

Miko Bodaskevits Bohannon Huston Inc.



PDS P/u

Monica ortiz

Mike B. Hydrology



CHAVEZ-GRIEVES/CONSULTING ENGINEERS, INC.

5639 JEFFERSON N. E.
ALBUQUERQUE, NEW MEXICO 87109
(505) 344 - 4080 FAX (505) 343 - 8759

July 1, 1993

Mr. Ray Darnell
Rio Grande Zoo
903 Tenth Street SW
Albuquerque, NM 87102

RE: RIO GRANDE ZOO WATER QUALITY ISSUES

Dear Mr. Darnell:

Today we are submitting the final draft of the Rio Grande Zoo Master Drainage Plan to the City. In this Plan we addressed hydrologic issues required by the COA Hydrology Division for drainage plan submittal, and not water quality issues. In our contract to do this work, we also agreed to address water quality issues. Therefore, transmitted herewith is the report on water quality at the Zoo.

Please let us know if you have any questions or comments. We would appreciate the opportunity to serve you again in the future.

Sincerely,

CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC.

Joe P. Kelley, P.E.
Project Engineer

JPK:ms

CC w/attachments:

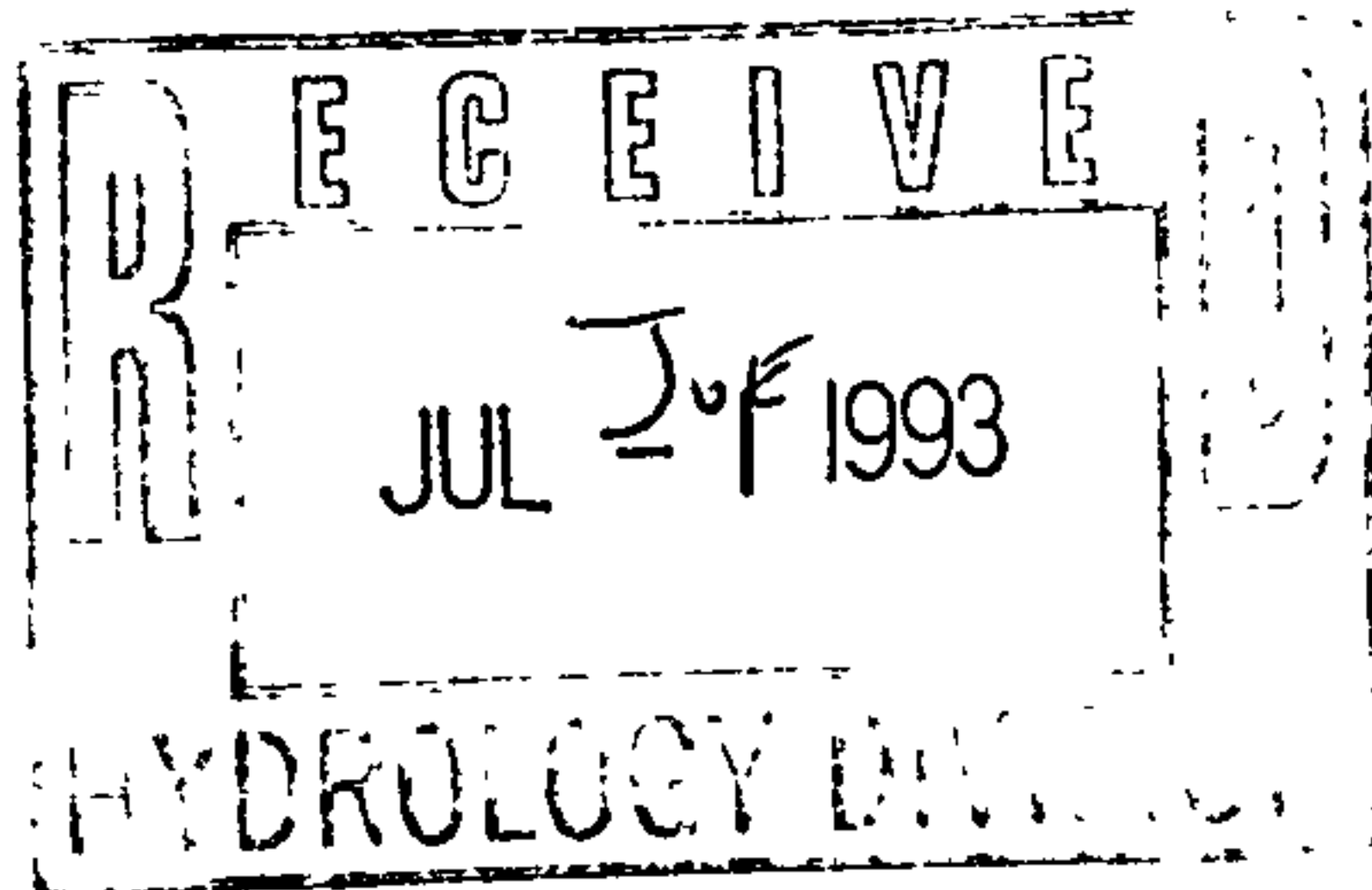
Mr. Loren Meinz, COA Public Works Department
Mr. Larry Read, C-G
Mr. Vic Chavez, C-G

LOREN MEINZIS

ROOM 301, I THINK -

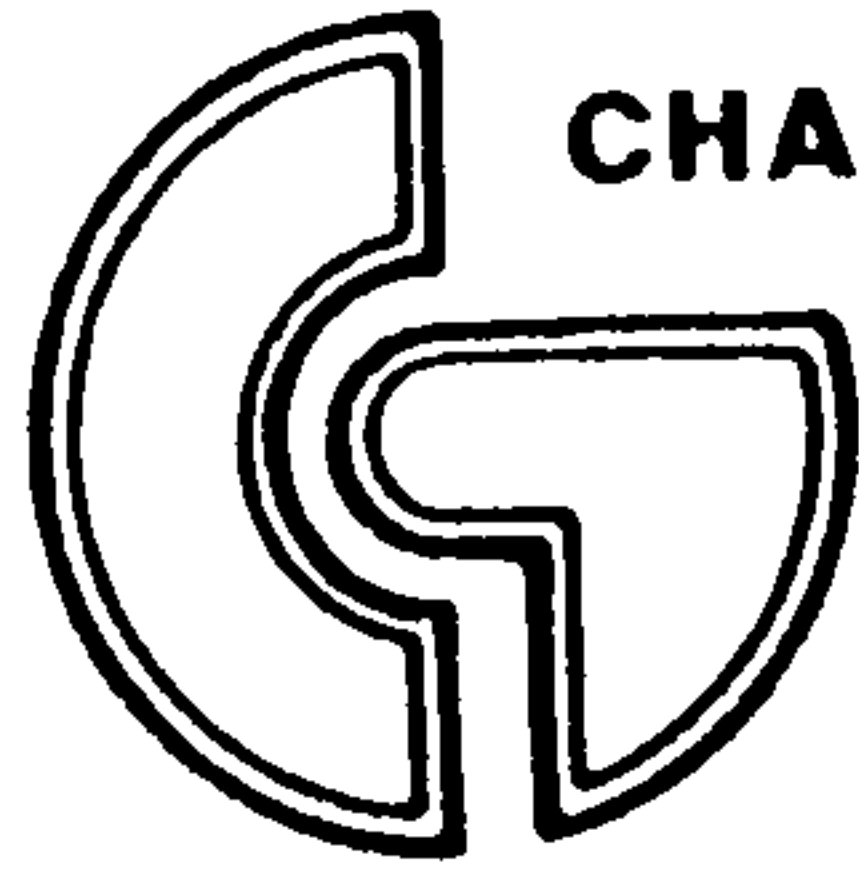
SAME ROOM AS HYDROLOGY

IN CITY HALL.



Bernie - FYI
Do we have a Zoo Master
File?

Return to Loren.



CHAVEZ-GRIEVES / CONSULTING ENGINEERS, INC.

5639 JEFFERSON N. E.
ALBUQUERQUE, NEW MEXICO 87109
(505) 344 - 4080 FAX (505) 343 - 8759

**REPORT ON
WATER QUALITY
AT THE
RIO GRANDE ZOO**

**ALBUQUERQUE, NEW MEXICO
JULY 1, 1993**

INTRODUCTION

This report has been prepared to address water quality concerns in the northwestern portion of the Rio Grande Zoo. This report covers the same portion of the Zoo that is covered by the Zoo Master Drainage Plan of this same date. Current Zoo practices relevant to water quality concerns are discussed in this report. A list of recommendations is included at the end of the report summarizing future steps the Zoo may want to take, or may have to take as environmental regulations change in the future.

1. CURRENT ZOO PRACTICE

U.S. DEPARTMENT OF AGRICULTURE INSPECTIONS

Everything the Zoo does on a day-to-day basis, including the discharge of run-off from animal holding areas, is regulated by the USDA Standards for Display and Housing of Exotic Species. The USDA makes unannounced inspections which average out to be about one a month. Sometimes they inspect as often as six times a month, and sometimes only once in three months. The areas of the Zoo that they inspect are chosen at random by the USDA. Every time the USDA makes an inspection, they fill out an inspection report. The reports itemize the conditions in the area that was inspected, specifically addressing everything from food to drainage. Copies of the inspection reports are maintained at the Zoo and at the USDA.

ANIMAL WASTES

Every day the Zoo performs these operations in each of its exhibits:

- feces are removed and disposed of
- exhibit is raked
- exhibit is swept

These maintenance actions are performed for two reasons: they promote the continued good health and safety of the animals; they keep the Zoo attractive and appealing. Contamination of ground water due to animals' solid wastes is minimal.

Solid animal wastes are disposed of in the same manner as municipal garbage, and the wastes end up in the City landfill.

Animal urine is disposed of in two ways. Some exhibits have impervious floors (e.g., some of the cat exhibits have concrete floors). These exhibits are hosed down, and the waste enters the sanitary sewer system. Parts or all of other exhibits have dirt and grass for ground cover. In these exhibits, the urine evaporates or infiltrates into the ground. During storm events, run-off ponds at the low point in these exhibits, and eventually evaporates or infiltrates into the ground. Storm events serve to greatly dilute the urine before it enters the ground.

In discussions with Astrid Larsen of the Environmental Protection Agency Region VI office in Dallas, and with the EPA National Storm Water Hotline, it was determined that this is an acceptable practice under current EPA criteria.

In discussions with Rick Powell of the New Mexico Service Water Quality Bureau, and with Richard Ohrbam of the New Mexico Groundwater Bureau, it was determined that no permit is required to discharge run-off in this manner. Even if this were a cattle feedlot or a dairy (in which nitrate concentrations due to animal excrement would be much higher), no State permits would be required as long as historical drainage patterns were not altered. The only time a permit would be required would be in the event that a lagoon was built, and ditches were constructed to convey storm water with animal wastes to a common lagoon. In that event, the State would require the lagoon and ditch to be constructed in accordance with their standards, and a Discharge Permit would be required as evidence that the lagoon construction was done to State standards.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

The Environmental Protection Agency has established the NPDES permitting process in order to regulate the quality of storm water run-off. Two EPA NPDES regulations potentially apply to the Zoo.

1) DISCHARGES FROM CONSTRUCTION AND INDUSTRIAL SITES

The EPA NPDES regulations for industrial or construction sites apply to sites of 5 acres or more. Sites of this type and size must submit a Notice of Intent (NOI) form to the Region VI office in Dallas prior to construction. During construction, a Storm Water Pollution Prevention Plan (SWP3) must be formulated and maintained on site at all times. At the end of construction, a Notice of Termination (NOT) form must be submitted to the EPA regional office.

EPA does not view the Zoo as an industrial site, and the impending Zoo projects total less than 5 acres; therefore the Zoo does not fall under the EPA requirements at this time. In the event that the Zoo does undertake a construction project of more than 5 acres, the EPA requirements would have to be followed.

2) DISCHARGES FROM CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFO's)

The EPA NPDES regulations for CAFO's applies to operations which confine more than 300 animal units (e.g., a dairy cow = 1 1/2 animal units; a pig = 1/3 animal unit) on nonvegetated soil for more than 45 days a year. These regulations do not apply to the Zoo at this time because the Zoo does not house

enough animals on nonvegetated soil. Should the Zoo increase to 300 or more the number of animal units it maintains on nonvegetated soil, it would then have to comply with this regulation.

In the future the EPA may require CAFO's of less than 300 animal units to comply with the NPDES regulations. At that time, the Zoo would have to submit an NOI to the EPA regional office, and a formal Pollution Prevention Plan would have to be developed and maintained on site.

The purpose of this EPA regulation is to prevent contamination of groundwater by operations with high animal concentrations such as feed lots, dairy farms, slaughter houses, etc. The concentration of animals at the Zoo is of a much lower magnitude than the animal concentrations found at feed lots, ground cover is more extensive, and maintenance of animal excrement is much better than at a feed lot. Technically, the Zoo may some day need to comply with this regulation as mentioned above, but practically speaking, the Zoo is very different from the feed lots which are the intended targets of this regulation.

USE OF HERBICIDES AND PESTICIDES

The Zoo uses herbicides and pesticides, primarily for maintenance of landscaping. The use of herbicides and pesticides in public places is regulated by the New Mexico State Department of Agriculture (NMSDA). Whenever chemicals are applied, it must be done in accordance with the product's labeling, and the rules of the NMSDA. The Zoo has two employees who hold Public Applicator's licenses from the NMSDA. Any chemical applied at the Zoo is applied by these personnel. The Zoo maintains a logbook of all chemicals applied, with the location, amount, rate of application, and date of application.

Herbicides and pesticides are stored out of the weather in a roofed building with a concrete floor. The chemical-storage area is locked, and only the licensed Applicators have keys.

VEHICLE MAINTENANCE AREAS

The Zoo maintains some of its vehicles inside a 7600 S.F. garage. The vehicles that are maintained on-site in this garage are the smaller electric and gas-powered carts. Oil changes on these vehicles are performed in this area. No ethylene glycol (anti-freeze) is used in this area because these vehicles have air-cooled engines and don't use anti-freeze. The City-owned automobiles used at the Zoo are maintained elsewhere. Construction equipment used at the zoo (e.g., front end loaders) is sometimes serviced at the Zoo garage by the owners of the equipment. The by-products of these maintenance operations are disposed of off-site by the

owners of the equipment. Since the vehicle maintenance operations are performed in a covered garage, there is no wash of contaminants into the ground water by storm run-off.

Waste oil is recycled by an outside recycling company that picks up the waste oil periodically. Waste oil is temporarily stored in 55 gallon drums in an open graveled area behind the garage. The drums have lids, so rain water doesn't enter them.

FUEL STORAGE

Two 500-gallon fuel storage tanks are adjacent to the maintenance garage. One is for diesel fuel, while the other is for gasoline. These tanks were installed so that the personnel carts and small service vehicles necessary for everyday operations at the Zoo can be refueled conveniently on site.

The tanks are on a concrete pad which has a curb around three sides. The fuel storage area is fenced and locked. Three Zoo employees have keys to the area, and fuel is dispensed by selected personnel only.

These tanks were relocated from another City-owned facility in about 1990. Above-ground tanks are inspected and regulated by the Fire Marshall, who monitored the tank installation in 1990, and who makes two to three site inspections of the Zoo every year.

SALT WATER FILTRATION

The Zoo recently installed a salt water filtration system that maintains the water quality in the new Sea Lion Exhibit. Water from the Sea Lion tank circulates through the system, and the impurities are removed. The system is comprised of four sand filter tanks that remove particulate matter from the water. Then chlorine and ozone are added to the water to kill the bacteria prior to recirculation into the tank. An unlined empty pond has been excavated adjacent to the filtration system. This pond serves the dual purpose of providing retention ponding during storm events, and of providing a ponding area for the sand filters in the event that a tank needs to be temporarily drained. Chemicals that are used in the salt water filtration system are stored out of the weather in an adjacent building. So the salt water filtration system is not a source of ground water contamination.

2. POSSIBLE FUTURE ACTIONS

- 1) Do not construct a common lagoon for discharge of run-off from animal exhibits. The present practice of ponding in individual exhibits is working well and is currently acceptable to the New Mexico State Groundwater Bureau.

2) The current method of disposing animal feces is acceptable. In researching this report, it was discovered that the new City composting facility is in need of manure. It may be profitable for the Zoo to contact the composting facility for disposal of the Zoo's animal wastes. Or the Zoo may be able to sell their animal wastes to a manure-processing company like Western Organic, Inc.

3) Whenever the Zoo plans on disturbing more than 5 total acres of land during single or simultaneous construction projects, the Zoo must follow the EPA's NOI, NOT, and SWP3 requirements. It is recommended that the Zoo never develop more than 5 acres at a time, so it doesn't have to deal with all the regulatory paperwork and expense.

4) Spill containment procedures should be posted in the fuel storage area to explain what to do in the event of a spill. An example of these procedures is in Appendix A. Have petroleum-absorbent bentonite clay granules (e.g. Zorb-All, or Wet-Dry) and/or rags available, along with an empty steel drum for disposal purposes.

APPENDIX A

EXAMPLE FUEL CONTAINMENT PROCEDURES

THE FOLLOWING PROCEDURES SHOULD BE FOLLOWED IN THE EVENT OF A FUEL SPILL.

- 1. DO NOT EXPOSE THE SPILL TO A SPARK OR A FLAME.**
- 2. STOP THE SOURCE OF THE SPILL.**
- 3. SOP THE SPILL UP WITH RAGS OR ZORB-ALL.**
- 4. PLACE ALL CONTAMINATED MATERIAL IN THE EMPTY 55-GALLON DRUM.**
- 5. NOTIFY THE CITY GARAGE FOR DISPOSAL OF THE CONTAMINATED MATERIAL.**



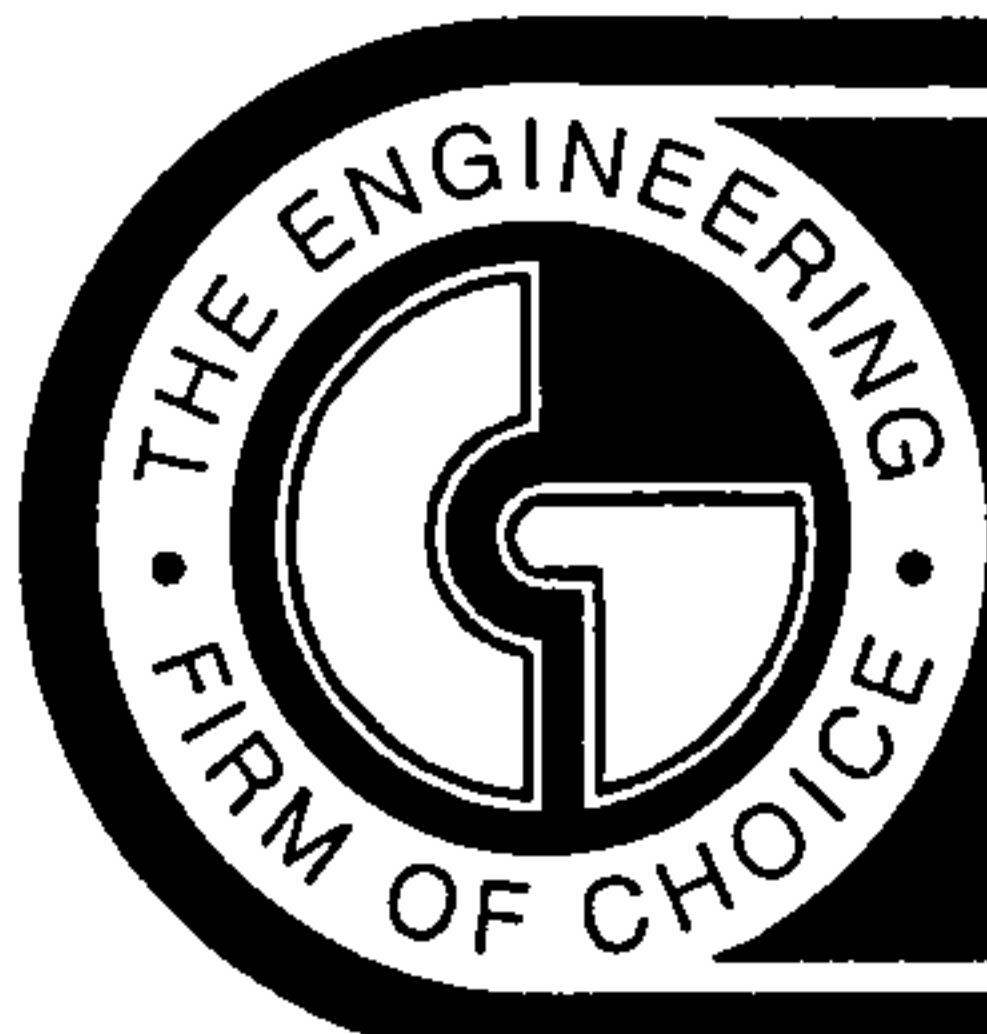
CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC.

5639 JEFFERSON STREET N.E.
ALBUQUERQUE, NEW MEXICO 87109
PHONE (505) 344-4080 FAX (505) 343-8759

MASTER DRAINAGE PLAN

FOR

THE RIO GRANDE ZOO



CHAVEZ · GRIEVES

CONSULTING ENGINEERS, INC.

5639 JEFFERSON STREET NE · ALBUQUERQUE, NEW MEXICO 87109 · PHONE (505) 344-4080 · FAX (505) 343-8759

May 2, 1994

Mr. Bernie Montoya, CE
City of Albuquerque Hydrology Division
City/County Bldg, Room 301
P.O. Box 1293
Albuquerque, New Mexico 87103

RE: Rio Grande Zoo Patio
Rio Grande Zoo Master Drainage Plan

Dear Mr. Montoya:

Transmitted herewith for building permit approval for the new Zoo Patio are the following:

1. Revised Master Drainage Plan. This plan is identical to the prior plan, except that Basin 38 has been revised, and Basin 52 has been added.
2. Xerox of a portion of the Master Plan with the Patio area highlighted.

The Zoo Patio project consists of the installation of a roof over an existing paved open-air eating area. No repaving or alteration of ground elevations will occur. The patio installation will not change the existing drainage pattern. The reason we revised the Master Plan is because the patio area was outside the limits of our previous study.

If you have any questions or comments while reviewing this Plan, please call.

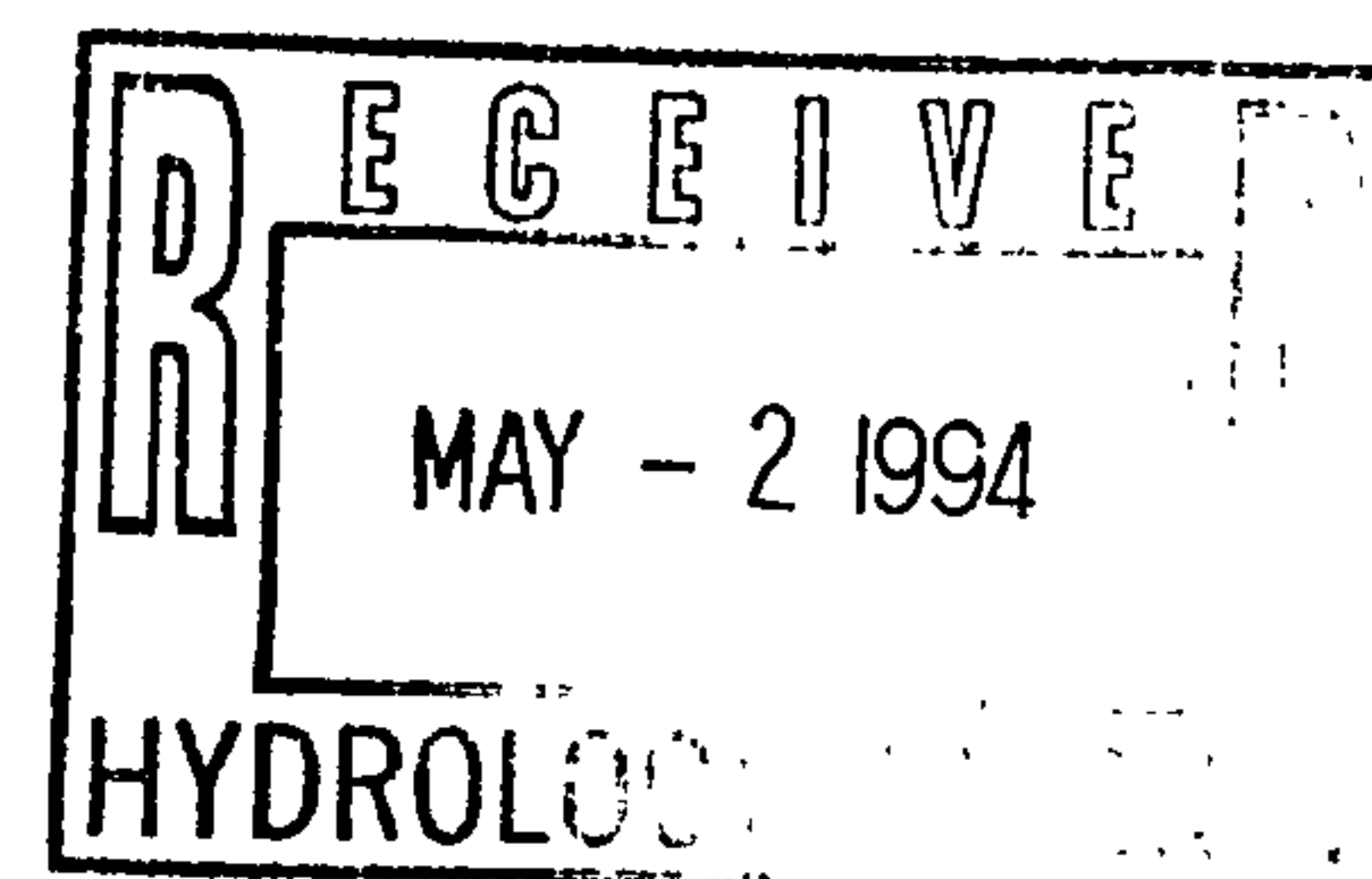
Thank you!

Sincerely,

CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC.

Joe P. Kelley, P.E.
Project Engineer

XC: Ms. Terri Smith, Rio Grande Zoo
Mr. Dale Crawford, DCA



DRAINAGE INFORMATION SHEET

PROJECT TITLE: ZOO PATIO / MASTER DRAINAGE PLAN ZONE ATLAS/DRNG.FILE #: K13/D39

LEGAL DESCRIPTION: S19, T10N, R3E, TOWN OF ATRISCO GRANT, RIO GRANDE ZOO

CITY ADDRESS: 10TH & STOVER

ENGINEERING FIRM: CHAVEZ-GREVES CONTACT: JOE KELLEY

ADDRESS: 5639 JEFFERSON NE PHONE: 399-9080

OWNER: RIO GRANDE ZOO CONTACT: TERRI SMITH

ADDRESS: _____ PHONE: 842-7299

ARCHITECT: DALE CRAWFORD CONTACT: DALE CRAWFORD

ADDRESS: 10701-F MONTGOMERY NE PHONE: 275-0157

SURVEYOR: N/A CONTACT: _____

ADDRESS: _____ PHONE: _____

CONTRACTOR: N/A CONTACT: _____

ADDRESS: _____ PHONE: _____

PRE-DESIGN MEETING:

☐ YES
☒ NO
☐ COPY OF CONFERENCE RECAP SHEET PROVIDED

DRB NO. _____
EPC NO. _____
PROJ. NO. _____

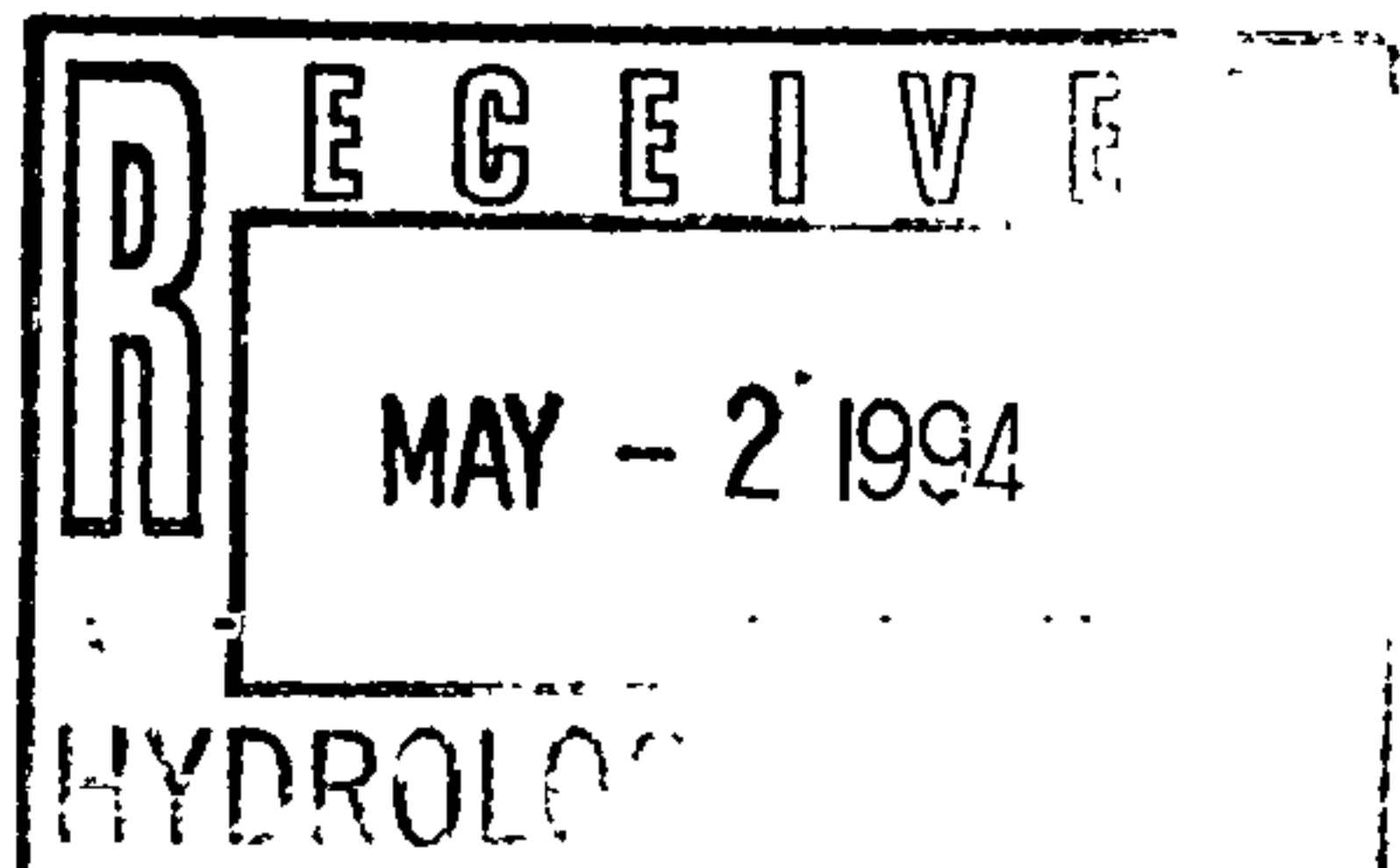
TYPE OF SUBMITTAL:

☒ DRAINAGE REPORT
☒ DRAINAGE PLAN
☐ CONCEPTUAL GRADING & DRAINAGE PLAN
☐ GRADING PLAN
☐ EROSION CONTROL PLAN
☐ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

☐ SKETCH PLAT APPROVAL
☐ PRELIMINARY PLAT APPROVAL
☐ SITE DEVELOPMENT PLAN APPROVAL
☐ FINAL PLAT APPROVAL
☒ BUILDING PERMIT APPROVAL
☐ FOUNDATION PERMIT APPROVAL
☐ CERTIFICATE OF OCCUPANCY APPROVAL
☐ ROUGH GRADING PERMIT APPROVAL
☐ GRADING/PAVING PERMIT APPROVAL
☐ OTHER _____ (SPECIFY)

DATE SUBMITTED: 5/2/94
BY: JOE KELLEY



MASTER DRAINAGE PLAN

FOR

THE RIO GRANDE ZOO

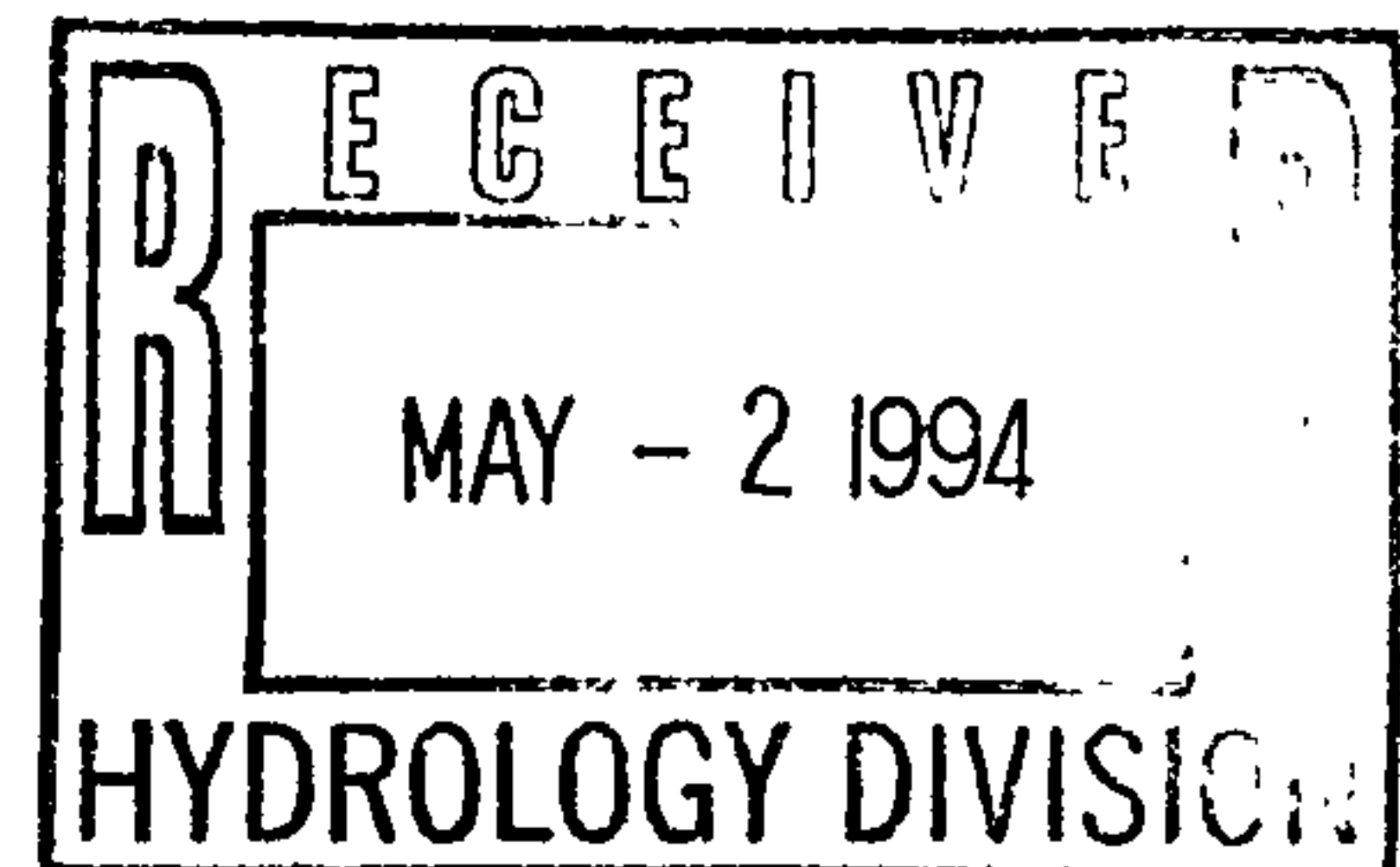
JULY, 1993

REVISED APRIL, 1994

CITY OF ALBUQUERQUE

CAPITAL IMPROVEMENTS PROJECT NO. 7370651

A/E JOB NO. 4424-01



I CERTIFY THAT I AM A REGISTERED PROFESSIONAL ENGINEER
IN THE STATE OF NEW MEXICO, AND THAT THIS REPORT WAS
PREPARED BY ME OR UNDER MY SUPERVISION.

Joe P. Kelley May 2, 1994
JOE P. KELLEY, P.E. DATE

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PLATES

MASTER DRAINAGE PLAN

PLATE 1A & 1B

AUTHORIZATION

Chavez-Grievess Consulting Engineers, Inc. was contracted by the City of Albuquerque on July 28, 1992 under A/E Job No. 4424-01, Capital Improvements Program Project No. 7370651, to prepare a Master Drainage Plan for the Rio Grande Zoo.

PURPOSE OF THIS SUBMITTAL

The purpose of this Report is to guide the Zoo as it plans exhibits in the northwest part of the Zoo. By following the design and recommendations in this report, the Zoo will be able to plan ahead for hydrologically sound exhibits. This report will also enable the Zoo to obtain City Hydrology approvals for recent and imminent Zoo construction in the portion of the Zoo addressed by this report. Recommendations have been made at the end of this report to help the Zoo improve the drainage aspects of its property.

Prior drainage reports, including several area Master Plans, have been prepared for portions of the Zoo. This report has been prepared only for the drainage areas shown in Plates 1A and 1B, which is the northwest part of the Zoo.

This report is a revision of a draft report submitted to the City Hydrology Department on April 2, 1993.

FUTURE CONSTRUCTION

This report provides the drainage plan for future construction in the northwest part of the Zoo. Whenever future construction actually occurs in the areas covered by this report, a site specific grading plan which has been prepared in accordance with the drainage pattern outlined in this report will need to be submitted for City approval.

LOCATION AND DESCRIPTION

The Rio Grande Zoo is located in southwest downtown Albuquerque, north of the Rio Grande River at the intersection of Stover Ave. SE and 10th St. SE. The property is zoned SU-2 for development as a Zoo. As shown by panel 350002-0028 of the National Flood Insurance Program Flood Insurance Rate Map for the City of Albuquerque, NM, dated October 14, 1983, the entire Zoo lies within a designated 100-year flood hazard zone.

About 75% of the Zoo property has currently been developed into exhibits, restaurants, research facilities, performance areas, and walkways. Conceptual plans have been developed for the northwest part of the Zoo property, and this Master Drainage Plan reflects these future plans.

EXISTING CONDITIONS

The Zoo is located in a low-lying area that is isolated from the City drainage system. It is comprised of many individual drainage sub-basins that retain run-off at their low points. Run-off ponds and is dissipated by evaporation and infiltration in some exhibits (most hoofstock exhibits, for instance). In other exhibits (the smaller carnivore exhibits, for instance), run-off is discharged to the sanitary sewer. Regardless of the method by which run-off is ultimately discharged, run-off is contained within each exhibit. There are no cross-exhibit discharges, or discharges from exhibits into pedestrian areas.

Some of the perimeter drainage basins discharge into City streets, where run-off is intercepted by the City storm drain system. Off-site discharges are only from paved or unpaved service areas, and none are from exhibit areas. Thus, water that is discharged off-site is the same quality as typical urban run-off.

According to the 1977 Soil Survey of Bernalillo County by the Soil Conservation Service, the soils on the Zoo property are of three types. Adjacent to the river is soil type Af, Agua loam. On the rest of the site are soil types Bs and Bt, Brazito silty clay loam and Brazito complex. These soils are within hydrologic soils groups A and B, and they are fairly permeable.

Within the Zoo property, ground cover consists of native and domestic grasses. Deciduous trees overhang a large portion of the area.

PROPOSED CONDITIONS AND NEW CONSTRUCTION

The primary area of new and future construction is in the northwest portion of the Zoo property. A new elephant exhibit, a new rhino exhibit, a new ostrich exhibit, and enclosures for other future animals will be built in this area. Adjacent to this development will be a new Children's Zoo. The runoff retention ponds in this portion of the Zoo will be provided primarily within exhibit areas. The ponds are to be sized and located as shown on the Plates 1A and 1B.

A new cafe is being built, along with repaving in a central walkway portion of the Zoo. A slight increase in impervious area will result from this construction. New ponding areas have been proposed adjacent to the walkways: in planters, cobbled dirt areas, and in a new grassed area. The required size and general location of these ponds and are noted on the Plates 1A and 1B.

A new 1.3 acre paved parking lot is slated for construction in an undeveloped area north of the existing lots. In its undeveloped state, the drainage basin discharges 2.88 cfs to 10th Street. In its developed state, the basin produces 7.04 cfs. By routing the

run-off through a detention pond in the new parking lot, it was possible to reduce the peak run-off to 3.05 cfs. This is a minor increase from the existing run-off, and will have negligible impact on the storm drain system in 10th Street.

A new polar bear exhibit with a new outdoor patio is to be built in an undeveloped area west of the existing polar bear exhibit. The majority of the new exhibit is impervious animal display area, and will be discharged to the sanitary sewer system. The remainder of the new exhibit is impervious roof and patio areas which will contribute run-off to existing Basin 16.

