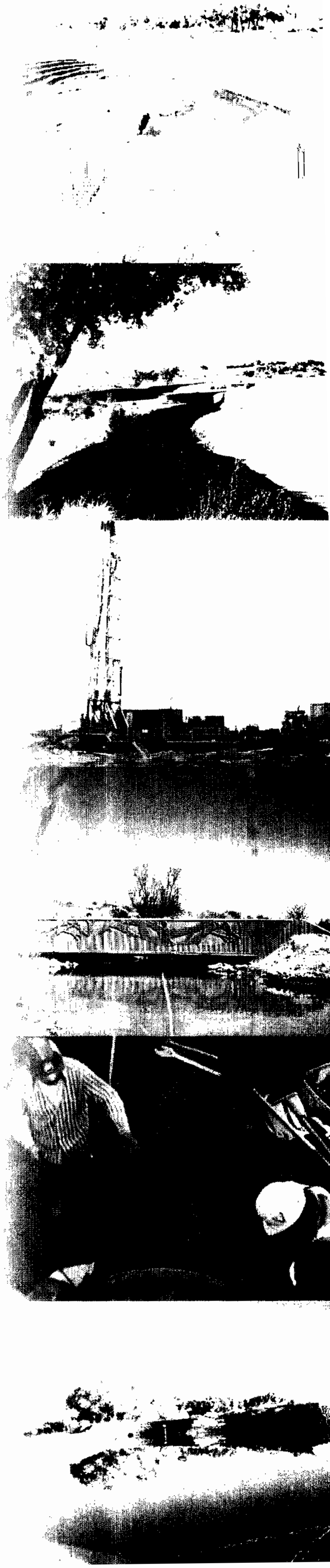
PIEDRAS MARCADAS WATERSHED AND

LYON BOULEVARD

Storm Drain

Drainage Management Plan



JULY 29, 2003

Approval by
AMAFCA (Lynn)

Prepared for:
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PIEDRAS MARCADAS WATERSHED AND LYON BOULEVARD

Storm Drain Drainage Management Plan

May 9, 2003

I, Daniel J. Grochowski, hereby certify that I am a Registered Professional Engineer, registered in the state of New Mexico, and that the following report was prepared under my direction and is true and correct to the best of my knowledge and belief.

Daniel J. Grochowski

Daniel J. Grochowski, P.E.
NMPE No. 8766

EXECUTIVE SUMMARY

This analysis update report covers the area roughly bounded by Unser/Lyon Boulevard on the east, Paradise Boulevard on the north and Paseo del Norte (PDN) extension on the south, comprising almost 600 acres of the Piedras Marcadas Dam watershed. The primary focus of the study was to determine what portion of the watershed could discharge to the Albuquerque Metropolitan Arroyo Flood Control Authority's (AMAFCA) future Lyon Boulevard storm drain extension. In the past year, the study was expanded to include analysis of the Piedras Marcardas Dam capacity, specifically to assess how much of the Piedras Marcardas developed watershed must be diverted north to the Calabacillas Arroyo to maintain one foot of freeboard in the dam.

History

There has been development interest in this area; however, due to lack of existing drainage outfalls, development has been limited. Following is a summary of some of the issues:

- The National Park Service has stated objections to allowing storm water runoff above the "historic" (not necessarily undeveloped) flow rate to pass through the Petroglyph National Monument.
- Flow to the south and east is limited. The Draft Piedras Marcadas Drainage Management Plan Revision, prepared by Molzen-Corbin & Associates in May 1993, found that the Piedras Marcadas Dam capacity would be exceeded under fully developed watershed conditions. The feasible solution was to divert storm water to the Calabacillas Arroyo at two locations. One diversion was in the vicinity of Ventana Ranch Subdivision, which has already been built, and the other was at Lyon Boulevard, which is the subject of AMAFCA's current study.
- The diversion of the upper part of the watershed was completed with the Las Ventanas Dam and outfall pipe to the Calabacillas Arroyo.
- The existing 72-inch storm drain outfall to the Calabacillas Arroyo in Lyon Boulevard has limited capacity.
- Property owners in the area, including Albuquerque Public Schools (APS), have been interested in developing their property but have been constrained by lack of drainage outfalls.

- Bernalillo County and the City of Albuquerque have an interest in a storm drain outfall for the future Unser Boulevard extension that will ultimately connect to Lyon Boulevard from the south.

Since AMAFCA has the Lyon Diversion Storm Drain on its project schedule, AMAFCA sponsored the drainage study for the area. AMAFCA entered into an Agreement with the City, County and developers in March 2001 to prepare a "Mini" Drainage Management Plan. The primary purpose was to determine how existing and proposed development will impact AMAFCA facilities. AMAFCA contracted Bohannan Huston, Inc. (BHI) to perform the work.

Results of Study

BHI took the original hydrologic model from the 1993 Molzen-Corbin study and updated drainage basins and facility capacities to reflect construction since that time. Among these projects are:

- Las Ventanas Dam and 60-inch storm drain outfall to the Calabacillas Arroyo.
- The Lyon Boulevard 72-inch storm drain outfall to the Calabacillas Arroyo.
- The Paradise Boulevard storm drain from Lyon Boulevard to an existing storm drain stub-out west of Golf Course Road. The ultimate outfall is the Piedras Marcadas Dam.
- Expansion of Piedras Marcadas Dam.

BHI used the 100-year flow rates from this analysis to determine storm drain options in the Lyon/Unser Boulevard corridor. The study was limited in scope to evaluate the following options:

- Option 1 – Free discharge from the study area into a larger, proposed Lyon Boulevard outfall pipe. This option was used as a benchmark to compare the other options.
- Option 2 – Utilize a single "regional" detention pond to reduce flow to minimize pipe sizes and to match the capacity of the existing outfall pipe.
- Option 3 – Utilize a series of smaller detention ponds to reduce flow to minimize pipe sizes and to match the capacity of the outfall pipe.
- Option 4 – Utilize detention ponding to reduce flow to minimize pipe sizes (Option 2 or 3). Maximize the existing outfall pipe capacity with pressure flow.

