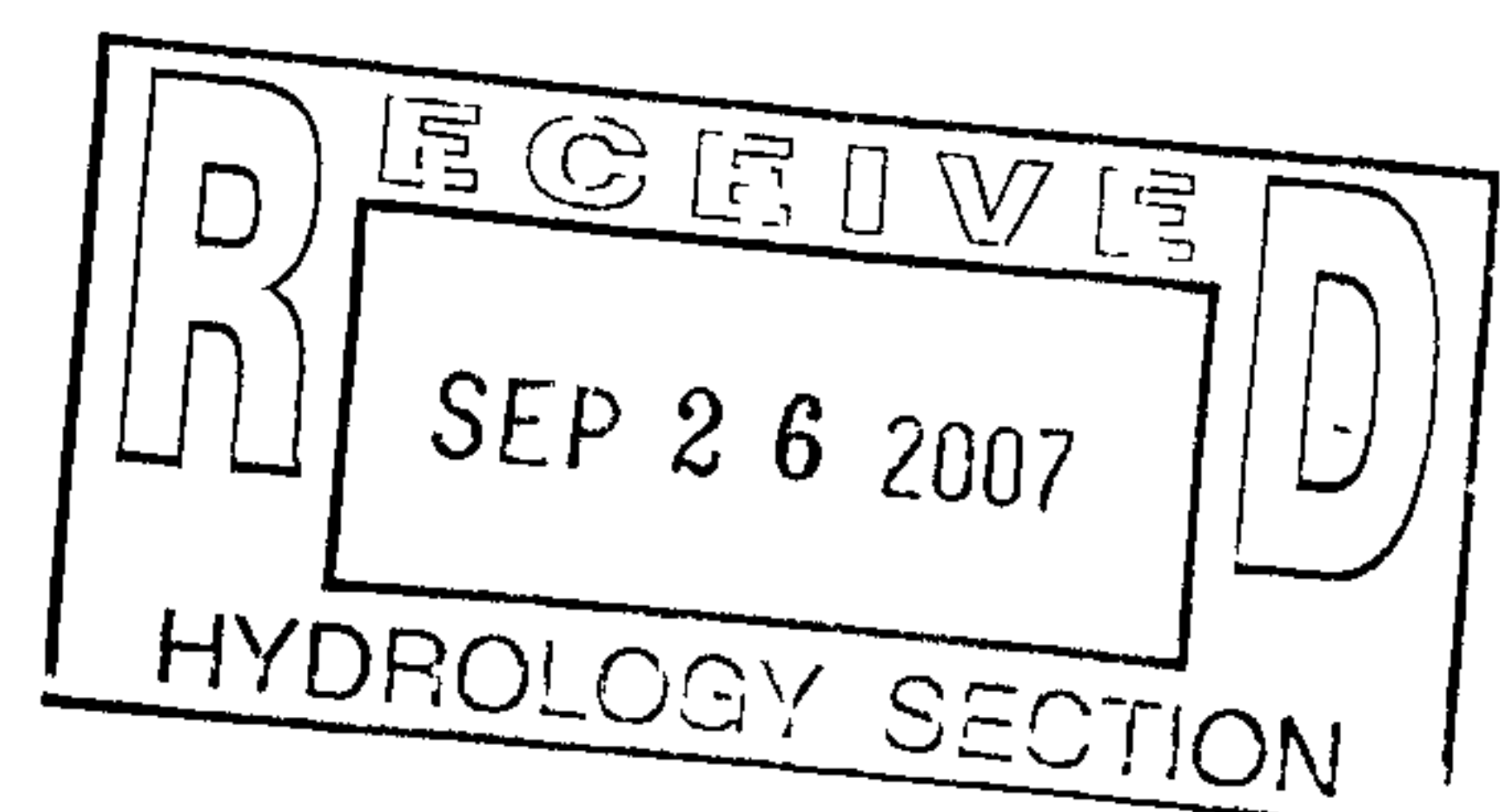
LANDSCAPE POND VOLUME 2		
CONTOUR	AREA	VOL (CF)
5114.0	484	
5113.0	220	352
		0
		0
Pond Volume		
352		