BASIS OF CALCULATIONS

Hydrologic calculations were based on AMAFCA's computerized hydrologic model, AHYMO, in conjunction with Section 22.2 of Albuquerque's Development Process Manual. An AHYMO analysis of the 100-year, 6-hour rainfall event was made, and is on page 10 of this report.

Under current City criteria adopted in May, 1991, retention ponds must be sized to retain the 100-year, 10-day storm. 10-day storm volumes were calculated in accordance with the methodology on page A-8 of DPM Section 22.2 - Hydrology, January, 1993. The required pond sizes calculated by this method are listed on Plate 1A, and the ponding areas are graphically depicted on Plates 1A and 1B.

RECOMMENDATIONS

1. Build the new parking lot in Basin 39 to provide the ponding volume and discharge listed in this report.
2. Alter the pedestrian walkway that winds through Basins 40-42 and 47-49 so that the run-off from the walkway can freely enter the ponding areas in the animal exhibits adjacent to the walkway. Free discharge into the exhibits can be accomplished by turning some of the concrete blocks adjacent to the exhibits on their sides, allowing storm run-off to spill into the exhibits.
3. The pedestrian walk in Basins 19, 21, and 25 (running from the kudos down to the cafe) is planned for reconstruction soon. Whenever the walk is reconstructed, the walkway should be engineered in conjunction with a new adjacent retention pond in order to eliminate nuisance ponding in the walkway area. Runoff from the three basins should be routed into one common ponding area that is not in the walkway at all.
4. When building the new exhibits in Basins 1-4 and 6-9, provide the retention ponding volumes listed on Plate 1A of this report.

APRIL, 1994 REVISION

This drainage plan was updated to include a portion of the Zoo west of the Main Entrance. Basin 52 was added to the plan, and Basin 38 was revised.

Job RIO GRANDE ZOO MASTER DRAINAGE
Subject NEW PARKING LOT - HYDRAULIC CALCULATIONS
Client ZOO

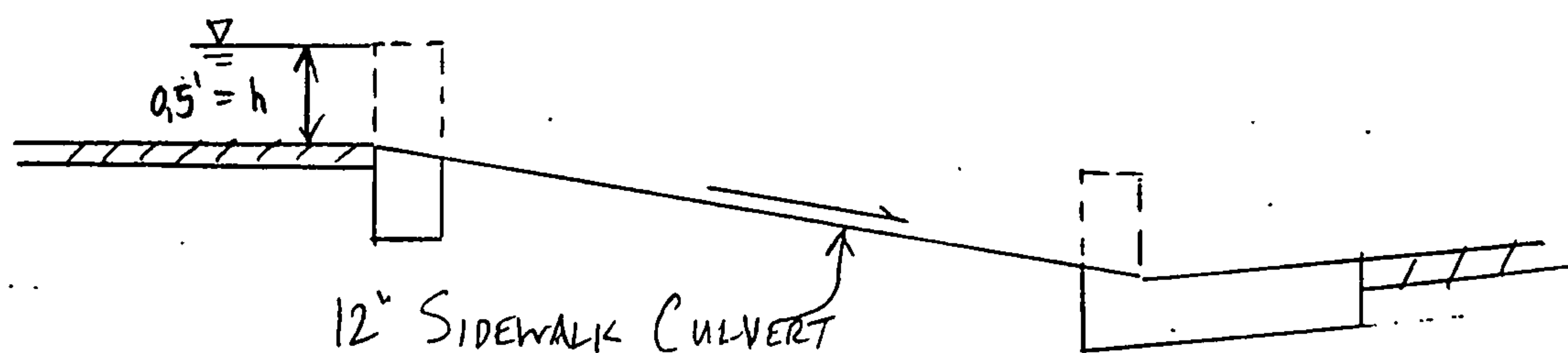
Sheet No. _____ of _____
Job. No. _____
By JPK Date 3/31/93



CHAVEZ - GRIEVES / CONSULTING ENGINEERS, Inc.

Albuquerque, NM

1. Use a 12" SIDEWALK CULVERT AT EACH LOW POINT, AND DISCHARGE INTO THE STREET.



USE THE WEIR EQUATION TO DETERMINE THE DISCHARGE:

$$Q = 3.0 L h^{1.5} (0.75) \quad \text{25\% CLOGGING FACTOR} \quad L \text{ IS THE WEIR LENGTH } = 1'$$

$$Q = 3.0 (1) (0.5)^{1.5} (0.75) = 0.80 \text{ CFS PER SIDEWALK CULVERT}$$

$$4 \text{ CULVERTS. } \rightarrow \therefore Q_{TOT} = 3.20 \text{ CFS}$$

THIS IS SLIGHTLY MORE THAN THE EXISTING Q OF 2.88 CFS

2. FROM THE ALL/MO RUN, IT CAN BE SEEN THAT THE EXISTING DISCHARGE FROM THE PARKING LOT (BASIN 39) IS 2.88 CFS. THE DEVELOPED RUNOFF IS 7.04 CFS. BY ROUTING THIS RUNOFF THROUGH A 0.10 AC-FT POND CREATED IN THE PARKING LOT, THE FINAL DEVELOPED DISCHARGE CAN BE REDUCED TO 3.05 CFS. THIS IS ESSENTIALLY THE SAME AS THE EXISTING PEAK RUNOFF RATE, AND WILL NOT NEGATIVELY IMPACT THE STORM DRAIN SYSTEM.

Job RIO GRANDE ZOO MASTER DRAINAGE
Subject HYDROLOGIC CALCULATIONS
Client Z60

Sheet No. _____ of _____
Job. No. _____
By JPK Date 5/4/93



CHAVEZ - GRIEVES / CONSULTING ENGINEERS, Inc.

Albuquerque, NM

DETERMINATION OF 100-YEAR, 10-DAY RUNOFF VOLUME

USE THE PROCEDURE OUTLINED IN DPM SECTION 22.2, JAN. 1993 ED.

$$\text{Eq'n A-9: } V_{10\text{-DAY}} = V_{360} + A_D (P_{10\text{-DAY}} - P_{360}) / 12''/1$$

$$\text{Eq'n C-9: } P_{10\text{-DAY}} = 10.0 - \left[\frac{29.9}{(P_{1440})^{1.4}} \right]$$

$$P_{10\text{-DAY}} = 10.0 - \frac{29.9}{(2.64)^{1.4}} = 3.60''$$

$$V_{10\text{-DAY}} = V_{360} + A_D (3.60 - 2.27) / 12$$

WHERE V_{360} = 6-HOUR STORM VOLUME (AC-FT)

A_D = IMPERVIOUS AREA (ACRES)

$$V_{10\text{-DAY}} = V_{360} + A_D (0.11)$$

THESE VALUES ARE TABULATED FOR EACH DRAINAGE BASIN ON PLATE IA.

AHYMO PROGRAM (AHYMO392) - AMAFCA VERSION OF HYMO - MARCH, 1992
 RUN DATE (MON/DAY/YR) = 04/29/1994
 START TIME (HR:MIN:SEC) = 13:22:21 USER NO.= J_KELLY_.S92
 INPUT FILE = B:\ZOO\ZOOMSTR.IN

***** CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC. *****

** AHYMO RUN FOR THE RIO GRANDE ZOO MASTER DRAINAGE PLAN

** FILENAME: C:\HYMO\ZOOMSTR.IN/OUT

** 100-YEAR, 6-HOUR STORM

** DATE: MARCH 31, 1993

** REVISED APRIL 29, 1994. ADDED BASIN 52, AND REVISED BASIN 38

**

START 0.00

RAINFALL TYPE=1 RAIN QUARTER=0.0 RAIN ONE=1.93
 RAIN SIX=2.27 RAIN DAY=2.64 DT=0.033333

COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.

DT = .033333 HOURS END TIME = 5.999940 HOURS

.0000	.0017	.0034	.0051	.0069	.0087	.0106
.0125	.0145	.0165	.0185	.0206	.0228	.0250
.0273	.0297	.0321	.0346	.0372	.0399	.0427
.0456	.0485	.0517	.0549	.0583	.0618	.0656
.0695	.0736	.0780	.0833	.0890	.0951	.1082
.1376	.1827	.2475	.3359	.4522	.6004	.7849
1.0101	1.2184	1.3056	1.3792	1.4446	1.5042	1.5591
1.6100	1.6576	1.7022	1.7441	1.7837	1.8211	1.8566
1.8901	1.9219	1.9521	1.9807	2.0079	2.0142	2.0202
2.0258	2.0312	2.0363	2.0412	2.0459	2.0504	2.0548
2.0590	2.0631	2.0671	2.0709	2.0747	2.0783	2.0818
2.0853	2.0886	2.0919	2.0951	2.0982	2.1013	2.1043
2.1072	2.1101	2.1129	2.1157	2.1184	2.1210	2.1236
2.1262	2.1287	2.1312	2.1337	2.1361	2.1385	2.1408
2.1431	2.1454	2.1476	2.1498	2.1520	2.1541	2.1562
2.1583	2.1604	2.1624	2.1645	2.1664	2.1684	2.1703
2.1723	2.1742	2.1760	2.1779	2.1797	2.1816	2.1833
2.1851	2.1869	2.1886	2.1904	2.1921	2.1938	2.1954
2.1971	2.1987	2.2004	2.2020	2.2036	2.2052	2.2067
2.2083	2.2099	2.2114	2.2129	2.2144	2.2159	2.2174
2.2189	2.2203	2.2218	2.2232	2.2246	2.2260	2.2275
2.2288	2.2302	2.2316	2.2330	2.2343	2.2357	2.2370
2.2383	2.2396	2.2410	2.2423	2.2435	2.2448	2.2461
2.2474	2.2486	2.2499	2.2511	2.2524	2.2536	2.2548
2.2560	2.2572	2.2584	2.2596	2.2608	2.2620	2.2631
2.2643	2.2654	2.2666	2.2677	2.2689	2.2700	

* COMPUTE BASIN 1. BASIN 1 IS THE SERVICE ROAD ADJACENT TO THE
 * NEW RHINO ENCLOSURE AND THE NEW ENCLOSURES 2 AND 3.

COMPUTE NM HYD ID=1 HYD=101 DA=.000569 SQ MI
 %A=0.0 %B=0.0 %C=100.0 %D=0.0
 TP=0.1333 RAINFALL=-1

K = .106544HR TP = .133300HR K/TP RATIO = .799277 SHAPE CONSTANT, N = 4.482733

UNIT PEAK = 1.6483 CFS UNIT VOLUME = .9924 B = 386.16 P60 = 1.9300
AREA = .000569 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 101.00

RUNOFF VOLUME = 1.05306 INCHES = .0320 ACRE-FEET
PEAK DISCHARGE RATE = 1.10 CFS AT 1.500 HOURS BASIN AREA = .0006 SQ. MI.

* COMPUTE BASIN 2. BASIN 2 IS THE FUTURE RHINO YARD.

COMPUTE NM HYD ID=1 HYD=102 DA=.001110 SQ MI
%A=90.0 %B=0.0 %C=0.0 %D=10.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .43823 CFS UNIT VOLUME = .9751 B = 526.28 P60 = 1.9300
AREA = .000111 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 2.0654 CFS UNIT VOLUME = .9928 B = 275.59 P60 = 1.9300
AREA = .000999 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 102.00

RUNOFF VOLUME = .63507 INCHES = .0376 ACRE-FEET
PEAK DISCHARGE RATE = 1.22 CFS AT 1.533 HOURS BASIN AREA = .0011 SQ. MI.

* COMPUTE BASIN 3. BASIN 3 IS THE FUTURE ENCLOSURE 3 AND THE

* ROOF OF THE NEW RHINO BLDG.

COMPUTE NM HYD ID=1 HYD=103 DA=.001203 SQ MI
%A=70.0 %B=0.0 %C=0.0 %D=30.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.4249 CFS UNIT VOLUME = .9911 B = 526.28 P60 = 1.9300
AREA = .000361 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.7410 CFS UNIT VOLUME = .9912 B = 275.59 P60 = 1.9300
AREA = .000842 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 103.00

RUNOFF VOLUME = .94620 INCHES = .0607 ACRE-FEET
PEAK DISCHARGE RATE = 1.80 CFS AT 1.500 HOURS BASIN AREA = .0012 SQ. MI.

* COMPUTE BASIN 4. BASIN 4 IS HALF OF THE ROOF OF THE NEW
* ELEPHANT BLDG, AND THE REAR SERVICE YARD.

COMPUTE NM HYD ID=1 HYD=104 DA=.000894 SQ MI
%A=72.0 %B=0.0 %C=11.0 %D=17.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .60003 CFS UNIT VOLUME = .9815 B = 526.28 P60 = 1.9300
AREA = .000152 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .154799HR TP = .133300HR K/TP RATIO = 1.161282 SHAPE CONSTANT, N = 3.052481
UNIT PEAK = 1.5924 CFS UNIT VOLUME = .9910 B = 286.07 P60 = 1.9300
AREA = .000742 SQ MI IA = .61024 INCHES INF = 1.55867 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 104.00

RUNOFF VOLUME = .79085 INCHES = .0377 ACRE-FEET
PEAK DISCHARGE RATE = 1.20 CFS AT 1.500 HOURS BASIN AREA = .0009 SQ. MI.

* COMPUTE BASIN 5. BASIN 5 IS THE EXISTING LECHWE ENCLOSURE.

COMPUTE NM HYD ID=1 HYD=105 DA=.000821 SQ MI
%A=96.0 %B=0.0 %C=0.0 %D=4.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .12965 CFS UNIT VOLUME = .9169 B = 526.28 P60 = 1.9300
AREA = .000033 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.6295 CFS UNIT VOLUME = .9906 B = 275.59 P60 = 1.9300
AREA = .000788 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 105.00

RUNOFF VOLUME = .54173 INCHES = .0237 ACRE-FEET
PEAK DISCHARGE RATE = .82 CFS AT 1.533 HOURS BASIN AREA = .0008 SQ. MI.

* COMPUTE BASIN 6. BASIN 6 IS THE NEW ELEPHANT YARD.
COMPUTE NM HYD ID=1 HYD=106 DA=.001198 SQ MI
%A=100.0 %B=0.0 %C=0.0 %D=0.0
TP=0.1333 RAINFALL=-1

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 2.4768 CFS UNIT VOLUME = .9937 B = 275.59 P60 = 1.9300
AREA = .001198 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 106.00

RUNOFF VOLUME = .47950 INCHES = .0306 ACRE-FEET
PEAK DISCHARGE RATE = 1.09 CFS AT 1.533 HOURS BASIN AREA = .0012 SQ. MI.

* COMPUTE BASIN 7. BASIN 7 IS FUTURE ENCLOSURE 2 ADJACENT
* TO THE NEW ELEPHANT BLDG.

COMPUTE NM HYD ID=1 HYD=107 DA=.002337 SQ MI
%A=70.0 %B=0.0 %C=0.0 %D=30.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 2.7680 CFS UNIT VOLUME = .9955 B = 526.28 P60 = 1.9300
AREA = .000701 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 3.3821 CFS UNIT VOLUME = .9954 B = 275.59 P60 = 1.9300
AREA = .001636 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 107.00

RUNOFF VOLUME = .94620 INCHES = .1179 ACRE-Feet
PEAK DISCHARGE RATE = 3.49 CFS AT 1.500 HOURS BASIN AREA = .0023 SQ. MI.

* COMPUTE BASIN 8. BASIN 8 IS THE FUTURE OSTRICH YARD.

COMPUTE NM HYD ID=1 HYD=108 DA=.000573 SQ MI
%A=88.0 %B=0.0 %C=0.0 %D=12.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .27147 CFS UNIT VOLUME = .9547 B = 526.28 P60 = 1.9300
AREA = .000069 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.0425 CFS UNIT VOLUME = .9860 B = 275.59 P60 = 1.9300
AREA = .000504 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 108.00

RUNOFF VOLUME = .66618 INCHES = .0204 ACRE-Feet
PEAK DISCHARGE RATE = .66 CFS AT 1.500 HOURS BASIN AREA = .0006 SQ. MI.

* COMPUTE BASIN 9. BASIN 9 IS THE NEW SERVICE ROAD BETWEEN
* THE CAT EXHIBIT AND THE NEW ENCLOSURE 2.

COMPUTE NM HYD ID=1 HYD=109 DA=.000638 SQ MI
%A=0.0 %B=0.0 %C=100.0 %D=0.0
TP=0.1333 RAINFALL=-1

K = .106544HR TP = .133300HR K/TP RATIO = .799277 SHAPE CONSTANT, N = 4.482733
UNIT PEAK = 1.8482 CFS UNIT VOLUME = .9932 B = 386.16 P60 = 1.9300
AREA = .000638 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 109.00

RUNOFF VOLUME = 1.05306 INCHES = .0358 ACRE-FEET
PEAK DISCHARGE RATE = 1.23 CFS AT 1.500 HOURS BASIN AREA = .0006 SQ. MI.

* COMPUTE BASIN 10. BASIN 10 IS THE CAT EXHIBITS.

COMPUTE NM HYD ID=1 HYD=1010 DA=.000791 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 3.1229 CFS UNIT VOLUME = .9955 B = 526.28 P60 = 1.9300
AREA = .000791 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1010.00

RUNOFF VOLUME = 2.03516 INCHES = .0859 ACRE-FEET
PEAK DISCHARGE RATE = 2.29 CFS AT 1.500 HOURS BASIN AREA = .0008 SQ. MI.

* COMPUTE BASIN 11. BASIN 11 IS THE LION EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1011 DA=.000203 SQ MI
%A=80.0 %B=0.0 %C=0.0 %D=20.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .16029 CFS UNIT VOLUME = .9286 B = 526.28 P60 = 1.9300
AREA = .000041 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .33575 CFS UNIT VOLUME = .9558 B = 275.59 P60 = 1.9300
AREA = .000162 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1011.00

RUNOFF VOLUME = .79063 INCHES = .0086 ACRE-FEET
PEAK DISCHARGE RATE = .28 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 12. BASIN 12 IS THE SERVICE AREA BETWEEN

* THE NEW POLAR BEAR EXHIBIT AND THE LION EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1012 DA=.000181 SQ MI
%A=0.0 %B=0.0 %C=100.0 %D=0.0
TP=0.1333 RAINFALL=-1

K = .106544HR TP = .133300HR K/TP RATIO = .799277 SHAPE CONSTANT, N = 4.482733
UNIT PEAK = .52434 CFS UNIT VOLUME = .9751 B = 386.16 P60 = 1.9300
AREA = .000181 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1012.00

RUNOFF VOLUME = 1.05306 INCHES = .0102 ACRE-FEET
PEAK DISCHARGE RATE = .36 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 13. BASIN 13 IS THE CHEETAH EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1013 DA=.000548 SQ MI
%A=95.0 %B=0.0 %C=0.0 %D=5.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .10818 CFS UNIT VOLUME = .8874 B = 526.28 P60 = 1.9300
AREA = .000027 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.0763 CFS UNIT VOLUME = .9860 B = 275.59 P60 = 1.9300
AREA = .000521 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1013.00

RUNOFF VOLUME = .55729 INCHES = .0163 ACRE-FEET
PEAK DISCHARGE RATE = .56 CFS AT 1.533 HOURS BASIN AREA = .0005 SQ. MI.

* COMPUTE BASIN 14. BASIN 14 IS PART OF THE NEW POLAR
* BEAR EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1014 DA=.000074 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = .29216 CFS UNIT VOLUME = .9610 B = 526.28 P60 = 1.9300
 AREA = .000074 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1014.00

RUNOFF VOLUME = 2.03517 INCHES = .0080 ACRE-FEET
 PEAK DISCHARGE RATE = .22 CFS AT 1.500 HOURS BASIN AREA = .0001 SQ. MI.

* COMPUTE BASIN 15. BASIN 15 IS PART OF THE NEW POLAR
 * BEAR EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1015 DA=.000401 SQ MI
 %A=0.0 %B=0.0 %C=0.0 %D=100.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 1.5832 CFS UNIT VOLUME = .9922 B = 526.28 P60 = 1.9300
 AREA = .000401 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1015.00

RUNOFF VOLUME = 2.03517 INCHES = .0435 ACRE-FEET
 PEAK DISCHARGE RATE = 1.17 CFS AT 1.500 HOURS BASIN AREA = .0004 SQ. MI.

* COMPUTE BASIN 16. BASIN 16 IS THE LARGE GRASSED AREA
 * IN FRONT OF THE PERFORMANCE STAGE.

COMPUTE NM HYD ID=1 HYD=1016 DA=.006052 SQ MI
 %A=85.0 %B=0.0 %C=0.0 %D=15.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 3.5840 CFS UNIT VOLUME = .9961 B = 526.28 P60 = 1.9300
 AREA = .000908 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
 UNIT PEAK = 10.635 CFS UNIT VOLUME = .9984 B = 275.59 P60 = 1.9300
 AREA = .005144 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1016.00

RUNOFF VOLUME = .71285 INCHES = .2301 ACRE-FEET
PEAK DISCHARGE RATE = 7.19 CFS AT 1.500 HOURS BASIN AREA = .0061 SQ. MI.

* COMPUTE BASIN 17. BASIN 17 IS A DEPRESSED CAGE ADJACENT
* TO THE CAT EXHIBITS.

COMPUTE NM HYD ID=1 HYD=1017 DA=.000278 SQ MI
%A=66.0 %B=0.0 %C=0.0 %D=34.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .37317 CFS UNIT VOLUME = .9664 B = 526.28 P60 = 1.9300
AREA = .000095 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .37934 CFS UNIT VOLUME = .9614 B = 275.59 P60 = 1.9300
AREA = .000183 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1017.00

RUNOFF VOLUME = 1.00843 INCHES = .0150 ACRE-FEET
PEAK DISCHARGE RATE = .45 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 18. BASIN 18 IS THE NATURE THEATRE.

COMPUTE NM HYD ID=1 HYD=1018 DA=.000367 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.4489 CFS UNIT VOLUME = .9911 B = 526.28 P60 = 1.9300
AREA = .000367 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1018.00

RUNOFF VOLUME = 2.03517 INCHES = .0398 ACRE-FEET
PEAK DISCHARGE RATE = 1.07 CFS AT 1.500 HOURS BASIN AREA = .0004 SQ. MI.

* COMPUTE BASIN 19. BASIN 19 IS THE FUTURE CHILDREN'S
* ZOO AREA.

COMPUTE NM HYD ID=1 HYD=1019 DA=.002034 SQ MI
%A=57.0 %B=0.0 %C=33.0 %D=10.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .80303 CFS UNIT VOLUME = .9840 B = 526.28 P60 = 1.9300
AREA = .000203 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .141774HR TP = .133300HR K/TP RATIO = 1.063574 SHAPE CONSTANT, N = 3.320290
UNIT PEAK = 4.2156 CFS UNIT VOLUME = .9968 B = 306.97 P60 = 1.9300
AREA = .001831 SQ MI IA = .54000 INCHES INF = 1.36200 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1019.00

RUNOFF VOLUME = .78411 INCHES = .0851 ACRE-FEET
PEAK DISCHARGE RATE = 2.82 CFS AT 1.500 HOURS BASIN AREA = .0020 SQ. MI.

* COMPUTE BASIN 20. BASIN 20 IS THE SERVICE AREA BEHIND
* THE NEW RESTAURANT.

COMPUTE NM HYD ID=1 HYD=1020 DA=.000487 SQ MI
%A=10.0 %B=0.0 %C=40.0 %D=50.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .96135 CFS UNIT VOLUME = .9881 B = 526.28 P60 = 1.9300
AREA = .000244 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .117669HR TP = .133300HR K/TP RATIO = .882739 SHAPE CONSTANT, N = 4.020106
UNIT PEAK = .65123 CFS UNIT VOLUME = .9799 B = 356.51 P60 = 1.9300
AREA = .000244 SQ MI IA = .41000 INCHES INF = .99800 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1020.00

RUNOFF VOLUME = 1.46883 INCHES = .0382 ACRE-FEET
PEAK DISCHARGE RATE = 1.13 CFS AT 1.500 HOURS BASIN AREA = .0005 SQ. MI.

* COMPUTE BASIN 21. BASIN 21 IS THE WALKWAY BETWEEN THE
* NEW RESTAURANT AND THE SEA LION EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1021 DA=.000673 SQ MI
%A=10.0 %B=0.0 %C=40.0 %D=50.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.3285 CFS UNIT VOLUME = .9911 B = 526.28 P60 = 1.9300
AREA = .000337 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .117669HR TP = .133300HR K/TP RATIO = .882739 SHAPE CONSTANT, N = 4.020106
UNIT PEAK = .89996 CFS UNIT VOLUME = .9850 B = 356.51 P60 = 1.9300
AREA = .000337 SQ MI IA = .41000 INCHES INF = .99800 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1021.00

RUNOFF VOLUME = 1.46883 INCHES = .0527 ACRE-FEET
PEAK DISCHARGE RATE = 1.55 CFS AT 1.500 HOURS BASIN AREA = .0007 SQ. MI.

* COMPUTE BASIN 22. BASIN 22 IS THE SEA LION EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1022 DA=.000182 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .71855 CFS UNIT VOLUME = .9840 B = 526.28 P60 = 1.9300
AREA = .000182 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1022.00

RUNOFF VOLUME = 2.03517 INCHES = .0198 ACRE-FEET
PEAK DISCHARGE RATE = .53 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 23. BASIN 23 IS THE OLD SEA LION EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1023 DA=.000131 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .51719 CFS UNIT VOLUME = .9786 B = 526.28 P60 = 1.9300
AREA = .000131 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1023.00

RUNOFF VOLUME = 2.03517 INCHES = .0142 ACRE-Feet
PEAK DISCHARGE RATE = .39 CFS AT 1.500 HOURS BASIN AREA = .0001 SQ. MI.

* COMPUTE BASIN 24. BASIN 24 IS THE PRAIRIE DOG EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1024 DA=.000073 SQ MI
%A=85.0 %B=0.0 %C=0.0 %D=15.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .43231E-01CFS UNIT VOLUME = .8874 B = 526.28 P60 = 1.9300
AREA = .000011 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .12829 CFS UNIT VOLUME = .8850 B = 275.59 P60 = 1.9300
AREA = .000062 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1024.00

RUNOFF VOLUME = .71285 INCHES = .0028 ACRE-Feet
PEAK DISCHARGE RATE = .10 CFS AT 1.500 HOURS BASIN AREA = .0001 SQ. MI.

* COMPUTE BASIN 25. BASIN 25 IS THE WALKWAY IN FRONT OF THE

* RESTROOM BLDG.

COMPUTE NM HYD ID=1 HYD=1025 DA=.000844 SQ MI
%A=5.0 %B=0.0 %C=25.0 %D=10.0
TP=0.1333 RAINFALL=-1

*****WARNING***** SUM OF TREATMENT TYPES DOES NOT EQUAL 100 PERCENT OR TOTAL AREA

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .83304 CFS UNIT VOLUME = .9862 B = 526.28 P60 = 1.9300
AREA = .000211 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .115815HR TP = .133300HR K/TP RATIO = .868829 SHAPE CONSTANT, N = 4.089414
UNIT PEAK = 1.7147 CFS UNIT VOLUME = .9929 B = 361.09 P60 = 1.9300
AREA = .000633 SQ MI IA = .40000 INCHES INF = .97000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1025.00

RUNOFF VOLUME = 1.20324 INCHES = .0542 ACRE-FEET
PEAK DISCHARGE RATE = 1.71 CFS AT 1.500 HOURS BASIN AREA = .0008 SQ. MI.

* COMPUTE BASIN 26. BASIN 26 IS THE BISON EXHIBIT.
COMPUTE NM HYD ID=1 HYD=1026 DA=.001048 SQ MI
%A=90.0 %B=0.0 %C=0.0 %D=10.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .41376 CFS UNIT VOLUME = .9711 B = 526.28 P60 = 1.9300
AREA = .000105 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.9500 CFS UNIT VOLUME = .9923 B = 275.59 P60 = 1.9300
AREA = .000943 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1026.00

RUNOFF VOLUME = .63507 INCHES = .0355 ACRE-FEET
PEAK DISCHARGE RATE = 1.15 CFS AT 1.533 HOURS BASIN AREA = .0010 SQ. MI.

* COMPUTE BASIN 27. BASIN 27 IS THE EXISTING ELEPHANT
* EXHIBIT.
COMPUTE NM HYD ID=1 HYD=1027 DA=.000296 SQ MI
%A=75.0 %B=0.0 %C=0.0 %D=25.0

TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .29216 CFS UNIT VOLUME = .9610 B = 526.28 P60 = 1.9300
AREA = .000074 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .45897 CFS UNIT VOLUME = .9685 B = 275.59 P60 = 1.9300
AREA = .000222 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1027.00

RUNOFF VOLUME = .86842 INCHES = .0137 ACRE-FEET
PEAK DISCHARGE RATE = .43 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 28. BASIN 28 IS THE GIRAFFE EXHIBIT.
COMPUTE NM HYD ID=1 HYD=1028 DA=.001128 SQ MI
%A=85.0 %B=0.0 %C=0.0 %D=15.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .66801 CFS UNIT VOLUME = .9815 B = 526.28 P60 = 1.9300
AREA = .000169 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.9823 CFS UNIT VOLUME = .9923 B = 275.59 P60 = 1.9300
AREA = .000959 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1028.00

RUNOFF VOLUME = .71285 INCHES = .0429 ACRE-FEET
PEAK DISCHARGE RATE = 1.35 CFS AT 1.500 HOURS BASIN AREA = .0011 SQ. MI.

* COMPUTE BASIN 29. BASIN 29 IS THE PAVED AREA NORTH OF
* THE GIRAFFE EXHIBIT THAT DISCHARGES TO RIO AVE.
COMPUTE NM HYD ID=1 HYD=1029 DA=.000438 SQ MI

%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.7292 CFS UNIT VOLUME = .9933 B = 526.28 P60 = 1.9300
AREA = .000438 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1029.00

RUNOFF VOLUME = 2.03516 INCHES = .0475 ACRE-FEET
PEAK DISCHARGE RATE = 1.27 CFS AT 1.500 HOURS BASIN AREA = .0004 SQ. MI.

* COMPUTE BASIN 30. BASIN 30 IS AN AFRICAN HOOFSTOCK EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1030 DA=.000266 SQ MI
%A=100.0 %B=0.0 %C=0.0 %D=0.0
TP=0.1333 RAINFALL=-1

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .54994 CFS UNIT VOLUME = .9725 B = 275.59 P60 = 1.9300
AREA = .000266 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1030.00

RUNOFF VOLUME = .47950 INCHES = .0068 ACRE-FEET
PEAK DISCHARGE RATE = .25 CFS AT 1.533 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 31. BASIN 31 IS THE PAVED WALKWAY/SERVICE

* AREA NORTH OF THE BISON.

COMPUTE NM HYD ID=1 HYD=1031 DA=.000464 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.8319 CFS UNIT VOLUME = .9933 B = 526.28 P60 = 1.9300
AREA = .000464 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1031.00

RUNOFF VOLUME = 2.03517 INCHES = .0504 ACRE-FEET
PEAK DISCHARGE RATE = 1.35 CFS AT 1.500 HOURS BASIN AREA = .0005 SQ. MI.

* COMPUTE BASIN 32. BASIN 32 IS THE VACANT EXHIBIT AREA
* EAST OF THE BISON.

COMPUTE NM HYD ID=1 HYD=1032 DA=.000749 SQ MI
%A=95.0 %B=0.0 %C=0.0 %D=5.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .14785 CFS UNIT VOLUME = .9169 B = 526.28 P60 = 1.9300
AREA = .000037 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.4711 CFS UNIT VOLUME = .9900 B = 275.59 P60 = 1.9300
AREA = .000712 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1032.00

RUNOFF VOLUME = .55729 INCHES = .0223 ACRE-FEET
PEAK DISCHARGE RATE = .76 CFS AT 1.533 HOURS BASIN AREA = .0007 SQ. MI.

* COMPUTE BASIN 33. BASIN 33 IS THE SERVICE AREA FOR THE
* SALT WATER FILTRATION.

COMPUTE NM HYD ID=1 HYD=1033 DA=.000700 SQ MI
%A=50.0 %B=0.0 %C=30.0 %D=20.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .55273 CFS UNIT VOLUME = .9786 B = 526.28 P60 = 1.9300
AREA = .000140 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .141311HR TP = .133300HR K/TP RATIO = 1.060096 SHAPE CONSTANT, N = 3.330964
UNIT PEAK = 1.2930 CFS UNIT VOLUME = .9896 B = 307.78 P60 = 1.9300
AREA = .000560 SQ MI IA = .53750 INCHES INF = 1.35500 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1033.00

RUNOFF VOLUME = .92645 INCHES = .0346 ACRE-FEET
 PEAK DISCHARGE RATE = 1.10 CFS AT 1.500 HOURS BASIN AREA = .0007 SQ. MI.

* COMPUTE BASIN 34. BASIN 34 IS THE FUTURE PAVED WALKWAY AREA

* SOUTH OF THE CAMEL AND KUDU.

COMPUTE NM HYD ID=1 HYD=1034 DA=.000736 SQ MI
 %A=40.0 %B=0.0 %C=0.0 %D=60.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 1.7435 CFS UNIT VOLUME = .9933 B = 526.28 P60 = 1.9300
 AREA = .000442 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
 UNIT PEAK = .60866 CFS UNIT VOLUME = .9760 B = 275.59 P60 = 1.9300
 AREA = .000294 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1034.00

RUNOFF VOLUME = 1.41290 INCHES = .0555 ACRE-FEET
 PEAK DISCHARGE RATE = 1.55 CFS AT 1.500 HOURS BASIN AREA = .0007 SQ. MI.

* COMPUTE BASIN 35. BASIN 35 IS THE CAMEL YARD.

COMPUTE NM HYD ID=1 HYD=1035 DA=.000676 SQ MI
 %A=95.0 %B=0.0 %C=0.0 %D=5.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = .13344 CFS UNIT VOLUME = .9169 B = 526.28 P60 = 1.9300
 AREA = .000034 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
 UNIT PEAK = 1.3277 CFS UNIT VOLUME = .9885 B = 275.59 P60 = 1.9300
 AREA = .000642 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1035.00

RUNOFF VOLUME = .55729 INCHES = .0201 ACRE-Feet
 PEAK DISCHARGE RATE = .69 CFS AT 1.533 HOURS BASIN AREA = .0007 SQ. MI.

* COMPUTE BASIN 36. BASIN 36 IS THE KUDU YARD.
 COMPUTE NM HYD ID=1 HYD=1036 DA=.000809 SQ MI
 %A=95.0 %B=0.0 %C=0.0 %D=5.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = .15970 CFS UNIT VOLUME = .9286 B = 526.28 P60 = 1.9300
 AREA = .000040 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
 UNIT PEAK = 1.5889 CFS UNIT VOLUME = .9906 B = 275.59 P60 = 1.9300
 AREA = .000769 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1036.00

RUNOFF VOLUME = .55729 INCHES = .0240 ACRE-Feet
 PEAK DISCHARGE RATE = .82 CFS AT 1.533 HOURS BASIN AREA = .0008 SQ. MI.

* COMPUTE BASIN 37. BASIN 37 IS THE GIBBON EXHIBIT.
 COMPUTE NM HYD ID=1 HYD=1037 DA=.000215 SQ MI
 %A=50.0 %B=0.0 %C=0.0 %D=50.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = .42442 CFS UNIT VOLUME = .9711 B = 526.28 P60 = 1.9300
 AREA = .000108 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
 UNIT PEAK = .22225 CFS UNIT VOLUME = .9334 B = 275.59 P60 = 1.9300
 AREA = .000108 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1037.00

RUNOFF VOLUME = 1.25733 INCHES = .0144 ACRE-Feet
 PEAK DISCHARGE RATE = .42 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 38. BASIN 38 IS THE SERVICE ROAD

* JUST NORTH OF THE MAIN ENTRANCE.

COMPUTE NM HYD ID=1 HYD=1038 DA=.000509 SQ MI
 %A=0.0 %B=0.0 %C=0.0 %D=100.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 2.0096 CFS UNIT VOLUME = .9933 B = 526.28 P60 = 1.9300
 AREA = .000509 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1038.00

RUNOFF VOLUME = 2.03516 INCHES = .0552 ACRE-Feet
 PEAK DISCHARGE RATE = 1.48 CFS AT 1.500 HOURS BASIN AREA = .0005 SQ. MI.

* COMPUTE BASIN 39 UNDER EXISTING CONDITIONS.

COMPUTE NM HYD ID=1 HYD=1039 DA=.002777 SQ MI
 %A=85.0 %B=0.0 %C=15.0 %D=0.0
 TP=0.1333 RAINFALL=-1

K = .153827HR TP = .133300HR K/TP RATIO = 1.153991 SHAPE CONSTANT, N = 3.070528
 UNIT PEAK = 5.9899 CFS UNIT VOLUME = .9974 B = 287.52 P60 = 1.9300
 AREA = .002777 SQ MI IA = .60500 INCHES INF = 1.54400 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1039.00

RUNOFF VOLUME = .54365 INCHES = .0805 ACRE-Feet
 PEAK DISCHARGE RATE = 2.88 CFS AT 1.533 HOURS BASIN AREA = .0028 SQ. MI.

* COMPUTE BASIN 39. BASIN 39 IS THE NEW OVERFLOW

* PARKING LOT.

COMPUTE NM HYD ID=1 HYD=1039 DA=.002777 SQ MI

%A=10.0 %B=0.0 %C=15.0 %D=75.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 8.2228 CFS UNIT VOLUME = .9981 B = 526.28 P60 = 1.9300
 AREA = .002083 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .128795HR TP = .133300HR K/TP RATIO = .966201 SHAPE CONSTANT, N = 3.656216
 UNIT PEAK = 1.7268 CFS UNIT VOLUME = .9923 B = 331.56 P60 = 1.9300
 AREA = .000694 SQ MI IA = .47000 INCHES INF = 1.16600 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1039.00

RUNOFF VOLUME = 1.71993 INCHES = .2547 ACRE-FEET
 PEAK DISCHARGE RATE = 7.04 CFS AT 1.500 HOURS BASIN AREA = .0028 SQ. MI.

- * ROUTE THE NEW PARKING LOT RUNOFF THROUGH A DETENTION
- * POND IN THE PARKING LOT IN ORDER TO DECREASE THE
- * RUNOFF TO LESS THAN EXISTING.

ROUTE RESERVOIR ID=2 HYD=1039.1 INFLOW ID=1 CODE=10
 OUTFLOW(CFS) STORAGE(AC-FT) EL(FT)
 0 0 0
 3.1 0.10 0.5

* * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	.00	.000	.00
.33	.00	.00	.000	.00
.67	.00	.00	.000	.00
1.00	.00	.00	.000	.00
1.33	1.90	.04	.008	.26
1.67	3.61	.49	.097	3.02
2.00	1.60	.41	.083	2.56
2.33	.35	.25	.049	1.53
2.67	.14	.12	.025	.77
3.00	.07	.06	.012	.39
3.33	.05	.03	.006	.20
3.67	.04	.02	.003	.11
4.00	.04	.01	.002	.07
4.33	.03	.01	.002	.05
4.67	.03	.01	.001	.04

5.00	.04	.01	.001	.04
5.33	.04	.01	.001	.04
5.67	.04	.01	.001	.04
6.00	.04	.01	.001	.04
6.33	.00	.00	.001	.03
6.67	.00	.00	.000	.01
7.00	.00	.00	.000	.01
7.33	.00	.00	.000	.00

PEAK DISCHARGE = 3.051 CFS - PEAK OCCURS AT HOUR 1.70

MAXIMUM WATER SURFACE ELEVATION = .492

MAXIMUM STORAGE = .0984 AC-FT INCREMENTAL TIME= .033333HRS

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 1039.10

RUNOFF VOLUME = 1.71984 INCHES = .2547 ACRE-FEET

PEAK DISCHARGE RATE = 3.05 CFS AT 1.700 HOURS BASIN AREA = .0028 SQ. MI.

* COMPUTE BASIN 40. BASIN 40 IS THE ANTELOPE EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1040 DA=.002026 SQ MI

%A=71.0 %B=0.0 %C=0.0 %D=29.0

TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420

UNIT PEAK = 2.3196 CFS UNIT VOLUME = .9941 B = 526.28 P60 = 1.9300

AREA = .000588 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302

UNIT PEAK = 2.9739 CFS UNIT VOLUME = .9948 B = 275.59 P60 = 1.9300

AREA = .001438 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1040.00

RUNOFF VOLUME = .93064 INCHES = .1006 ACRE-FEET

PEAK DISCHARGE RATE = 2.98 CFS AT 1.500 HOURS BASIN AREA = .0020 SQ. MI.

* COMPUTE BASIN 41. BASIN 41 IS AN AFRICAN HOOFSTOCK

* EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1041 DA=.000824 SQ MI

%A=50.0 %B=0.0 %C=0.0 %D=50.0

TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.6266 CFS UNIT VOLUME = .9922 B = 526.28 P60 = 1.9300
AREA = .000412 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .85179 CFS UNIT VOLUME = .9829 B = 275.59 P60 = 1.9300
AREA = .000412 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1041.00

RUNOFF VOLUME = 1.25733 INCHES = .0553 ACRE-FEET
PEAK DISCHARGE RATE = 1.57 CFS AT 1.500 HOURS BASIN AREA = .0008 SQ. MI.