The results of the analysis also indicated that the capacity of the Piedras Marcadas Dam must also be taken into account. Although approximately 2.7 square miles have been diverted from the dam watershed to the Calabacillas Arroyo with the Las Ventanas Dam and Lyon Boulevard storm drain outfalls, it was necessary to evaluate the dam capacity with ultimate development. The current capacity, with one foot of freeboard, is 280 acre-feet. The study evaluated the additional drainage basin area that will need to be diverted to the Lyon Boulevard storm drain to maintain this capacity. An area of approximately 115 acres will be required to discharge to the Lyon Boulevard storm drain. Since the total discharge from this area is 400 cfs, and the additional capacity available in the outfall in Option 4 is 210 cfs, detention ponding will be required.

Construction Cost Estimates

Several construction cost scenarios were evaluated. The first was total project cost, from the future PDN to the existing 72-inch outfall to the Calabacillas Arroyo. The second was just the AMAFCA portion from the Paradise/Lyon intersection to the existing outfall. The third was the AMAFCA portion, excluding basalt excavation. This scenario was included as a comparison since construction within the basalt layer will significantly drive up the cost.

The County and APS have been interested in extending the Paradise Boulevard storm drain to the west. Therefore, this fourth scenario was included as an addition to the AMAFCA Lyon Boulevard storm drain portion.

Following is a summary of the construction cost estimates:

Storm Drain Option	Total Project Cost	Lyon Project Cost (AMAFCA)	Lyon Project Cost (excl. basalt) (AMAFCA)	Paradise/Lyon Project Cost	Flow from South (cfs)
1	$24,831,000	$7,800,000	$3,477,000	$9,153,000	1460
2	$26,429,000	$4,687,000	$1,343,000	$6,040,000	170
3	$17,359,000	$3,082,000	$1,129,000	$4,435,000	130
4	n/a	$3,337,000	$1,292,000	$4,690,000	210

The recommended option is Option 4. The total project cost was not calculated since the storm drain option south of Paradise Boulevard could follow Option 2 or 3. The AMAFCA Lyon storm drain project is $255,000 more than Option 3 because it has a 90-inch storm drain connection to the existing outfall, while Option 3 has a 78-inch and 84-inch storm drain. Option 4 optimizes the use of the existing outfall and, with an increase of one pipe diameter, almost doubles the allowable flow from south of Paradise Boulevard.

I. INTRODUCTION

The Piedras Marcadas Watershed and Lyon Boulevard Storm Drain Analysis Update deals with an area of northwest Albuquerque that, up to this time, has had a very limited potential for development due to the lack of an outfall for developed flows. This area is approximately bounded by Unser/Lyon Boulevard on the east, Paradise Boulevard on the north, and on the south and west sides by the limits of the Piedras Marcadas Watershed. An attempt was made to include whole properties into the primary study area, and some area east of Unser Boulevard is included because it is possible to use the same system. There is an existing 72" storm drain line in the Unser/Lyon Boulevard Alignment from Irving Boulevard to the Calabacillas Arroyo. Past studies have proposed a southern extension of this storm drain to Paradise Boulevard. The intent of the primary analysis is to determine the feasibility of using the proposed Lyon Boulevard storm drain as the outfall point for the primary study area. The effects of recent developments in the entire watershed on the Piedras Marcadas Dam have also been included in this report. The Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA), the chief sponsor of this study, the City, and area landowners have funded and provided needed information for this study.

Two past reports are foundational to the work done in this study. The first is the "Piedras Marcadas Drainage Management Plan" by Molzen-Corbin done in May 1993. It deals with drainage issues for the entire Piedras Marcadas Watershed. A number of developments have occurred in the watershed in the ten years since the report was completed, changing the area's hydrology. The other report is the "Conceptual Design Analysis for Lyon (Unser) Boulevard/Paradise Boulevard Storm Drain" by Bohannan Huston done in June 2000. The report evaluates a proposed storm drain down Paradise to Lyon and then continuing in Lyon connecting to the existing Lyon Boulevard Storm Drain.

As a starting point for this study, the existing section of storm drain, from Irving to the Calabacillas Arroyo, was analyzed to determine the existing capacity, which was determined to be 734 cfs based on Manning's Equation. In addition, the maximum area that could be routed to the storm drain was determined. The preliminary layout for the Paradise Boulevard Storm Drain west of Lyon Boulevard was also examined to determine whether or not it could be reduced due to addition of storm drain line south of Paradise Boulevard. Three options were investigated for diverting the maximum drainage basin to the Lyon Boulevard Storm Drain System, and a fourth option was investigated for the storm drains in Paradise and Lyon Boulevards. The first option assumes an upsizing of the existing storm drain and an Unser Storm Drain that extends into the study area without detention ponds. The second option utilizes one detention pond to reduce flows to preserve the existing storm drain. The third option also looks to use the existing system, but makes use of several detention ponds rather than one. The fourth option looks at a pressure storm drain system in Paradise and Lyon Boulevards. The four options are discussed in further detail in Section III, below.

Since the watershed has undergone some development and improvements to the drainage system, the effects of that development have changed its hydrology. After revising the hydrology, other possible scenarios became apparent and are discussed in Section IV, below.

II. HYDROLOGY

Hydrologic modeling for this project was performed using the 1997 version of The Arid-Lands Hydrologic Model (AHYMO) in accordance with the City of Albuquerque Development Process Manual, Section 22.2, January 1993. Pipes were sized using Manning's Equation. Hydraulic grade lines were not calculated except for Option 4. Concrete box culverts were modeled as equivalent pipes in the AHYMO model. The 100-year storm event is used.