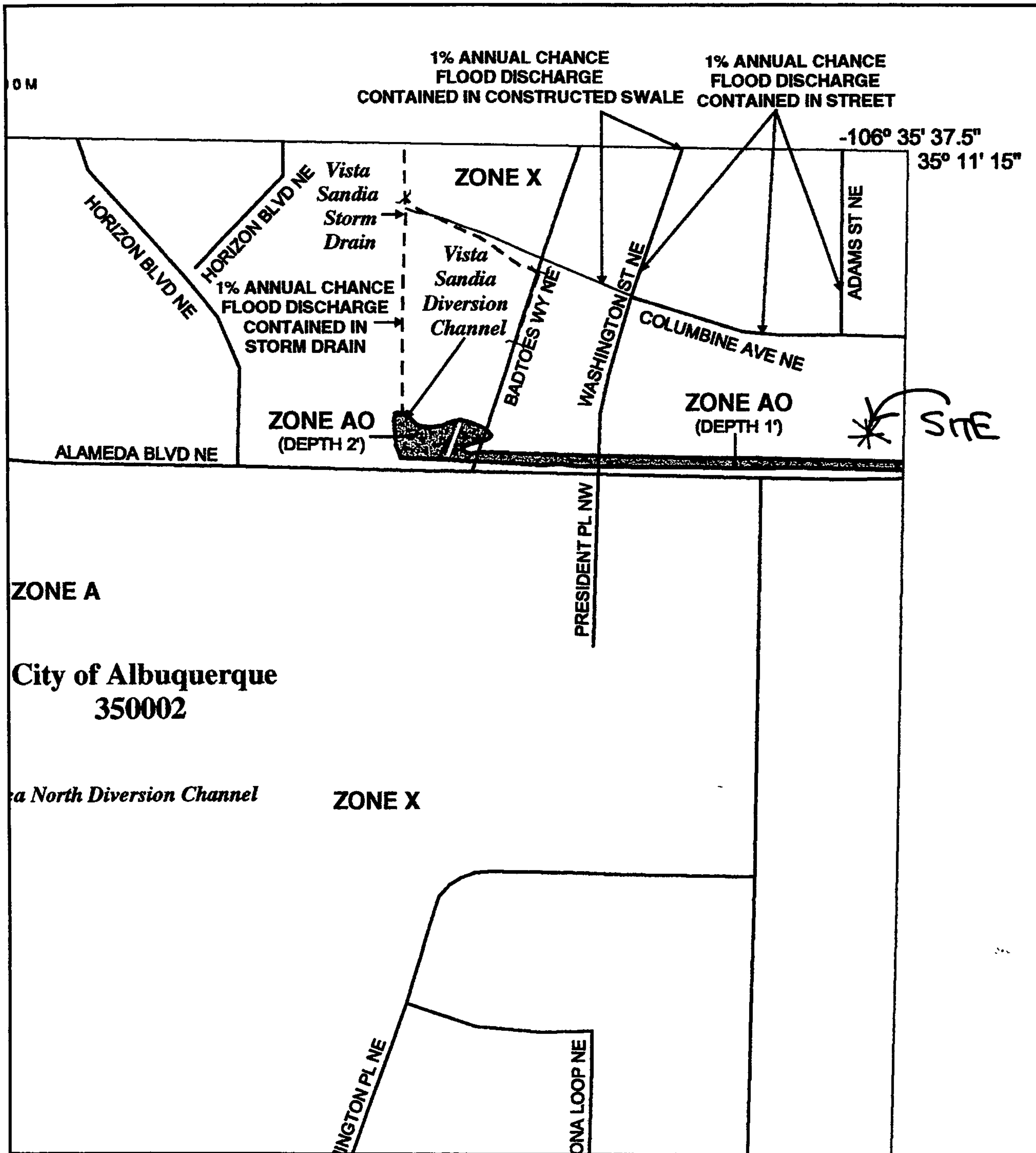
Pond Volume Required	155	CF	OK
Pond Volume Proposed	352	CF	

PROPOSED POND CALCULATIONS - MAIN POND

MAIN POND VOLUME		
CONTOUR	AREA	VOL (CF)
5108.0	5644	
5107.5	3452	2274
5107.0	2626	1520
5106.0	2502	2564
Pond Volume		
6358		

Pond Volume Required	6313	CF	OK
Pond Volume Proposed	6358	CF	





MAP SCALE 1" = 500'

500 1000 FEET

METERS

PANEL 0136F

FIRM

FLOOD INSURANCE RATE MAP

BERNALILLO COUNTY, NEW MEXICO AND INCORPORATED AREAS

PANEL 136 OF 825

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ALBUQUERQUE, CITY OF	350002	0136	F
BERNALILLO COUNTY	350001	0136	F
LOS RANCHOS DE ALBUQUERQUE, VILLAGE OF	350123	0136	F

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER 35001C0136F

MAP REVISED NOVEMBER 19, 2003

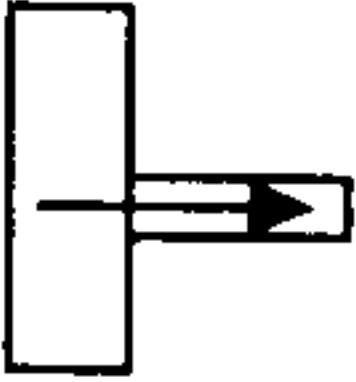
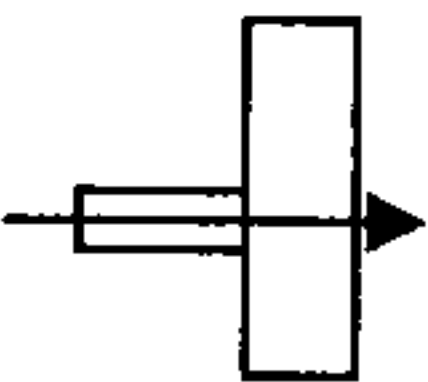
Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

POND VOLUMES

RICHFIELD PARK SUBDIVISION - LOTS 4 AND 5
7/9/2007

ELEV	AREA (SF)	VOLUME (CF)	VOLUME (Ac-ft)	SUM VOL (Ac-ft)
5108	5178	3111.5	0.071430211	0.071430211
5107	1045			

ORIFICE EQUATION - RECTANGULAR						
Rectangular Area	144 sq.in.		1.00 sq.ft.			
Width	24 in		2.00 ft			
Height	6 in		0.50 ft			
Headwater Elevation	1 feet		0.75		Actual H to centerline of culvert	
C	0.6		C values	Rounded	Sharp	Tube Out
g	32.2 f/s^2			0.98	0.61	0.80
						
						
$Q = C \cdot A \cdot ((2 \cdot g \cdot H)^{0.5})$ = 4.22 cfs for 1 sq.ft. orifice						

Richfield Park - Lots 4 & 5 - Public Storm Drain