* COMPUTE BASIN 42. BASIN 42 IS AN AFRICAN HOOFSTOCK
* EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1042 DA=.000317 SQ MI
%A=60.0 %B=0.0 %C=0.0 %D=40.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .50061 CFS UNIT VOLUME = .9751 B = 526.28 P60 = 1.9300
AREA = .000127 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .39323 CFS UNIT VOLUME = .9639 B = 275.59 P60 = 1.9300
AREA = .000190 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1042.00

RUNOFF VOLUME = 1.10177 INCHES = .0186 ACRE-FEET
PEAK DISCHARGE RATE = .55 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 43. BASIN 43 IS AN OFF-EXHIBIT AFRICAN
* HOOFSTOCK AREA.

COMPUTE NM HYD ID=1 HYD=1043 DA=.000255 SQ MI
%A=90.0 %B=0.0 %C=0.0 %D=10.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .10068 CFS UNIT VOLUME = .8874 B = 526.28 P60 = 1.9300
AREA = .000026 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .47448 CFS UNIT VOLUME = .9685 B = 275.59 P60 = 1.9300
AREA = .000230 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1043.00

RUNOFF VOLUME = .63507 INCHES = .0086 ACRE-FEET
PEAK DISCHARGE RATE = .29 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

- * COMPUTE BASIN 44. BASIN 44 IS A PAVED SERVICE AREA
- * NORTHEAST OF THE AFRICAN HOOFSTOCK.

COMPUTE NM HYD ID=1 HYD=1044 DA=.000226 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .89226 CFS UNIT VOLUME = .9862 B = 526.28 P60 = 1.9300
AREA = .000226 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1044.00

RUNOFF VOLUME = 2.03517 INCHES = .0245 ACRE-FEET
PEAK DISCHARGE RATE = .66 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

- * COMPUTE BASIN 45. BASIN 45 IS A PAVED SERVICE AREA
- * NORTHEAST OF THE AFRICAN HOOFSTOCK.

COMPUTE NM HYD ID=1 HYD=1045 DA=.000306 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 1.2081 CFS UNIT VOLUME = .9897 B = 526.28 P60 = 1.9300
 AREA = .000306 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1045.00

RUNOFF VOLUME = 2.03517 INCHES = .0332 ACRE-FEET
 PEAK DISCHARGE RATE = .89 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

- * COMPUTE BASIN 46. BASIN 46 IS A PAVED PERIMETER SERVICE
- * DRIVE THAT DISCHARGES DIRECTLY TO STOVER STREET.

COMPUTE NM HYD ID=1 HYD=1046 DA=.000232 SQ MI
 %A=0.0 %B=0.0 %C=0.0 %D=100.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = .91595 CFS UNIT VOLUME = .9862 B = 526.28 P60 = 1.9300
 AREA = .000232 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1046.00

RUNOFF VOLUME = 2.03517 INCHES = .0252 ACRE-FEET
 PEAK DISCHARGE RATE = .68 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

- * COMPUTE BASIN 47. BASIN 47 IS AN AFRICAN HOOFSTOCK
- * EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1047 DA=.001484 SQ MI
 %A=88.0 %B=0.0 %C=0.0 %D=12.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = .70307 CFS UNIT VOLUME = .9840 B = 526.28 P60 = 1.9300
 AREA = .000178 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
 UNIT PEAK = 2.6999 CFS UNIT VOLUME = .9945 B = 275.59 P60 = 1.9300
 AREA = .001306 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD

ID=1 CODE=1

HYDROGRAPH FROM AREA 1047.00

RUNOFF VOLUME = .66618 INCHES = .0527 ACRE-FEET
PEAK DISCHARGE RATE = 1.68 CFS AT 1.500 HOURS BASIN AREA = .0015 SQ. MI.

* COMPUTE BASIN 48. BASIN 48 IS THE KANGAROO EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1048 DA=.000578 SQ MI
%A=90.0 %B=0.0 %C=0.0 %D=10.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .22820 CFS UNIT VOLUME = .9473 B = 526.28 P60 = 1.9300
AREA = .000058 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.0755 CFS UNIT VOLUME = .9860 B = 275.59 P60 = 1.9300
AREA = .000520 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD

ID=1 CODE=1

HYDROGRAPH FROM AREA 1048.00

RUNOFF VOLUME = .63507 INCHES = .0196 ACRE-FEET
PEAK DISCHARGE RATE = .64 CFS AT 1.533 HOURS BASIN AREA = .0006 SQ. MI.

* COMPUTE BASIN 49. BASIN 49 IS THE EXISTING RHINO EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1049 DA=.000614 SQ MI
%A=93.0 %B=0.0 %C=0.0 %D=7.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .16969 CFS UNIT VOLUME = .9286 B = 526.28 P60 = 1.9300
AREA = .000043 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.1806 CFS UNIT VOLUME = .9878 B = 275.59 P60 = 1.9300
AREA = .000571 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1049.00

RUNOFF VOLUME = .58840 INCHES = .0193 ACRE-FEET
PEAK DISCHARGE RATE = .65 CFS AT 1.533 HOURS BASIN AREA = .0006 SQ. MI.

* COMPUTE BASIN 50. BASIN 50 IS A PAVED SERVICE ROAD
* THAT DISCHARGES TO 12TH STREET.

COMPUTE NM HYD ID=1 HYD=1050 DA=.000190 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .75013 CFS UNIT VOLUME = .9840 B = 526.28 P60 = 1.9300
AREA = .000190 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1050.00

RUNOFF VOLUME = 2.03516 INCHES = .0206 ACRE-FEET
PEAK DISCHARGE RATE = .56 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 51. BASIN 51 IS A PAVED SERVICE ROAD THAT
* DISCHARGES TO STOVER STREET.

COMPUTE NM HYD ID=1 HYD=1051 DA=.000372 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.4687 CFS UNIT VOLUME = .9911 B = 526.28 P60 = 1.9300
AREA = .000372 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1051.00

RUNOFF VOLUME = 2.03517 INCHES = .0404 ACRE-FEET
PEAK DISCHARGE RATE = 1.08 CFS AT 1.500 HOURS BASIN AREA = .0004 SQ. MI.

* COMPUTE BASIN 52. BASIN 52 IS IMMEDIATELY WEST OF THE ZOO
* ENTRANCE.

COMPUTE NM HYD ID=1 HYD=1052 DA=.000409 SQ MI
%A=0.0 %B=14.0 %C=0.0 %D=86.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.3887 CFS UNIT VOLUME = .9911 B = 526.28 P60 = 1.9300
AREA = .000352 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .131123HR TP = .133300HR K/TP RATIO = .983665 SHAPE CONSTANT, N = 3.589803
UNIT PEAK = .14039 CFS UNIT VOLUME = .9008 B = 326.83 P60 = 1.9300
AREA = .000057 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1052.00

RUNOFF VOLUME = 1.85047 INCHES = .0404 ACRE-FEET
PEAK DISCHARGE RATE = 1.11 CFS AT 1.500 HOURS BASIN AREA = .0004 SQ. MI.

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 13:22:41

AHYMO PROGRAM (AHYMO392) - AMAFCA VERSION OF HYMO - MARCH, 1992
 RUN DATE (MON/DAY/YR) = 04/29/1994
 START TIME (HR:MIN:SEC) = 13:15:36 USER NO.= J_KELLY_.S92
 INPUT FILE = B:\ZOO\ZOOMSTR.IN

***** CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC. *****
 ** AHYMO RUN FOR THE RIO GRANDE ZOO MASTER DRAINAGE PLAN
 ** FILENAME: C:\HYMO\ZOOMSTR.IN/OUT
 ** 100-YEAR, 24-HOUR STORM
 ** DATE: MARCH 31, 1993
 ** REVISED APRIL 29, 1994. ADDED BASIN 52, AND REVISED BASIN 38
 **

START 0.00
 RAINFALL TYPE=2 RAIN QUARTER=0.0 RAIN ONE=1.93
 RAIN SIX=2.27 RAIN DAY=2.64 DT=0.05

COMPUTED 24-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.

DT = .050000 HOURS			END TIME = 24.000000 HOURS			
.0000	.0025	.0051	.0078	.0106	.0135	.0165
.0196	.0228	.0262	.0297	.0334	.0372	.0413
.0456	.0501	.0549	.0600	.0656	.0715	.0780
.0861	.0951	.1212	.1827	.2885	.4522	.6879
1.0102	1.2644	1.3792	1.4751	1.5591	1.6342	1.7022
1.7642	1.8212	1.8736	1.9219	1.9666	2.0080	2.0172
2.0258	2.0337	2.0412	2.0482	2.0548	2.0611	2.0671
2.0728	2.0783	2.0836	2.0886	2.0935	2.0982	2.1028
2.1072	2.1115	2.1157	2.1197	2.1236	2.1275	2.1312
2.1349	2.1385	2.1420	2.1454	2.1487	2.1520	2.1552
2.1583	2.1614	2.1645	2.1674	2.1704	2.1732	2.1760
2.1788	2.1816	2.1842	2.1869	2.1895	2.1921	2.1946
2.1971	2.1996	2.2020	2.2044	2.2067	2.2091	2.2114
2.2137	2.2159	2.2181	2.2203	2.2225	2.2246	2.2268
2.2288	2.2309	2.2330	2.2350	2.2370	2.2390	2.2410
2.2429	2.2448	2.2467	2.2486	2.2505	2.2524	2.2542
2.2560	2.2578	2.2596	2.2614	2.2631	2.2649	2.2666
2.2683	2.2700	2.2716	2.2732	2.2748	2.2764	2.2779
2.2795	2.2811	2.2826	2.2842	2.2857	2.2872	2.2888
2.2903	2.2918	2.2934	2.2949	2.2964	2.2979	2.2994
2.3009	2.3024	2.3038	2.3053	2.3068	2.3083	2.3097
2.3112	2.3126	2.3141	2.3155	2.3170	2.3184	2.3198
2.3212	2.3227	2.3241	2.3255	2.3269	2.3283	2.3297
2.3311	2.3325	2.3339	2.3352	2.3366	2.3380	2.3393
2.3407	2.3421	2.3434	2.3448	2.3461	2.3475	2.3488
2.3501	2.3515	2.3528	2.3541	2.3554	2.3567	2.3580
2.3593	2.3607	2.3619	2.3632	2.3645	2.3658	2.3671
2.3684	2.3697	2.3709	2.3722	2.3735	2.3747	2.3760
2.3772	2.3785	2.3797	2.3810	2.3822	2.3835	2.3847
2.3859	2.3871	2.3884	2.3896	2.3908	2.3920	2.3932
2.3944	2.3956	2.3968	2.3980	2.3992	2.4004	2.4016
2.4028	2.4040	2.4051	2.4063	2.4075	2.4087	2.4098
2.4110	2.4121	2.4133	2.4145	2.4156	2.4167	2.4179
2.4190	2.4202	2.4213	2.4224	2.4236	2.4247	2.4258
2.4269	2.4281	2.4292	2.4303	2.4314	2.4325	2.4336

2.4347	2.4358	2.4369	2.4380	2.4391	2.4402	2.4413
2.4424	2.4434	2.4445	2.4456	2.4467	2.4477	2.4488
2.4499	2.4509	2.4520	2.4531	2.4541	2.4552	2.4562
2.4573	2.4583	2.4594	2.4604	2.4614	2.4625	2.4635
2.4645	2.4656	2.4666	2.4676	2.4687	2.4697	2.4707
2.4717	2.4727	2.4737	2.4747	2.4758	2.4768	2.4778
2.4788	2.4798	2.4808	2.4817	2.4827	2.4837	2.4847
2.4857	2.4867	2.4877	2.4886	2.4896	2.4906	2.4916
2.4925	2.4935	2.4945	2.4954	2.4964	2.4974	2.4983
2.4993	2.5002	2.5012	2.5021	2.5031	2.5040	2.5050
2.5059	2.5069	2.5078	2.5087	2.5097	2.5106	2.5115
2.5125	2.5134	2.5143	2.5152	2.5162	2.5171	2.5180
2.5189	2.5198	2.5207	2.5217	2.5226	2.5235	2.5244
2.5253	2.5262	2.5271	2.5280	2.5289	2.5298	2.5307
2.5316	2.5325	2.5333	2.5342	2.5351	2.5360	2.5369
2.5378	2.5386	2.5395	2.5404	2.5413	2.5421	2.5430
2.5439	2.5447	2.5456	2.5465	2.5473	2.5482	2.5490
2.5499	2.5508	2.5516	2.5525	2.5533	2.5542	2.5550
2.5559	2.5567	2.5575	2.5584	2.5592	2.5601	2.5609
2.5617	2.5626	2.5634	2.5642	2.5651	2.5659	2.5667
2.5675	2.5684	2.5692	2.5700	2.5708	2.5717	2.5725
2.5733	2.5741	2.5749	2.5757	2.5765	2.5773	2.5781
2.5790	2.5798	2.5806	2.5814	2.5822	2.5830	2.5838
2.5846	2.5853	2.5861	2.5869	2.5877	2.5885	2.5893
2.5901	2.5909	2.5917	2.5924	2.5932	2.5940	2.5948
2.5956	2.5963	2.5971	2.5979	2.5986	2.5994	2.6002
2.6010	2.6017	2.6025	2.6033	2.6040	2.6048	2.6055
2.6063	2.6071	2.6078	2.6086	2.6093	2.6101	2.6108
2.6116	2.6123	2.6131	2.6138	2.6146	2.6153	2.6161
2.6168	2.6176	2.6183	2.6190	2.6198	2.6205	2.6212
2.6220	2.6227	2.6235	2.6242	2.6249	2.6256	2.6264
2.6271	2.6278	2.6285	2.6293	2.6300	2.6307	2.6314
2.6322	2.6329	2.6336	2.6343	2.6350	2.6357	2.6365
2.6372	2.6379	2.6386	2.6393	2.6400		

* COMPUTE BASIN 1. BASIN 1 IS THE SERVICE ROAD ADJACENT TO THE
 * NEW RHINO ENCLOSURE AND THE NEW ENCLOSURES 2 AND 3.

COMPUTE NM HYD ID=1 HYD=101 DA=.000569 SQ MI
 %A=0.0 %B=0.0 %C=100.0 %D=0.0
 TP=0.1333 RAINFALL=-1

K = .106544HR TP = .133300HR K/TP RATIO = .799277 SHAPE CONSTANT, N = 4.482733
 UNIT PEAK = 1.6483 CFS UNIT VOLUME = .9939 B = 386.16 P60 = 1.9300
 AREA = .000569 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 101.00

RUNOFF VOLUME = 1.05119 INCHES = .0319 ACRE-FEET

PEAK DISCHARGE RATE = 1.09 CFS AT 1.500 HOURS BASIN AREA = .0006 SQ. MI.

* COMPUTE BASIN 2. BASIN 2 IS THE FUTURE RHINO YARD.

COMPUTE NM HYD ID=1 HYD=102 DA=.001110 SQ MI
%A=90.0 %B=0.0 %C=0.0 %D=10.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .43823 CFS UNIT VOLUME = .9739 B = 526.28 P60 = 1.9300
AREA = .000111 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 2.0654 CFS UNIT VOLUME = .9918 B = 275.59 P60 = 1.9300
AREA = .000999 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 102.00

RUNOFF VOLUME = .67106 INCHES = .0397 ACRE-FEET
PEAK DISCHARGE RATE = 1.22 CFS AT 1.500 HOURS BASIN AREA = .0011 SQ. MI.

* COMPUTE BASIN 3. BASIN 3 IS THE FUTURE ENCLOSURE 3 AND THE

* ROOF OF THE NEW RHINO BLDG.

COMPUTE NM HYD ID=1 HYD=103 DA=.001203 SQ MI
%A=70.0 %B=0.0 %C=0.0 %D=30.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.4249 CFS UNIT VOLUME = .9911 B = 526.28 P60 = 1.9300
AREA = .000361 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.7410 CFS UNIT VOLUME = .9903 B = 275.59 P60 = 1.9300
AREA = .000842 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 103.00

RUNOFF VOLUME = 1.05683 INCHES = .0678 ACRE-FEET
PEAK DISCHARGE RATE = 1.79 CFS AT 1.500 HOURS BASIN AREA = .0012 SQ. MI.

* COMPUTE BASIN 4. BASIN 4 IS HALF OF THE ROOF OF THE NEW

* ELEPHANT BLDG, AND THE REAR SERVICE YARD.

COMPUTE NM HYD ID=1 HYD=104 DA=.000894 SQ MI
%A=72.0 %B=0.0 %C=11.0 %D=17.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .60003 CFS UNIT VOLUME = .9832 B = 526.28 P60 = 1.9300
AREA = .000152 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .154799HR TP = .133300HR K/TP RATIO = 1.161282 SHAPE CONSTANT, N = 3.052481
UNIT PEAK = 1.5924 CFS UNIT VOLUME = .9910 B = 286.07 P60 = 1.9300
AREA = .000742 SQ MI IA = .61024 INCHES INF = 1.55867 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 104.00

RUNOFF VOLUME = .85201 INCHES = .0406 ACRE-FEET
PEAK DISCHARGE RATE = 1.18 CFS AT 1.500 HOURS BASIN AREA = .0009 SQ. MI.

* COMPUTE BASIN 5. BASIN 5 IS THE EXISTING LECHWE ENCLOSURE.

COMPUTE NM HYD ID=1 HYD=105 DA=.000821 SQ MI
%A=96.0 %B=0.0 %C=0.0 %D=4.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .12965 CFS UNIT VOLUME = .9198 B = 526.28 P60 = 1.9300
AREA = .000033 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.6295 CFS UNIT VOLUME = .9895 B = 275.59 P60 = 1.9300
AREA = .000788 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 105.00

RUNOFF VOLUME = .55533 INCHES = .0243 ACRE-FEET
PEAK DISCHARGE RATE = .81 CFS AT 1.500 HOURS BASIN AREA = .0008 SQ. MI.

* COMPUTE BASIN 6. BASIN 6 IS THE NEW ELEPHANT YARD.

COMPUTE NM HYD ID=1 HYD=106 DA=.001198 SQ MI
%A=100.0 %B=0.0 %C=0.0 %D=0.0
TP=0.1333 RAINFALL=-1

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 2.4768 CFS UNIT VOLUME = .9925 B = 275.59 P60 = 1.9300
AREA = .001198 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 106.00

RUNOFF VOLUME = .47817 INCHES = .0306 ACRE-FEET
PEAK DISCHARGE RATE = 1.07 CFS AT 1.500 HOURS BASIN AREA = .0012 SQ. MI.

* COMPUTE BASIN 7. BASIN 7 IS FUTURE ENCLOSURE 2 ADJACENT
* TO THE NEW ELEPHANT BLDG.

COMPUTE NM HYD ID=1 HYD=107 DA=.002337 SQ MI
%A=70.0 %B=0.0 %C=0.0 %D=30.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 2.7680 CFS UNIT VOLUME = .9951 B = 526.28 P60 = 1.9300
AREA = .000701 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 3.3821 CFS UNIT VOLUME = .9941 B = 275.59 P60 = 1.9300
AREA = .001636 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 107.00

RUNOFF VOLUME = 1.05683 INCHES = .1317 ACRE-FEET
PEAK DISCHARGE RATE = 3.46 CFS AT 1.500 HOURS BASIN AREA = .0023 SQ. MI.

* COMPUTE BASIN 8. BASIN 8 IS THE FUTURE OSTRICH YARD.

COMPUTE NM HYD ID=1 HYD=108 DA=.000573 SQ MI
%A=88.0 %B=0.0 %C=0.0 %D=12.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .27147 CFS UNIT VOLUME = .9593 B = 526.28 P60 = 1.9300
AREA = .000069 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.0425 CFS UNIT VOLUME = .9849 B = 275.59 P60 = 1.9300
AREA = .000504 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 108.00

RUNOFF VOLUME = .70963 INCHES = .0217 ACRE-FEET
PEAK DISCHARGE RATE = .66 CFS AT 1.500 HOURS BASIN AREA = .0006 SQ. MI.

* COMPUTE BASIN 9. BASIN 9 IS THE NEW SERVICE ROAD BETWEEN

* THE CAT EXHIBIT AND THE NEW ENCLOSURE 2.

COMPUTE NM HYD ID=1 HYD=109 DA=.000638 SQ MI
%A=0.0 %B=0.0 %C=100.0 %D=0.0
TP=0.1333 RAINFALL=-1

K = .106544HR TP = .133300HR K/TP RATIO = .799277 SHAPE CONSTANT, N = 4.482733
UNIT PEAK = 1.8482 CFS UNIT VOLUME = .9951 B = 386.16 P60 = 1.9300
AREA = .000638 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 109.00

RUNOFF VOLUME = 1.05119 INCHES = .0358 ACRE-FEET
PEAK DISCHARGE RATE = 1.22 CFS AT 1.500 HOURS BASIN AREA = .0006 SQ. MI.

* COMPUTE BASIN 10. BASIN 10 IS THE CAT EXHIBITS.

COMPUTE NM HYD ID=1 HYD=1010 DA=.000791 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 3.1229 CFS UNIT VOLUME = .9959 B = 526.28 P60 = 1.9300
AREA = .000791 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1010.00

RUNOFF VOLUME = 2.40702 INCHES = .1015 ACRE-FEET
PEAK DISCHARGE RATE = 2.25 CFS AT 1.500 HOURS BASIN AREA = .0008 SQ. MI.

* COMPUTE BASIN 11. BASIN 11 IS THE LION EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1011 DA=.000203 SQ MI
%A=80.0 %B=0.0 %C=0.0 %D=20.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .16029 CFS UNIT VOLUME = .9361 B = 526.28 P60 = 1.9300
AREA = .000041 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .33575 CFS UNIT VOLUME = .9567 B = 275.59 P60 = 1.9300
AREA = .000162 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1011.00

RUNOFF VOLUME = .86394 INCHES = .0094 ACRE-FEET
PEAK DISCHARGE RATE = .27 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 12. BASIN 12 IS THE SERVICE AREA BETWEEN
* THE NEW POLAR BEAR EXHIBIT AND THE LION EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1012 DA=.000181 SQ MI
%A=0.0 %B=0.0 %C=100.0 %D=0.0
TP=0.1333 RAINFALL=-1

K = .106544HR TP = .133300HR K/TP RATIO = .799277 SHAPE CONSTANT, N = 4.482733
UNIT PEAK = .52434 CFS UNIT VOLUME = .9784 B = 386.16 P60 = 1.9300
AREA = .000181 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1012.00

RUNOFF VOLUME = 1.05119 INCHES = .0101 ACRE-FEET
PEAK DISCHARGE RATE = .35 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 13. BASIN 13 IS THE CHEETAH EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1013 DA=.000548 SQ MI
%A=95.0 %B=0.0 %C=0.0 %D=5.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .10818 CFS UNIT VOLUME = .8994 B = 526.28 P60 = 1.9300
AREA = .000027 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.0763 CFS UNIT VOLUME = .9849 B = 275.59 P60 = 1.9300
AREA = .000521 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1013.00

RUNOFF VOLUME = .57462 INCHES = .0168 ACRE-FEET
PEAK DISCHARGE RATE = .56 CFS AT 1.500 HOURS BASIN AREA = .0005 SQ. MI.

* COMPUTE BASIN 14. BASIN 14 IS PART OF THE NEW POLAR

* BEAR EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1014 DA=.000074 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .29216 CFS UNIT VOLUME = .9593 B = 526.28 P60 = 1.9300
AREA = .000074 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1014.00

RUNOFF VOLUME = 2.40701 INCHES = .0095 ACRE-FEET
PEAK DISCHARGE RATE = .22 CFS AT 1.500 HOURS BASIN AREA = .0001 SQ. MI.

* COMPUTE BASIN 15. BASIN 15 IS PART OF THE NEW POLAR
* BEAR EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1015 DA=.000401 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.5832 CFS UNIT VOLUME = .9928 B = 526.28 P60 = 1.9300
AREA = .000401 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1015.00

RUNOFF VOLUME = 2.40701 INCHES = .0515 ACRE-FEET
PEAK DISCHARGE RATE = 1.15 CFS AT 1.500 HOURS BASIN AREA = .0004 SQ. MI.

* COMPUTE BASIN 16. BASIN 16 IS THE LARGE GRASSED AREA
* IN FRONT OF THE PERFORMANCE STAGE.

COMPUTE NM HYD ID=1 HYD=1016 DA=.006052 SQ MI
%A=85.0 %B=0.0 %C=0.0 %D=15.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 3.5840 CFS UNIT VOLUME = .9959 B = 526.28 P60 = 1.9300
AREA = .000908 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 10.635 CFS UNIT VOLUME = .9971 B = 275.59 P60 = 1.9300
AREA = .005144 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1016.00

RUNOFF VOLUME = .76750 INCHES = .2477 ACRE-FEET
PEAK DISCHARGE RATE = 7.18 CFS AT 1.500 HOURS BASIN AREA = .0061 SQ. MI.

* COMPUTE BASIN 17. BASIN 17 IS A DEPRESSED CAGE ADJACENT
* TO THE CAT EXHIBITS.

COMPUTE NM HYD ID=1 HYD=1017 DA=.000278 SQ MI
%A=66.0 %B=0.0 %C=0.0 %D=34.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .37317 CFS UNIT VOLUME = .9674 B = 526.28 P60 = 1.9300
AREA = .000095 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .37934 CFS UNIT VOLUME = .9607 B = 275.59 P60 = 1.9300
AREA = .000183 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1017.00

RUNOFF VOLUME = 1.13398 INCHES = .0168 ACRE-FEET
PEAK DISCHARGE RATE = .45 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 18. BASIN 18 IS THE NATURE THEATRE.

COMPUTE NM HYD ID=1 HYD=1018 DA=.000367 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.4489 CFS UNIT VOLUME = .9911 B = 526.28 P60 = 1.9300
AREA = .000367 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1018.00

RUNOFF VOLUME = 2.40701 INCHES = .0471 ACRE-FEET
PEAK DISCHARGE RATE = 1.05 CFS AT 1.500 HOURS BASIN AREA = .0004 SQ. MI.

* COMPUTE BASIN 19. BASIN 19 IS THE FUTURE CHILDREN'S
* ZOO AREA.

COMPUTE NM HYD ID=1 HYD=1019 DA=.002034 SQ MI
%A=57.0 %B=0.0 %C=33.0 %D=10.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .80303 CFS UNIT VOLUME = .9865 B = 526.28 P60 = 1.9300
AREA = .000203 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .141774HR TP = .133300HR K/TP RATIO = 1.063574 SHAPE CONSTANT, N = 3.320290
UNIT PEAK = 4.2156 CFS UNIT VOLUME = .9969 B = 306.97 P60 = 1.9300
AREA = .001831 SQ MI IA = .54000 INCHES INF = 1.36200 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1019.00

RUNOFF VOLUME = .81928 INCHES = .0889 ACRE-FEET
PEAK DISCHARGE RATE = 2.81 CFS AT 1.500 HOURS BASIN AREA = .0020 SQ. MI.

* COMPUTE BASIN 20. BASIN 20 IS THE SERVICE AREA BEHIND
* THE NEW RESTAURANT.

COMPUTE NM HYD ID=1 HYD=1020 DA=.000487 SQ MI
%A=10.0 %B=0.0 %C=40.0 %D=50.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .96135 CFS UNIT VOLUME = .9891 B = 526.28 P60 = 1.9300
AREA = .000244 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .117669HR TP = .133300HR K/TP RATIO = .882739 SHAPE CONSTANT, N = 4.020106
UNIT PEAK = .65123 CFS UNIT VOLUME = .9813 B = 356.51 P60 = 1.9300
AREA = .000244 SQ MI IA = .41000 INCHES INF = .99800 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1020.00

RUNOFF VOLUME = 1.65442 INCHES = .0430 ACRE-FEET
PEAK DISCHARGE RATE = 1.11 CFS AT 1.500 HOURS BASIN AREA = .0005 SQ. MI.

* COMPUTE BASIN 21. BASIN 21 IS THE WALKWAY BETWEEN THE
* NEW RESTAURANT AND THE SEA LION EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1021 DA=.000673 SQ MI
%A=10.0 %B=0.0 %C=40.0 %D=50.0

TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.3285 CFS UNIT VOLUME = .9911 B = 526.28 P60 = 1.9300
AREA = .000337 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .117669HR TP = .133300HR K/TP RATIO = .882739 SHAPE CONSTANT, N = 4.020106
UNIT PEAK = .89996 CFS UNIT VOLUME = .9862 B = 356.51 P60 = 1.9300
AREA = .000337 SQ MI IA = .41000 INCHES INF = .99800 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1021.00

RUNOFF VOLUME = 1.65443 INCHES = .0594 ACRE-FEET
PEAK DISCHARGE RATE = 1.53 CFS AT 1.500 HOURS BASIN AREA = .0007 SQ. MI.

* COMPUTE BASIN 22. BASIN 22 IS THE SEA LION EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1022 DA=.000182 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .71855 CFS UNIT VOLUME = .9832 B = 526.28 P60 = 1.9300
AREA = .000182 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1022.00

RUNOFF VOLUME = 2.40701 INCHES = .0234 ACRE-FEET
PEAK DISCHARGE RATE = .53 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 23. BASIN 23 IS THE OLD SEA LION EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1023 DA=.000131 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .51719 CFS UNIT VOLUME = .9791 B = 526.28 P60 = 1.9300
AREA = .000131 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1023.00

RUNOFF VOLUME = 2.40701 INCHES = .0168 ACRE-FEET
PEAK DISCHARGE RATE = .38 CFS AT 1.500 HOURS BASIN AREA = .0001 SQ. MI.

* COMPUTE BASIN 24. BASIN 24 IS THE PRAIRIE DOG EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1024 DA=.000073 SQ MI
%A=85.0 %B=0.0 %C=0.0 %D=15.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .43231E-01CFS UNIT VOLUME = .8994 B = 526.28 P60 = 1.9300
AREA = .000011 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .12829 CFS UNIT VOLUME = .8931 B = 275.59 P60 = 1.9300
AREA = .000062 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1024.00

RUNOFF VOLUME = .76750 INCHES = .0030 ACRE-FEET
PEAK DISCHARGE RATE = .10 CFS AT 1.500 HOURS BASIN AREA = .0001 SQ. MI.

* COMPUTE BASIN 25. BASIN 25 IS THE WALKWAY IN FRONT OF THE
* RESTROOM BLDG.

COMPUTE NM HYD ID=1 HYD=1025 DA=.000844 SQ MI
%A=5.0 %B=0.0 %C=25.0 %D=10.0
TP=0.1333 RAINFALL=-1

*****WARNING***** SUM OF TREATMENT TYPES DOES NOT EQUAL 100 PERCENT OR TOTAL AREA

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .83304 CFS UNIT VOLUME = .9865 B = 526.28 P60 = 1.9300
AREA = .000211 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .115815HR TP = .133300HR K/TP RATIO = .868829 SHAPE CONSTANT, N = 4.089414
UNIT PEAK = 1.7147 CFS UNIT VOLUME = .9946 B = 361.09 P60 = 1.9300

AREA = .000633 SQ MI IA = .40000 INCHES INF = .97000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1025.00

RUNOFF VOLUME = 1.29523 INCHES = .0583 ACRE-FEET
PEAK DISCHARGE RATE = 1.69 CFS AT 1.500 HOURS BASIN AREA = .0008 SQ. MI.

* COMPUTE BASIN 26. BASIN 26 IS THE BISON EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1026 DA=.001048 SQ MI
%A=90.0 %B=0.0 %C=0.0 %D=10.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .41376 CFS UNIT VOLUME = .9739 B = 526.28 P60 = 1.9300
AREA = .000105 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.9500 CFS UNIT VOLUME = .9911 B = 275.59 P60 = 1.9300
AREA = .000943 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1026.00

RUNOFF VOLUME = .67106 INCHES = .0375 ACRE-FEET
PEAK DISCHARGE RATE = 1.15 CFS AT 1.500 HOURS BASIN AREA = .0010 SQ. MI.

* COMPUTE BASIN 27. BASIN 27 IS THE EXISTING ELEPHANT

* EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1027 DA=.000296 SQ MI
%A=75.0 %B=0.0 %C=0.0 %D=25.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .29216 CFS UNIT VOLUME = .9593 B = 526.28 P60 = 1.9300
AREA = .000074 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302

UNIT PEAK = .45897 CFS UNIT VOLUME = .9677 B = 275.59 P60 = 1.9300
AREA = .000222 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1027.00

RUNOFF VOLUME = .96038 INCHES = .0152 ACRE-Feet
PEAK DISCHARGE RATE = .42 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 28. BASIN 28 IS THE GIRAFFE EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1028 DA=.001128 SQ MI
%A=85.0 %B=0.0 %C=0.0 %D=15.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .66801 CFS UNIT VOLUME = .9832 B = 526.28 P60 = 1.9300
AREA = .000169 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.9823 CFS UNIT VOLUME = .9911 B = 275.59 P60 = 1.9300
AREA = .000959 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1028.00

RUNOFF VOLUME = .76750 INCHES = .0462 ACRE-Feet
PEAK DISCHARGE RATE = 1.35 CFS AT 1.500 HOURS BASIN AREA = .0011 SQ. MI.

* COMPUTE BASIN 29. BASIN 29 IS THE PAVED AREA NORTH OF

* THE GIRAFFE EXHIBIT THAT DISCHARGES TO RIO AVE.

COMPUTE NM HYD ID=1 HYD=1029 DA=.000438 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.7292 CFS UNIT VOLUME = .9928 B = 526.28 P60 = 1.9300
AREA = .000438 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1029.00

RUNOFF VOLUME = 2.40701 INCHES = .0562 ACRE-FEET
 PEAK DISCHARGE RATE = 1.25 CFS AT 1.500 HOURS BASIN AREA = .0004 SQ. MI.

* COMPUTE BASIN 30. BASIN 30 IS AN AFRICAN HOOFSTOCK EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1030 DA=.000266 SQ MI
 %A=100.0 %B=0.0 %C=0.0 %D=0.0
 TP=0.1333 RAINFALL=-1

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
 UNIT PEAK = .54994 CFS UNIT VOLUME = .9734 B = 275.59 P60 = 1.9300
 AREA = .000266 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1030.00

RUNOFF VOLUME = .47817 INCHES = .0068 ACRE-FEET
 PEAK DISCHARGE RATE = .24 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 31. BASIN 31 IS THE PAVED WALKWAY/SERVICE

* AREA NORTH OF THE BISON.

COMPUTE NM HYD ID=1 HYD=1031 DA=.000464 SQ MI
 %A=0.0 %B=0.0 %C=0.0 %D=100.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 1.8319 CFS UNIT VOLUME = .9928 B = 526.28 P60 = 1.9300
 AREA = .000464 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1031.00

RUNOFF VOLUME = 2.40701 INCHES = .0596 ACRE-FEET
 PEAK DISCHARGE RATE = 1.33 CFS AT 1.500 HOURS BASIN AREA = .0005 SQ. MI.

* COMPUTE BASIN 32. BASIN 32 IS THE VACANT EXHIBIT AREA

* EAST OF THE BISON.

COMPUTE NM HYD ID=1 HYD=1032 DA=.000749 SQ MI

%A=95.0 %B=0.0 %C=0.0 %D=5.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .14785 CFS UNIT VOLUME = .9198 B = 526.28 P60 = 1.9300
AREA = .000037 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.4711 CFS UNIT VOLUME = .9885 B = 275.59 P60 = 1.9300
AREA = .000712 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1032.00

RUNOFF VOLUME = .57462 INCHES = .0230 ACRE-FEET
PEAK DISCHARGE RATE = .76 CFS AT 1.500 HOURS BASIN AREA = .0007 SQ. MI.

- * COMPUTE BASIN 33. BASIN 33 IS THE SERVICE AREA FOR THE
- * SALT WATER FILTRATION.

COMPUTE NM HYD ID=1 HYD=1033 DA=.000700 SQ MI
%A=50.0 %B=0.0 %C=30.0 %D=20.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .55273 CFS UNIT VOLUME = .9791 B = 526.28 P60 = 1.9300
AREA = .000140 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .141311HR TP = .133300HR K/TP RATIO = 1.060096 SHAPE CONSTANT, N = 3.330964
UNIT PEAK = 1.2930 CFS UNIT VOLUME = .9898 B = 307.78 P60 = 1.9300
AREA = .000560 SQ MI IA = .53750 INCHES INF = 1.35500 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1033.00

RUNOFF VOLUME = .99918 INCHES = .0373 ACRE-FEET
PEAK DISCHARGE RATE = 1.09 CFS AT 1.500 HOURS BASIN AREA = .0007 SQ. MI.

- * COMPUTE BASIN 34. BASIN 34 IS THE FUTURE PAVED WALKWAY AREA

* SOUTH OF THE CAMEL AND KUDU.

COMPUTE NM HYD ID=1 HYD=1034 DA=.000736 SQ MI.
%A=40.0 %B=0.0 %C=0.0 %D=60.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.7435 CFS UNIT VOLUME = .9928 B = 526.28 P60 = 1.9300
AREA = .000442 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .60866 CFS UNIT VOLUME = .9759 B = 275.59 P60 = 1.9300
AREA = .000294 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1034.00

RUNOFF VOLUME = 1.63548 INCHES = .0642 ACRE-FEET
PEAK DISCHARGE RATE = 1.53 CFS AT 1.500 HOURS BASIN AREA = .0007 SQ. MI.

* COMPUTE BASIN 35. BASIN 35 IS THE CAMEL YARD.

COMPUTE NM HYD ID=1 HYD=1035 DA=.000676 SQ MI
%A=95.0 %B=0.0 %C=0.0 %D=5.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .13344 CFS UNIT VOLUME = .9198 B = 526.28 P60 = 1.9300
AREA = .000034 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.3277 CFS UNIT VOLUME = .9874 B = 275.59 P60 = 1.9300
AREA = .000642 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1035.00

RUNOFF VOLUME = .57462 INCHES = .0207 ACRE-FEET
PEAK DISCHARGE RATE = .68 CFS AT 1.500 HOURS BASIN AREA = .0007 SQ. MI.

* COMPUTE BASIN 36. BASIN 36 IS THE KUDU YARD.

COMPUTE NM HYD ID=1 HYD=1036 DA=.000809 SQ MI
%A=95.0 %B=0.0 %C=0.0 %D=5.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .15970 CFS UNIT VOLUME = .9361 B = 526.28 P60 = 1.9300
AREA = .000040 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.5889 CFS UNIT VOLUME = .9895 B = 275.59 P60 = 1.9300
AREA = .000769 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1036.00

RUNOFF VOLUME = .57462 INCHES = .0248 ACRE-Feet
PEAK DISCHARGE RATE = .81 CFS AT 1.500 HOURS BASIN AREA = .0008 SQ. MI.

* COMPUTE BASIN 37. BASIN 37 IS THE GIBBON EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1037 DA=.000215 SQ MI
%A=50.0 %B=0.0 %C=0.0 %D=50.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .42442 CFS UNIT VOLUME = .9739 B = 526.28 P60 = 1.9300
AREA = .000108 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .22225 CFS UNIT VOLUME = .9354 B = 275.59 P60 = 1.9300
AREA = .000108 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1037.00

RUNOFF VOLUME = 1.44259 INCHES = .0165 ACRE-Feet
PEAK DISCHARGE RATE = .42 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 38. BASIN 38 IS THE SERVICE ROAD

* JUST NORTH OF THE MAIN ENTRANCE.

COMPUTE NM HYD ID=1 HYD=1038 DA=.000509 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 2.0096 CFS UNIT VOLUME = .9941 B = 526.28 P60 = 1.9300
AREA = .000509 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1038.00

RUNOFF VOLUME = 2.40701 INCHES = .0653 ACRE-FEET
PEAK DISCHARGE RATE = 1.45 CFS AT 1.500 HOURS BASIN AREA = .0005 SQ. MI.

* COMPUTE BASIN 39 UNDER EXISTING CONDITIONS.

COMPUTE NM HYD ID=1 HYD=1039 DA=.002777 SQ MI
%A=85.0 %B=0.0 %C=15.0 %D=0.0
TP=0.1333 RAINFALL=-1

K = .153827HR TP = .133300HR K/TP RATIO = 1.153991 SHAPE CONSTANT, N = 3.070528
UNIT PEAK = 5.9899 CFS UNIT VOLUME = .9972 B = 287.52 P60 = 1.9300
AREA = .002777 SQ MI IA = .60500 INCHES INF = 1.54400 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1039.00

RUNOFF VOLUME = .54095 INCHES = .0801 ACRE-FEET
PEAK DISCHARGE RATE = 2.82 CFS AT 1.500 HOURS BASIN AREA = .0028 SQ. MI.

* COMPUTE BASIN 39. BASIN 39 IS THE NEW OVERFLOW

* PARKING LOT.