A. Drainage Basins

As mentioned above, the primary focus of the study area is bounded on the east, with some exceptions, by the proposed alignment for Unser Boulevard. This is because the Unser Corridor is a natural extension for the Lyon/Unser Storm Drain and is very nearly the outer limit of area that can physically be drained to the Calabacillas. There is some area east of Unser that is included because it could drain to the system and does not have another currently available outlet due to the presence of the Petroglyph National Monument downstream. The National Park Service has been very restrictive about allowing developed storm water flows to pass through the Monument.

In order to get as much area as possible to drain into the system, it was assumed that the storm drain trench at the intersection of Lyon and Paradise Boulevards should not be deeper than 30'. A hypothetical pipe line was taken from the intersection south at a 0.2% slope. The placement of the hypothetical pipe line was determined by maintaining at least two feet of cover above the soffitt in relation to the existing contours. The hypothetical pipe line was then used as the basis for the basin boundary. It is also the approximate location for the pipe lines in the three options. Other properties on the east that border the Unser alignment could be brought into the system if they are filled on the eastern portion of the property and the added flow does not overload the system. This may require the use of detention ponds on these sites. Due to the complexity of analyzing the feasibility of this option, these areas were not included in this study.

The sub-basins used in these options were developed from the basins in the Molzen-Corbin report "Piedras Marcadas Drainage Management Plan Revision" (1993) for the area south of Paradise Boulevard and the Bohannan-Huston report "Conceptual Design Analysis for Lyon (Unser) Boulevard/ Paradise Boulevard Storm Drain" (2000) for the area north of Paradise Boulevard. Plate 1 is a copy of the drainage basin map from the conceptual Lyon report. Plate 2 includes the basin maps from the Piedras Marcadas Report. Sub-basin 315 from the Piedras Marcadas report was the primary basin in the Lyon/Unser study area and was divided into Sub-basins 1 through 7. Sub-basins 3 and 6A are extended past the outer boundary of the Piedras Marcadas to include whole properties. This was the practice everywhere possible so that an owner would not have two separate drainage systems on the same property. Sub-basin 313 is a combination of sections from Molzen-Corbin's Sub-basins 313N and 313S. Sub-basins 311N, 311S, and 310 are located similarly to Molzen-Corbin's, except that there are changes due to the new mapping used (Bernalillo County, 1999), and the sub-basins end at the Unser alignment. Sub-basin 312 is only the very southern portion of Molzen-Corbin's original. Sub-basin 8 is within a portion of the proposed Unser Boulevard Corridor. The sub-basins can be seen in Exhibit 1.

B. Land Treatments

The land treatment percentages were determined based on zoning and the intended land uses as provided by the primary land owners in the area. The intended uses and zoning are also shown in Exhibit 1, and the land treatment percentages assigned to each basin are shown in Appendix A along with the AHYMO input and summary printouts. The land treatment percentages for the sub-basins, along with the 100-yr flow rates, volumes, and CFS/acre, are shown in Table 1. The land treatment percentages for the entire watershed analysis were not revised from the Molzen-Corbin report.

Table 1 – Sub-Basin Summary (Lyon Blvd. Storm Drain Options)

SUB-BASIN	AREA (acres)	% LAND TREATMENT *				Q (100-YR) (CFS)	VOLUME (acre-ft)	CFS/Acre
		A	B	C	D			
1	22.7	0.0	12.9	18.1	69.0	88.5	3.8	3.91
2	16.0	0.0	9.3	11.6	79.1	65.2	2.9	4.09
3	64.4	0.0	9.7	12.3	78.0	185.1	11.6	2.87
4	103.7	0.0	9.0	12.2	78.9	361.6	18.8	3.49
5	27.7	0.0	14.7	19.6	65.7	106.5	4.5	3.84
6A	176.8	0.0	13.4	17.4	69.1	451.8	29.8	2.56
6B	48.3	0.0	15.0	20.0	65.0	184.9	7.9	3.83
7	21.4	0.0	9.6	10.9	79.5	66.5	3.9	3.10
313	38.0	0.0	12.7	16.6	70.7	122.5	6.5	3.22
310	7.3	0.0	15.0	20.0	65.0	27.9	1.2	3.83
311S	18.7	0.0	14.0	19.3	66.7	72.2	3.1	3.84
311N	32.4	0.0	8.2	10.9	80.9	109.8	6.0	3.39
312	8.2	0.0	8.6	12.1	79.3	33.1	1.5	4.07
8	11.2	0.0	0.0	10.0	90.0	29.8	2.2	2.65

*Obtained from Section 22.2, Hydrology of the Development Process Manual, Volume 2.

For comparison purposes, Table 2 shows Molzen-Corbin's sub-basins within this area and the CFS/Acre for each. The areas of each sub-basin are not shown since the sub-basins' areas have changed, due to being cut off at the Unser Alignment, inclusion of whole properties, and changes due to new mapping. (Refer to Section II.A.)

Table 2 – Molzen-Corbin's Sub-Basins Within Study Area

SUB-BASIN	CFS/Acre
315W	3.50
315S	3.50
315N	3.50
313S	3.15
311S	3.50
310	3.50
311N	2.78
312	2.26

C. Paradise Boulevard Storm Drain Analysis

Part of the scope of the study was to examine the preliminary layout of the Paradise Boulevard Storm Drain, from Chamisa Ridge to Lyon/Unser Boulevard, to determine if the size of the system could be reduced based on a reduced drainage area. There was a reduction in area since the original study in an area east of the James Monroe Middle School. This area, which is included in the new Sub-basin 313, was originally in a sub-basin contributing to the Paradise Boulevard Storm Drain according to the 2000 Lyon Report. In addition, some of the other areas south of Paradise Boulevard have been developed at a lower density than was predicted by the 2000 Lyon Report. However, even with the area reduction and less impervious contributing areas, the flow rates were not reduced enough to require a smaller storm drain system. The majority of flow into the system is from the north side of Paradise Boulevard. Please refer to the 2000 "Conceptual Design Analysis for Lyon Boulevard/Paradise Boulevard Storm Drain" by Bohannan Huston for information, calculations and layout of the Paradise Boulevard storm drain.