COMPUTE NM HYD ID=1 HYD=1039 DA=.002777 SQ MI
%A=10.0 %B=0.0 %C=15.0 %D=75.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 8.2228 CFS UNIT VOLUME = .9978 B = 526.28 P60 = 1.9300
AREA = .002083 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .128795HR TP = .133300HR K/TP RATIO = .966201 SHAPE CONSTANT, N = 3.656216
UNIT PEAK = 1.7268 CFS UNIT VOLUME = .9942 B = 331.56 P60 = 1.9300
AREA = .000694 SQ MI IA = .47000 INCHES INF = 1.16600 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1039.00

RUNOFF VOLUME = 1.99874 INCHES = .2960 ACRE-FEET
PEAK DISCHARGE RATE = 6.94 CFS AT 1.500 HOURS BASIN AREA = .0028 SQ. MI.

- * ROUTE THE NEW PARKING LOT RUNOFF THROUGH A DETENTION
- * POND IN THE PARKING LOT IN ORDER TO DECREASE THE
- * RUNOFF TO LESS THAN EXISTING.

ROUTE RESERVOIR ID=2 HYD=1039.1 INFLOW ID=1 CODE=10
OUTFLOW(CFS) STORAGE(AC-FT) EL(FT)

0 0 0
3.1 0.10 0.5

* * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	.00	.000	.00
.50	.00	.00	.000	.00
1.00	.00	.00	.000	.00
1.50	6.94	.31	.062	1.91
2.00	1.57	.41	.082	2.54
2.50	.22	.17	.035	1.08
3.00	.07	.06	.012	.38
3.50	.04	.02	.005	.14
4.00	.04	.01	.002	.07
4.50	.04	.01	.001	.04
5.00	.04	.01	.001	.04
5.50	.04	.01	.001	.04
6.00	.04	.01	.001	.04
6.50	.04	.01	.001	.04
7.00	.04	.01	.001	.04
7.50	.04	.01	.001	.04
8.00	.04	.01	.001	.04
8.50	.04	.01	.001	.04
9.00	.04	.01	.001	.04
9.50	.03	.01	.001	.04
10.00	.03	.01	.001	.03
10.50	.03	.01	.001	.03
11.00	.03	.01	.001	.03
11.50	.03	.01	.001	.03

12.00	.03	.00	.001	.03
12.50	.03	.00	.001	.03
13.00	.03	.00	.001	.03
13.50	.03	.00	.001	.03
14.00	.03	.00	.001	.03
14.50	.03	.00	.001	.03
15.00	.03	.00	.001	.03
15.50	.03	.00	.001	.03
16.00	.03	.00	.001	.03
16.50	.02	.00	.001	.03
17.00	.02	.00	.001	.02
17.50	.02	.00	.001	.02
18.00	.02	.00	.001	.02
18.50	.02	.00	.001	.02
19.00	.02	.00	.001	.02
19.50	.02	.00	.001	.02
20.00	.02	.00	.001	.02
20.50	.02	.00	.001	.02
21.00	.02	.00	.001	.02
21.50	.02	.00	.001	.02
22.00	.02	.00	.001	.02
22.50	.02	.00	.001	.02
23.00	.02	.00	.001	.02
23.50	.02	.00	.001	.02
24.00	.02	.00	.001	.02
24.50	.00	.00	.000	.01
25.00	.00	.00	.000	.00

PEAK DISCHARGE = 3.049 CFS - PEAK OCCURS AT HOUR 1.70
 MAXIMUM WATER SURFACE ELEVATION = .492
 MAXIMUM STORAGE = .0984 AC-FT INCREMENTAL TIME= .050000HRS

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 1039.10

RUNOFF VOLUME = 1.99862 INCHES = .2960 ACRE-FEET
 PEAK DISCHARGE RATE = 3.05 CFS AT 1.700 HOURS BASIN AREA = .0028 SQ. MI.

* COMPUTE BASIN 40. BASIN 40 IS THE ANTELOPE EXHIBIT.
 COMPUTE NM HYD ID=1 HYD=1040 DA=.002026 SQ MI
 %A=71.0 %B=0.0 %C=0.0 %D=29.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 2.3196 CFS UNIT VOLUME = .9941 B = 526.28 P60 = 1.9300
 AREA = .000588 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 2.9739 CFS UNIT VOLUME = .9936 B = 275.59 P60 = 1.9300
AREA = .001438 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1040.00

RUNOFF VOLUME = 1.03754 INCHES = .1121 ACRE-Feet
PEAK DISCHARGE RATE = 2.97 CFS AT 1.500 HOURS BASIN AREA = .0020 SQ. MI.

* COMPUTE BASIN 41. BASIN 41 IS AN AFRICAN HOOFSTOCK
* EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1041 DA=.000824 SQ MI
%A=50.0 %B=0.0 %C=0.0 %D=50.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.6266 CFS UNIT VOLUME = .9928 B = 526.28 P60 = 1.9300
AREA = .000412 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .85179 CFS UNIT VOLUME = .9819 B = 275.59 P60 = 1.9300
AREA = .000412 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1041.00

RUNOFF VOLUME = 1.44259 INCHES = .0634 ACRE-Feet
PEAK DISCHARGE RATE = 1.55 CFS AT 1.500 HOURS BASIN AREA = .0008 SQ. MI.

* COMPUTE BASIN 42. BASIN 42 IS AN AFRICAN HOOFSTOCK
* EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1042 DA=.000317 SQ MI
%A=60.0 %B=0.0 %C=0.0 %D=40.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .50061 CFS UNIT VOLUME = .9791 B = 526.28 P60 = 1.9300
AREA = .000127 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .39323 CFS UNIT VOLUME = .9644 B = 275.59 P60 = 1.9300
AREA = .000190 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1042.00

RUNOFF VOLUME = 1.24971 INCHES = .0211 ACRE-FEET
PEAK DISCHARGE RATE = .54 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 43. BASIN 43 IS AN OFF-EXHIBIT AFRICAN
* HOOFSTOCK AREA.

COMPUTE NM HYD ID=1 HYD=1043 DA=.000255 SQ MI
%A=90.0 %B=0.0 %C=0.0 %D=10.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .10068 CFS UNIT VOLUME = .8994 B = 526.28 P60 = 1.9300
AREA = .000026 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .47448 CFS UNIT VOLUME = .9677 B = 275.59 P60 = 1.9300
AREA = .000230 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1043.00

RUNOFF VOLUME = .67106 INCHES = .0091 ACRE-FEET
PEAK DISCHARGE RATE = .29 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 44. BASIN 44 IS A PAVED SERVICE AREA
* NORTHEAST OF THE AFRICAN HOOFSTOCK.

COMPUTE NM HYD ID=1 HYD=1044 DA=.000226 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .89226 CFS UNIT VOLUME = .9865 B = 526.28 P60 = 1.9300
AREA = .000226 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1044.00

RUNOFF VOLUME = 2.40701 INCHES = .0290 ACRE-FEET
PEAK DISCHARGE RATE = .65 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 45. BASIN 45 IS A PAVED SERVICE AREA

* NORTHEAST OF THE AFRICAN HOOFSTOCK.

COMPUTE NM HYD ID=1 HYD=1045 DA=.000306 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.2081 CFS UNIT VOLUME = .9911 B = 526.28 P60 = 1.9300
AREA = .000306 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1045.00

RUNOFF VOLUME = 2.40701 INCHES = .0393 ACRE-FEET
PEAK DISCHARGE RATE = .88 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 46. BASIN 46 IS A PAVED PERIMETER SERVICE

* DRIVE THAT DISCHARGES DIRECTLY TO STOVER STREET.

COMPUTE NM HYD ID=1 HYD=1046 DA=.000232 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .91595 CFS UNIT VOLUME = .9865 B = 526.28 P60 = 1.9300
AREA = .000232 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1046.00

RUNOFF VOLUME = 2.40701 INCHES = .0298 ACRE-FEET
PEAK DISCHARGE RATE = .67 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 47. BASIN 47 IS AN AFRICAN HOOFSTOCK
* EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1047 DA=.001484 SQ MI
%A=88.0 %B=0.0 %C=0.0 %D=12.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .70307 CFS UNIT VOLUME = .9832 B = 526.28 P60 = 1.9300
AREA = .000178 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 2.6999 CFS UNIT VOLUME = .9931 B = 275.59 P60 = 1.9300
AREA = .001306 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1047.00

RUNOFF VOLUME = .70963 INCHES = .0562 ACRE-FEET
PEAK DISCHARGE RATE = 1.68 CFS AT 1.500 HOURS BASIN AREA = .0015 SQ. MI.

* COMPUTE BASIN 48. BASIN 48 IS THE KANGAROO EXHIBIT.
COMPUTE NM HYD ID=1 HYD=1048 DA=.000578 SQ MI

%A=90.0 %B=0.0 %C=0.0 %D=10.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .22820 CFS UNIT VOLUME = .9490 B = 526.28 P60 = 1.9300
AREA = .000058 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.0755 CFS UNIT VOLUME = .9849 B = 275.59 P60 = 1.9300
AREA = .000520 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1048.00

RUNOFF VOLUME = .67106 INCHES = .0207 ACRE-FEET
PEAK DISCHARGE RATE = .64 CFS AT 1.500 HOURS BASIN AREA = .0006 SQ. MI.

* COMPUTE BASIN 49. BASIN 49 IS THE EXISTING RHINO EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1049 DA=.000614 SQ MI
%A=93.0 %B=0.0 %C=0.0 %D=7.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .16969 CFS UNIT VOLUME = .9361 B = 526.28 P60 = 1.9300
AREA = .000043 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.1806 CFS UNIT VOLUME = .9862 B = 275.59 P60 = 1.9300
AREA = .000571 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1049.00

RUNOFF VOLUME = .61319 INCHES = .0201 ACRE-FEET
PEAK DISCHARGE RATE = .65 CFS AT 1.500 HOURS BASIN AREA = .0006 SQ. MI.

* COMPUTE BASIN 50. BASIN 50 IS A PAVED SERVICE ROAD

* THAT DISCHARGES TO 12TH STREET.

COMPUTE NM HYD ID=1 HYD=1050 DA=.000190 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .75013 CFS UNIT VOLUME = .9865 B = 526.28 P60 = 1.9300
AREA = .000190 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1050.00

RUNOFF VOLUME = 2.40702 INCHES = .0244 ACRE-FEET
PEAK DISCHARGE RATE = .55 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 51. BASIN 51 IS A PAVED SERVICE ROAD THAT

* DISCHARGES TO STOVER STREET.

COMPUTE NM HYD ID=1 HYD=1051 DA=.000372 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0

TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.4687 CFS UNIT VOLUME = .9911 B = 526.28 P60 = 1.9300
AREA = .000372 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1051.00

RUNOFF VOLUME = 2.40701 INCHES = .0478 ACRE-FEET
PEAK DISCHARGE RATE = 1.06 CFS AT 1.500 HOURS BASIN AREA = .0004 SQ. MI.

* COMPUTE BASIN 52. BASIN 52 IS IMMEDIATELY WEST OF THE ZOO
* ENTRANCE.

COMPUTE NM HYD ID=1 HYD=1052 DA=.000409 SQ MI
%A=0.0 %B=14.0 %C=0.0 %D=86.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.3887 CFS UNIT VOLUME = .9911 B = 526.28 P60 = 1.9300
AREA = .000352 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

K = .131123HR TP = .133300HR K/TP RATIO = .983665 SHAPE CONSTANT, N = 3.589803
UNIT PEAK = .14039 CFS UNIT VOLUME = .9038 B = 326.83 P60 = 1.9300
AREA = .000057 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050000

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1052.00

RUNOFF VOLUME = 2.17012 INCHES = .0473 ACRE-FEET
PEAK DISCHARGE RATE = 1.09 CFS AT 1.500 HOURS BASIN AREA = .0004 SQ. MI.

FINISH

NORMAL PROGRAM FINISH

END TIME (HR:MIN:SEC) = 13:15:57



CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC.

5639 JEFFERSON STREET N.E.
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MASTER DRAINAGE PLAN

FOR

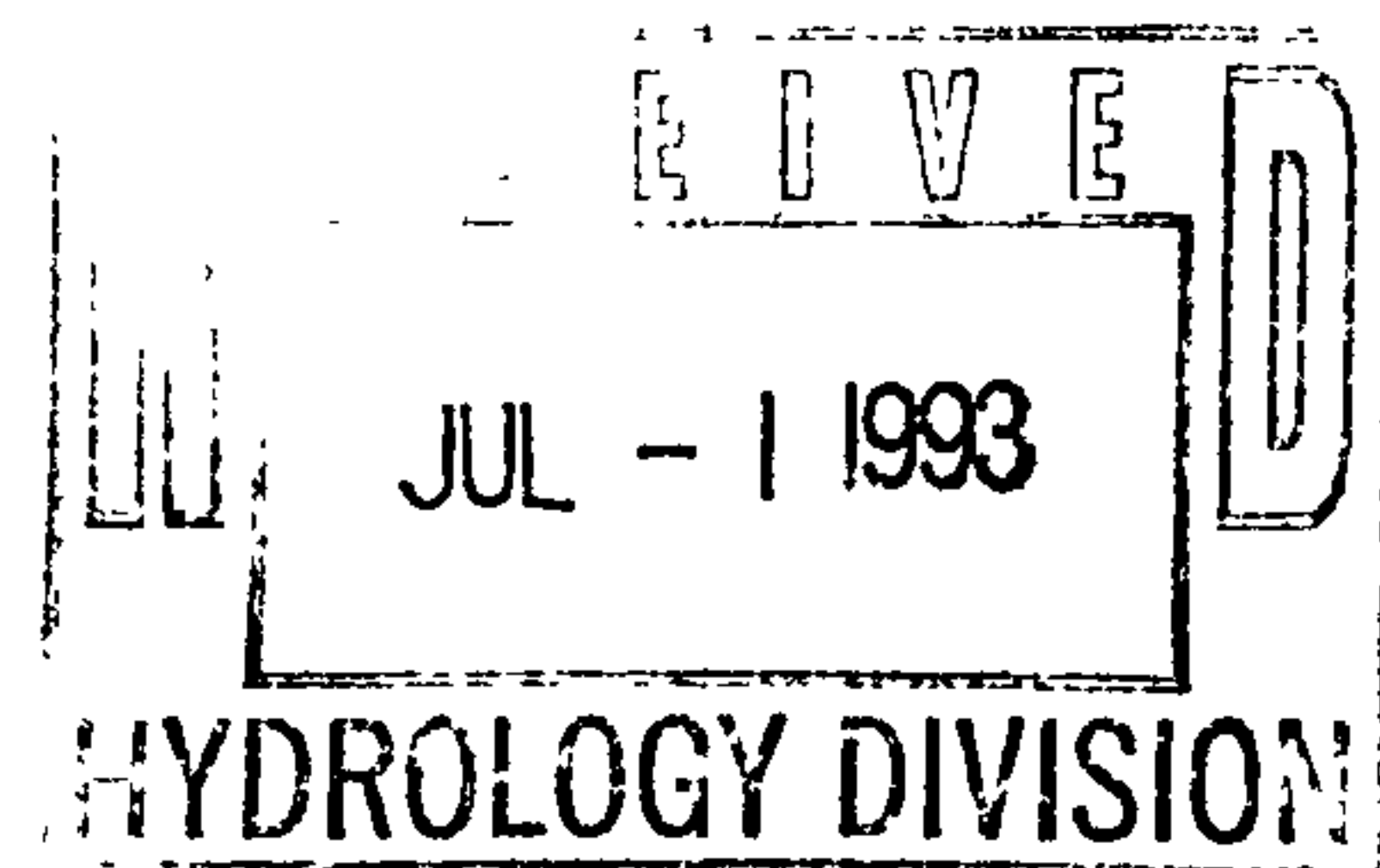
THE RIO GRANDE ZOO

MASTER DRAINAGE PLAN

FOR

THE RIO GRANDE ZOO

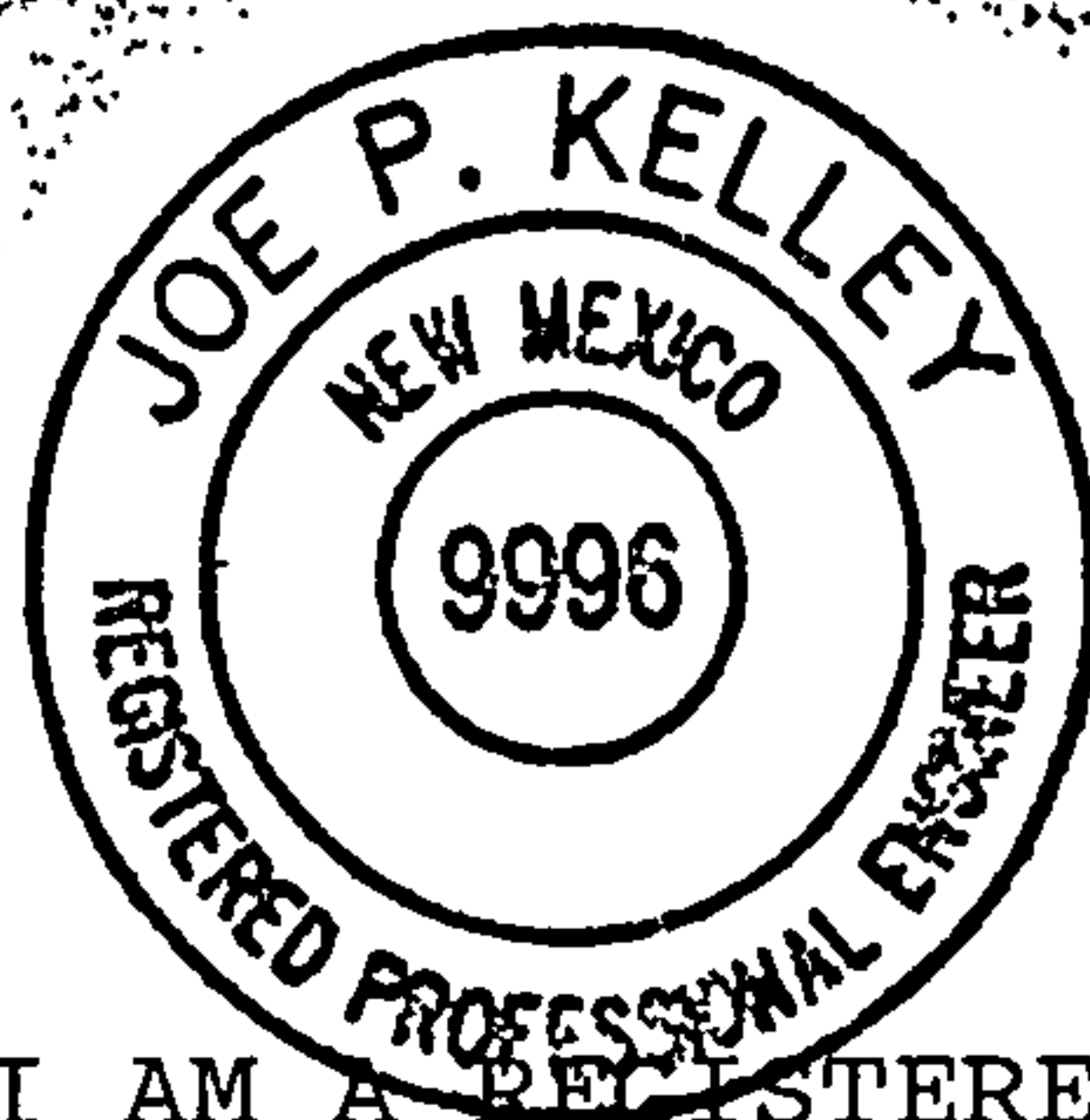
JULY, 1993



CITY OF ALBUQUERQUE

CAPITAL IMPROVEMENTS PROJECT NO. 7370651

A/E JOB NO. 4424-01



I CERTIFY THAT I AM A REGISTERED PROFESSIONAL ENGINEER
IN THE STATE OF NEW MEXICO, AND THAT THIS REPORT WAS
PREPARED BY ME OR UNDER MY SUPERVISION.

Joe Kelley
JOE P. KELLEY, P.E.

7/1/93
DATE

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AUTHORIZATION

Chavez-Grievies Consulting Engineers, Inc. was contracted by the City of Albuquerque on July 28, 1992 under A/E Job No. 4424-01, Capital Improvements Program Project No. 7370651, to prepare a Master Drainage Plan for the Rio Grande Zoo.

PURPOSE OF THIS SUBMITTAL

The purpose of this Report is to guide the Zoo as it plans exhibits in the northwest part of the Zoo. By following the design and recommendations in this report, the Zoo will be able to plan ahead for hydrologically sound exhibits. This report will also enable the Zoo to obtain City Hydrology approvals for recent and imminent Zoo construction in the portion of the Zoo addressed by this report. Recommendations have been made at the end of this report to help the Zoo improve the drainage aspects of its property.

Prior drainage reports, including several area Master Plans, have been prepared for portions of the Zoo. This report has been prepared only for the drainage areas shown in Plates 1A and 1B, which is the northwest part of the Zoo.

This report is a revision of a draft report submitted to the City Hydrology Department on April 2, 1993.

FUTURE CONSTRUCTION

This report provides the drainage plan for future construction in the northwest part of the Zoo. Whenever future construction actually occurs in the areas covered by this report, a site specific grading plan which has been prepared in accordance with the drainage pattern outlined in this report will need to be submitted for City approval.

LOCATION AND DESCRIPTION

The Rio Grande Zoo is located in southwest downtown Albuquerque, north of the Rio Grande River at the intersection of Stover Ave. SE and 10th St. SE. The property is zoned SU-2 for development as a Zoo. As shown by panel 350002-0028 of the National Flood Insurance Program Flood Insurance Rate Map for the City of Albuquerque, NM, dated October 14, 1983, the entire Zoo lies within a designated 100-year flood hazard zone.

About 75% of the Zoo property has currently been developed into exhibits, restaurants, research facilities, performance areas, and walkways. Conceptual plans have been developed for the northwest part of the Zoo property, and this Master Drainage Plan reflects these future plans.

EXISTING CONDITIONS

The Zoo is located in a low-lying area that is isolated from the City drainage system. It is comprised of many individual drainage sub-basins that retain run-off at their low points. Run-off ponds and is dissipated by evaporation and infiltration in some exhibits (most hoofstock exhibits, for instance). In other exhibits (the smaller carnivore exhibits, for instance), run-off is discharged to the sanitary sewer. Regardless of the method by which run-off is ultimately discharged, run-off is contained within each exhibit. There are no cross-exhibit discharges, or discharges from exhibits into pedestrian areas.

Some of the perimeter drainage basins discharge into City streets, where run-off is intercepted by the City storm drain system. Off-site discharges are only from paved or unpaved service areas, and none are from exhibit areas. Thus, water that is discharged off-site is the same quality as typical urban run-off.

According to the 1977 Soil Survey of Bernalillo County by the Soil Conservation Service, the soils on the Zoo property are of three types. Adjacent to the river is soil type Af, Agua loam. On the rest of the site are soil types Bs and Bt, Brazito silty clay loam and Brazito complex. These soils are within hydrologic soils groups A and B, and they are fairly permeable.

Within the Zoo property, ground cover consists of native and domestic grasses. Deciduous trees overhang a large portion of the area.

PROPOSED CONDITIONS AND NEW CONSTRUCTION

The primary area of new and future construction is in the northwest portion of the Zoo property. A new elephant exhibit, a new rhino exhibit, a new ostrich exhibit, and enclosures for other future animals will be built in this area. Adjacent to this development will be a new Children's Zoo. The runoff retention ponds in this portion of the Zoo will be provided primarily within exhibit areas. The ponds are to be sized and located as shown on the Plates 1A and 1B.

A new cafe is being built, along with repaving in a central walkway portion of the Zoo. A slight increase in impervious area will result from this construction. New ponding areas have been proposed adjacent to the walkways: in planters, cobbled dirt areas, and in a new grassed area. The required size and general location of these ponds and are noted on the Plates 1A and 1B.

A new 1.3 acre paved parking lot is slated for construction in an undeveloped area north of the existing lots. In its undeveloped state, the drainage basin discharges 2.88 cfs to 10th Street. In its developed state, the basin produces 7.04 cfs. By routing the

run-off through a detention pond in the new parking lot, it was possible to reduce the peak run-off to 3.05 cfs. This is a minor increase from the existing run-off, and will have negligible impact on the storm drain system in 10th Street.

A new polar bear exhibit with a new outdoor patio is to be built in an undeveloped area west of the existing polar bear exhibit. The majority of the new exhibit is impervious animal display area, and will be discharged to the sanitary sewer system. The remainder of the new exhibit is impervious roof and patio areas which will contribute run-off to existing Basin 16.

BASIS OF CALCULATIONS

Hydrologic calculations were based on AMAFCA's computerized hydrologic model, AHYMO, in conjunction with Section 22.2 of Albuquerque's Development Process Manual. An AHYMO analysis of the 100-year, 6-hour rainfall event was made, and is on page 10 of this report.

Under current City criteria adopted in May, 1991, retention ponds must be sized to retain the 100-year, 10-day storm. 10-day storm volumes were calculated in accordance with the methodology on page A-8 of DPM Section 22.2 - Hydrology, January, 1993. The required pond sizes calculated by this method are listed on Plate 1A, and the ponding areas are graphically depicted on Plates 1A and 1B.

RECOMMENDATIONS

1. Build the new parking lot in Basin 39 to provide the ponding volume and discharge listed in this report.
2. Alter the pedestrian walkway that winds through Basins 40-42 and 47-49 so that the run-off from the walkway can freely enter the ponding areas in the animal exhibits adjacent to the walkway. Free discharge into the exhibits can be accomplished by turning some of the concrete blocks adjacent to the exhibits on their sides, allowing storm run-off to spill into the exhibits.
3. The pedestrian walk in Basins 19, 21, and 25 (running from the kudos down to the cafe) is planned for reconstruction soon. Whenever the walk is reconstructed, the walkway should be engineered in conjunction with a new adjacent retention pond in order to eliminate nuisance ponding in the walkway area. Runoff from the three basins should be routed into one common ponding area that is not in the walkway at all.
4. When building the new exhibits in Basins 1-4 and 6-9, provide the retention ponding volumes listed on Plate 1A of this report.

Job RIO GRANDE ZOO MASTER DRAINAGE
Subject NEW PARKING LOT - HYDRAULIC CALCULATIONS
Client ZOO

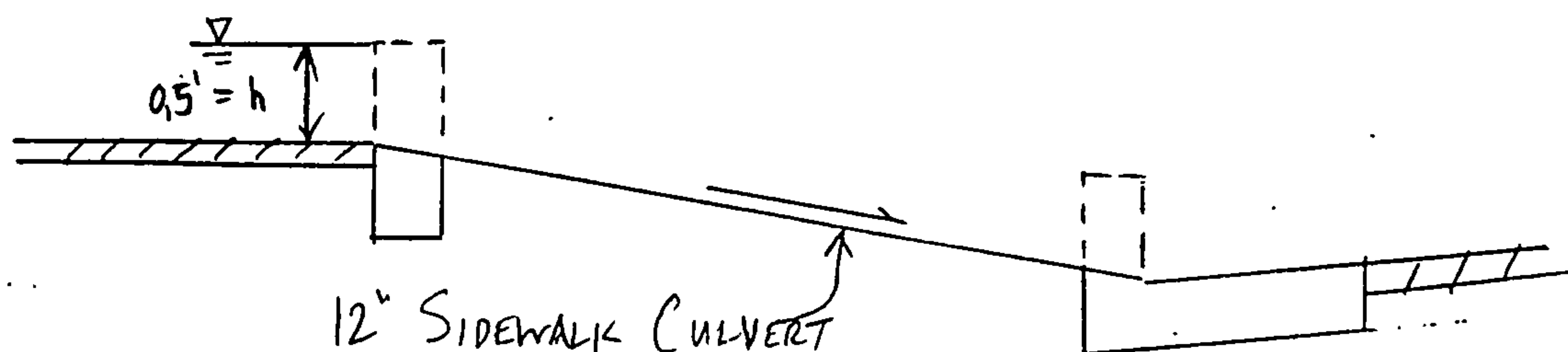
Sheet No. _____ of _____
Job. No. _____
By JPK Date 3/31/93



CHAVEZ - GRIEVES / CONSULTING ENGINEERS, Inc.

Albuquerque, NM

1. Use a 12" SIDEWALK CULVERT AT EACH LOW POINT, AND DISCHARGE INTO THE STREET.



USE THE WEIR EQUATION TO DETERMINE THE DISCHARGE:

$$Q = 3.0 L^{1.5} (0.75) \quad \text{25\% CLOGGING FACTOR}$$

L IS THE WEIR LENGTH = 1'

$$Q = 3.0 (1) (0.5)^{1.5} (0.75) = 0.80 \text{ CFS PER SIDEWALK CULVERT}$$

$$4 \text{ CULVERTS.} \rightarrow \therefore Q_{TOT} = 3.20 \text{ CFS}$$

THIS IS SLIGHTLY MORE THAN THE EXISTING Q OF 2.88 CFS

2. FROM THE AHYMO RUN, IT CAN BE SEEN THAT THE EXISTING DISCHARGE FROM THE PARKING LOT (BASIN 39) IS 2.88 CFS. THE DEVELOPED RUNOFF IS 7.04 CFS. BY ROUTING THIS RUNOFF THROUGH A 0.10 AC-FT POND CREATED IN THE PARKING LOT, THE FINAL DEVELOPED DISCHARGE CAN BE REDUCED TO 3.05 CFS. THIS IS ESSENTIALLY THE SAME AS THE EXISTING PEAK RUNOFF RATE, AND WILL NOT NEGATIVELY IMPACT THE STORM DRAIN SYSTEM.

Job RIO GRANDE ZOO MASTER DRAINAGE
Subject HYDROLOGIC CALCULATIONS
Client Z60

Sheet No. _____ of _____
Job. No. _____
By JPK Date 5/4/93



CHAVEZ - GRIEVES / CONSULTING ENGINEERS, Inc.

Albuquerque, NM

DETERMINATION OF 100-YEAR, 10-DAY RUNOFF VOLUME

USE THE PROCEDURE OUTLINED IN DPM SECTION 22.2, JAN. 1993 ED.

$$\text{Eq'n A-9: } V_{10\text{-DAY}} = V_{360} + A_D (P_{10\text{-DAY}} - P_{360}) / 12''/1$$

$$\text{Eq'n C-9: } P_{10\text{-DAY}} = 10.0 - \left[\frac{24.9}{(P_{1440})^{1.4}} \right]$$

$$P_{10\text{-DAY}} = 10.0 - \frac{24.9}{(2.64)^{1.4}} = 3.60''$$

$$V_{10\text{-DAY}} = V_{360} + A_D (3.60 - 2.27) / 12$$

WHERE V_{360} = 6-HOUR STORM VOLUME (AC-FT)

A_D = IMPERVIOUS AREA (ACRES)

$$V_{10\text{-DAY}} = V_{360} + A_D (0.11)$$

THESE VALUES ARE TABULATED FOR EACH DRAINAGE BASIN ON PLATE IA.

AHYMO PROGRAM (AHYMO392) - AMAFCA VERSION OF HYMO - MARCH, 1992
 RUN DATE (MON/DAY/YR) = 03/31/1993
 START TIME (HR:MIN:SEC) = 19:27:56 USER NO.= M_WALLA_.S92
 INPUT FILE = A:ZOOMSTR.IN

***** CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC. *****
 ** AHYMO RUN FOR THE RIO GRANDE ZOO MASTER DRAINAGE PLAN
 ** FILENAME: C:\HYMO\ZOOMSTR.IN/OUT
 ** 100-YEAR, 6-HOUR STORM
 ** DATE: MARCH 31, 1993
 **

START 0.00
 RAINFALL TYPE=1 RAIN QUARTER=0.0 RAIN ONE=1.93
 RAIN SIX=2.27 RAIN DAY=2.64 DT=0.033333

COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
 DT = .033333 HOURS END TIME = 5.999940 HOURS

.0000	.0017	.0034	.0051	.0069	.0087	.0106
.0125	.0145	.0165	.0185	.0206	.0228	.0250
.0273	.0297	.0321	.0346	.0372	.0399	.0427
.0456	.0485	.0517	.0549	.0583	.0618	.0656
.0695	.0736	.0780	.0833	.0890	.0951	.1082
.1376	.1827	.2475	.3359	.4522	.6004	.7849
1.0101	1.2184	1.3056	1.3792	1.4446	1.5042	1.5591
1.6100	1.6576	1.7022	1.7441	1.7837	1.8211	1.8566
1.8901	1.9219	1.9521	1.9807	2.0079	2.0142	2.0202
2.0258	2.0312	2.0363	2.0412	2.0459	2.0504	2.0548
2.0590	2.0631	2.0671	2.0709	2.0747	2.0783	2.0818
2.0853	2.0886	2.0919	2.0951	2.0982	2.1013	2.1043
2.1072	2.1101	2.1129	2.1157	2.1184	2.1210	2.1236
2.1262	2.1287	2.1312	2.1337	2.1361	2.1385	2.1408
2.1431	2.1454	2.1476	2.1498	2.1520	2.1541	2.1562
2.1583	2.1604	2.1624	2.1645	2.1664	2.1684	2.1703
2.1723	2.1742	2.1760	2.1779	2.1797	2.1816	2.1833
2.1851	2.1869	2.1886	2.1904	2.1921	2.1938	2.1954
2.1971	2.1987	2.2004	2.2020	2.2036	2.2052	2.2067
2.2083	2.2099	2.2114	2.2129	2.2144	2.2159	2.2174
2.2189	2.2203	2.2218	2.2232	2.2246	2.2260	2.2275
2.2288	2.2302	2.2316	2.2330	2.2343	2.2357	2.2370
2.2383	2.2396	2.2410	2.2423	2.2435	2.2448	2.2461
2.2474	2.2486	2.2499	2.2511	2.2524	2.2536	2.2548
2.2560	2.2572	2.2584	2.2596	2.2608	2.2620	2.2631
2.2643	2.2654	2.2666	2.2677	2.2689	2.2700	

* COMPUTE BASIN 1. BASIN 1 IS THE SERVICE ROAD ADJACENT TO THE
 * NEW RHINO ENCLOSURE AND THE NEW ENCLOSURES 2 AND 3.
 COMPUTE NM HYD ID=1 HYD=101 DA=.000569 SQ MI
 %A=0.0 %B=0.0 %C=100.0 %D=0.0
 TP=0.1333 RAINFALL=-1

K = .106544HR TP = .133300HR K/TP RATIO = .799277 SHAPE CONSTANT, N = 4.482733
 UNIT PEAK = 1.6483 CFS UNIT VOLUME = .9924 B = 386.16 P60 = 1.9300
 AREA = .000569 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 101.00

RUNOFF VOLUME = 1.05306 INCHES = .0320 ACRE-FEET
 PEAK DISCHARGE RATE = 1.10 CFS AT 1.500 HOURS BASIN AREA = .0006 SQ. MI.

* COMPUTE BASIN 2. BASIN 2 IS THE FUTURE RHINO YARD.
 COMPUTE NM HYD ID=1 HYD=102 DA=.001110 SQ MI
 %A=90.0 %B=0.0 %C=0.0 %D=10.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420

UNIT PEAK = .43823 CFS UNIT VOLUME = .9751 B = 526.28 P60 = 1.9300
AREA = .000111 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 2.0654 CFS UNIT VOLUME = .9928 B = 275.59 P60 = 1.9300
AREA = .000999 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 102.00

RUNOFF VOLUME = .63507 INCHES = .0376 ACRE-FEET
PEAK DISCHARGE RATE = 1.22 CFS AT 1.533 HOURS BASIN AREA = .0011 SQ. MI.

* COMPUTE BASIN 3. BASIN 3 IS THE FUTURE ENCLOSURE 3 AND THE
* ROOF OF THE NEW RHINO BLDG.

COMPUTE NM HYD ID=1 HYD=103 DA=.001203 SQ MI
%A=70.0 %B=0.0 %C=0.0 %D=30.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.4249 CFS UNIT VOLUME = .9911 B = 526.28 P60 = 1.9300
AREA = .000361 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.7410 CFS UNIT VOLUME = .9912 B = 275.59 P60 = 1.9300
AREA = .000842 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 103.00

RUNOFF VOLUME = .94620 INCHES = .0607 ACRE-FEET
PEAK DISCHARGE RATE = 1.80 CFS AT 1.500 HOURS BASIN AREA = .0012 SQ. MI.

* COMPUTE BASIN 4. BASIN 4 IS HALF OF THE ROOF OF THE NEW
* ELEPHANT BLDG, AND THE REAR SERVICE YARD.

COMPUTE NM HYD ID=1 HYD=104 DA=.000894 SQ MI
%A=72.0 %B=0.0 %C=11.0 %D=17.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .60003 CFS UNIT VOLUME = .9815 B = 526.28 P60 = 1.9300
AREA = .000152 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .154799HR TP = .133300HR K/TP RATIO = 1.161282 SHAPE CONSTANT, N = 3.052481
UNIT PEAK = 1.5924 CFS UNIT VOLUME = .9910 B = 286.07 P60 = 1.9300
AREA = .000742 SQ MI IA = .61024 INCHES INF = 1.55867 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 104.00

RUNOFF VOLUME = .79085 INCHES = .0377 ACRE-FEET
PEAK DISCHARGE RATE = 1.20 CFS AT 1.500 HOURS BASIN AREA = .0009 SQ. MI.

* COMPUTE BASIN 5. BASIN 5 IS THE EXISTING LECHWE ENCLOSURE.

COMPUTE NM HYD ID=1 HYD=105 DA=.000821 SQ MI
%A=96.0 %B=0.0 %C=0.0 %D=4.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .12965 CFS UNIT VOLUME = .9169 B = 526.28 P60 = 1.9300
AREA = .000033 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.6295 CFS UNIT VOLUME = .9906 B = 275.59 P60 = 1.9300
AREA = .000788 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 105.00

RUNOFF VOLUME = .54173 INCHES = .0237 ACRE-FEET
PEAK DISCHARGE RATE = .82 CFS AT 1.533 HOURS BASIN AREA = .0008 SQ. MI.

* COMPUTE BASIN 6. BASIN 6 IS THE NEW ELEPHANT YARD.

COMPUTE NM HYD ID=1 HYD=106 DA=.001198 SQ MI
%A=100.0 %B=0.0 %C=0.0 %D=0.0
TP=0.1333 RAINFALL=-1

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 2.4768 CFS UNIT VOLUME = .9937 B = 275.59 P60 = 1.9300
AREA = .001198 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 106.00

RUNOFF VOLUME = .47950 INCHES = .0306 ACRE-FEET
PEAK DISCHARGE RATE = 1.09 CFS AT 1.533 HOURS BASIN AREA = .0012 SQ. MI.

* COMPUTE BASIN 7. BASIN 7 IS FUTURE ENCLOSURE 2 ADJACENT

* TO THE NEW ELEPHANT BLDG.

COMPUTE NM HYD ID=1 HYD=107 DA=.002337 SQ MI
%A=70.0 %B=0.0 %C=0.0 %D=30.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 2.7680 CFS UNIT VOLUME = .9955 B = 526.28 P60 = 1.9300
AREA = .000701 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 3.3821 CFS UNIT VOLUME = .9954 B = 275.59 P60 = 1.9300
AREA = .001636 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 107.00

RUNOFF VOLUME = .94620 INCHES = .1179 ACRE-FEET
PEAK DISCHARGE RATE = 3.49 CFS AT 1.500 HOURS BASIN AREA = .0023 SQ. MI.

* COMPUTE BASIN 8. BASIN 8 IS THE FUTURE OSTRICH YARD.
 COMPUTE NM HYD ID=1 HYD=108 DA=.000573 SQ MI
 %A=88.0 %B=0.0 %C=0.0 %D=12.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = .27147 CFS UNIT VOLUME = .9547 B = 526.28 P60 = 1.9300
 AREA = .000069 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
 UNIT PEAK = 1.0425 CFS UNIT VOLUME = .9860 B = 275.59 P60 = 1.9300
 AREA = .000504 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 108.00

RUNOFF VOLUME = .66618 INCHES = .0204 ACRE-FEET
 PEAK DISCHARGE RATE = .66 CFS AT 1.500 HOURS BASIN AREA = .0006 SQ. MI.

* COMPUTE BASIN 9. BASIN 9 IS THE NEW SERVICE ROAD BETWEEN
 * THE CAT EXHIBIT AND THE NEW ENCLOSURE 2.
 COMPUTE NM HYD ID=1 HYD=109 DA=.000638 SQ MI
 %A=0.0 %B=0.0 %C=100.0 %D=0.0
 TP=0.1333 RAINFALL=-1

K = .106544HR TP = .133300HR K/TP RATIO = .799277 SHAPE CONSTANT, N = 4.482733
 UNIT PEAK = 1.8482 CFS UNIT VOLUME = .9932 B = 386.16 P60 = 1.9300
 AREA = .000638 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 109.00

RUNOFF VOLUME = 1.05306 INCHES = .0358 ACRE-FEET
 PEAK DISCHARGE RATE = 1.23 CFS AT 1.500 HOURS BASIN AREA = .0006 SQ. MI.

* COMPUTE BASIN 10. BASIN 10 IS THE CAT EXHIBITS.
 COMPUTE NM HYD ID=1 HYD=1010 DA=.000791 SQ MI
 %A=0.0 %B=0.0 %C=0.0 %D=100.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 3.1229 CFS UNIT VOLUME = .9955 B = 526.28 P60 = 1.9300
 AREA = .000791 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1010.00

RUNOFF VOLUME = 2.03516 INCHES = .0859 ACRE-FEET
 PEAK DISCHARGE RATE = 2.29 CFS AT 1.500 HOURS BASIN AREA = .0008 SQ. MI.

* COMPUTE BASIN 11. BASIN 11 IS THE LION EXHIBIT.
 COMPUTE NM HYD ID=1 HYD=1011 DA=.000203 SQ MI
 %A=80.0 %B=0.0 %C=0.0 %D=20.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .16029 CFS UNIT VOLUME = .9286 B = 526.28 P60 = 1.9300
AREA = .000041 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .33575 CFS UNIT VOLUME = .9558 B = 275.59 P60 = 1.9300
AREA = .000162 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1011.00

RUNOFF VOLUME = .79063 INCHES = .0086 ACRE-FEET
PEAK DISCHARGE RATE = .28 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 13. BASIN 13 IS THE CHEETAH EXHIBIT.
COMPUTE NM HYD ID=1 HYD=1013 DA=.000548 SQ MI
%A=95.0 %B=0.0 %C=0.0 %D=5.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .10818 CFS UNIT VOLUME = .8874 B = 526.28 P60 = 1.9300
AREA = .000027 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.0763 CFS UNIT VOLUME = .9860 B = 275.59 P60 = 1.9300
AREA = .000521 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1013.00

RUNOFF VOLUME = .55729 INCHES = .0163 ACRE-FEET
PEAK DISCHARGE RATE = .56 CFS AT 1.533 HOURS BASIN AREA = .0005 SQ. MI.

* COMPUTE BASIN 14. BASIN 14 IS PART OF THE NEW POLAR
* BEAR EXHIBIT.
COMPUTE NM HYD ID=1 HYD=1014 DA=.000074 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .29216 CFS UNIT VOLUME = .9610 B = 526.28 P60 = 1.9300
AREA = .000074 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1014.00

RUNOFF VOLUME = 2.03517 INCHES = .0080 ACRE-FEET
PEAK DISCHARGE RATE = .22 CFS AT 1.500 HOURS BASIN AREA = .0001 SQ. MI.

* COMPUTE BASIN 15. BASIN 15 IS PART OF THE NEW POLAR
* BEAR EXHIBIT.
COMPUTE NM HYD ID=1 HYD=1015 DA=.000401 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0

TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.5832 CFS UNIT VOLUME = .9922 B = 526.28 P60 = 1.9300
AREA = .000401 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1015.00

RUNOFF VOLUME = 2.03517 INCHES = .0435 ACRE-FEET
PEAK DISCHARGE RATE = 1.17 CFS AT 1.500 HOURS BASIN AREA = .0004 SQ. MI.

* COMPUTE BASIN 16. BASIN 16 IS THE LARGE GRASSED AREA
* IN FRONT OF THE PERFORMANCE STAGE.

COMPUTE NM HYD ID=1 HYD=1016 DA=.006052 SQ MI
%A=85.0 %B=0.0 %C=0.0 %D=15.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 3.5840 CFS UNIT VOLUME = .9961 B = 526.28 P60 = 1.9300
AREA = .000908 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 10.635 CFS UNIT VOLUME = .9984 B = 275.59 P60 = 1.9300
AREA = .005144 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1016.00

RUNOFF VOLUME = .71285 INCHES = .2301 ACRE-FEET
PEAK DISCHARGE RATE = 7.19 CFS AT 1.500 HOURS BASIN AREA = .0061 SQ. MI.

* COMPUTE BASIN 17. BASIN 17 IS A DEPRESSED CAGE ADJACENT
* TO THE CAT EXHIBITS.

COMPUTE NM HYD ID=1 HYD=1017 DA=.000278 SQ MI
%A=66.0 %B=0.0 %C=0.0 %D=34.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .37317 CFS UNIT VOLUME = .9664 B = 526.28 P60 = 1.9300
AREA = .000095 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .37934 CFS UNIT VOLUME = .9614 B = 275.59 P60 = 1.9300
AREA = .000183 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1017.00

RUNOFF VOLUME = 1.00843 INCHES = .0150 ACRE-FEET
PEAK DISCHARGE RATE = .45 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 18. BASIN 18 IS THE NATURE THEATRE.

COMPUTE NM HYD ID=1 HYD=1018 DA=.000367 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.4489 CFS UNIT VOLUME = .9911 B = 526.28 P60 = 1.9300
AREA = .000367 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1018.00

RUNOFF VOLUME = 2.03517 INCHES = .0398 ACRE-FEET
PEAK DISCHARGE RATE = 1.07 CFS AT 1.500 HOURS BASIN AREA = .0004 SQ. MI.

* COMPUTE BASIN 19. BASIN 19 IS THE FUTURE CHILDREN'S
* ZOO AREA.

COMPUTE NM HYD ID=1 HYD=1019 DA=.002034 SQ MI
%A=57.0 %B=0.0 %C=33.0 %D=10.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .80303 CFS UNIT VOLUME = .9840 B = 526.28 P60 = 1.9300
AREA = .000203 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .141774HR TP = .133300HR K/TP RATIO = 1.063574 SHAPE CONSTANT, N = 3.320290
UNIT PEAK = 4.2156 CFS UNIT VOLUME = .9968 B = 306.97 P60 = 1.9300
AREA = .001831 SQ MI IA = .54000 INCHES INF = 1.36200 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1019.00

RUNOFF VOLUME = .78411 INCHES = .0851 ACRE-FEET
PEAK DISCHARGE RATE = 2.82 CFS AT 1.500 HOURS BASIN AREA = .0020 SQ. MI.

* COMPUTE BASIN 20. BASIN 20 IS THE SERVICE AREA BEHIND
* THE NEW RESTAURANT.

COMPUTE NM HYD ID=1 HYD=1020 DA=.000487 SQ MI
%A=10.0 %B=0.0 %C=40.0 %D=50.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .96135 CFS UNIT VOLUME = .9881 B = 526.28 P60 = 1.9300
AREA = .000244 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .117669HR TP = .133300HR K/TP RATIO = .882739 SHAPE CONSTANT, N = 4.020106
UNIT PEAK = .65123 CFS UNIT VOLUME = .9799 B = 356.51 P60 = 1.9300
AREA = .000244 SQ MI IA = .41000 INCHES INF = .99800 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1020.00

RUNOFF VOLUME = 1.46883 INCHES = .0382 ACRE-FEET
PEAK DISCHARGE RATE = 1.13 CFS AT 1.500 HOURS BASIN AREA = .0005 SQ. MI.

* COMPUTE BASIN 21. BASIN 21 IS THE WALKWAY BETWEEN THE
 * NEW RESTAURANT AND THE SEA LION EXHIBIT.
 COMPUTE NM HYD ID=1 HYD=1021 DA=.000673 SQ MI
 %A=10.0 %B=0.0 %C=40.0 %D=50.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 1.3285 CFS UNIT VOLUME = .9911 B = 526.28 P60 = 1.9300
 AREA = .000337 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .117669HR TP = .133300HR K/TP RATIO = .882739 SHAPE CONSTANT, N = 4.020106
 UNIT PEAK = .89996 CFS UNIT VOLUME = .9850 B = 356.51 P60 = 1.9300
 AREA = .000337 SQ MI IA = .41000 INCHES INF = .99800 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1021.00

RUNOFF VOLUME = 1.46883 INCHES = .0527 ACRE-FEET
 PEAK DISCHARGE RATE = 1.55 CFS AT 1.500 HOURS BASIN AREA = .0007 SQ. MI.

* COMPUTE BASIN 22. BASIN 22 IS THE SEA LION EXHIBIT.
 COMPUTE NM HYD ID=1 HYD=1022 DA=.000182 SQ MI
 %A=0.0 %B=0.0 %C=0.0 %D=100.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = .71855 CFS UNIT VOLUME = .9840 B = 526.28 P60 = 1.9300
 AREA = .000182 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1022.00

RUNOFF VOLUME = 2.03517 INCHES = .0198 ACRE-FEET
 PEAK DISCHARGE RATE = .53 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 23. BASIN 23 IS THE OLD SEA LION EXHIBIT.
 COMPUTE NM HYD ID=1 HYD=1023 DA=.000131 SQ MI
 %A=0.0 %B=0.0 %C=0.0 %D=100.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = .51719 CFS UNIT VOLUME = .9786 B = 526.28 P60 = 1.9300
 AREA = .000131 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1023.00

RUNOFF VOLUME = 2.03517 INCHES = .0142 ACRE-FEET
 PEAK DISCHARGE RATE = .39 CFS AT 1.500 HOURS BASIN AREA = .0001 SQ. MI.

* COMPUTE BASIN 24. BASIN 24 IS THE PRAIRIE DOG EXHIBIT.
 COMPUTE NM HYD ID=1 HYD=1024 DA=.000073 SQ MI
 %A=85.0 %B=0.0 %C=0.0 %D=15.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .43231E-01CFS UNIT VOLUME = .8874 B = 526.28 P60 = 1.9300
AREA = .000011 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .12829 CFS UNIT VOLUME = .8850 B = 275.59 P60 = 1.9300
AREA = .000062 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1024.00

RUNOFF VOLUME = .71285 INCHES = .0028 ACRE-Feet
PEAK DISCHARGE RATE = .10 CFS AT 1.500 HOURS BASIN AREA = .0001 SQ. MI.

* COMPUTE BASIN 25. BASIN 25 IS THE WALKWAY IN FRONT OF THE
* RESTROOM BLDG.

COMPUTE NM HYD ID=1 HYD=1025 DA=.000844 SQ MI
%A=5.0 %B=0.0 %C=25.0 %D=10.0
TP=0.1333 RAINFALL=-1

*****WARNING***** SUM OF TREATMENT TYPES DOES NOT EQUAL 100 PERCENT OR TOTAL AREA

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .83304 CFS UNIT VOLUME = .9862 B = 526.28 P60 = 1.9300
AREA = .000211 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .115815HR TP = .133300HR K/TP RATIO = .868829 SHAPE CONSTANT, N = 4.089414
UNIT PEAK = 1.7147 CFS UNIT VOLUME = .9929 B = 361.09 P60 = 1.9300
AREA = .000633 SQ MI IA = .40000 INCHES INF = .97000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1025.00

RUNOFF VOLUME = 1.20324 INCHES = .0542 ACRE-Feet
PEAK DISCHARGE RATE = 1.71 CFS AT 1.500 HOURS BASIN AREA = .0008 SQ. MI.

* COMPUTE BASIN 26. BASIN 26 IS THE BISON EXHIBIT.
COMPUTE NM HYD ID=1 HYD=1026 DA=.001048 SQ MI

%A=90.0 %B=0.0 %C=0.0 %D=10.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .41376 CFS UNIT VOLUME = .9711 B = 526.28 P60 = 1.9300
AREA = .000105 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.9500 CFS UNIT VOLUME = .9923 B = 275.59 P60 = 1.9300
AREA = .000943 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1026.00

RUNOFF VOLUME = .63507 INCHES = .0355 ACRE-Feet

PEAK DISCHARGE RATE = 1.15 CFS AT 1.533 HOURS BASIN AREA = .0010 SQ. MI.

* COMPUTE BASIN 27. BASIN 27 IS THE EXISTING ELEPHANT
* EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1027 DA=.000296 SQ MI
%A=75.0 %B=0.0 %C=0.0 %D=25.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .29216 CFS UNIT VOLUME = .9610 B = 526.28 P60 = 1.9300
AREA = .000074 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .45897 CFS UNIT VOLUME = .9685 B = 275.59 P60 = 1.9300
AREA = .000222 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1027.00

RUNOFF VOLUME = .86842 INCHES = .0137 ACRE-FEET
PEAK DISCHARGE RATE = .43 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 28. BASIN 28 IS THE GIRAFFE EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1028 DA=.001128 SQ MI
%A=85.0 %B=0.0 %C=0.0 %D=15.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .66801 CFS UNIT VOLUME = .9815 B = 526.28 P60 = 1.9300
AREA = .000169 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.9823 CFS UNIT VOLUME = .9923 B = 275.59 P60 = 1.9300
AREA = .000959 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1028.00

RUNOFF VOLUME = .71285 INCHES = .0429 ACRE-FEET
PEAK DISCHARGE RATE = 1.35 CFS AT 1.500 HOURS BASIN AREA = .0011 SQ. MI.

* COMPUTE BASIN 29. BASIN 29 IS THE PAVED AREA NORTH OF
* THE GIRAFFE EXHIBIT THAT DISCHARGES TO RIO AVE.

COMPUTE NM HYD ID=1 HYD=1029 DA=.000438 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.7292 CFS UNIT VOLUME = .9933 B = 526.28 P60 = 1.9300
AREA = .000438 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1029.00

RUNOFF VOLUME = 2.03516 INCHES = .0475 ACRE-FEET
PEAK DISCHARGE RATE = 1.27 CFS AT 1.500 HOURS BASIN AREA = .0004 SQ. MI.

* COMPUTE BASIN 30. BASIN 30 IS AN AFRICAN HOOFSTOCK EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1030 DA=.000266 SQ MI
%A=100.0 %B=0.0 %C=0.0 %D=0.0
TP=0.1333 RAINFALL=-1

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .54994 CFS UNIT VOLUME = .9725 B = 275.59 P60 = 1.9300
AREA = .000266 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1030.00

RUNOFF VOLUME = .47950 INCHES = .0068 ACRE-FEET
PEAK DISCHARGE RATE = .25 CFS AT 1.533 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 31. BASIN 31 IS THE PAVED WALKWAY/SERVICE

* AREA NORTH OF THE BISON.

COMPUTE NM HYD ID=1 HYD=1031 DA=.000464 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.8319 CFS UNIT VOLUME = .9933 B = 526.28 P60 = 1.9300
AREA = .000464 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1031.00

RUNOFF VOLUME = 2.03517 INCHES = .0504 ACRE-FEET
PEAK DISCHARGE RATE = 1.35 CFS AT 1.500 HOURS BASIN AREA = .0005 SQ. MI.

* COMPUTE BASIN 32. BASIN 32 IS THE VACANT EXHIBIT AREA

* EAST OF THE BISON.

COMPUTE NM HYD ID=1 HYD=1032 DA=.000749 SQ MI
%A=95.0 %B=0.0 %C=0.0 %D=5.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .14785 CFS UNIT VOLUME = .9169 B = 526.28 P60 = 1.9300
AREA = .000037 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.4711 CFS UNIT VOLUME = .9900 B = 275.59 P60 = 1.9300
AREA = .000712 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1032.00

RUNOFF VOLUME = .55729 INCHES = .0223 ACRE-FEET
PEAK DISCHARGE RATE = .76 CFS AT 1.533 HOURS BASIN AREA = .0007 SQ. MI.

* COMPUTE BASIN 33. BASIN 33 IS THE SERVICE AREA FOR THE
* SALT WATER FILTRATION.

COMPUTE NM HYD ID=1 HYD=1033 DA=.000700 SQ MI
%A=50.0 %B=0.0 %C=30.0 %D=20.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .55273 CFS UNIT VOLUME = .9786 B = 526.28 P60 = 1.9300
AREA = .000140 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .141311HR TP = .133300HR K/TP RATIO = 1.060096 SHAPE CONSTANT, N = 3.330964
UNIT PEAK = 1.2930 CFS UNIT VOLUME = .9896 B = 307.78 P60 = 1.9300
AREA = .000560 SQ MI IA = .53750 INCHES INF = 1.35500 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1033.00

RUNOFF VOLUME = .92645 INCHES = .0346 ACRE-FEET
PEAK DISCHARGE RATE = 1.10 CFS AT 1.500 HOURS BASIN AREA = .0007 SQ. MI.

* COMPUTE BASIN 34. BASIN 34 IS THE FUTURE PAVED WALKWAY AREA
* SOUTH OF THE CAMEL AND KUDU.

COMPUTE NM HYD ID=1 HYD=1034 DA=.000736 SQ MI
%A=40.0 %B=0.0 %C=0.0 %D=60.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.7435 CFS UNIT VOLUME = .9933 B = 526.28 P60 = 1.9300
AREA = .000442 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .60866 CFS UNIT VOLUME = .9760 B = 275.59 P60 = 1.9300
AREA = .000294 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1034.00

RUNOFF VOLUME = 1.41290 INCHES = .0555 ACRE-FEET
PEAK DISCHARGE RATE = 1.55 CFS AT 1.500 HOURS BASIN AREA = .0007 SQ. MI.

* COMPUTE BASIN 35. BASIN 35 IS THE CAMEL YARD.

COMPUTE NM HYD ID=1 HYD=1035 DA=.000676 SQ MI
%A=95.0 %B=0.0 %C=0.0 %D=5.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .13344 CFS UNIT VOLUME = .9169 B = 526.28 P60 = 1.9300
AREA = .000034 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.3277 CFS UNIT VOLUME = .9885 B = 275.59 P60 = 1.9300
AREA = .000642 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1035.00

RUNOFF VOLUME = .55729 INCHES = .0201 ACRE-FEET
 PEAK DISCHARGE RATE = .69 CFS AT 1.533 HOURS BASIN AREA = .0007 SQ. MI.

* COMPUTE BASIN 36. BASIN 36 IS THE KUDU YARD.
 COMPUTE NM HYD ID=1 HYD=1036 DA=.000809 SQ MI
 %A=95.0 %B=0.0 %C=0.0 %D=5.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = .15970 CFS UNIT VOLUME = .9286 B = 526.28 P60 = 1.9300
 AREA = .000040 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
 UNIT PEAK = 1.5889 CFS UNIT VOLUME = .9906 B = 275.59 P60 = 1.9300
 AREA = .000769 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1036.00

RUNOFF VOLUME = .55729 INCHES = .0240 ACRE-FEET
 PEAK DISCHARGE RATE = .82 CFS AT 1.533 HOURS BASIN AREA = .0008 SQ. MI.

* COMPUTE BASIN 37. BASIN 37 IS THE GIBBON EXHIBIT.
 COMPUTE NM HYD ID=1 HYD=1037 DA=.000215 SQ MI
 %A=50.0 %B=0.0 %C=0.0 %D=50.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = .42442 CFS UNIT VOLUME = .9711 B = 526.28 P60 = 1.9300
 AREA = .000108 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
 UNIT PEAK = .22225 CFS UNIT VOLUME = .9334 B = 275.59 P60 = 1.9300
 AREA = .000108 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1037.00

RUNOFF VOLUME = 1.25733 INCHES = .0144 ACRE-FEET
 PEAK DISCHARGE RATE = .42 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 38. BASIN 38 IS THE SERVICE ROAD
 * JUST NORTH OF THE MAIN ENTRANCE.
 COMPUTE NM HYD ID=1 HYD=1038 DA=.000348 SQ MI
 %A=0.0 %B=0.0 %C=0.0 %D=100.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 1.3739 CFS UNIT VOLUME = .9911 B = 526.28 P60 = 1.9300
 AREA = .000348 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1038.00

RUNOFF VOLUME = 2.03517 INCHES = .0378 ACRE-FEET
 PEAK DISCHARGE RATE = 1.01 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 39 UNDER EXISTING CONDITIONS.
 COMPUTE NM HYD ID=1 HYD=1039 DA=.002777 SQ MI
 %A=85.0 %B=0.0 %C=15.0 %D=0.0
 TP=0.1333 RAINFALL=-1

K = .153827HR TP = .133300HR K/TP RATIO = 1.153991 SHAPE CONSTANT, N = 3.070528
 UNIT PEAK = 5.9899 CFS UNIT VOLUME = .9974 B = 287.52 P60 = 1.9300
 AREA = .002777 SQ MI IA = .60500 INCHES INF = 1.54400 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1039.00

RUNOFF VOLUME = .54365 INCHES = .0805 ACRE-FEET
 PEAK DISCHARGE RATE = 2.88 CFS AT 1.533 HOURS BASIN AREA = .0028 SQ. MI.

* COMPUTE BASIN 39. BASIN 39 IS THE NEW OVERFLOW
 * PARKING LOT.
 COMPUTE NM HYD ID=1 HYD=1039 DA=.002777 SQ MI
 %A=10.0 %B=0.0 %C=15.0 %D=75.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 8.2228 CFS UNIT VOLUME = .9981 B = 526.28 P60 = 1.9300
 AREA = .002083 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .128795HR TP = .133300HR K/TP RATIO = .966201 SHAPE CONSTANT, N = 3.656216
 UNIT PEAK = 1.7268 CFS UNIT VOLUME = .9923 B = 331.56 P60 = 1.9300
 AREA = .000694 SQ MI IA = .47000 INCHES INF = 1.16600 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1039.00

RUNOFF VOLUME = 1.71993 INCHES = .2547 ACRE-FEET
 PEAK DISCHARGE RATE = 7.04 CFS AT 1.500 HOURS BASIN AREA = .0028 SQ. MI.

* ROUTE THE NEW PARKING LOT RUNOFF THROUGH A DETENTION
 * POND IN THE PARKING LOT IN ORDER TO DECREASE THE
 * RUNOFF TO LESS THAN EXISTING.
 ROUTE RESERVOIR ID=2 HYD=1039.1 INFLOW ID=1 CODE=10

OUTFLOW(CFS) STORAGE(AC-FT) EL(FT)
 0 0 0
 3.1 0.10 0.5

* * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	.00	.000	.00
.33	.00	.00	.000	.00
.67	.00	.00	.000	.00
1.00	.00	.00	.000	.00

1.33	1.90	.04	.008	.26
1.67	3.61	.49	.097	3.02
2.00	1.60	.41	.083	2.56
2.33	.35	.25	.049	1.53
2.67	.14	.12	.025	.77
3.00	.07	.06	.012	.39
3.33	.05	.03	.006	.20
3.67	.04	.02	.003	.11
4.00	.04	.01	.002	.07
4.33	.03	.01	.002	.05
4.67	.03	.01	.001	.04
5.00	.04	.01	.001	.04
5.33	.04	.01	.001	.04
5.67	.04	.01	.001	.04
6.00	.04	.01	.001	.04
6.33	.00	.00	.001	.03
6.67	.00	.00	.000	.01
7.00	.00	.00	.000	.01
7.33	.00	.00	.000	.00

PEAK DISCHARGE = 3.051 CFS - PEAK OCCURS AT HOUR 1.70
 MAXIMUM WATER SURFACE ELEVATION = .492
 MAXIMUM STORAGE = .0984 AC-FT INCREMENTAL TIME= .033333HRS

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 1039.10

RUNOFF VOLUME = 1.71984 INCHES = .2547 ACRE-Feet
 PEAK DISCHARGE RATE = 3.05 CFS AT 1.700 HOURS BASIN AREA = .0028 SQ. MI.

* COMPUTE BASIN 40. BASIN 40 IS THE ANTELOPE EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1040 DA=.002026 SQ MI
 %A=71.0 %B=0.0 %C=0.0 %D=29.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 2.3196 CFS UNIT VOLUME = .9941 B = 526.28 P60 = 1.9300
 AREA = .000588 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
 UNIT PEAK = 2.9739 CFS UNIT VOLUME = .9948 B = 275.59 P60 = 1.9300
 AREA = .001438 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1040.00

RUNOFF VOLUME = .93064 INCHES = .1006 ACRE-Feet
 PEAK DISCHARGE RATE = 2.98 CFS AT 1.500 HOURS BASIN AREA = .0020 SQ. MI.

* COMPUTE BASIN 41. BASIN 41 IS AN AFRICAN HOOFSOCK
* EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1041 DA=.000824 SQ MI
 %A=50.0 %B=0.0 %C=0.0 %D=50.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 1.6266 CFS UNIT VOLUME = .9922 B = 526.28 P60 = 1.9300
 AREA = .000412 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302

UNIT PEAK = .85179 CFS UNIT VOLUME = .9829 B = 275.59 P60 = 1.9300
AREA = .000412 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1041.00

RUNOFF VOLUME = 1.25733 INCHES = .0553 ACRE-FEET
PEAK DISCHARGE RATE = 1.57 CFS AT 1.500 HOURS BASIN AREA = .0008 SQ. MI.

* COMPUTE BASIN 42. BASIN 42 IS AN AFRICAN HOOFSTOCK
* EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1042 DA=.000317 SQ MI
%A=60.0 %B=0.0 %C=0.0 %D=40.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .50061 CFS UNIT VOLUME = .9751 B = 526.28 P60 = 1.9300
AREA = .000127 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .39323 CFS UNIT VOLUME = .9639 B = 275.59 P60 = 1.9300
AREA = .000190 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1042.00

RUNOFF VOLUME = 1.10177 INCHES = .0186 ACRE-FEET
PEAK DISCHARGE RATE = .55 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 43. BASIN 43 IS AN OFF-EXHIBIT AFRICAN
* HOOFSTOCK AREA.

COMPUTE NM HYD ID=1 HYD=1043 DA=.000255 SQ MI
%A=90.0 %B=0.0 %C=0.0 %D=10.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .10068 CFS UNIT VOLUME = .8874 B = 526.28 P60 = 1.9300
AREA = .000026 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .47448 CFS UNIT VOLUME = .9685 B = 275.59 P60 = 1.9300
AREA = .000230 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1043.00

RUNOFF VOLUME = .63507 INCHES = .0086 ACRE-FEET
PEAK DISCHARGE RATE = .29 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 44. BASIN 44 IS A PAVED SERVICE AREA
* NORTHEAST OF THE AFRICAN HOOFSTOCK.

COMPUTE NM HYD ID=1 HYD=1044 DA=.000226 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0

TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .89226 CFS UNIT VOLUME = .9862 B = 526.28 P60 = 1.9300
AREA = .000226 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1044.00

RUNOFF VOLUME = 2.03517 INCHES = .0245 ACRE-FEET
PEAK DISCHARGE RATE = .66 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 45. BASIN 45 IS A PAVED SERVICE AREA

* NORTHEAST OF THE AFRICAN HOOFSOCK.

COMPUTE NM HYD ID=1 HYD=1045 DA=.000306 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.2081 CFS UNIT VOLUME = .9897 B = 526.28 P60 = 1.9300
AREA = .000306 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1045.00

RUNOFF VOLUME = 2.03517 INCHES = .0332 ACRE-FEET
PEAK DISCHARGE RATE = .89 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 46. BASIN 46 IS A PAVED PERIMETER SERVICE

* DRIVE THAT DISCHARGES DIRECTLY TO STOVER STREET.

COMPUTE NM HYD ID=1 HYD=1046 DA=.000232 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .91595 CFS UNIT VOLUME = .9862 B = 526.28 P60 = 1.9300
AREA = .000232 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1046.00

RUNOFF VOLUME = 2.03517 INCHES = .0252 ACRE-FEET
PEAK DISCHARGE RATE = .68 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 47. BASIN 47 IS AN AFRICAN HOOFSOCK

* EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1047 DA=.001484 SQ MI
%A=88.0 %B=0.0 %C=0.0 %D=12.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .70307 CFS UNIT VOLUME = .9840 B = 526.28 P60 = 1.9300
AREA = .000178 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302

UNIT PEAK = 2.6999 CFS UNIT VOLUME = .9945 B = 275.59 P60 = 1.9300
AREA = .001306 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1047.00

RUNOFF VOLUME = .66618 INCHES = .0527 ACRE-FEET
PEAK DISCHARGE RATE = 1.68 CFS AT 1.500 HOURS BASIN AREA = .0015 SQ. MI.

* COMPUTE BASIN 48. BASIN 48 IS THE KANGAROO EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1048 DA=.000578 SQ MI
%A=90.0 %B=0.0 %C=0.0 %D=10.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .22820 CFS UNIT VOLUME = .9473 B = 526.28 P60 = 1.9300
AREA = .000058 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.0755 CFS UNIT VOLUME = .9860 B = 275.59 P60 = 1.9300
AREA = .000520 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1048.00

RUNOFF VOLUME = .63507 INCHES = .0196 ACRE-FEET
PEAK DISCHARGE RATE = .64 CFS AT 1.533 HOURS BASIN AREA = .0006 SQ. MI.

* COMPUTE BASIN 49. BASIN 49 IS THE EXISTING RHINO EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1049 DA=.000614 SQ MI
%A=93.0 %B=0.0 %C=0.0 %D=7.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .16969 CFS UNIT VOLUME = .9286 B = 526.28 P60 = 1.9300
AREA = .000043 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.1806 CFS UNIT VOLUME = .9878 B = 275.59 P60 = 1.9300
AREA = .000571 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1049.00

RUNOFF VOLUME = .58840 INCHES = .0193 ACRE-FEET
PEAK DISCHARGE RATE = .65 CFS AT 1.533 HOURS BASIN AREA = .0006 SQ. MI.

* COMPUTE BASIN 50. BASIN 50 IS A PAVED SERVICE ROAD
* THAT DISCHARGES TO 12TH STREET.

COMPUTE NM HYD ID=1 HYD=1050 DA=.000190 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .75013 CFS UNIT VOLUME = .9840 B = 526.28 P60 = 1.9300
AREA = .000190 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1050.00

RUNOFF VOLUME = 2.03516 INCHES = .0206 ACRE-FEET
PEAK DISCHARGE RATE = .56 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 51. BASIN 51 IS A PAVED SERVICE ROAD THAT
* DISCHARGES TO STOVER STREET.

COMPUTE NM HYD ID=1 HYD=1051 DA=.000372 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.4687 CFS UNIT VOLUME = .9911 B = 526.28 P60 = 1.9300
AREA = .000372 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1051.00

RUNOFF VOLUME = 2.03517 INCHES = .0404 ACRE-FEET
PEAK DISCHARGE RATE = 1.08 CFS AT 1.500 HOURS BASIN AREA = .0004 SQ. MI.

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 19:28:19



CHAVEZ-GRIEVES /CONSULTING ENGINEERS INC.

4600 MONTGOMERY N.E., BLDG. C, #101

ALBUQUERQUE, N.M. 87109

(505) 881-7376 FAX (505) 883-7119

MASTER DRAINAGE REPORT

FOR

THE RIO GRANDE ZOO

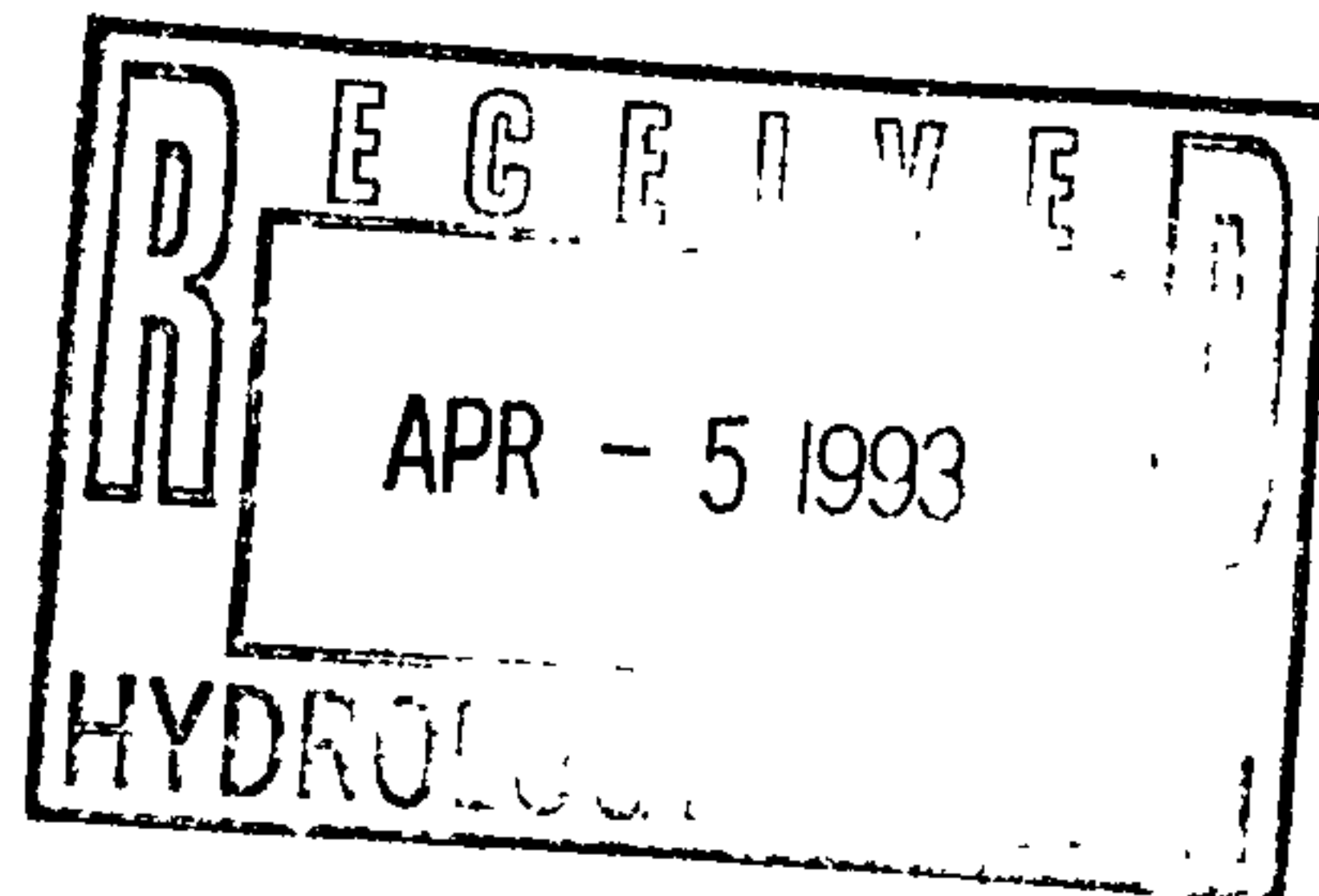
"QUALITY FIRST"

DRAFT

MASTER DRAINAGE REPORT

FOR

THE RIO GRANDE ZOO



PREPARED BY:

CHAVEZ-GRIEVES CONSULTING ENGINEERS INC.
4600 MONTGOMERY NE, BLDG C, #101
ALBUQUERQUE, NM 87109

JOB NO. C03-107-5192

I CERTIFY THAT I AM A REGISTERED PROFESSIONAL ENGINEER
IN THE STATE OF NEW MEXICO, AND THAT THIS REPORT WAS
PREPARED BY ME OR UNDER MY SUPERVISION.

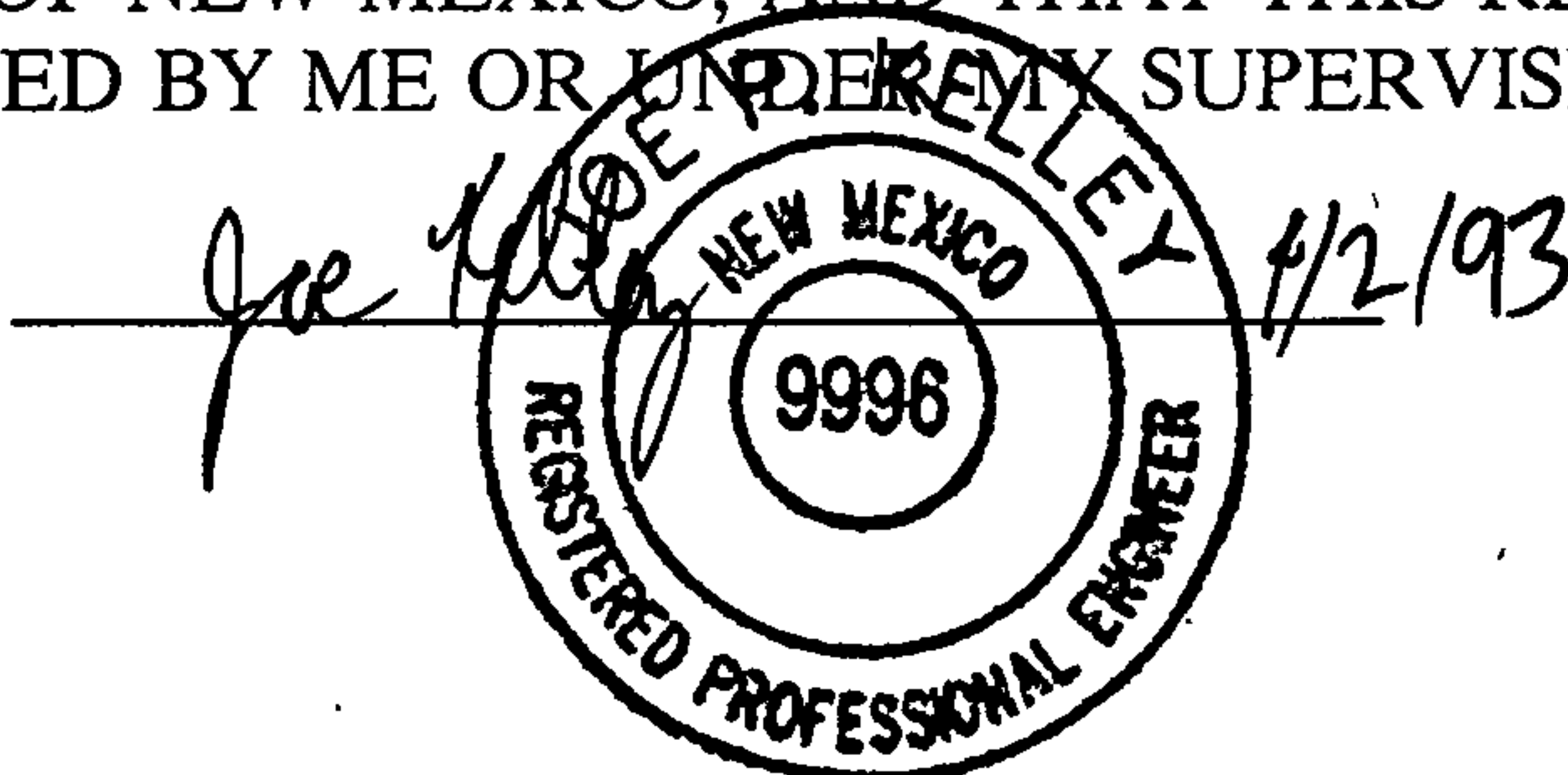


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PURPOSE OF THIS SUBMITTAL

This report addresses the hydrologic and hydraulic concerns on the Zoo property in order to obtain City approvals for recent and imminent Zoo construction. This report does not address water quality issues, and is therefore considered a draft submittal. After this report has been revised to address water quality, it will be resubmitted.

LOCATION AND DESCRIPTION

The Rio Grande Zoo is located in southwest downtown Albuquerque, north of the Rio Grande River at the intersection of Stover Ave. SE and 10th St. SE. The property is zoned SU-2 for development as a Zoo. As shown by panel 350002-0028 of the National Flood Insurance Program Flood Insurance Rate Map for the City of Albuquerque, NM, dated October 14, 1983, the entire Zoo lies within a designated 100-year flood hazard zone.

About 75% of the Zoo property has currently been developed into exhibits. Conceptual plans have been developed for portions of the remainder of the Zoo property, and this Master Drainage Plan reflects these future plans.

EXISTING CONDITIONS

The Zoo is located in a low-lying area that is isolated from the City drainage system. It is comprised of many individual drainage basins, each with its own area of ponding. Runoff ponds and is dissipated by evaporation and infiltration in some exhibits for which this type of ponding is allowed (hoofstock, for instance). In exhibits for which dissipation by evaporation and infiltration is not allowed (carnivores, for instance), runoff is discharged to the sanitary sewer. Runoff is contained within each exhibit. There are no cross-exhibit discharges, or discharges from exhibits into pedestrian areas.

Some of the perimeter drainage basins discharge into City streets, where run-off is intercepted by the City storm drain system. Offsite discharges are only from paved or unpaved service areas, and none are from exhibit areas. This water that is discharged off-site is the same quality as typical urban run-off.

According to the 1977 Soil Survey of Bernalillo County by the Soil Conservation Service, the soils on the Zoo property are of three types. Adjacent to the river is soil type Af, Agua loam. On the rest of the site are soil types Bs and Bt, Brazito silty clay loam and Brazito complex. These soils are within hydrologic soils groups A and B, and they are fairly permeable.

Within the Zoo property, ground cover is sparse, and deciduous trees overhang a large portion of the area.

PROPOSED CONDITIONS AND NEW CONSTRUCTION

The primary area of new and future construction is in the northwest portion of the Zoo property. A new elephant exhibit, a new rhino exhibit, a new ostrich exhibit, and enclosures for other future animals will be built in this area. Adjacent to this development will be a new Children's Zoo. Ponds will be provided within the exhibit areas to hold the excess runoff. The ponds are to be sized and located as shown on the Plates 1A and 1B.

A new cafe is being built, along with repaving in a central walkway portion of the Zoo. This increases the impervious area. New ponding areas will be provided adjacent to the walkways: in planters, in cobbled dirt areas, and in a new grassed area. The required sizes of these ponds are noted on the Plates 1A and 1B.