III. LYON BLVD. STORM DRAIN OPTIONS

A. Option 1: Free Discharge, All New Storm Drain, Full Conveyance

Option 1 is a storm drain only option without detention and, consequently, includes expansion of the existing storm drain. This option requires concrete box culverts (CBC) as large as 12' X 12'. The entire network including flow rates can be seen on Exhibit 3. The flow rate in the pipe network coming into the intersection of Paradise and Lyon is 1,453 cfs, and the box culvert size is 12' X 12' with a slope of 0.2%. Under this option, the storm drain on the north side of the intersection must be an 11' X 10' CBC, and the replacement of the existing storm drain must be 96" pipe. The total flow at the outfall to the Calabacillas is 1,983 cfs.

B. Option 2: Existing Storm Drain, 1 Large Detention Basin South of Paradise Blvd.

Option 2 maintains the existing storm drain as is and has one large detention pond to attenuate flows to its capacity. Option 2 is shown in Exhibit 4. A possible location for the pond was found to be near the intersection of Paradise and Lyon. This site is chosen because it can collect runoff from all of the basins in the study area. This is important since even the smaller sub-basins adjacent to the chosen pond site (311N&S, 312, 310, and 8) could overwhelm the existing storm drain if their flows are not attenuated. The pond would need to have storage of 65.4 ac-ft and would cover an area of approximately 8-9 acres. This option would also require very large concrete box culverts (12' X 12') upstream of the pond. The peak flow rate entering the pond is 1509 cfs, and the peak outflow is 174 cfs. The pipes north of the intersection to the existing storm drain would need to be 84" and 90".

C. Option 3: Existing Storm Drain, 4 Smaller Detention Basins South of Paradise Blvd.

There is more flexibility in Option 3, which is shown in Exhibit 5. Four detention ponds are used to attenuate flows in this option. The largest pipe in the system south of the intersection of Lyon and Paradise is 66", and the largest pipe north of the intersection is 84". The total amount of storage provided by the ponds is 113.6 ac-ft, and the approximate area needed for all four ponds is 15 acres. The peak outflow from the final pond, which enters the Lyon Boulevard storm drain, is 131 cfs.

D. Option 4: Existing Storm Drain, Full Conveyance under Pressure Flow Conditions Assuming 212 cfs from Area South of Paradise Blvd.

As mentioned in the introduction, Option 4 is exclusively for the Paradise and Lyon Boulevard Storm Drains. It includes a hydraulic grade line (HGL) analysis to determine the maximum flow rate that can be allowed from the south at the intersection of Paradise and Lyon, while tying to the existing storm drain. The maximum allowable flow rate is 212 cfs. The largest pipe size required is 90". Larger sizes were tried just north of the intersection, but the ultimate control of the system is the existing storm drain. Therefore, the 90" gave as much capacity as a larger diameter pipe. Exhibit 6 contains a plan and profile sheet showing Option 4, as well as a profile of the basalt along the Lyon Boulevard alignment.

IV. REVISED PIEDRAS MARCADAS DAM WATERSHED HYDROLOGY AND SCENARIOS

Subsequent to the development of the four options for the Lyon Blvd. storm drain, an outfall to the Piedras Marcadas Dam from developing areas upstream of the Petroglyph National Monument again became a possibility with the designation of the future Paseo del Norte alignment. In order to take advantage of this outfall in the Paseo del Norte corridor, the effects on the dam of all current and future development in the Piedras Marcadas watershed were investigated.

The total drainage area to the dam is nearly 4.0 square miles. The drainage area is slightly less than that reported in the Molzen-Corbin study primarily because Basin 311N is now shown as being diverted to the Calabacillas Arroyo via the future Lyon Boulevard storm drain. Figure 1 shows the overall area draining to the dam (Molzen-Corbin - Alternative 9) as well as the areas being diverted to the Calabacillas Arroyo.

The drainage area to the dam includes the area west of Lyon Boulevard and south of the drainage divide to the Calabacillas Arroyo. The four Options previously discussed assumed a diversion of a large portion of this area to the Calabacillas Arroyo via the future Lyon Boulevard storm drain. This diversion is not incorporated into the revised hydrology because it was not required to meet the capacity of the dam.