A new 1.3 acre paved parking lot is slated for construction in an undeveloped area north of the existing lots. In its undeveloped state, the drainage basin discharges 2.88 cfs to 10th Street. In its developed state, the basin produces 7.04 cfs. By routing the run-off through a detention pond in the new parking lot, it was possible to reduce the peak run-off to 3.05 cfs. This is a minor increase from the existing run-off, and will have negligible impact on the storm drain system in 10th Street.

A new polar bear exhibit with a new outdoor patio is to be built in an undeveloped area west of the existing polar bear exhibit. The majority of the new exhibit is impervious animal display area, and will be discharged to the sanitary sewer system. The remainder of the new exhibit is impervious roof and patio areas which will contribute run-off to existing low points.

BASIS OF CALCULATIONS

Hydrologic calculations were based on AMAFCA's computerized hydrologic model, AHYMO, in conjunction with Section 22.2 of Albuquerque's Development Process Manual. An analysis of both the 100-year, 6-hour and 24-hour rainfall events was made, and is included in this report. In order to determine the ponding volumes, the 24-hour event was compared to the 6-hour event, and the greater of the two was used for the pond design. In every case, the 24-hour volume governed.

RECOMMENDATIONS

By providing the ponding areas as outlined in this report, the site runoff will be safely ponded until the water has had enough time to evaporate or infiltrate into the ground. Construction of the new parking lot in accordance with this report will result in a minor increase in peak flows. Provision should be made to insure that exhibits which are to be discharged to the sanitary sewer system have an adequately sized sanitary connection and/or ponding area to discharge the storm volumes that have been quantified in this report.

Job RIO GRANDE ZOO MASTER DRAINAGE
Subject NEW PARKING LOT - HYDRAULIC CALCULATIONS
Client ZOO

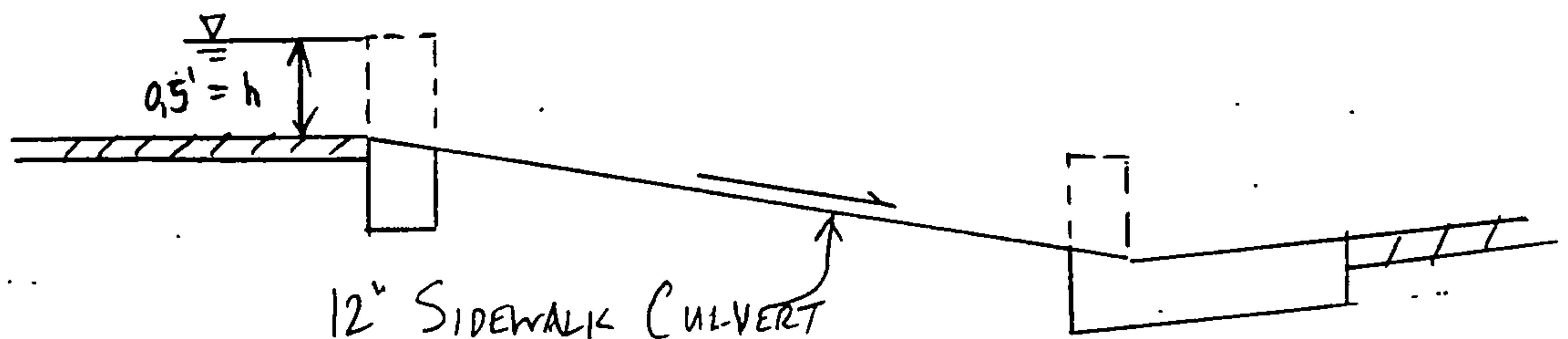
Sheet No. _____ of _____
Job. No. _____
By JPIC Date 3/31/93



CHAVEZ - GRIEVES / CONSULTING ENGINEERS, Inc.

Albuquerque, NM

1. Use a 12" SIDEWALK CULVERT AT EACH LOW POINT, AND DISCHARGE INTO THE STREET.



USE THE WEIR EQUATION TO DETERMINE THE DISCHARGE:

$$Q = 3.0 L^{1.5} (0.75) \quad \text{25\% CLOGGING FACTOR} \quad L \text{ IS THE WEIR LENGTH} = 1'$$

$$Q = 3.0 (1) (0.5)^{1.5} (0.75) = 0.80 \text{ CFS PER SIDEWALK CULVERT}$$

$$4 \text{ CULVERTS.} \rightarrow \therefore Q_{TOT} = 3.20 \text{ CFS}$$

THIS IS SLIGHTLY MORE THAN THE EXISTING Q OF 2.88 CFS

2. FROM THE AH/MO RUN, IT CAN BE SEEN THAT THE EXISTING DISCHARGE FROM THE PARKING LOT (BASIN 39) IS 2.88 CFS. THE DEVELOPED RUNOFF IS 7.04 CFS. BY ROUTING THIS RUNOFF THROUGH A 0.10 AC-FT POND CREATED IN THE PARKING LOT, THE FINAL DEVELOPED DISCHARGE CAN BE REDUCED TO 3.05 CFS. THIS IS ESSENTIALLY THE SAME AS THE EXISTING PEAK RUNOFF RATE, AND WILL NOT NEGATIVELY IMPACT THE STORM DRAIN SYSTEM.

AHYMO PROGRAM (AHYMO392) - AMAFCA VERSION OF HYMO - MARCH, 1992
 RUN DATE (MON/DAY/YR) = 03/31/1993
 START TIME (HR:MIN:SEC) = 19:27:56 USER NO.= M_WALLA_.S92
 INPUT FILE = A:ZOOMSTR.IN

***** CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC. *****
 ** AHYMO RUN FOR THE RIO GRANDE ZOO MASTER DRAINAGE PLAN
 ** FILENAME: C:\HYMO\ZOOMSTR.IN/OUT
 ** 100-YEAR, 6-HOUR STORM
 ** DATE: MARCH 31, 1993
 **

START 0.00
 RAINFALL TYPE=1 RAIN QUARTER=0.0 RAIN ONE=1.93
 RAIN SIX=2.27 RAIN DAY=2.64 DT=0.033333

COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
 DT = .033333 HOURS END TIME = 5.999940 HOURS

.0000	.0017	.0034	.0051	.0069	.0087	.0106
.0125	.0145	.0165	.0185	.0206	.0228	.0250
.0273	.0297	.0321	.0346	.0372	.0399	.0427
.0456	.0485	.0517	.0549	.0583	.0618	.0656
.0695	.0736	.0780	.0833	.0890	.0951	.1082
.1376	.1827	.2475	.3359	.4522	.6004	.7849
1.0101	1.2184	1.3056	1.3792	1.4446	1.5042	1.5591
1.6100	1.6576	1.7022	1.7441	1.7837	1.8211	1.8566
1.8901	1.9219	1.9521	1.9807	2.0079	2.0142	2.0202
2.0258	2.0312	2.0363	2.0412	2.0459	2.0504	2.0548
2.0590	2.0631	2.0671	2.0709	2.0747	2.0783	2.0818
2.0853	2.0886	2.0919	2.0951	2.0982	2.1013	2.1043
2.1072	2.1101	2.1129	2.1157	2.1184	2.1210	2.1236
2.1262	2.1287	2.1312	2.1337	2.1361	2.1385	2.1408
2.1431	2.1454	2.1476	2.1498	2.1520	2.1541	2.1562
2.1583	2.1604	2.1624	2.1645	2.1664	2.1684	2.1703
2.1723	2.1742	2.1760	2.1779	2.1797	2.1816	2.1833
2.1851	2.1869	2.1886	2.1904	2.1921	2.1938	2.1954
2.1971	2.1987	2.2004	2.2020	2.2036	2.2052	2.2067
2.2083	2.2099	2.2114	2.2129	2.2144	2.2159	2.2174
2.2189	2.2203	2.2218	2.2232	2.2246	2.2260	2.2275
2.2288	2.2302	2.2316	2.2330	2.2343	2.2357	2.2370
2.2383	2.2396	2.2410	2.2423	2.2435	2.2448	2.2461
2.2474	2.2486	2.2499	2.2511	2.2524	2.2536	2.2548
2.2560	2.2572	2.2584	2.2596	2.2608	2.2620	2.2631
2.2643	2.2654	2.2666	2.2677	2.2689	2.2700	

* COMPUTE BASIN 1. BASIN 1 IS THE SERVICE ROAD ADJACENT TO THE
 * NEW RHINO ENCLOSURE AND THE NEW ENCLOSURES 2 AND 3.
 COMPUTE NM HYD ID=1 HYD=101 DA=.000569 SQ MI
 %A=0.0 %B=0.0 %C=100.0 %D=0.0
 TP=0.1333 RAINFALL=-1

K = .106544HR TP = .133300HR K/TP RATIO = .799277 SHAPE CONSTANT, N = 4.482733
 UNIT PEAK = 1.6483 CFS UNIT VOLUME = .9924 B = 386.16 P60 = 1.9300
 AREA = .000569 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 101.00

RUNOFF VOLUME = 1.05306 INCHES = .0320 ACRE-FEET
 PEAK DISCHARGE RATE = 1.10 CFS AT 1.500 HOURS BASIN AREA = .0006 SQ. MI.

* COMPUTE BASIN 2. BASIN 2 IS THE FUTURE RHINO YARD.
 COMPUTE NM HYD ID=1 HYD=102 DA=.001110 SQ MI
 %A=90.0 %B=0.0 %C=0.0 %D=10.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420

UNIT PEAK = .43823 CFS UNIT VOLUME = .9751 B = 526.28 P60 = 1.9300
AREA = .000111 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 2.0654 CFS UNIT VOLUME = .9928 B = 275.59 P60 = 1.9300
AREA = .000999 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 102.00

RUNOFF VOLUME = .63507 INCHES = .0376 ACRE-FEET
PEAK DISCHARGE RATE = 1.22 CFS AT 1.533 HOURS BASIN AREA = .0011 SQ. MI.

* COMPUTE BASIN 3. BASIN 3 IS THE FUTURE ENCLOSURE 3 AND THE
* ROOF OF THE NEW RHINO BLDG.
COMPUTE NM HYD ID=1 HYD=103 DA=.001203 SQ MI
%A=70.0 %B=0.0 %C=0.0 %D=30.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.4249 CFS UNIT VOLUME = .9911 B = 526.28 P60 = 1.9300
AREA = .000361 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.7410 CFS UNIT VOLUME = .9912 B = 275.59 P60 = 1.9300
AREA = .000842 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 103.00

RUNOFF VOLUME = .94620 INCHES = .0607 ACRE-FEET
PEAK DISCHARGE RATE = 1.80 CFS AT 1.500 HOURS BASIN AREA = .0012 SQ. MI.

* COMPUTE BASIN 4. BASIN 4 IS HALF OF THE ROOF OF THE NEW
* ELEPHANT BLDG, AND THE REAR SERVICE YARD.
COMPUTE NM HYD ID=1 HYD=104 DA=.000894 SQ MI
%A=72.0 %B=0.0 %C=11.0 %D=17.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .60003 CFS UNIT VOLUME = .9815 B = 526.28 P60 = 1.9300
AREA = .000152 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .154799HR TP = .133300HR K/TP RATIO = 1.161282 SHAPE CONSTANT, N = 3.052481
UNIT PEAK = 1.5924 CFS UNIT VOLUME = .9910 B = 286.07 P60 = 1.9300
AREA = .000742 SQ MI IA = .61024 INCHES INF = 1.55867 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 104.00

RUNOFF VOLUME = .79085 INCHES = .0377 ACRE-FEET
PEAK DISCHARGE RATE = 1.20 CFS AT 1.500 HOURS BASIN AREA = .0009 SQ. MI.

Form 2

$$A = 1.0760'$$

$$D = .4487$$

$$E = \frac{(.53)(1.07) + (2.12)(.4487)}{.5512 + .9512} = 1.003$$

$$\frac{1.003}{12} \times 1.497 = .1251$$

$$.1251 \times (.4487)(395 - 2.35) / 12$$

$$\frac{.1849}{.007} = 8055$$

$$.1251 + .4487(2.75 - 2.35) / 12$$

$$V_{10} = V_{360} + WD \times (P_{10} - P_{360}) / 12$$

$$\frac{157 \text{ mil.}}{27667.60} \times 55 \text{ ft}$$

* COMPUTE BASIN 5. BASIN 5 IS THE EXISTING LECHWE ENCLOSURE.
 COMPUTE NM HYD ID=1 HYD=105 DA=.000821 SQ MI
 %A=96.0 %B=0.0 %C=0.0 %D=4.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = .12965 CFS UNIT VOLUME = .9169 B = 526.28 P60 = 1.9300
 AREA = .000033 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
 UNIT PEAK = 1.6295 CFS UNIT VOLUME = .9906 B = 275.59 P60 = 1.9300
 AREA = .000788 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 105.00

RUNOFF VOLUME = .54173 INCHES = .0237 ACRE-FEET
 PEAK DISCHARGE RATE = .82 CFS AT 1.533 HOURS BASIN AREA = .0008 SQ. MI.

* COMPUTE BASIN 6. BASIN 6 IS THE NEW ELEPHANT YARD.
 COMPUTE NM HYD ID=1 HYD=106 DA=.001198 SQ MI
 %A=100.0 %B=0.0 %C=0.0 %D=0.0
 TP=0.1333 RAINFALL=-1

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
 UNIT PEAK = 2.4768 CFS UNIT VOLUME = .9937 B = 275.59 P60 = 1.9300
 AREA = .001198 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 106.00

RUNOFF VOLUME = .47950 INCHES = .0306 ACRE-FEET
 PEAK DISCHARGE RATE = 1.09 CFS AT 1.533 HOURS BASIN AREA = .0012 SQ. MI.

* COMPUTE BASIN 7. BASIN 7 IS FUTURE ENCLOSURE 2 ADJACENT
 * TO THE NEW ELEPHANT BLDG.
 COMPUTE NM HYD ID=1 HYD=107 DA=.002337 SQ MI 1.497 acrs
 %A=70.0 %B=0.0 %C=0.0 %D=30.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 2.7680 CFS UNIT VOLUME = .9955 B = 526.28 P60 = 1.9300
 AREA = .000701 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
 UNIT PEAK = 3.3821 CFS UNIT VOLUME = .9954 B = 275.59 P60 = 1.9300
 AREA = .001636 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 107.00

RUNOFF VOLUME = .94620 INCHES = .1179 ACRE-FEET
 PEAK DISCHARGE RATE = 3.49 CFS AT 1.500 HOURS BASIN AREA = .0023 SQ. MI.

* COMPUTE BASIN 8. BASIN 8 IS THE FUTURE OSTRICH YARD.
 COMPUTE NM HYD ID=1 HYD=108 DA=.000573 SQ MI
 %A=88.0 %B=0.0 %C=0.0 %D=12.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = .27147 CFS UNIT VOLUME = .9547 B = 526.28 P60 = 1.9300
 AREA = .000069 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
 UNIT PEAK = 1.0425 CFS UNIT VOLUME = .9860 B = 275.59 P60 = 1.9300
 AREA = .000504 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 108.00

RUNOFF VOLUME = .66618 INCHES = .0204 ACRE-FEET
 PEAK DISCHARGE RATE = .66 CFS AT 1.500 HOURS BASIN AREA = .0006 SQ. MI.

* COMPUTE BASIN 9. BASIN 9 IS THE NEW SERVICE ROAD BETWEEN
 * THE CAT EXHIBIT AND THE NEW ENCLOSURE 2.
 COMPUTE NM HYD ID=1 HYD=109 DA=.000638 SQ MI
 %A=0.0 %B=0.0 %C=100.0 %D=0.0
 TP=0.1333 RAINFALL=-1

K = .106544HR TP = .133300HR K/TP RATIO = .799277 SHAPE CONSTANT, N = 4.482733
 UNIT PEAK = 1.8482 CFS UNIT VOLUME = .9932 B = 386.16 P60 = 1.9300
 AREA = .000638 SQ MI IA = .35000 INCHES INF = .83000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 109.00

RUNOFF VOLUME = 1.05306 INCHES = .0358 ACRE-FEET
 PEAK DISCHARGE RATE = 1.23 CFS AT 1.500 HOURS BASIN AREA = .0006 SQ. MI.

* COMPUTE BASIN 10. BASIN 10 IS THE CAT EXHIBITS.
 COMPUTE NM HYD ID=1 HYD=1010 DA=.000791 SQ MI
 %A=0.0 %B=0.0 %C=0.0 %D=100.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 3.1229 CFS UNIT VOLUME = .9955 B = 526.28 P60 = 1.9300
 AREA = .000791 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1010.00

RUNOFF VOLUME = 2.03516 INCHES = .0859 ACRE-FEET
 PEAK DISCHARGE RATE = 2.29 CFS AT 1.500 HOURS BASIN AREA = .0008 SQ. MI.

* COMPUTE BASIN 11. BASIN 11 IS THE LION EXHIBIT.
 COMPUTE NM HYD ID=1 HYD=1011 DA=.000203 SQ MI
 %A=80.0 %B=0.0 %C=0.0 %D=20.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .16029 CFS UNIT VOLUME = .9286 B = 526.28 P60 = 1.9300
AREA = .000041 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .33575 CFS UNIT VOLUME = .9558 B = 275.59 P60 = 1.9300
AREA = .000162 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1011.00

RUNOFF VOLUME = .79063 INCHES = .0086 ACRE-Feet
PEAK DISCHARGE RATE = .28 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 13. BASIN 13 IS THE CHEETAH EXHIBIT.
COMPUTE NM HYD ID=1 HYD=1013 DA=.000548 SQ MI
%A=95.0 %B=0.0 %C=0.0 %D=5.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .10818 CFS UNIT VOLUME = .8874 B = 526.28 P60 = 1.9300
AREA = .000027 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.0763 CFS UNIT VOLUME = .9860 B = 275.59 P60 = 1.9300
AREA = .000521 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1013.00

RUNOFF VOLUME = .55729 INCHES = .0163 ACRE-Feet
PEAK DISCHARGE RATE = .56 CFS AT 1.533 HOURS BASIN AREA = .0005 SQ. MI.

* COMPUTE BASIN 14. BASIN 14 IS PART OF THE NEW POLAR
* BEAR EXHIBIT.
COMPUTE NM HYD ID=1 HYD=1014 DA=.000074 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .29216 CFS UNIT VOLUME = .9610 B = 526.28 P60 = 1.9300
AREA = .000074 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1014.00

RUNOFF VOLUME = 2.03517 INCHES = .0080 ACRE-Feet
PEAK DISCHARGE RATE = .22 CFS AT 1.500 HOURS BASIN AREA = .0001 SQ. MI.

* COMPUTE BASIN 15. BASIN 15 IS PART OF THE NEW POLAR
* BEAR EXHIBIT.
COMPUTE NM HYD ID=1 HYD=1015 DA=.000401 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0

TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.5832 CFS UNIT VOLUME = .9922 B = 526.28 P60 = 1.9300
AREA = .000401 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1015.00

RUNOFF VOLUME = 2.03517 INCHES = .0435 ACRE-Feet
PEAK DISCHARGE RATE = 1.17 CFS AT 1.500 HOURS BASIN AREA = .0004 SQ. MI.

* COMPUTE BASIN 16. BASIN 16 IS THE LARGE GRASSED AREA
* IN FRONT OF THE PERFORMANCE STAGE.

COMPUTE NM HYD ID=1 HYD=1016 DA=.006052 SQ MI
%A=85.0 %B=0.0 %C=0.0 %D=15.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 3.5840 CFS UNIT VOLUME = .9961 B = 526.28 P60 = 1.9300
AREA = .000908 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 10.635 CFS UNIT VOLUME = .9984 B = 275.59 P60 = 1.9300
AREA = .005144 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1016.00

RUNOFF VOLUME = .71285 INCHES = .2301 ACRE-Feet
PEAK DISCHARGE RATE = 7.19 CFS AT 1.500 HOURS BASIN AREA = .0061 SQ. MI.

* COMPUTE BASIN 17. BASIN 17 IS A DEPRESSED CAGE ADJACENT
* TO THE CAT EXHIBITS.

COMPUTE NM HYD ID=1 HYD=1017 DA=.000278 SQ MI
%A=66.0 %B=0.0 %C=0.0 %D=34.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .37317 CFS UNIT VOLUME = .9664 B = 526.28 P60 = 1.9300
AREA = .000095 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .37934 CFS UNIT VOLUME = .9614 B = 275.59 P60 = 1.9300
AREA = .000183 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1017.00

RUNOFF VOLUME = 1.00843 INCHES = .0150 ACRE-Feet
PEAK DISCHARGE RATE = .45 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 18. BASIN 18 IS THE NATURE THEATRE.

COMPUTE NM HYD ID=1 HYD=1018 DA=.000367 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.4489 CFS UNIT VOLUME = .9911 B = 526.28 P60 = 1.9300
AREA = .000367 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1018.00

RUNOFF VOLUME = 2.03517 INCHES = .0398 ACRE-FEET
PEAK DISCHARGE RATE = 1.07 CFS AT 1.500 HOURS BASIN AREA = .0004 SQ. MI.

* COMPUTE BASIN 19. BASIN 19 IS THE FUTURE CHILDREN'S
* ZOO AREA.

COMPUTE NM HYD ID=1 HYD=1019 DA=.002034 SQ MI
%A=57.0 %B=0.0 %C=33.0 %D=10.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .80303 CFS UNIT VOLUME = .9840 B = 526.28 P60 = 1.9300
AREA = .000203 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .141774HR TP = .133300HR K/TP RATIO = 1.063574 SHAPE CONSTANT, N = 3.320290
UNIT PEAK = 4.2156 CFS UNIT VOLUME = .9968 B = 306.97 P60 = 1.9300
AREA = .001831 SQ MI IA = .54000 INCHES INF = 1.36200 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1019.00

RUNOFF VOLUME = .78411 INCHES = .0851 ACRE-FEET
PEAK DISCHARGE RATE = 2.82 CFS AT 1.500 HOURS BASIN AREA = .0020 SQ. MI.

* COMPUTE BASIN 20. BASIN 20 IS THE SERVICE AREA BEHIND
* THE NEW RESTAURANT.

COMPUTE NM HYD ID=1 HYD=1020 DA=.000487 SQ MI
%A=10.0 %B=0.0 %C=40.0 %D=50.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .96135 CFS UNIT VOLUME = .9881 B = 526.28 P60 = 1.9300
AREA = .000244 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .117669HR TP = .133300HR K/TP RATIO = .882739 SHAPE CONSTANT, N = 4.020106
UNIT PEAK = .65123 CFS UNIT VOLUME = .9799 B = 356.51 P60 = 1.9300
AREA = .000244 SQ MI IA = .41000 INCHES INF = .99800 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1020.00

RUNOFF VOLUME = 1.46883 INCHES = .0382 ACRE-FEET
PEAK DISCHARGE RATE = 1.13 CFS AT 1.500 HOURS BASIN AREA = .0005 SQ. MI.

* COMPUTE BASIN 21. BASIN 21 IS THE WALKWAY BETWEEN THE
 * NEW RESTAURANT AND THE SEA LION EXHIBIT.
 COMPUTE NM HYD ID=1 HYD=1021 DA=.000673 SQ MI
 %A=10.0 %B=0.0 %C=40.0 %D=50.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 1.3285 CFS UNIT VOLUME = .9911 B = 526.28 P60 = 1.9300
 AREA = .000337 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .117669HR TP = .133300HR K/TP RATIO = .882739 SHAPE CONSTANT, N = 4.020106
 UNIT PEAK = .89996 CFS UNIT VOLUME = .9850 B = 356.51 P60 = 1.9300
 AREA = .000337 SQ MI IA = .41000 INCHES INF = .99800 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1021.00

RUNOFF VOLUME = 1.46883 INCHES = .0527 ACRE-FEET
 PEAK DISCHARGE RATE = 1.55 CFS AT 1.500 HOURS BASIN AREA = .0007 SQ. MI.

* COMPUTE BASIN 22. BASIN 22 IS THE SEA LION EXHIBIT.
 COMPUTE NM HYD ID=1 HYD=1022 DA=.000182 SQ MI
 %A=0.0 %B=0.0 %C=0.0 %D=100.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = .71855 CFS UNIT VOLUME = .9840 B = 526.28 P60 = 1.9300
 AREA = .000182 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1022.00

RUNOFF VOLUME = 2.03517 INCHES = .0198 ACRE-FEET
 PEAK DISCHARGE RATE = .53 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 23. BASIN 23 IS THE OLD SEA LION EXHIBIT.
 COMPUTE NM HYD ID=1 HYD=1023 DA=.000131 SQ MI
 %A=0.0 %B=0.0 %C=0.0 %D=100.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = .51719 CFS UNIT VOLUME = .9786 B = 526.28 P60 = 1.9300
 AREA = .000131 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1023.00

RUNOFF VOLUME = 2.03517 INCHES = .0142 ACRE-FEET
 PEAK DISCHARGE RATE = .39 CFS AT 1.500 HOURS BASIN AREA = .0001 SQ. MI.

* COMPUTE BASIN 24. BASIN 24 IS THE PRAIRIE DOG EXHIBIT.
 COMPUTE NM HYD ID=1 HYD=1024 DA=.000073 SQ MI
 %A=85.0 %B=0.0 %C=0.0 %D=15.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .43231E-01CFS UNIT VOLUME = .8874 B = 526.28 P60 = 1.9300
AREA = .000011 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .12829 CFS UNIT VOLUME = .8850 B = 275.59 P60 = 1.9300
AREA = .000062 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1024.00

RUNOFF VOLUME = .71285 INCHES = .0028 ACRE-Feet
PEAK DISCHARGE RATE = .10 CFS AT 1.500 HOURS BASIN AREA = .0001 SQ. MI.

* COMPUTE BASIN 25. BASIN 25 IS THE WALKWAY IN FRONT OF THE
* RESTROOM BLDG.

COMPUTE NM HYD ID=1 HYD=1025 DA=.000844 SQ MI
%A=5.0 %B=0.0 %C=25.0 %D=10.0
TP=0.1333 RAINFALL=-1

*****WARNING***** SUM OF TREATMENT TYPES DOES NOT EQUAL 100 PERCENT OR TOTAL AREA

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .83304 CFS UNIT VOLUME = .9862 B = 526.28 P60 = 1.9300
AREA = .000211 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .115815HR TP = .133300HR K/TP RATIO = .868829 SHAPE CONSTANT, N = 4.089414
UNIT PEAK = 1.7147 CFS UNIT VOLUME = .9929 B = 361.09 P60 = 1.9300
AREA = .000633 SQ MI IA = .40000 INCHES INF = .97000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1025.00

RUNOFF VOLUME = 1.20324 INCHES = .0542 ACRE-Feet
PEAK DISCHARGE RATE = 1.71 CFS AT 1.500 HOURS BASIN AREA = .0008 SQ. MI.

* COMPUTE BASIN 26. BASIN 26 IS THE BISON EXHIBIT.
COMPUTE NM HYD ID=1 HYD=1026 DA=.001048 SQ MI

%A=90.0 %B=0.0 %C=0.0 %D=10.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .41376 CFS UNIT VOLUME = .9711 B = 526.28 P60 = 1.9300
AREA = .000105 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.9500 CFS UNIT VOLUME = .9923 B = 275.59 P60 = 1.9300
AREA = .000943 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1026.00

RUNOFF VOLUME = .63507 INCHES = .0355 ACRE-Feet

PEAK DISCHARGE RATE = 1.15 CFS AT 1.533 HOURS BASIN AREA = .0010 SQ. MI.

* COMPUTE BASIN 27. BASIN 27 IS THE EXISTING ELEPHANT
* EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1027 DA=.000296 SQ MI
%A=75.0 %B=0.0 %C=0.0 %D=25.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .29216 CFS UNIT VOLUME = .9610 B = 526.28 P60 = 1.9300
AREA = .000074 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .45897 CFS UNIT VOLUME = .9685 B = 275.59 P60 = 1.9300
AREA = .000222 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1027.00

RUNOFF VOLUME = .86842 INCHES = .0137 ACRE-FEET
PEAK DISCHARGE RATE = .43 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 28. BASIN 28 IS THE GIRAFFE EXHIBIT.
COMPUTE NM HYD ID=1 HYD=1028 DA=.001128 SQ MI

%A=85.0 %B=0.0 %C=0.0 %D=15.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .66801 CFS UNIT VOLUME = .9815 B = 526.28 P60 = 1.9300
AREA = .000169 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.9823 CFS UNIT VOLUME = .9923 B = 275.59 P60 = 1.9300
AREA = .000959 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1028.00

RUNOFF VOLUME = .71285 INCHES = .0429 ACRE-FEET
PEAK DISCHARGE RATE = 1.35 CFS AT 1.500 HOURS BASIN AREA = .0011 SQ. MI.

* COMPUTE BASIN 29. BASIN 29 IS THE PAVED AREA NORTH OF
* THE GIRAFFE EXHIBIT THAT DISCHARGES TO RIO AVE.

COMPUTE NM HYD ID=1 HYD=1029 DA=.000438 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.7292 CFS UNIT VOLUME = .9933 B = 526.28 P60 = 1.9300
AREA = .000438 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1029.00

RUNOFF VOLUME = 2.03516 INCHES = .0475 ACRE-FEET
PEAK DISCHARGE RATE = 1.27 CFS AT 1.500 HOURS BASIN AREA = .0004 SQ. MI.

* COMPUTE BASIN 30. BASIN 30 IS AN AFRICAN HOOFSTOCK EXHIBIT.
COMPUTE NM HYD ID=1 HYD=1030 DA=.000266 SQ MI

%A=100.0 %B=0.0 %C=0.0 %D=0.0
TP=0.1333 RAINFALL=-1

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .54994 CFS UNIT VOLUME = .9725 B = 275.59 P60 = 1.9300
AREA = .000266 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1030.00

RUNOFF VOLUME = .47950 INCHES = .0068 ACRE-FEET
PEAK DISCHARGE RATE = .25 CFS AT 1.533 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 31. BASIN 31 IS THE PAVED WALKWAY/SERVICE
* AREA NORTH OF THE BISON.

COMPUTE NM HYD ID=1 HYD=1031 DA=.000464 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.8319 CFS UNIT VOLUME = .9933 B = 526.28 P60 = 1.9300
AREA = .000464 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1031.00

RUNOFF VOLUME = 2.03517 INCHES = .0504 ACRE-FEET
PEAK DISCHARGE RATE = 1.35 CFS AT 1.500 HOURS BASIN AREA = .0005 SQ. MI.

* COMPUTE BASIN 32. BASIN 32 IS THE VACANT EXHIBIT AREA
* EAST OF THE BISON.

COMPUTE NM HYD ID=1 HYD=1032 DA=.000749 SQ MI
%A=95.0 %B=0.0 %C=0.0 %D=5.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .14785 CFS UNIT VOLUME = .9169 B = 526.28 P60 = 1.9300
AREA = .000037 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.4711 CFS UNIT VOLUME = .9900 B = 275.59 P60 = 1.9300
AREA = .000712 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1032.00

RUNOFF VOLUME = .55729 INCHES = .0223 ACRE-FEET
PEAK DISCHARGE RATE = .76 CFS AT 1.533 HOURS BASIN AREA = .0007 SQ. MI.

* COMPUTE BASIN 33. BASIN 33 IS THE SERVICE AREA FOR THE
* SALT WATER FILTRATION.

COMPUTE NM HYD ID=1 HYD=1033 DA=.000700 SQ MI
%A=50.0 %B=0.0 %C=30.0 %D=20.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .55273 CFS UNIT VOLUME = .9786 B = 526.28 P60 = 1.9300
AREA = .000140 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .141311HR TP = .133300HR K/TP RATIO = 1.060096 SHAPE CONSTANT, N = 3.330964
UNIT PEAK = 1.2930 CFS UNIT VOLUME = .9896 B = 307.78 P60 = 1.9300
AREA = .000560 SQ MI IA = .53750 INCHES INF = 1.35500 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1033.00

RUNOFF VOLUME = .92645 INCHES = .0346 ACRE-Feet
PEAK DISCHARGE RATE = 1.10 CFS AT 1.500 HOURS BASIN AREA = .0007 SQ. MI.

* COMPUTE BASIN 34. BASIN 34 IS THE FUTURE PAVED WALKWAY AREA
* SOUTH OF THE CAMEL AND KUDU.

COMPUTE NM HYD ID=1 HYD=1034 DA=.000736 SQ MI
%A=40.0 %B=0.0 %C=0.0 %D=60.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.7435 CFS UNIT VOLUME = .9933 B = 526.28 P60 = 1.9300
AREA = .000442 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .60866 CFS UNIT VOLUME = .9760 B = 275.59 P60 = 1.9300
AREA = .000294 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1034.00

RUNOFF VOLUME = 1.41290 INCHES = .0555 ACRE-Feet
PEAK DISCHARGE RATE = 1.55 CFS AT 1.500 HOURS BASIN AREA = .0007 SQ. MI.

* COMPUTE BASIN 35. BASIN 35 IS THE CAMEL YARD.

COMPUTE NM HYD ID=1 HYD=1035 DA=.000676 SQ MI
%A=95.0 %B=0.0 %C=0.0 %D=5.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .13344 CFS UNIT VOLUME = .9169 B = 526.28 P60 = 1.9300
AREA = .000034 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.3277 CFS UNIT VOLUME = .9885 B = 275.59 P60 = 1.9300
AREA = .000642 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1035.00

RUNOFF VOLUME = .55729 INCHES = .0201 ACRE-FEET
 PEAK DISCHARGE RATE = .69 CFS AT 1.533 HOURS BASIN AREA = .0007 SQ. MI.

* COMPUTE BASIN 36. BASIN 36 IS THE KUDU YARD.
 COMPUTE NM HYD ID=1 HYD=1036 DA=.000809 SQ MI
 %A=95.0 %B=0.0 %C=0.0 %D=5.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = .15970 CFS UNIT VOLUME = .9286 B = 526.28 P60 = 1.9300
 AREA = .000040 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
 UNIT PEAK = 1.5889 CFS UNIT VOLUME = .9906 B = 275.59 P60 = 1.9300
 AREA = .000769 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1036.00

RUNOFF VOLUME = .55729 INCHES = .0240 ACRE-FEET
 PEAK DISCHARGE RATE = .82 CFS AT 1.533 HOURS BASIN AREA = .0008 SQ. MI.

* COMPUTE BASIN 37. BASIN 37 IS THE GIBBON EXHIBIT.
 COMPUTE NM HYD ID=1 HYD=1037 DA=.000215 SQ MI
 %A=50.0 %B=0.0 %C=0.0 %D=50.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = .42442 CFS UNIT VOLUME = .9711 B = 526.28 P60 = 1.9300
 AREA = .000108 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
 UNIT PEAK = .22225 CFS UNIT VOLUME = .9334 B = 275.59 P60 = 1.9300
 AREA = .000108 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1037.00

RUNOFF VOLUME = 1.25733 INCHES = .0144 ACRE-FEET
 PEAK DISCHARGE RATE = .42 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 38. BASIN 38 IS THE SERVICE ROAD
 * JUST NORTH OF THE MAIN ENTRANCE.
 COMPUTE NM HYD ID=1 HYD=1038 DA=.000348 SQ MI
 %A=0.0 %B=0.0 %C=0.0 %D=100.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 1.3739 CFS UNIT VOLUME = .9911 B = 526.28 P60 = 1.9300
 AREA = .000348 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1038.00

RUNOFF VOLUME = 2.03517 INCHES = .0378 ACRE-FEET
 PEAK DISCHARGE RATE = 1.01 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 39 UNDER EXISTING CONDITIONS.
 COMPUTE NM HYD ID=1 HYD=1039 DA=.002777 SQ MI
 %A=85.0 %B=0.0 %C=15.0 %D=0.0
 TP=0.1333 RAINFALL=-1

K = .153827HR TP = .133300HR K/TP RATIO = 1.153991 SHAPE CONSTANT, N = 3.070528
 UNIT PEAK = 5.9899 CFS UNIT VOLUME = .9974 B = 287.52 P60 = 1.9300
 AREA = .002777 SQ MI IA = .60500 INCHES INF = 1.54400 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1039.00

RUNOFF VOLUME = .54365 INCHES = .0805 ACRE-FEET
 PEAK DISCHARGE RATE = 2.88 CFS AT 1.533 HOURS BASIN AREA = .0028 SQ. MI.

* COMPUTE BASIN 39. BASIN 39 IS THE NEW OVERFLOW
 * PARKING LOT.
 COMPUTE NM HYD ID=1 HYD=1039 DA=.002777 SQ MI
 %A=10.0 %B=0.0 %C=15.0 %D=75.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 8.2228 CFS UNIT VOLUME = .9981 B = 526.28 P60 = 1.9300
 AREA = .002083 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .128795HR TP = .133300HR K/TP RATIO = .966201 SHAPE CONSTANT, N = 3.656216
 UNIT PEAK = 1.7268 CFS UNIT VOLUME = .9923 B = 331.56 P60 = 1.9300
 AREA = .000694 SQ MI IA = .47000 INCHES INF = 1.16600 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1039.00

RUNOFF VOLUME = 1.71993 INCHES = .2547 ACRE-FEET
 PEAK DISCHARGE RATE = 7.04 CFS AT 1.500 HOURS BASIN AREA = .0028 SQ. MI.

* ROUTE THE NEW PARKING LOT RUNOFF THROUGH A DETENTION
 * POND IN THE PARKING LOT IN ORDER TO DECREASE THE
 * RUNOFF TO LESS THAN EXISTING.
 ROUTE RESERVOIR ID=2 HYD=1039.1 INFLOW ID=1 CODE=10

OUTFLOW(CFS) STORAGE(AC-FT) EL(FT)
 0 0 0
 3.1 0.10 0.5

* * * * *

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	.00	.000	.00
.33	.00	.00	.000	.00
.67	.00	.00	.000	.00
1.00	.00	.00	.000	.00

1.33	1.90	.04	.008	.26
1.67	3.61	.49	.097	3.02
2.00	1.60	.41	.083	2.56
2.33	.35	.25	.049	1.53
2.67	.14	.12	.025	.77
3.00	.07	.06	.012	.39
3.33	.05	.03	.006	.20
3.67	.04	.02	.003	.11
4.00	.04	.01	.002	.07
4.33	.03	.01	.002	.05
4.67	.03	.01	.001	.04
5.00	.04	.01	.001	.04
5.33	.04	.01	.001	.04
5.67	.04	.01	.001	.04
6.00	.04	.01	.001	.04
6.33	.00	.00	.001	.03
6.67	.00	.00	.000	.01
7.00	.00	.00	.000	.01
7.33	.00	.00	.000	.00

PEAK DISCHARGE = 3.051 CFS - PEAK OCCURS AT HOUR 1.70
 MAXIMUM WATER SURFACE ELEVATION = .492
 MAXIMUM STORAGE = .0984 AC-FT INCREMENTAL TIME= .03333HRS

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA 1039.10

RUNOFF VOLUME = 1.71984 INCHES = .2547 ACRE-Feet
 PEAK DISCHARGE RATE = 3.05 CFS AT 1.700 HOURS BASIN AREA = .0028 SQ. MI.

* COMPUTE BASIN 40. BASIN 40 IS THE ANTELOPE EXHIBIT.
 COMPUTE NM HYD ID=1 HYD=1040 DA=.002026 SQ MI
 %A=71.0 %B=0.0 %C=0.0 %D=29.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 2.3196 CFS UNIT VOLUME = .9941 B = 526.28 P60 = 1.9300
 AREA = .000588 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
 UNIT PEAK = 2.9739 CFS UNIT VOLUME = .9948 B = 275.59 P60 = 1.9300
 AREA = .001438 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1040.00

RUNOFF VOLUME = .93064 INCHES = .1006 ACRE-Feet
 PEAK DISCHARGE RATE = 2.98 CFS AT 1.500 HOURS BASIN AREA = .0020 SQ. MI.

* COMPUTE BASIN 41. BASIN 41 IS AN AFRICAN HOOFSOCK
 * EXHIBIT.
 COMPUTE NM HYD ID=1 HYD=1041 DA=.000824 SQ MI
 %A=50.0 %B=0.0 %C=0.0 %D=50.0
 TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
 UNIT PEAK = 1.6266 CFS UNIT VOLUME = .9922 B = 526.28 P60 = 1.9300
 AREA = .000412 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302

UNIT PEAK = .85179 CFS UNIT VOLUME = .9829 B = 275.59 P60 = 1.9300
AREA = .000412 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1041.00

RUNOFF VOLUME = 1.25733 INCHES = .0553 ACRE-Feet
PEAK DISCHARGE RATE = 1.57 CFS AT 1.500 HOURS BASIN AREA = .0008 SQ. MI.

* COMPUTE BASIN 42. BASIN 42 IS AN AFRICAN HOOFSOCK
* EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1042 DA=.000317 SQ MI
%A=60.0 %B=0.0 %C=0.0 %D=40.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .50061 CFS UNIT VOLUME = .9751 B = 526.28 P60 = 1.9300
AREA = .000127 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .39323 CFS UNIT VOLUME = .9639 B = 275.59 P60 = 1.9300
AREA = .000190 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1042.00

RUNOFF VOLUME = 1.10177 INCHES = .0186 ACRE-Feet
PEAK DISCHARGE RATE = .55 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 43. BASIN 43 IS AN OFF-EXHIBIT AFRICAN
* HOOFSOCK AREA.