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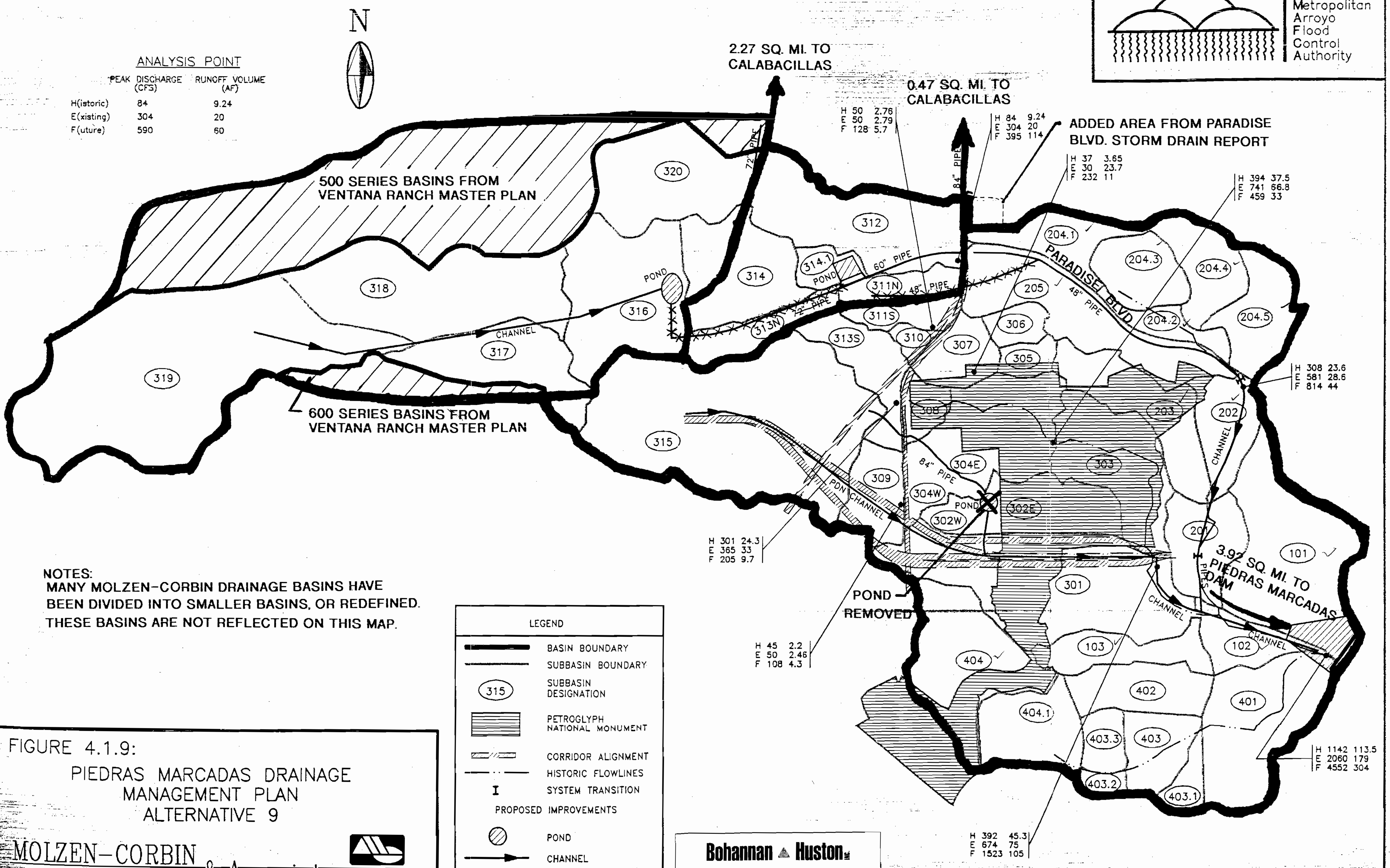

ANALYSIS POINT

	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AF)
H(istoric)	84	9.24
E(xisting)	304	20
F(uture)	590	60

NOTES:
MANY MOLZEN-CORBIN DRAINAGE BASINS HAVE BEEN DIVIDED INTO SMALLER BASINS, OR REDEFINED. THESE BASINS ARE NOT REFLECTED ON THIS MAP.

LEGEND

▬	BASIN BOUNDARY
—	SUBBASIN BOUNDARY
(315)	SUBBASIN DESIGNATION
▤	PETROGLYPH NATIONAL MONUMENT
▨	CORRIDOR ALIGNMENT
—··—	HISTORIC FLOWLINES
I	SYSTEM TRANSITION

PROPOSED IMPROVEMENTS

▨	POND
→	CHANNEL
—	PIPE

FIGURE 4.1.9:
PIEDRAS MARCADAS DRAINAGE
MANAGEMENT PLAN
ALTERNATIVE 9

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BASINS FOR MOLZEN-CORBIN ALTERNATIVE 9 FIGURE 1

The Molzen-Corbin AHYMO model (Option 9) served as the base model for this analysis. It has been appended with the Ventana Ranch, Shenandoah and Rancho Sereno subdivisions. The Ventana Ranch Detention Dam, shown in Basin 316, has been constructed and is responsible for diverting over two square miles of the upper watershed to the Calabacillas Arroyo. The second diversion area to the Calabacillas Arroyo is the Lyon Boulevard storm drain. This diversion is planned for the future and was presented in the original Molzen-Corbin model, but with a different drainage area to the outlet.

In addition to these changes, the AHYMO model has been modified in a number of other ways. Most notably, the proposed pond in Basin 302/304 has been removed; the Shenandoah and Rancho Sereno Subdivision models, located within Basins 301 and 102 respectively, have been edited so that all the hydrographs are being added into the dam. A new basin has been created out of Basin 205 for the Paradise Ridge Subdivision. Routes have been added to reflect the new Paradise Boulevard storm drain.

When all the revisions were included, the model indicated a smaller drainage area to the dam than in the Molzen-Corbin report. Comparisons were made between the original AHYMO model and subsequent changes over the last ten years. It was discovered that when the subbasins were redefined, and the Shenandoah and Rancho Sereno Subdivisions were incorporated, the new drainage basin boundaries did not match the original basin boundaries in Basins 102 and 301. A new basin in 102 was added to account for this and area added to offsite Basin SHENO1E in 301.

The information used to calculate the required sediment storage in the dam was based on Dr. Richard Heggen's Sediment Study of the Piedras Marcadas Watershed as included in the Piedras Marcadas DMP. His results did not include any diversions to the Calabacillas Arroyo, so the total drainage area to the dam was larger than it is today. No reduction in sediment to the dam for the reduced area has been included in this analysis. From observations made during a site visit, it was noted that vegetation has grown in the dam basin. No account for any loss of capacity due to the vegetation has been made.

The results of the analysis of the capacity of the Piedras Marcadas Dam at the emergency spillway are as follows:

	Source	Volume (ac-ft)
Piedras Marcadas Dam Design Capacity (to the crest of the emergency spillway)	1995 Revised Grading Plan by BHI	307 ac-ft
Sediment Volume (5 x annual + 100-year) (5 x 0.31 ac-ft + 2.07 ac-ft)	Piedras Marcadas DMP, 1993	3.6 ac-ft
Available storage in Piedras Marcadas Dam		303 ac-ft
100-Yr Runoff Volume	2002 Revised AHYMO model by BHI	292 ac-ft
Excess Capacity in the Piedras Marcadas Dam		**11 ac-ft**
Freeboard in the Piedras Marcadas Dam		**0.55 ft**

In order to meet an AMAFCA requirement for one foot of freeboard below the emergency spillway, a maximum of 280 ac-ft of runoff volume can be allowed into the dam. The runoff volume into the Piedras Marcadas Dam cannot be reduced to the recommended 280 ac-ft while not exceeding the 212 cfs capacity of the Option 4 Lyon Boulevard storm drain if free discharge from all basins to Lyon Boulevard is assumed. Below are presented results for two scenarios that would satisfy the dam volume constraint (280 ac-ft) and the Lyon Blvd. storm drain capacity constraint (212 cfs). Refer to Figure 2.

A. Scenario 1: Do not Exceed Lyon Boulevard Storm Drain Capacity

To not exceed the Lyon Boulevard storm drain capacity, only Basins 311N and 311S can free discharge to Lyon Boulevard. The total 100-year flow from these basins is approximately 205 cfs. The runoff volume into the dam is reduced to 287 ac-ft. Recall that in the original model Basin 311N was already diverted north.

B. Scenario 2: Disregard Lyon Boulevard Storm Drain Capacity and Meet the Required Runoff Volume

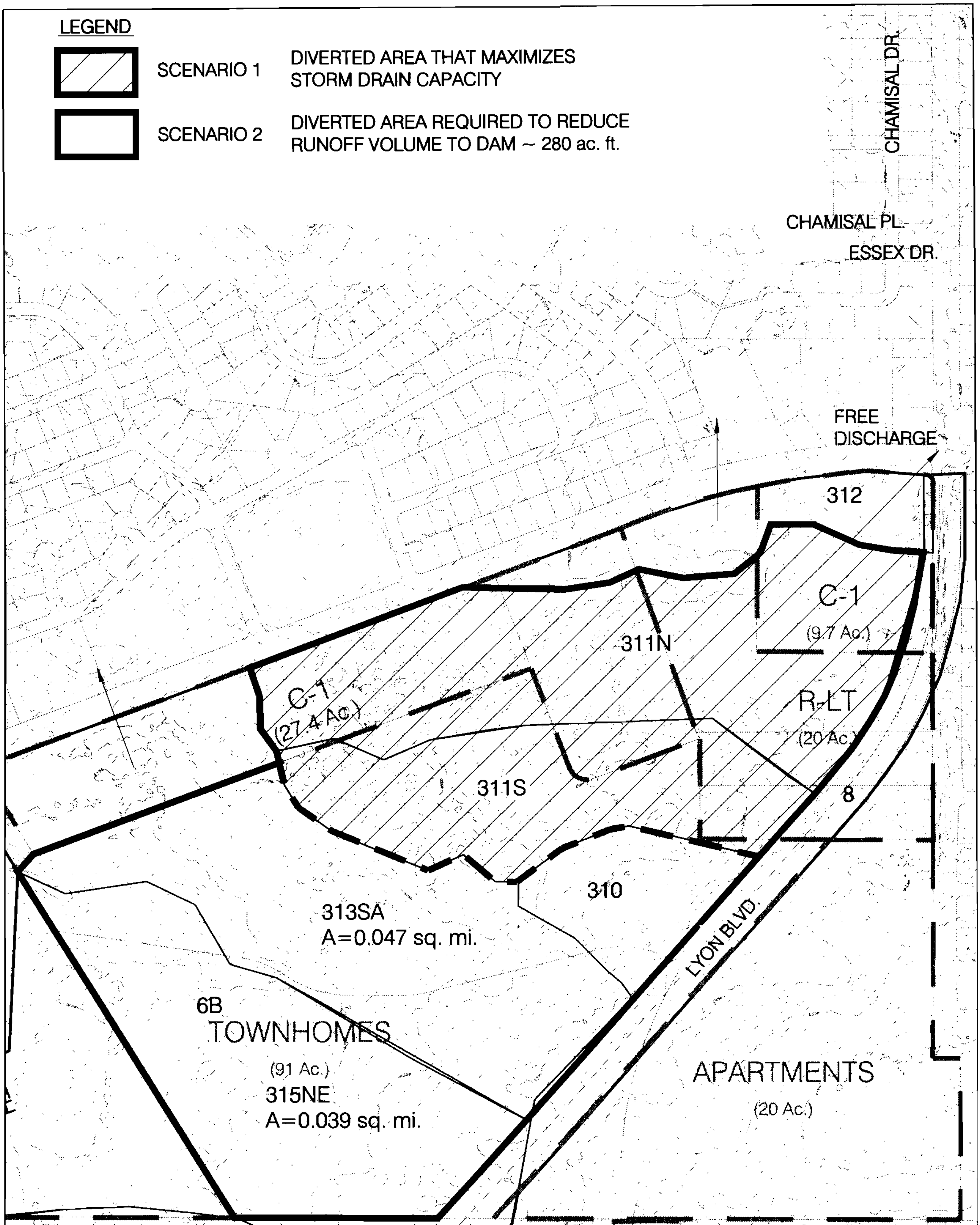
To reduce the total runoff volume into the dam to 280 ac-ft, Basins 311N, 311S, 310, 313SA and 315NE need to be diverted to the Lyon Boulevard storm drain. The total 100-year runoff from these basins is 400 cfs. The calculated runoff volume to the dam is 278 ac-ft.