COMPUTE NM HYD ID=1 HYD=1043 DA=.000255 SQ MI
%A=90.0 %B=0.0 %C=0.0 %D=10.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .10068 CFS UNIT VOLUME = .8874 B = 526.28 P60 = 1.9300
AREA = .000026 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = .47448 CFS UNIT VOLUME = .9685 B = 275.59 P60 = 1.9300
AREA = .000230 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1043.00

RUNOFF VOLUME = .63507 INCHES = .0086 ACRE-Feet
PEAK DISCHARGE RATE = .29 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 44. BASIN 44 IS A PAVED SERVICE AREA
* NORTHEAST OF THE AFRICAN HOOFSOCK.

COMPUTE NM HYD ID=1 HYD=1044 DA=.000226 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0

TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .89226 CFS UNIT VOLUME = .9862 B = 526.28 P60 = 1.9300
AREA = .000226 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1044.00

RUNOFF VOLUME = 2.03517 INCHES = .0245 ACRE-FEET
PEAK DISCHARGE RATE = .66 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 45. BASIN 45 IS A PAVED SERVICE AREA
* NORTHEAST OF THE AFRICAN HOOFSOCK.

COMPUTE NM HYD ID=1 HYD=1045 DA=.000306 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.2081 CFS UNIT VOLUME = .9897 B = 526.28 P60 = 1.9300
AREA = .000306 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1045.00

RUNOFF VOLUME = 2.03517 INCHES = .0332 ACRE-FEET
PEAK DISCHARGE RATE = .89 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

* COMPUTE BASIN 46. BASIN 46 IS A PAVED PERIMETER SERVICE
* DRIVE THAT DISCHARGES DIRECTLY TO STOVER STREET.

COMPUTE NM HYD ID=1 HYD=1046 DA=.000232 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .91595 CFS UNIT VOLUME = .9862 B = 526.28 P60 = 1.9300
AREA = .000232 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1046.00

RUNOFF VOLUME = 2.03517 INCHES = .0252 ACRE-FEET
PEAK DISCHARGE RATE = .68 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 47. BASIN 47 IS AN AFRICAN HOOFSOCK
* EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1047 DA=.001484 SQ MI
%A=88.0 %B=0.0 %C=0.0 %D=12.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .70307 CFS UNIT VOLUME = .9840 B = 526.28 P60 = 1.9300
AREA = .000178 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302

UNIT PEAK = 2.6999 CFS UNIT VOLUME = .9945 B = 275.59 P60 = 1.9300
AREA = .001306 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1047.00

RUNOFF VOLUME = .66618 INCHES = .0527 ACRE-FEET
PEAK DISCHARGE RATE = 1.68 CFS AT 1.500 HOURS BASIN AREA = .0015 SQ. MI.

* COMPUTE BASIN 48. BASIN 48 IS THE KANGAROO EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1048 DA=.000578 SQ MI
%A=90.0 %B=0.0 %C=0.0 %D=10.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .22820 CFS UNIT VOLUME = .9473 B = 526.28 P60 = 1.9300
AREA = .000058 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.0755 CFS UNIT VOLUME = .9860 B = 275.59 P60 = 1.9300
AREA = .000520 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1048.00

RUNOFF VOLUME = .63507 INCHES = .0196 ACRE-FEET
PEAK DISCHARGE RATE = .64 CFS AT 1.533 HOURS BASIN AREA = .0006 SQ. MI.

* COMPUTE BASIN 49. BASIN 49 IS THE EXISTING RHINO EXHIBIT.

COMPUTE NM HYD ID=1 HYD=1049 DA=.000614 SQ MI
%A=93.0 %B=0.0 %C=0.0 %D=7.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .16969 CFS UNIT VOLUME = .9286 B = 526.28 P60 = 1.9300
AREA = .000043 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

K = .162171HR TP = .133300HR K/TP RATIO = 1.216588 SHAPE CONSTANT, N = 2.924302
UNIT PEAK = 1.1806 CFS UNIT VOLUME = .9878 B = 275.59 P60 = 1.9300
AREA = .000571 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1049.00

RUNOFF VOLUME = .58840 INCHES = .0193 ACRE-FEET
PEAK DISCHARGE RATE = .65 CFS AT 1.533 HOURS BASIN AREA = .0006 SQ. MI.

* COMPUTE BASIN 50. BASIN 50 IS A PAVED SERVICE ROAD

* THAT DISCHARGES TO 12TH STREET.

COMPUTE NM HYD ID=1 HYD=1050 DA=.000190 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = .75013 CFS UNIT VOLUME = .9840 B = 526.28 P60 = 1.9300
AREA = .000190 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1050.00

RUNOFF VOLUME = 2.03516 INCHES = .0206 ACRE-FEET
PEAK DISCHARGE RATE = .56 CFS AT 1.500 HOURS BASIN AREA = .0002 SQ. MI.

* COMPUTE BASIN 51. BASIN 51 IS A PAVED SERVICE ROAD THAT
* DISCHARGES TO STOVER STREET.

COMPUTE NM HYD ID=1 HYD=1051 DA=.000372 SQ MI
%A=0.0 %B=0.0 %C=0.0 %D=100.0
TP=0.1333 RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 1.4687 CFS UNIT VOLUME = .9911 B = 526.28 P60 = 1.9300
AREA = .000372 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA 1051.00

RUNOFF VOLUME = 2.03517 INCHES = .0404 ACRE-FEET
PEAK DISCHARGE RATE = 1.08 CFS AT 1.500 HOURS BASIN AREA = .0004 SQ. MI.

FINISH

NORMAL PROGRAM FINISH

END TIME (HR:MIN:SEC) = 19:28:19

U4-DIC



CHAVEZ-GRIEVES/CONSULTING ENGINEERS, INC.

5639 JEFFERSON N. E.
ALBUQUERQUE, NEW MEXICO 87109
(505) 344 - 4080 FAX (505) 343 - 8759

July 1, 1993

Mr. Bernie Montoya, CE
City of Albuquerque Hydrology Division
P.O. Box 1293
Albuquerque, New Mexico 87103

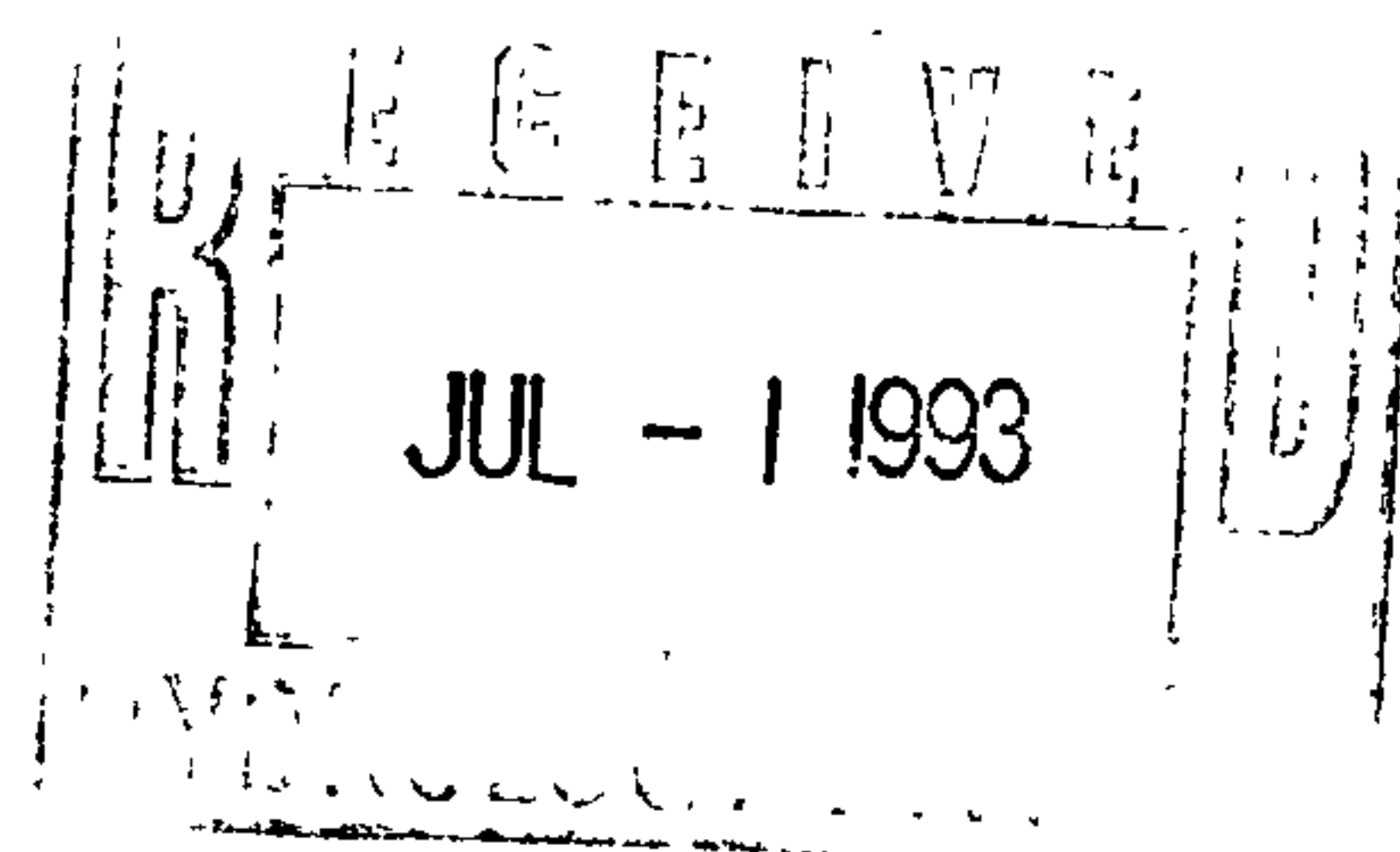
RE: MASTER DRAINAGE PLAN FOR THE RIO GRANDE ZOO (K13-D34)
ENGINEER'S CERTIFICATION FOR THE ZOO'S PLAZA CAFE

Dear Mr. Montoya:

The referenced plan is hereby resubmitted for your review and approval. The concerns that you listed in your April 8, 1993 letter have been addressed as follows:

1. The required retention pond volumes have been revised to reflect the requirements for retention ponds as enumerated in the emergency rule published by the City on May 14, 1991.
2. The outfalls of drainage basins which drain to off-site inlets has been noted on the drainage plan. The Basin Development Plan on Plate 1A also notes which basins outfall to perimeter streets.
3. A search was made of Hydrology files in your office, as well as through Zoo files to determine the locations of lines and inlets. Field research was also done.
4. It was noted on the Masterplan plates, and within the Masterplan text that separate submittals for Hydrology approval will be required for all future construction.

Inserted into Plate 2 you will also find the referenced Engineer's Certification. I believe that this certification is all that is needed for the City to issue a Certificate of Occupancy for the Cafe.



Mr. Bernie Montoya
COA Hydrology

Page 2
July 1, 1993

Bernie, if you have any questions or comments during your review, please give me a call. Thank you!

Sincerely,

CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC.



Joe P. Kelley, P.E.
Project Engineer

XC: Ms. Terri Smith, Rio Grande Zoo

JPK:ms



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

July 19, 1993

Joe Kelley
Chavez-Grievess Consulting Engineers Inc.
5639 Jefferson Street NE
Albuquerque, NM 87109

RE: MASTER DRAINAGE PLAN FOR RIO GRANDE ZOO (K13-D34) REVISION
DATED 5/6/93.

Dear Mr. Kelley:

Based on the information provided on your July 1, 1993 submittal, the above referenced site is approved for Master Plan.

Please be advised that site specific submittals for future development will be required for review. Site specific plans must follow the Master Plan Concept. Also, Engineer Certification per the D.P.M. checklist will be required after completion of each development.

If I can be of further assistance, please feel free to contact me at 768-2667.

Sincerely,

Bernie J. Montoya, CE
Engineer Associate

BJM/d1/WPHYD/7857

xc: Alan Martinez
Terri Smith
File

PUBLIC WORKS DEPARTMENT



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

April 8, 1993

Joe P. Kelley
Chavez-Grievess Engineering
4600 Montgomery NE Building C #101
Albuquerque, NM 87109

RE: MASTER DRAINAGE PLAN FOR THE RIO GRANDE ZOO (K13-D34) ENGINEER'S
STAMP DATED 4/2/93 PLATE 1A & 1B.

Dear Mr. Kelley:

Based on the information provided on your April 5, 1993 submittal, listed are some concerns that will need to be addressed prior to final approval:

1. The majority of the ponding areas are retention, therefore, the notice of emergency rule for retention ponds will apply. (Attached).
2. There are areas located within the zoo area which drain to storm lines and inlets. Please indicate these areas on your Master and where the final outfall is located.
3. Some of the files on hand may assist you in locating some of the lines and inlets.
4. Note on Master Plan indicating that separate submittals for each proposed future construction will be required for review prior to Hydrology approval.

If I can be of further assistance, please feel free to contact me at 768-2667.

Sincerely,

Bernie J. Montoya
Bernie J. Montoya, CE
Engineering Assistant

BJM/d1/WPHYD/7670

xc: ~~File~~

PUBLIC WORKS DEPARTMENT



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

April 13, 1993

Joe P. Kelley
Chavez-Grievess Engineering
4600 Montgomery NE Building C #101
Albuquerque, NM 87109

RE: REVISED GRADING/PAVING PLAN FOR OVERFLOW PARKING WITHIN BASIN 39 RIO
GRANDE ZOO (K13-D34) ENGINEER'S STAMP DATED 4/12/93.

Dear Mr. Kelley:

Based on the information provided on your April 13, 1993 resubmittal, the
above referenced site is approved for Grading/Paving and Work Order.

Please be advised that after construction is completed, Engineer Certification
per the D.P.M. checklist will be required.

If I can be of further assistance, please feel free to contact me at 768-2667.

Sincerely,

Bernie J. Montoya
Bernie J. Montoya, CE
Engineer Associate

BJM/d1/WPHYD/7684

xc: Alan Martinez
Peter Chang
File

PUBLIC WORKS DEPARTMENT



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

August 2, 1993

Joe Kelley
Chavez-Grievess Engineering
5639 Jefferson NE
Albuquerque, NM 87109

RE: ENGINEER CERTIFICATION FOR RIO GRANDE ZOO OVERFLOW PARKING
(K13-D34) CERTIFICATION STATEMENT DATED 7/15/93.

Dear Mr. Kelley:

Based on the information provided on your July 20, 1993 submittal, Engineer Certification is acceptable.

If I can be of further assistance, please feel free to contact me at 768-2667.

Sincerely,

Bernie J. Montoya, CE
Engineer Associate

BJM/d1/WPHYD/7857

xc: Alan Martinez

File

PUBLIC WORKS DEPARTMENT

DRAINAGE INFORMATION SHEET

PROJECT TITLE: RIO GRANDE ZOO OVERFLOW PARKING ZONE ATLAS/DRNG.FILE #: K-13/034

LEGAL DESCRIPTION: S19, T10N, R3E, TOWN OF ATRISCO GRANT, RIO GRANDE ZOO

CITY ADDRESS: 10TH & STOVER

ENGINEERING FIRM: CHAVEZ-GRIEVES

ADDRESS: 5639 JEFFERSON NE

OWNER: RIO GRANDE ZOO

ADDRESS: _____

ARCHITECT: SEE OWNER

ADDRESS: _____

SURVEYOR: SEE OWNER

ADDRESS: _____

CONTRACTOR: SEE OWNER

ADDRESS: _____

CONTACT: JOE KELLEY

PHONE: 344-4080

CONTACT: TERRI SMITH

PHONE: 842-7299

CONTACT: _____

PHONE: _____

CONTACT: _____

PHONE: _____

CONTACT: _____

PHONE: _____

PRE-DESIGN MEETING:

☐ YES

☒ NO

☐ COPY OF CONFERENCE RECAP
SHEET PROVIDED

DRB NO. _____

EPC NO. _____

PROJ. NO. _____

TYPE OF SUBMITTAL:

☐ DRAINAGE REPORT

☐ DRAINAGE PLAN

☐ CONCEPTUAL GRADING & DRAINAGE PLAN

☐ GRADING PLAN

☐ EROSION CONTROL PLAN

☒ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

☐ SKETCH PLAT APPROVAL

☐ PRELIMINARY PLAT APPROVAL

☐ SITE DEVELOPMENT PLAN APPROVAL

☐ FINAL PLAT APPROVAL

☐ BUILDING PERMIT APPROVAL

☐ FOUNDATION PERMIT APPROVAL

☒ CERTIFICATE OF OCCUPANCY APPROVAL

☐ ROUGH GRADING PERMIT APPROVAL

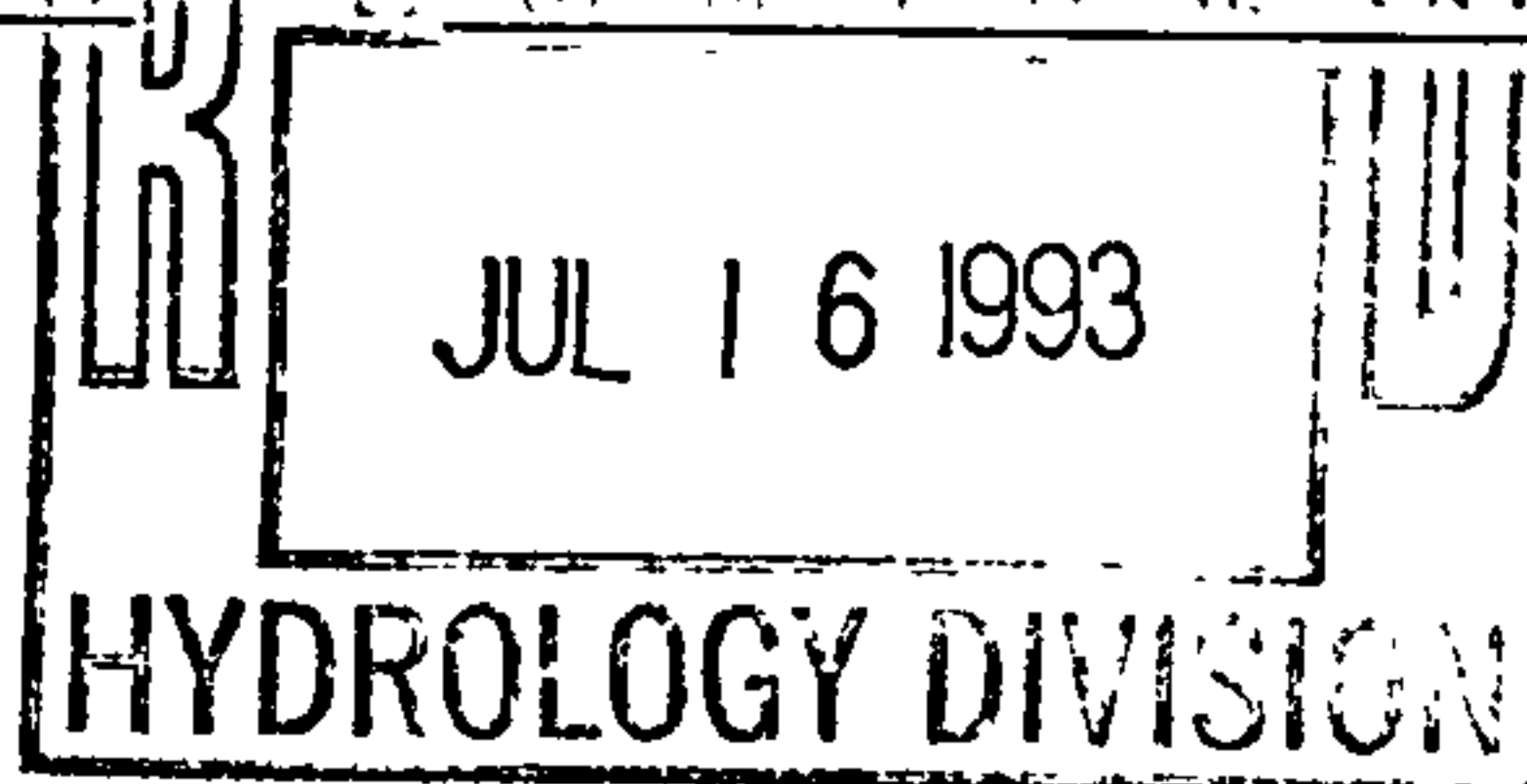
☐ GRADING/PAVING PERMIT APPROVAL

☐ OTHER (SPECIFY)

(SPECIFY)

DATE SUBMITTED: 7/15/93

BY: JOE KELLEY



DRAINAGE INFORMATION SHEET

PROJECT TITLE: RIO GRANDE ZOO OVERFLOW PARKING ZONE ATLAS/DRNG.FILE #: K-13/134

LEGAL DESCRIPTION: S19, T10N, R3E, TOWN OF ATRISCO GRANT, RIO GRANDE ZOO

CITY ADDRESS: 10TH & STOVER

ENGINEERING FIRM: CHAVEZ-GRIEYES

CONTACT: JOE KELLEY

ADDRESS: 5639 JEFFERSON NE

PHONE: 344-4080

OWNER: RIO GRANDE ZOO

CONTACT: TERRI SMITH

ADDRESS: _____

PHONE: 842-7299

ARCHITECT: SEE OWNER

CONTACT: _____

ADDRESS: _____

PHONE: _____

SURVEYOR: SEE OWNER

CONTACT: _____

ADDRESS: _____

PHONE: _____

CONTRACTOR: SEE OWNER

CONTACT: _____

ADDRESS: _____

PHONE: _____

PRE-DESIGN MEETING:

☐ YES

☒ NO

☐ COPY OF CONFERENCE RECAP
SHEET PROVIDED

DRB NO. _____

EPC NO. _____

PROJ. NO. _____

TYPE OF SUBMITTAL:

☐ DRAINAGE REPORT

☐ DRAINAGE PLAN

☐ CONCEPTUAL GRADING & DRAINAGE PLAN

☐ GRADING PLAN

☐ EROSION CONTROL PLAN

☒ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

☐ SKETCH PLAT APPROVAL

☐ PRELIMINARY PLAT APPROVAL

☐ SITE DEVELOPMENT PLAN APPROVAL

☐ FINAL PLAT APPROVAL

☐ BUILDING PERMIT APPROVAL

☐ FOUNDATION PERMIT APPROVAL

☐ CERTIFICATE OF OCCUPANCY APPROVAL

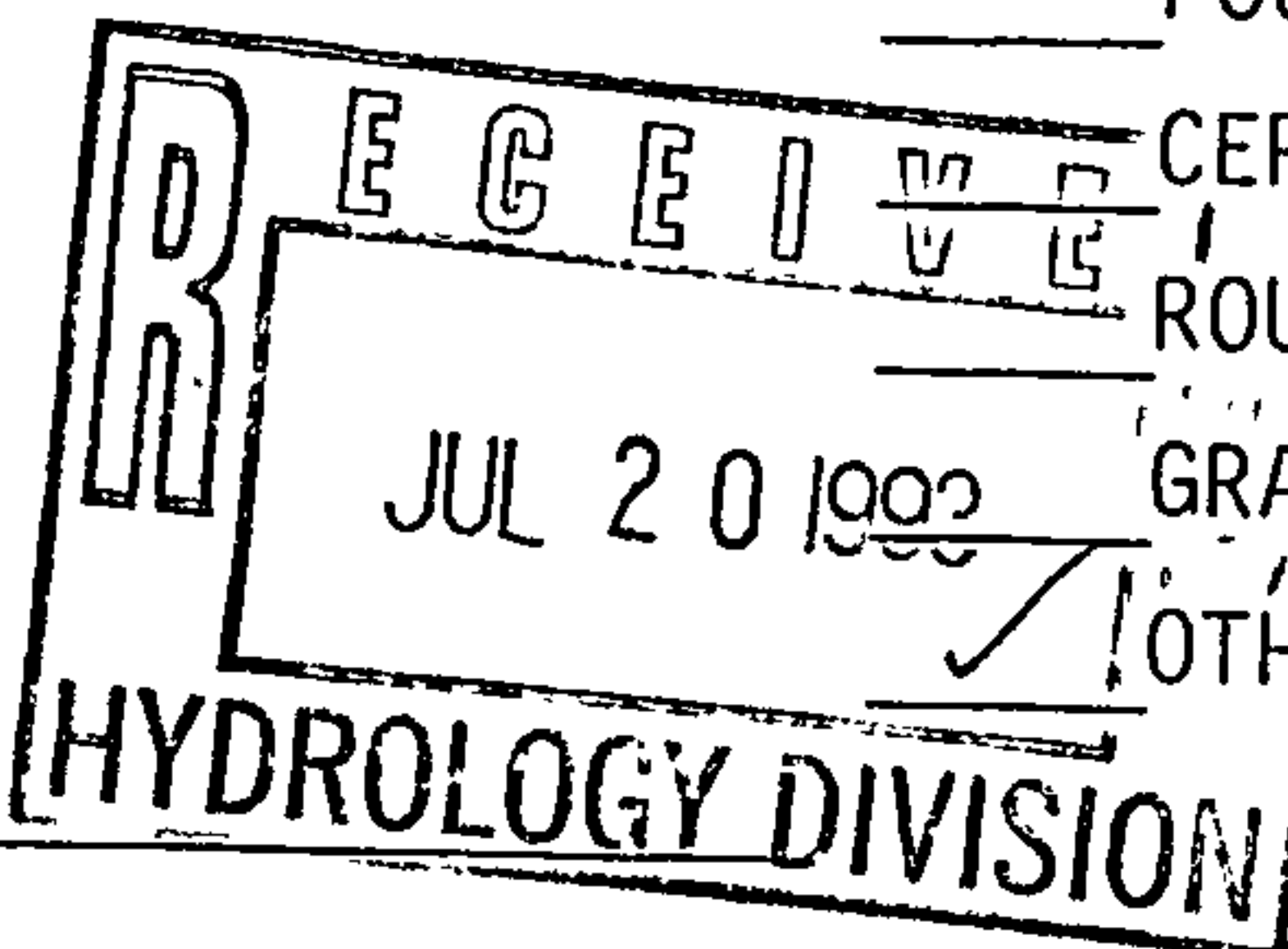
☐ ROUGH GRADING PERMIT APPROVAL

☐ GRADING/PAVING PERMIT APPROVAL

☒ OTHER _____ (SPECIFY)

DATE SUBMITTED: 7/20/93

BY: JOE KELLEY





City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

July 19, 1993

Joe Kelley
Chavez-Grievies Consulting Engineers, Inc.
5639 Jefferson Street NE
Albuquerque, NM 87109

RE: ENGINEER CERTIFICATION FOR OVERFLOW PARKING @ THE RIO GRANDE ZOO
(K13-D34) ENGINEER'S CERTIFICATION STATEMENT DATED 7/15/93.

Dear Mr. Kelley:

Based on the information provided on your July 16, 1993 submittal, Engineer Certification for the above referenced site is acceptable.

If I can be of further assistance, please feel free to contact me at 768-2667.

Sincerely,

Bernie J. Montoya
Bernie J. Montoya, CE
Engineer Associate

BJM/d1/WPHYD/7857

xc: Alan Martinez
File

PUBLIC WORKS DEPARTMENT

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Rio Grande Zoo ^{MASTER PLAN} _& ^{CAFE} ZONE ATLAS/DRNG.FILE #: K-13/D34
LEGAL DESCRIPTION: SECTION 19, T10N, R3E, TOWN OF ATZISCO GRANT, RIO GRANDE ZOO

CITY ADDRESS: 10TH & STOVER

ENGINEERING FIRM: CHAVEZ-GRIEYES

CONTACT: JOE KELLEY

ADDRESS: 5639 JEFFERSON NE

PHONE: 344-4080

OWNER: RIO GRANDE ZOO

CONTACT: TERRI SMITH

ADDRESS: _____

PHONE: 842-7299

ARCHITECT: SEE OWNER

CONTACT: _____

ADDRESS: _____

PHONE: _____

SURVEYOR: SEE OWNER

CONTACT: _____

ADDRESS: _____

PHONE: _____

CONTRACTOR: SEE OWNER

CONTACT: _____

ADDRESS: _____

PHONE: _____

PRE-DESIGN MEETING:

☐ YES

☒ NO

☐ COPY OF CONFERENCE RECAP SHEET PROVIDED

DRB NO. _____

EPC NO. _____

PROJ. NO. _____

TYPE OF SUBMITTAL:

☐ DRAINAGE REPORT

☒ DRAINAGE PLAN

☐ CONCEPTUAL GRADING & DRAINAGE PLAN

☐ GRADING PLAN

☐ EROSION CONTROL PLAN

☒ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

☐ SKETCH PLAT APPROVAL

☐ PRELIMINARY PLAT APPROVAL

☒ SITE DEVELOPMENT PLAN APPROVAL - MASTER DRAINAGE

☐ FINAL PLAT APPROVAL

☐ BUILDING PERMIT APPROVAL

☐ FOUNDATION PERMIT APPROVAL

☒ ~~CERTIFICATE OF OCCUPANCY APPROVAL - CAFE~~

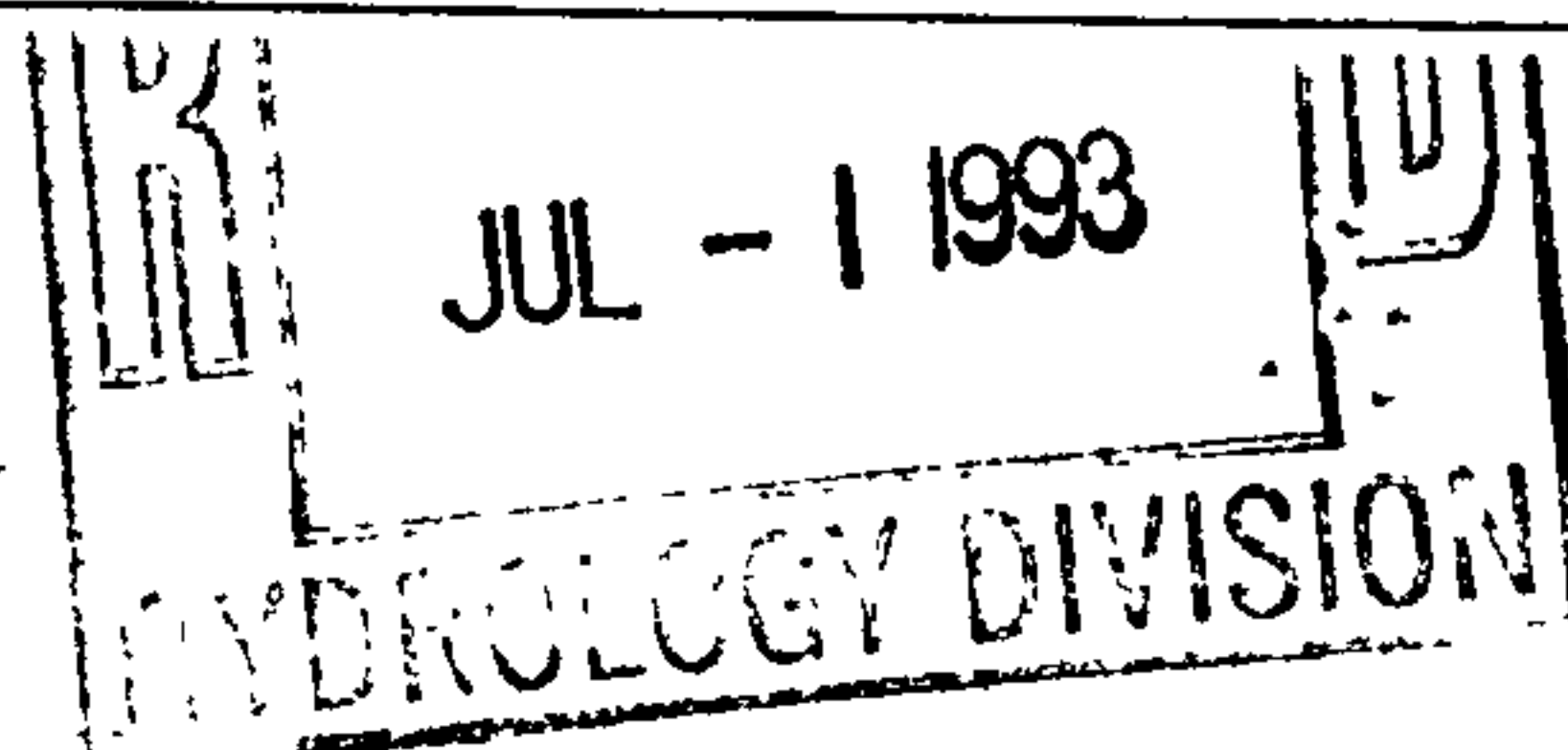
☐ ROUGH GRADING PERMIT APPROVAL

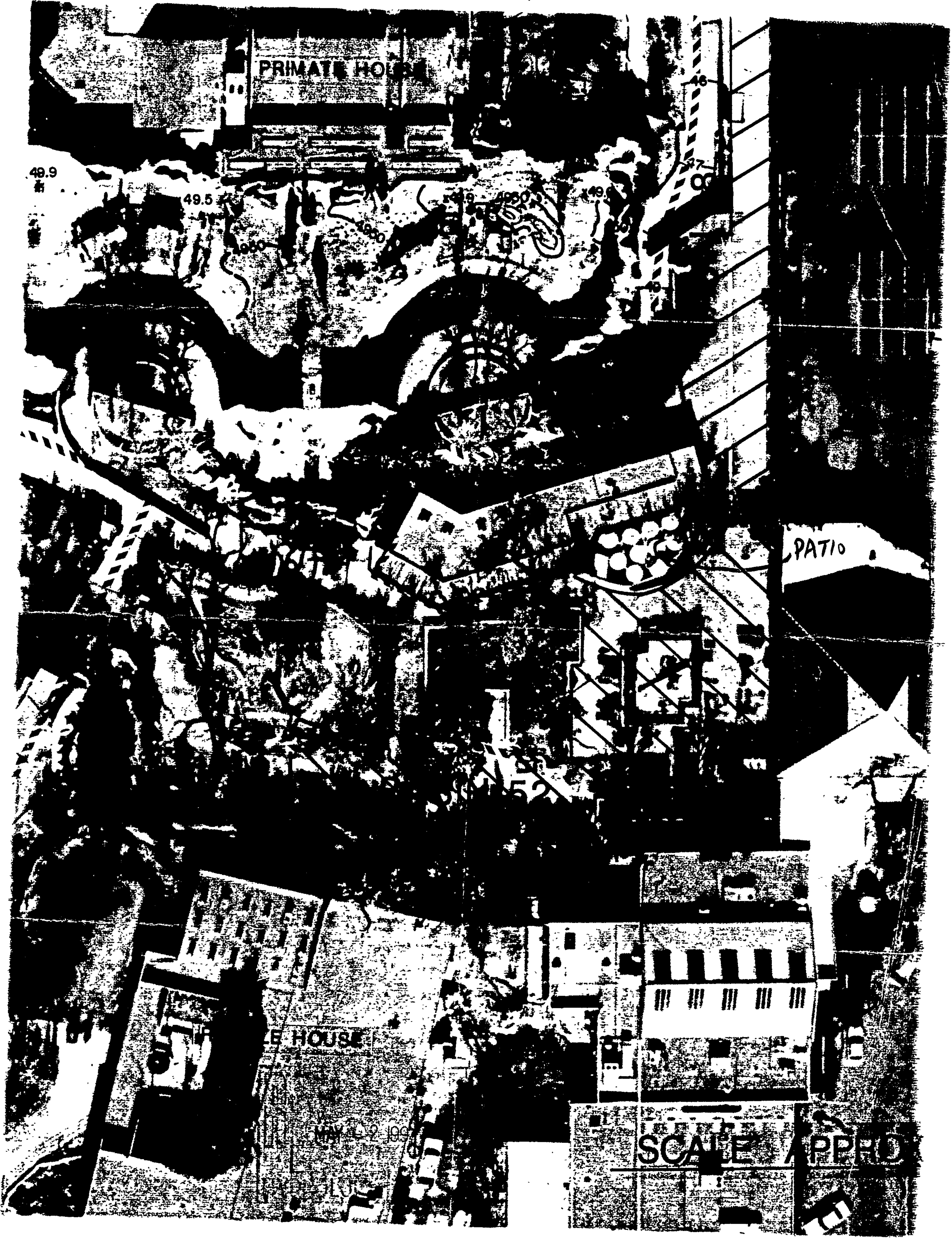
☐ GRADING/PAVING PERMIT APPROVAL

☐ OTHER IF R.C.B. 1111 (SPECIFY)

DATE SUBMITTED: 7/1/93

BY: Joe Kelley







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

July 12, 1994

Fred Arfman
Isaacson & Arfman
128 Monroe NE
Albuquerque, NM 87108

RE: DRAINAGE PLAN FOR THE ZOO FISH GROWING FACILITY (K13-D34)
ENGINEER'S STAMP DATED 6/17/94.

Dear Mr. Arfman:

Based on the information provided on your June 21, 1994 submittal, the above referenced site is approved for Building Permit.

Please attach a copy of this approval plan to the construction sets prior to sign-off by Hydrology.

If I can be of further assistance, please feel free to contact me at 768-2667.