The most obvious way to meet both limitations is to construct a detention pond(s) that would attenuate the flows in the second scenario to the 212 cfs capacity. Another option to meet both criteria is to convert the Piedras Marcadas Dam from retention to detention. The Piedras Marcadas Dam is currently operated as a retention dam; however, modifications to create a detention facility are possible and could prove very beneficial. Only after downstream facilities are capable of accepting flows impounded in the dam can the principle spillway (a 36" pipe) be opened. If the principle spillway were to be extended to the Rio Grande (approximately 4500'), the hydraulic capacity of the dam and its ability to accept more runoff would be enhanced. Even with none of the area shown in being diverted to the Lyon Blvd. storm drain, there is still approximately 45 ac-ft of capacity in the dam with the 36" pipe open to the river. Figure 2 illustrates the drainage areas corresponding to each scenario above. Note that the basin labeled "312" is actually only a very small portion of Basin 312 in the AHYMO model. The majority of the basin lies north of Paradise Boulevard. Therefore, runoff from the sliver shown does not contribute to the total flow in the storm drain south of Paradise Boulevard.

In general, the basin divides shown are based on topography and are similar to those of the Molzen-Corbin study. The exception is Basin 315NE, which was based on lot lines. It seemed prudent to create the basin in this manner so that the entirety of Lot 6 will be diverted to the storm drain, rather than having only, a portion of it diverted. Basins 313SA and 315NE were originally part of larger basins, 313S and 315N respectively, but were subdivided to suit this analysis.

V. COST ESTIMATE FOR THE FOUR LYON BLVD. OPTIONS

There are four design parameters that strongly impact the cost of the options; storm drain size, trench depth, detention pond size, and land costs. The first three are especially important because they affect the amount of basalt rock removal that will be necessary. In the areas where basalt rock removal was determined to be necessary there are no trenching costs, but there is a backfill cost since the basalt rock cannot be used as backfill. Where trenching is specified, the unit cost was based on the 1998 Unit Cost used by the City of Albuquerque with a 30% increase to



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PIEDRAS MARCADAS WATERSHED AND
LYON BOULEVARD STORM DRAIN

BASINS FOR SCENARIOS 1 AND 2
FIGURE 2

DRAWN BY	S.F.G	DATE	01.07.03
CHECKED BY	D.J.G.	PROJECT NO	00289.09C

P:\00280\Hydro\Lyons-moved from 0289-don't use\Control\Exist\00289basinexh01.dwg
May 08, 2003 - 2:47pm

make it comparable to recent contractors' estimates for storm drain construction. The pond costs were determined based on the costs of recent AMAFCA dams and recently constructed ponds designed by Bohannan-Huston. The dams and ponds were placed in an Excel spreadsheet based on size and cost per acre-foot. An equation was derived for a titted curve, and that equation was used to determine the cost per acre-foot for the ponds used in the estimate. A chart showing the points and fitted curve is shown in Appendix B. The reinforced concrete pipe / concrete box culverts costs were determined by using the 1998 Unit Cost, recent contractor bids, and information provided by a local supplier and local contractor. The 20% contingency used for the cost estimates in the preliminary report has been reduced to 10% for the cost estimates presented here because unit costs that are more accurate were used. The cost of the land was roughly estimated at $50,000 per acre.

The most important aspect of the cost of any of the options is the presence of basalt rock. One area that is proven to have basalt is the area from the intersection of Paradise and Lyon Boulevards to the outfall. Basalt removal calculations were performed in this area based on information in the Conceptual Lyon Report (2000), which is based on borehole data. Refer to Appendix E. However, it is assumed that all the trenches south of Paradise Boulevard will also require basalt removal. This assumption is based on visual appraisal of the surface and borehole data provided in the "Unser Middle Transportation Corridor Study" done by Leedshill-Herkenhoff in 1992. Two boreholes that fall within the study area near the proposed Paseo Del Norte alignment show basalt rock from 2-5 feet below the surface through 31-38 feet below the surface. The basalt removal greatly increases the costs of all options. The basalt rock removal volumes were calculated based on a typical trench prism in rock. This assumes vertical sides. It was also assumed that basalt rock removal will be necessary for the ponds unless they are located in a valley where a berm could be placed above ground to gain storage. The pond in Option 2, therefore, requires basalt rock removal, as do Ponds 1 and 3 in Option 3. The cost of basalt rock removal was based on current projects near the study area.

The estimated costs of the four options are shown below in Table 3. The estimated construction cost for the Paradise Boulevard portion of the storm drain system is $1,353,000, assuming that there is no basalt rock removal. For detailed estimates, see Appendix C.

Table 3 – Estimated Construction Cost

OPTION	Primary Study Area	Lyon Boulevard Storm Drain	Paradise Boulevard Storm Drain	Total without Paradise Blvd. Storm Drain	Total with Paradise Blvd. Storm Drain
OPTION 1	17,031,000	7,800,000	1,353,000	24,831,000	26,184,000
OPTION 2	21,742,000	4,687,000	1,353,000	26,429,000	27,782,000
OPTION 3	14,277,000	3,082,000	1,353,000	17,359,000	18,712,000
OPTION 4	NA	3,337,000	1,353,000	NA	NA

VI. CONCLUSION

A. Four original Lyon Blvd. storm drain options

Though Option 3 is the lowest cost option for the Paradise/Lyon Blvd. storm drain, Option 4 is the recommended option. Though slightly more expensive than Option 3, Option 4 will maximize use of the existing storm drain and allow a maximum area south of Paradise Blvd. to flow to the storm drain. There are also other advantages to Option 4, including constructability. All of the items in Option 4 are commonly constructed in the Albuquerque area, whereas the large box culverts required in the first two options are not. This could lead to more problems in design and construction. Having such large box culverts also increases the possibility for conflicts with existing utilities and will make the design and construction of future utilities in the area much more difficult. Although the Option 4 configuration is more costly than Option 3 by $255,000, it allows approximately 80 cfs more than Option 3 into the Lyon Boulevard storm drain. This increased flow rate means that less ponding would be required south of Paradise Boulevard, which would reduce the pond costs. It is also recommended that more information be acquired concerning the basalt in the area, as this is the most expensive element of any plan.