Sincerely,

Bernie J. Montoya, CE
Engineering Associate

BJM/d1/WPHYD/7857

c: Andrew Garcia
File

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Zoo Fish Growing Facility ZONE ATLAS/DRNG. FILE #: K13E/034

DRB #: _____ EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: Rio Grande Zoological ParkCITY ADDRESS: 10th StoverENGINEERING FIRM: Isaacson & Arfman CONTACT: Jud LeeADDRESS: 128 Monroe NE PHONE: 268-8828

OWNER: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

ARCHITECT: D.P. & A CONTACT: Branden LipmanADDRESS: 6501 Americas Pkwy. Ste 675 PHONE: 888-3111

SURVEYOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

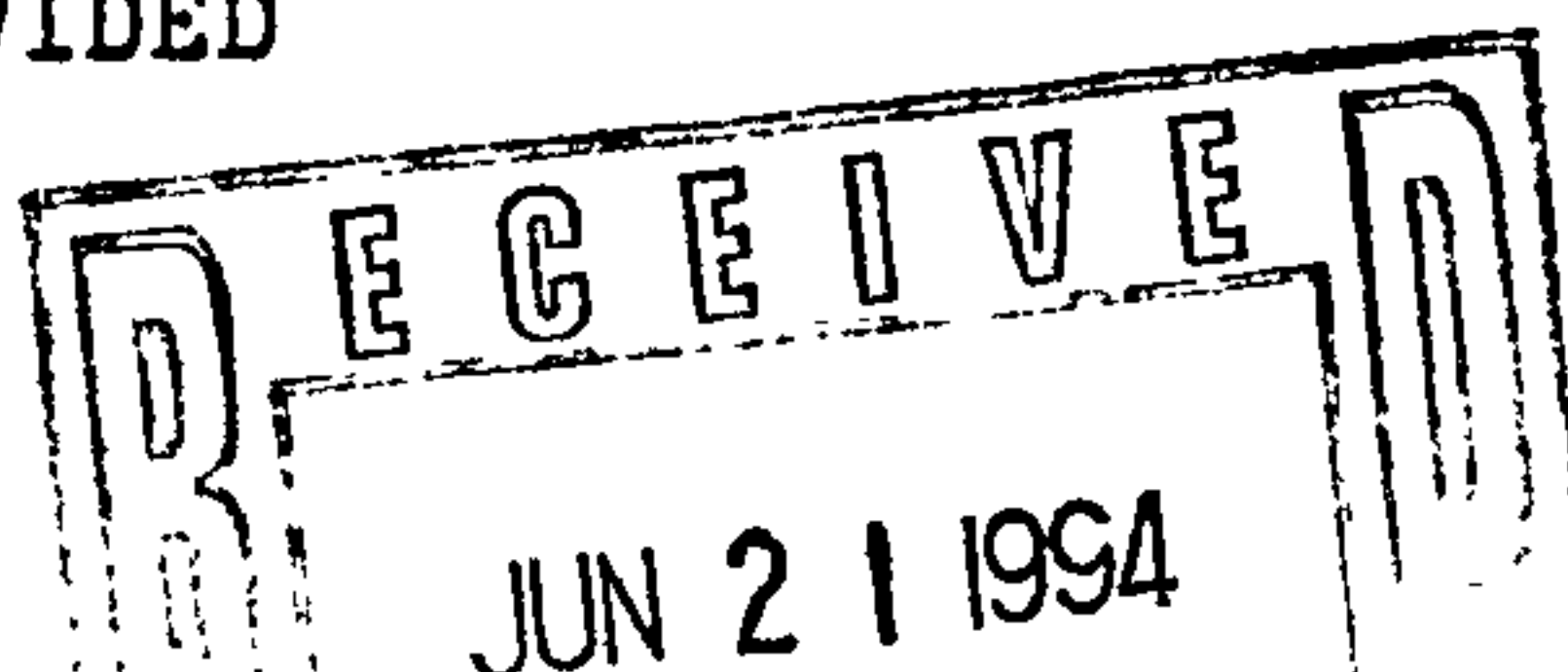
- ☐ DRAINAGE REPORT
☒ DRAINAGE PLAN
☐ CONCEPTUAL GRADING & DRAINAGE PLAN
☒ GRADING PLAN
☐ EROSION CONTROL PLAN
☐ ENGINEER'S CERTIFICATION
☐ OTHER

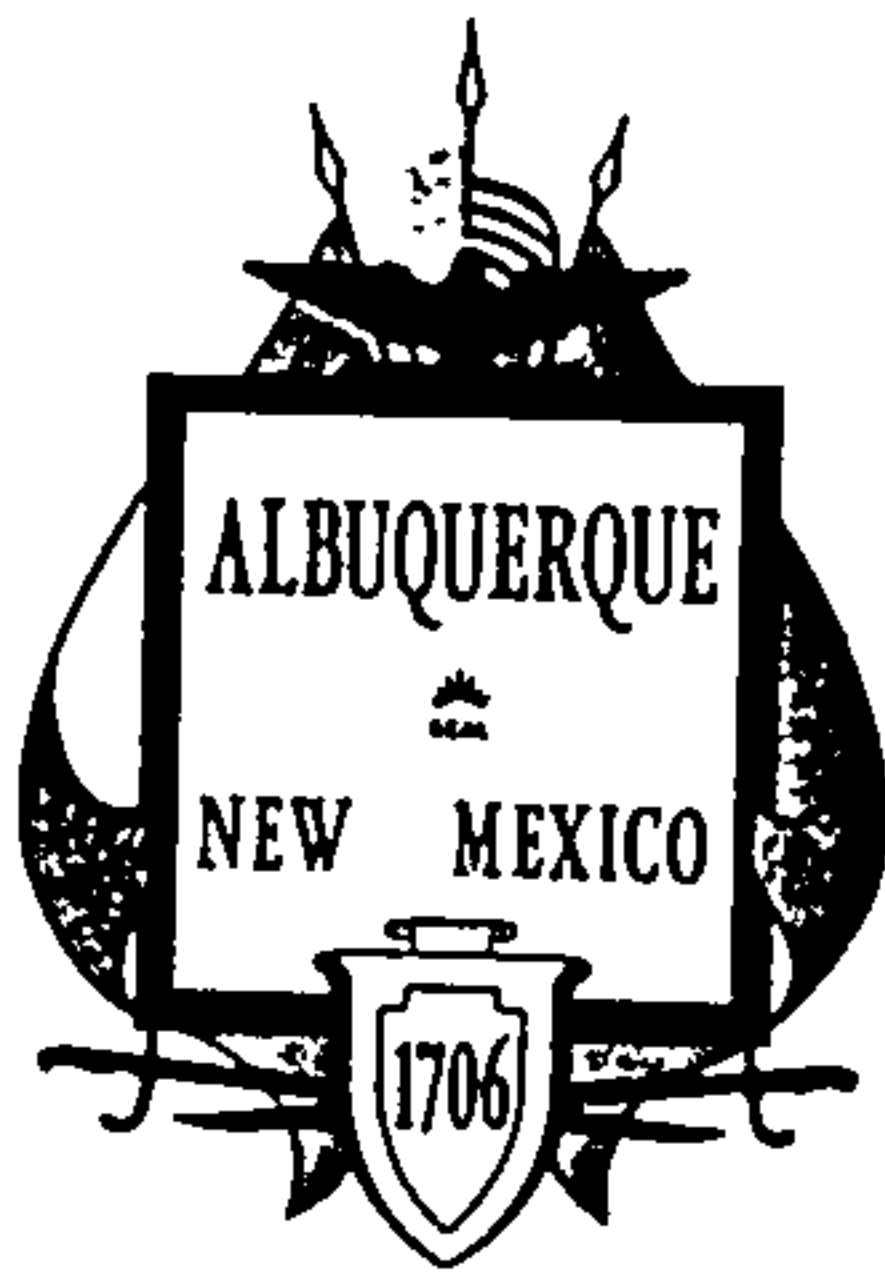
PRE-DESIGN MEETING:

- ☐ YES
☒ NO
☐ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

- ☐ SKETCH PLAT APPROVAL
☐ PRELIMINARY PLAT APPROVAL
☐ S. DEV. PLAN FOR SUB'D. APPROVAL
☐ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
☐ SECTOR PLAN APPROVAL
☐ FINAL PLAT APPROVAL
☐ FOUNDATION PERMIT APPROVAL
☒ BUILDING PERMIT APPROVAL
☐ CERTIFICATE OF OCCUPANCY APPROVAL
☐ GRADING PERMIT APPROVAL
☐ PAVING PERMIT APPROVAL
☐ S.A.D. DRAINAGE REPORT
☐ DRAINAGE REQUIREMENTS
☐ OTHER _____ (SPECIFY)

DATE SUBMITTED: June 17, 1994BY: Jud Lee



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

May 13, 1994

Joe Kelly
Chavez-Grieves
5639 Jefferson St. NE
Albuquerque, NM 87109

RE: DRAINAGE PLAN FOR ZOO PATIO AREA (K13-D34) ENGINEER'S STAMP
PLATE 1A DATED 5/2/94 & PLATE 1B DATED 5/2/94.

Dear Mr. Kelly:

Based on the information provided on your May 2, 1994 submittal, the above referenced site is approved for Building Permit. Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

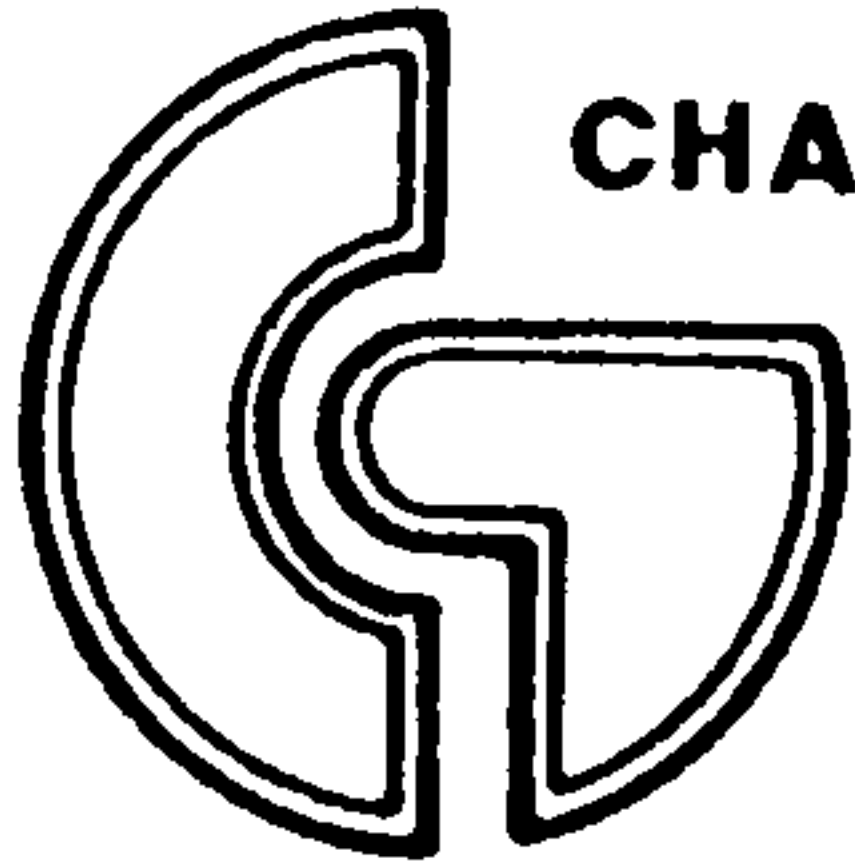
If I can be of further assistance, please feel free to contact me at 768-2667.

Sincerely,

Bernie J. Montoya, CE
Engineering Associate

BJM/d1/WPHYD/7857

c: Andrew Garcia
~~File~~



CHAVEZ-GRIEVES / CONSULTING ENGINEERS, INC.

5639 JEFFERSON N. E.
ALBUQUERQUE, NEW MEXICO 87109
(505) 344 - 4080 FAX (505) 343 - 8759

July 20, 1993

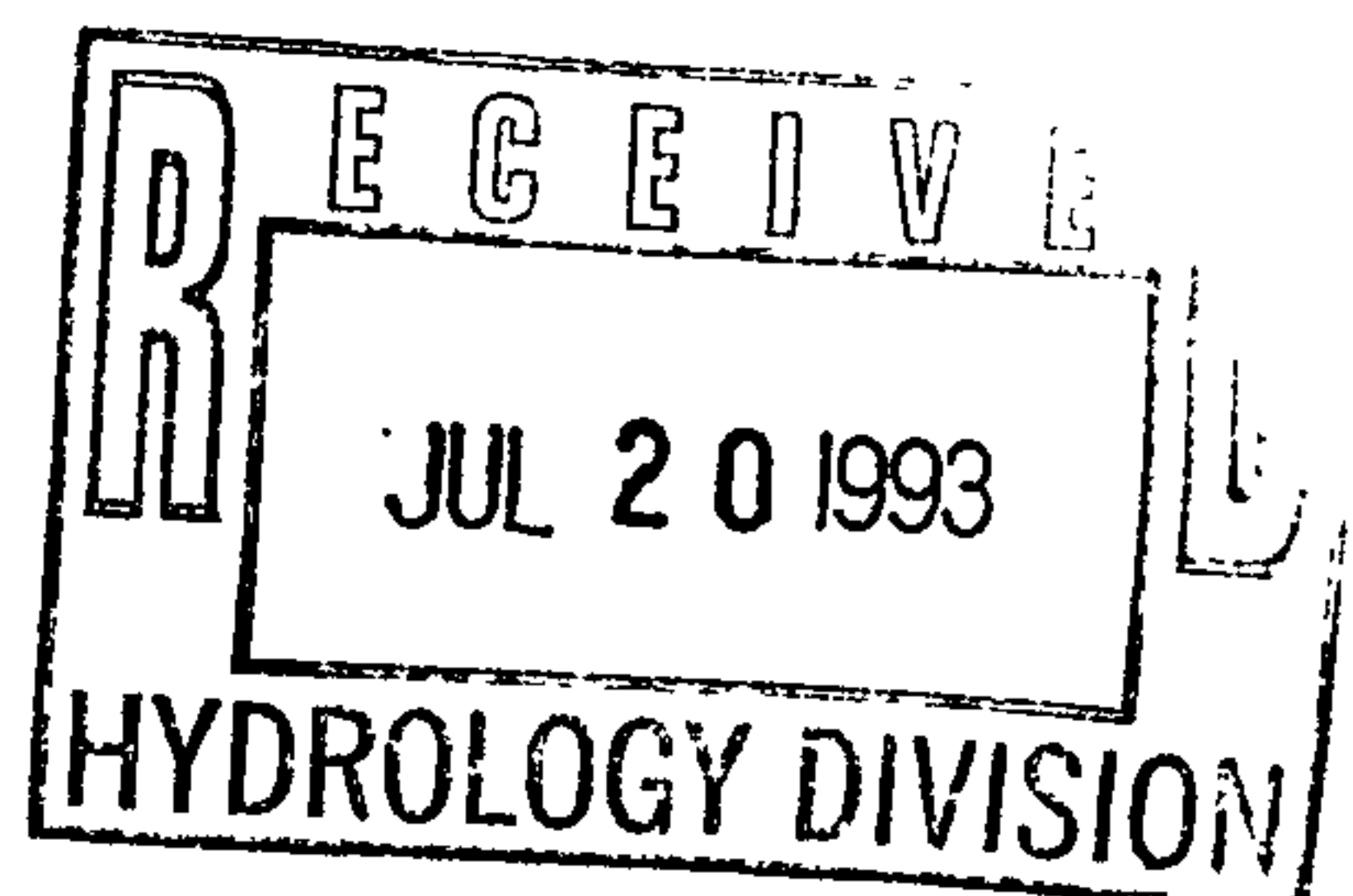
Mr. Bernie Montoya, CE
City of Albuquerque Hydrology Division
P.O. Box 1293
Albuquerque, New Mexico 87103

RE: Rio Grande Zoo Elephant Exhibit
Rio Grande Zoo Overflow Parking Lot
Rio Grande Zoo Master Drainage Plan

Dear Mr. Montoya:

I am writing this letter to address the issues we discussed on the phone yesterday:

1. I have submitted a separate drainage information sheet for each of the above-referenced jobs.
2. The Elephant Exhibit elevations have been adjusted to City of Albuquerque datum.
3. The Elephant Exhibit ponds that were deeper than 1.5' in non-exhibit areas have been revised to depths less than 1.5'.
4. Peter Chang is on vacation, so I spoke to Russ Gibler about the sidewalk culverts adjacent to the Parking Lot. He said the project was constructed under a City Work Order, and that he would call you regarding the letter of acceptance.
5. The Master Drainage Plan ponds that were deeper than 5' in non-exhibit areas have been revised to depths less than 1.5'. As discussed on the phone, this was done because ponds of 1.5' or more in depth are required to be fenced. The ponds that were changed were in Basins 4, 20, and 33. The ponds in Basins 26 and 42 are deeper than 1.5', but since these are animal exhibit areas, there is no need for a fence around these ponds.



Mr. Bernie Montoya
COA Hydrology

Page 2
July 20, 1993

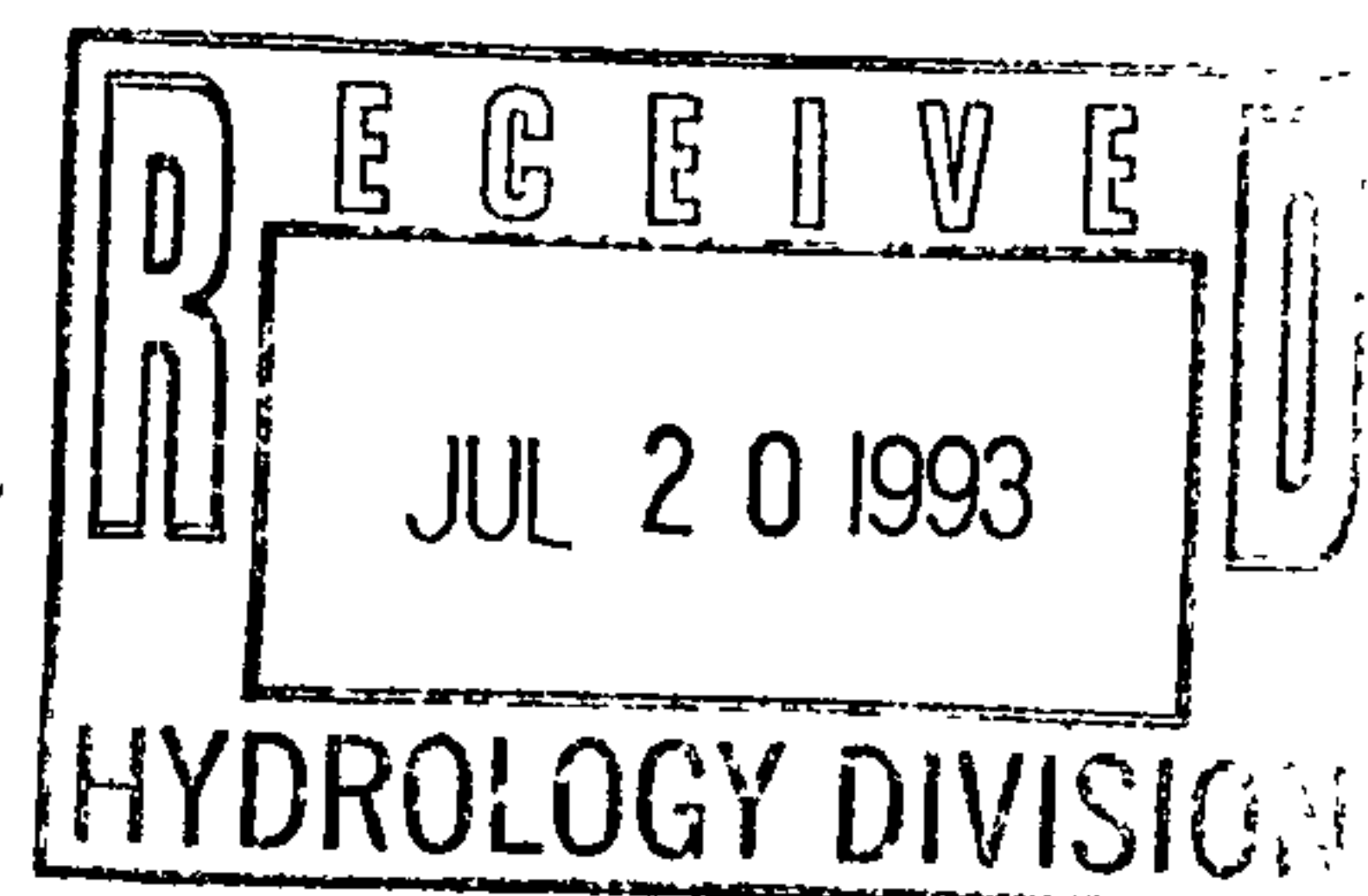
Bernie, I think this will satisfy all your requirements. If there is anything else I can do for you, please call. Thanks!

Sincerely,

CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC.

Joe Kelley
Joe P. Kelley, P.E.
Project Engineer

XC: Ms. Terri Smith, Rio Grande Zoo



DRAINAGE INFORMATION SHEET

PROJECT TITLE: Rio Grande Zoo Master Plan ZONE ATLAS/DRNG.FILE #: K-13/034

LEGAL DESCRIPTION: S19, T10N, R3E, Town of Atrisco Grant, Rio Grande Zoo

CITY ADDRESS: 10th & Stover

ENGINEERING FIRM: CHAVEZ-GRIEVES

CONTACT: JOE KELLEY

ADDRESS: 5639 JEFFERSON NE

PHONE: 344-4080

OWNER: Rio Grande Zoo

CONTACT: TERI SMITH

ADDRESS: _____

PHONE: 842-7299

ARCHITECT: SEE OWNER

CONTACT: _____

ADDRESS: _____

PHONE: _____

SURVEYOR: SEE OWNER

CONTACT: _____

ADDRESS: _____

PHONE: _____

CONTRACTOR: SEE OWNER

CONTACT: _____

ADDRESS: _____

PHONE: _____

PRE-DESIGN MEETING:

☐ YES

☒ NO

☐ COPY OF CONFERENCE RECAP
SHEET PROVIDED

DRB NO. _____

EPC NO. _____

PROJ. NO. _____

TYPE OF SUBMITTAL:

☐ DRAINAGE REPORT

☒ DRAINAGE PLAN

☐ CONCEPTUAL GRADING & DRAINAGE PLAN

☐ GRADING PLAN

☐ EROSION CONTROL PLAN

☐ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

☐ SKETCH PLAT APPROVAL

☐ PRELIMINARY PLAT APPROVAL

☒ SITE DEVELOPMENT PLAN APPROVAL

☐ FINAL PLAT APPROVAL

☐ BUILDING PERMIT APPROVAL

☐ FOUNDATION PERMIT APPROVAL

☐ CERTIFICATE OF OCCUPANCY APPROVAL

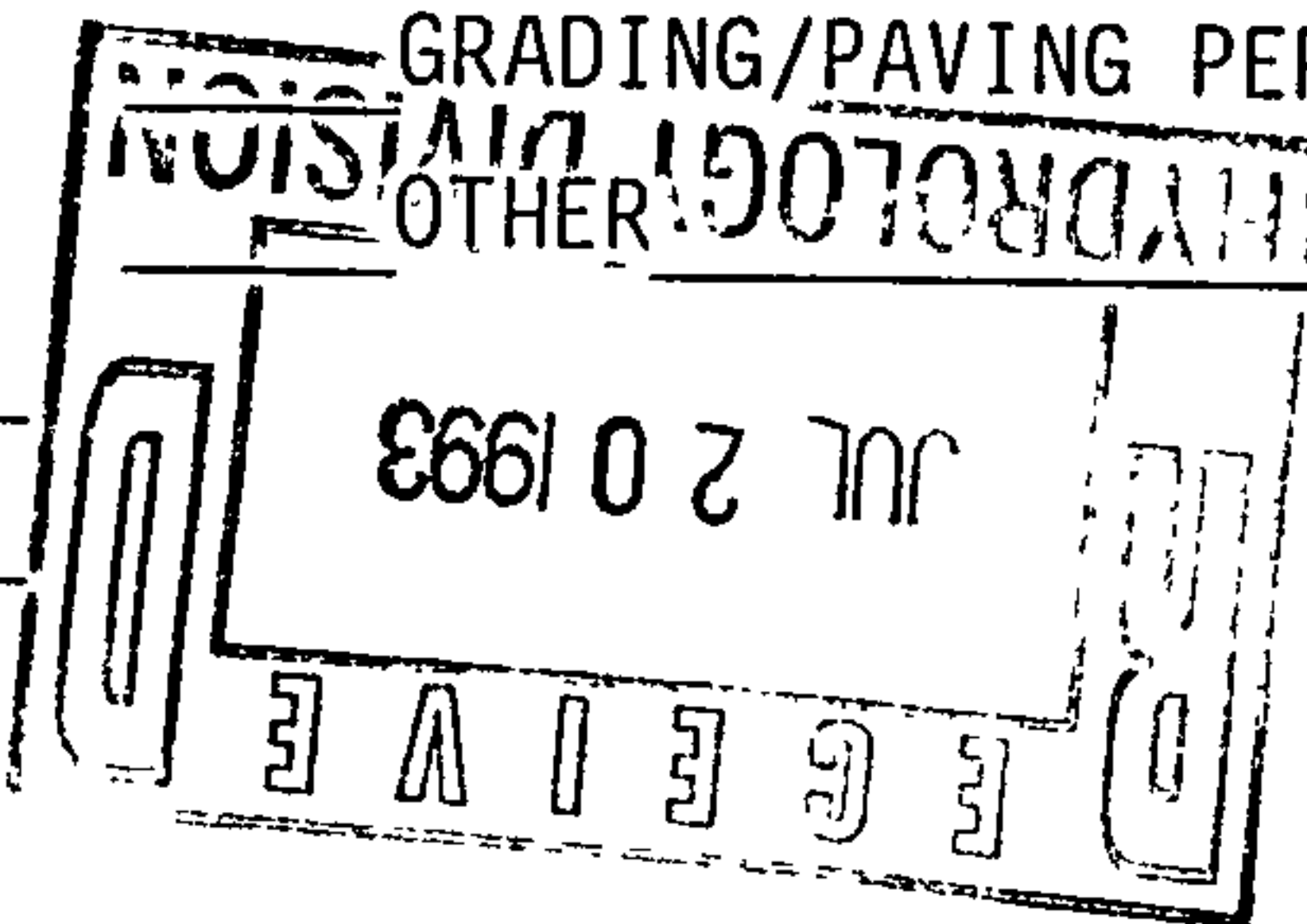
☐ ROUGH GRADING PERMIT APPROVAL

☐ GRADING/PAVING PERMIT APPROVAL

☐ OTHER: _____ (SPECIFY)

DATE SUBMITTED: 7/20/93

BY: JOE KELLEY



DRAINAGE INFORMATION SHEET

PROJECT TITLE: RIO GRANDE ZOO OVERFLOW PARKING ZONE ATLAS/DRNG.FILE #: K-13/D-34

LEGAL DESCRIPTION: SECTION 19, T10N, R3E, TOWN OF ATRISCO GRANT, RIO GRANDE ZOO.

CITY ADDRESS: 10TH & STOVER

ENGINEERING FIRM: CHAYEN GRIEVES CONTACT: JOE KELLEY

ADDRESS: 4600-C MONT GOMERY PHONE: 881-7376

OWNER: RIO GRANDE ZOO CONTACT: TERRY SMITH

ADDRESS: _____ PHONE: 842-7299

ARCHITECT: SEE OWNER CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: SEE OWNER CONTACT: _____

ADDRESS: _____ PHONE: _____

CONTRACTOR: SEE OWNER CONTACT: _____

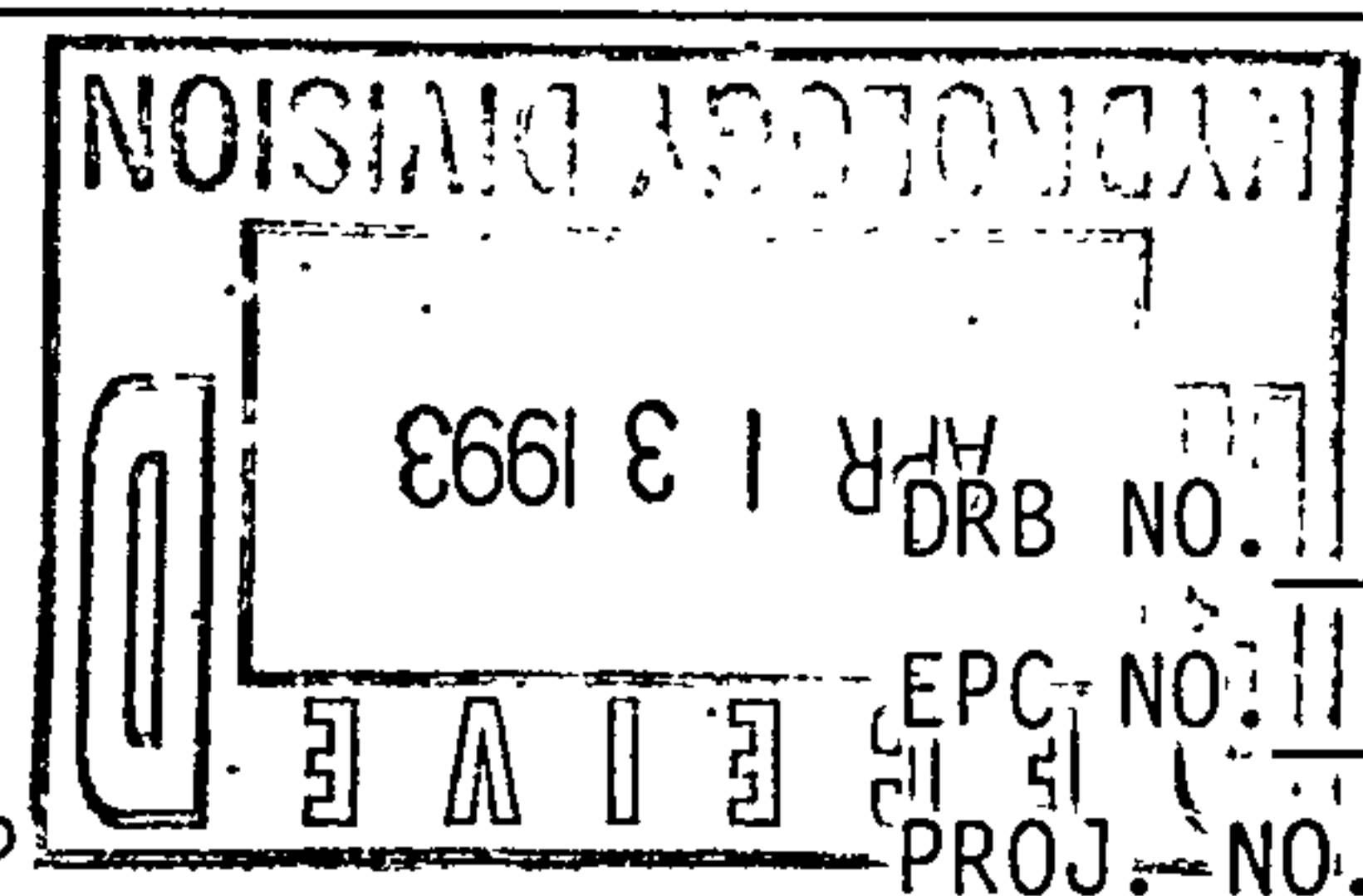
ADDRESS: _____ PHONE: _____

PRE-DESIGN MEETING:

 YES

 NO

 COPY OF CONFERENCE RECAP SHEET PROVIDED



TYPE OF SUBMITTAL:

- DRAINAGE REPORT
- DRAINAGE PLAN
- CONCEPTUAL GRADING & DRAINAGE PLAN
- X GRADING PLAN
- EROSION CONTROL PLAN
- ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

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

DATE SUBMITTED: 4/13/93

BY: JOE KELLEY

DRAINAGE INFORMATION SHEET

PROJECT TITLE: RIO GRANDE ZOO MASTER DRAINAGE PLAN ZONE ATLAS/DRNG.FILE #: K-13 / 1034

LEGAL DESCRIPTION: SECTION 19, TOWNSHIP 10 N, RANGE 3 E, TOWN OF ATRISCO GRANT.
RIO GRANDE ZOO

CITY ADDRESS: 10TH & STOVER

ENGINEERING FIRM: CHAVEZ-GRIEVES

CONTACT: JOE KELLEY

ADDRESS: 4600-C MONTGOMERY

PHONE: 881-2376

OWNER: RIO GRANDE ZOO

CONTACT: TERRY SMITH

ADDRESS: _____

PHONE: 842-7299

ARCHITECT: SEE OWNER

CONTACT: _____

ADDRESS: _____

PHONE: _____

SURVEYOR: SEE OWNER

CONTACT: _____

ADDRESS: _____

PHONE: _____

CONTRACTOR: SEE OWNER

CONTACT: _____

ADDRESS: _____

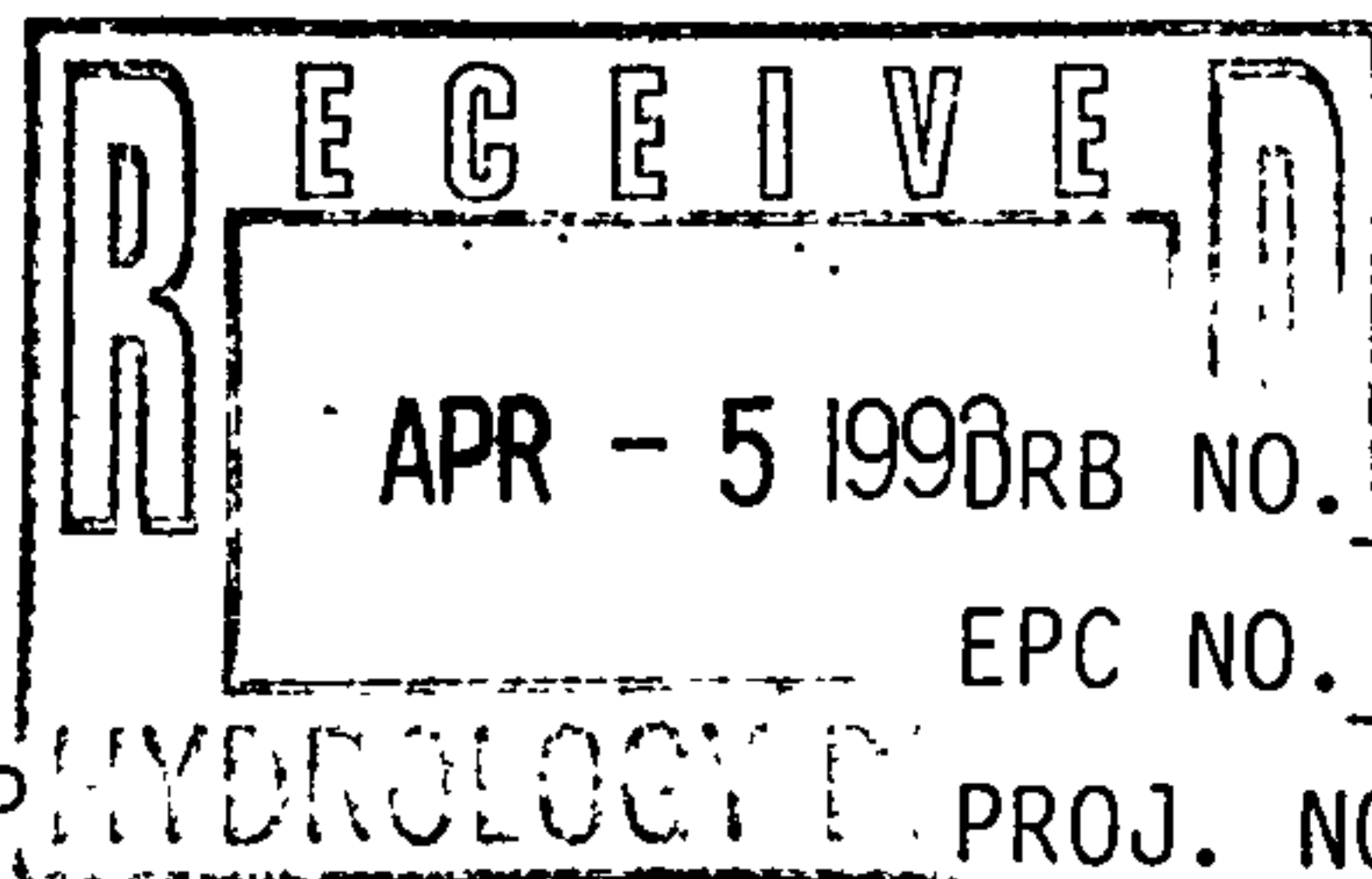
PHONE: _____

PRE-DESIGN MEETING:

YES

NO

COPY OF CONFERENCE RECAP SHEET PROVIDED



TYPE OF SUBMITTAL:

☒ DRAINAGE REPORT

☐ DRAINAGE PLAN

☐ CONCEPTUAL GRADING & DRAINAGE PLAN

☒ GRADING PLAN

☐ EROSION CONTROL PLAN

☐ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

☐ SKETCH PLAT APPROVAL

☐ PRELIMINARY PLAT APPROVAL

☒ SITE DEVELOPMENT PLAN APPROVAL - MASTER DRAINAGE

☐ FINAL PLAT APPROVAL

☒ BUILDING PERMIT APPROVAL - ELEPHANT

☐ FOUNDATION PERMIT APPROVAL

☒ CERTIFICATE OF OCCUPANCY APPROVAL - CAFE

☐ ROUGH GRADING PERMIT APPROVAL

☒ GRADING/PAVING PERMIT APPROVAL - PARKING LOT

☐ OTHER _____ (SPECIFY)

DATE SUBMITTED: 4/2/93

BY: JOE KELLEY

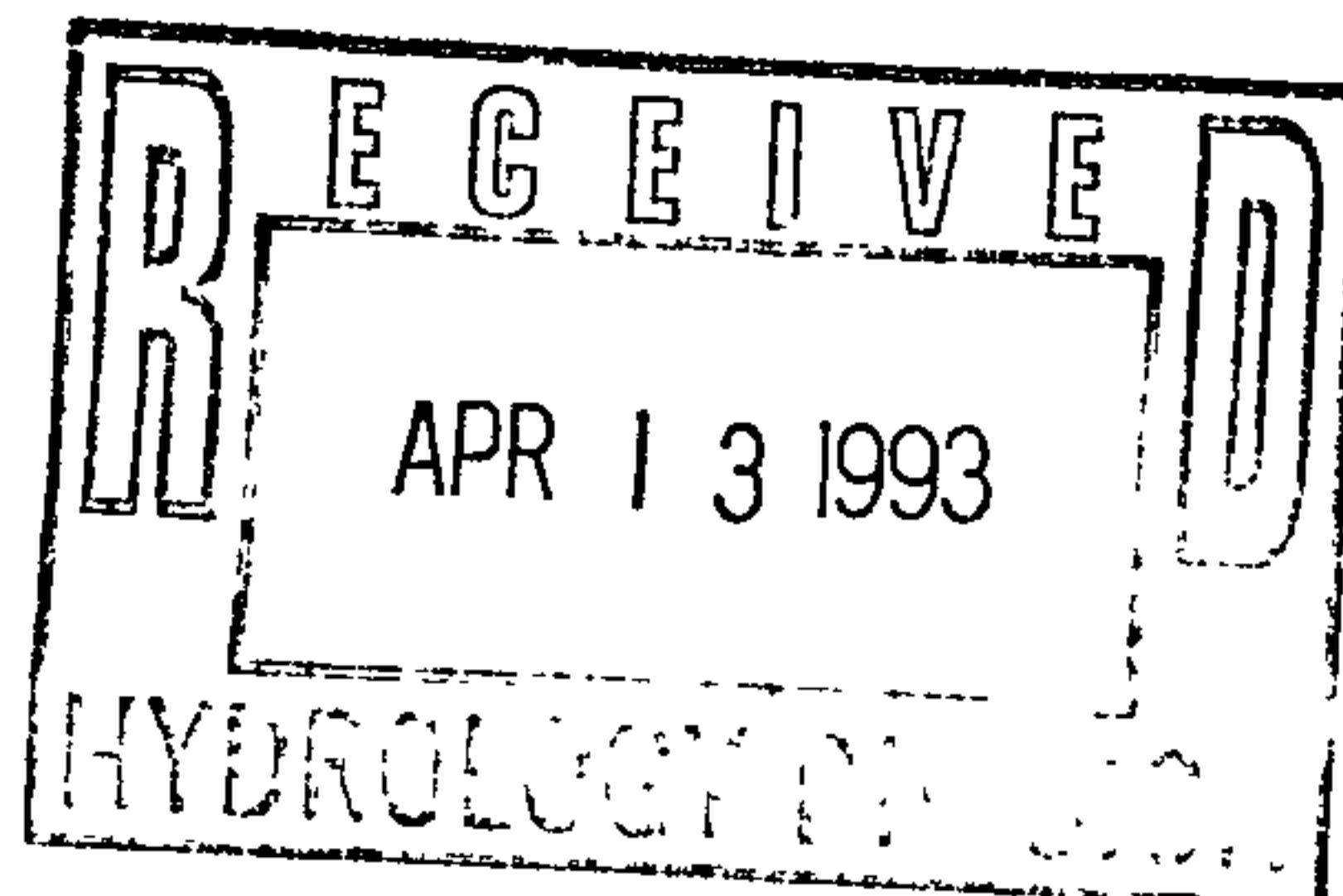
Certificate of Occupancy for Cafe verbal cmts need separate
Building Permit for Elephant Building verbal cmts " Submittal



CHAVEZ-GRIEVES /CONSULTING ENGINEERS INC.

4600 MONTGOMERY N.E., BLDG. C, #101
ALBUQUERQUE, N.M. 87109
(505) 881-7376 FAX (505) 883-7119

April 12, 1993



Mr. Bernie Montoya, CE
City of Albuquerque Hydrology Division
P.O. Box 1293
Albuquerque, New Mexico 87103

RE: GRADING/PAVING PLAN FOR OVERFLOW PARKING WITHIN BASIN 39 RIO GRANDE ZOO (K13/D34).

Dear Mr. Montoya:

The referenced plan is hereby resubmitted for your review and approval. The concerns that you listed in your April 7, 1993 letter have been addressed as follows:

1. Top of curb and flowline elevations on 10th Street have been added where this information was available from an existing plan set.
2. Each sidewalk culvert has been shown on the drawing, and the outflow rate for each culvert was noted.
3. A note has been added to remove the entire curb stone at each sidewalk drain.
4. The S.O. 19 notes have been revised to include all six notes.
5. The design slopes have been noted. No slopes are less than 0.5%.
6. The flow rate and volumes, which are identical to the Master Plan, have been noted.

As I said on the phone, Bernie, Albuquerque Surveying will soon be verifying the existing elevations along 10th Street (hopefully, this week). In the meantime, I added a note on this plan for the Contractor to verify positive drainage from the parking lot into the street prior to construction. If the Contractor finds that a positive grade does not exist, we can adjust the entire parking lot upwards.

"QUALITY FIRST"

Mr. Bernie Montoya, CE
City of Albuquerque Hydrology Division

Page 2
4/12/93

Thank you for the quick manner in which you have been reviewing these plans. The Zoo is hoping to open the new lot by Mother's Day, and you have been very helpful in meeting this deadline due to your responsiveness.

Sincerely,


Joe P. Kelley, P.E.
Project Engineer

XC: Rio Grande Zoo



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

April 7, 1993

Joe P. Kelley
Chavez-Grievess Engineering
4600 Montgomery NE Building C #101
Albuquerque, NM 87109

RE: GRADING/PAVING PLAN FOR OVERFLOW PARKING WITHIN BASIN 39 RIO GRANDE
ZOO (K13-D34) ENGINEER'S STAMP DATED 4/3/93.

Dear Mr. Kelley:

Based on the information provided on your April 5, 1993 submittal, listed are some concerns that will need to be satisfied prior to final approval:

1. Top of curb and flowline elevations on 10th Street SW.
2. Please identify on the plan drawing each culvert crossing the sidewalk onto the curb, also indicate the outflow rate for each culvert on the drawing.
3. According to C.O.A.STD. DRWG. 2415 you must replace the complete stone and not sawcut. Please indicate on your plan drawing.
4. You are lacking two items from the Notice to Contractor format from the S.O. 19. Note #1 & #6. Please include on the plan drawing.
5. Please indicate on the plan drawing the slopes that you have designed towards the ponding area. You need at least 1/2 % slope.
6. Please indicate your flow rate and volume on the plan drawing.

If I can be of further assistance, please feel free to contact me at 768-266

Sincerely,


Bernie J. Montoya, CE
Engineering Assistant

BJM/d1/WPHYD/7667

PUBLIC WORKS DEPARTMENT