B. Additional Scenarios

After completion of the four options investigation, an outfall for developed runoff upstream of the Petroglyph National Monument to the Piedras Marcadas Dam through the Paseo del Norte corridor became a possibility. Additional hydrologic scenarios were studied to make use of this outfall.

The Piedras Marcadas Dam can accept a volume of 280 ac-ft. The watershed area that can flow with free discharge to the dam, based on Molzen-Corbin's development assumptions, can be maximized to make full use of this capacity. This allows for a reduction in the area flowing to the Lyon Blvd. storm drain compared to the four original options. Used in conjunction with the Option 4 storm drain, the area immediately south and west of the Lyon Blvd. /Paradise Blvd. intersection can flow to the storm drain at a maximum flow rate of 212 cfs. In order to accomplish this flow rate some detention ponding is necessary.

If the Piedras Marcadas Dam can be converted to a detention dam additional areas would be able to flow with free discharge to the dam. This assumes the conveyance facilities to the dam already in place can accept the added flow.

ZONE/USE	LAND TREATMENT PERCENTAGES			
	A	B	C	D
O-1	0	20	20	60
C-1	0	5	5	90
R-T	0	15	20	65
Roadway	0	0	10	90
Apartments	0	15	15	70
Town Homes	0	15	20	65
R-D	0	13.5	13.5	73
R-LT	0	15	25	60
Chamisa	48	10	25	17
School	0	15	25	60

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COMMAND         IDENTIFICATION NO.  NO.      (SQ MI)      (CFS)        (AC-FT)    (INCHES)   (HOURS)     ACRE      NOTATION

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*S*                                  MINI DRAINAGE MANAGEMENT PLAN
*S*                   JOB NO.  00280C4.01
*S*                   DATE:  JUNE, 2001
*S*
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*S*                   OUTUPUT FILE NAME:  Opt1_06.out
*S*                   FILES LOCATION:  BHI-MAIN\00280\HYDRO\DESIGN\AHYMO
*S*    COMMENTS:
*S*         6-29-01:  Divided Sub-basin 6 into 6A and 6B
*S*         6-19-01:  Added the BHI study of the LYONS SD done in 99
*S*                   and modified for the additional flows
*S*
*S*
*S*         6-01:  Added Basin 8
*S*
*S*         5-16-01:  Revised Basins 1&2 and added Basin 7
*S*
*S*         5-9-01:  Basin 315 has been broken into several smaller basins
*S*
*S*
*S                     4-2-01:  Basins are based on those used in previous reports
*S                     in this area, originally from Molzen-Corbin's Piedras
*S                     Marcadas Arroyo Analysis (1991); however, basins
*S                     have been modified to reflect new mapping and the
*S                     maximum drainable area (based on slope).
*S
*S ////////////////////////////////////////////////////////////////////////////
RAINFALL  TYPE= 2                                                                                         RAIN24=   2.700
SEDIMENT BULK                                                                                             PK BF =    1.02
*S
*S       SUB-BASIN 1
COMPUTE NM HYD          1.00    -     1        .03540        88.50        3.818      2.02214    1.500     3.906 PER IMP=  69.00
*S
*S Route Basin 1 through 4.5' pipe for 1350'
ROUTE MCUNGE                RT1    1   12       .03540        77.57        3.759      1.99087    1.550     3.424 CCODE =      .2
*S       SUB-BASIN 2
COMPUTE NM HYD          2.00    -     2        .02490        65.15        2.902      2.18492    1.500     4.088 PER IMP=  79.10
*S  Add Sub-basin 2 and the Routed Sub-basin 1
ADD HYD                  RT1&2 12& 2  13       .06030       136.94        6.660      2.07098    1.500     3.548
*S  Route Sub-basin 2 and the upstream flow through 920' of 66" pipe
ROUTE MCUNGE             RT2UP    13   14       .06030       130.44        6.611      2.05566    1.550     3.380 CCODE =      .2
*S      SUB-BASIN 3
COMPUTE NM HYD          3.00    -     3        .10070       185.06       11.639      2.16716    1.650     2.871 PER IMP=  78.00
*S  Add Sub-basin 3 to upstream flow in pipe
ADD HYD                RT2UP&3 14& 3  15       .16100       308.27       18.250      2.12539    1.600     2.992
*S  Route Sub-basin 3 and the upstream flow through 530' of 90" pipe
ROUTE MCUNGE             RT3UP    15   16       .16100       300.99       18.201      2.11970    1.600     2.921 CCODE =      .2
*S      SUB-BASIN 4

                              FROM  TO                    PEAK         RUNOFF                 TIME TO    CFS       PAGE =    2
                  HYDROGRAPH   ID   ID        AREA      DISCHARGE      VOLUME      RUNOFF      PEAK      PER
COMMAND         IDENTIFICATION NO.  NO.      (SQ MI)      (CFS)        (AC-FT)    (INCHES)   (HOURS)     ACRE      NOTATION
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COMPUTE NM HYD         4.00    -     4        .16200       361.61       18.848       2.18149    1.550     3.488 PER IMP=   78.80
*S  Add Sub-basin 4 to upstream flow in pipe
ADD HYD              RT3UP&4 16& 4  17        .32300       638.94       37.049       2.15069    1.550     3.091
*S   Route Sub-basin 4 and upstream flow through 465' of 114" pipe
ROUTE MCUNGE         RT4UP   17    18        .32300       624.22       36.899       2.14196    1.600     3.020 CCODE =        .2
*S       SUB-BASIN 5
COMPUTE NM HYD         5.00    -     5        .04330       106.46        4.542       1.96678    1.500     3.842 PER IMP=   65.70
*S  Add Sub-basin 5 to upstream flow in pipe
ADD HYD              RT4UP&5 18& 5  19        .36630       707.27       41.441       2.12126    1.550     3.017
*S  Route Sub-basin 5 and upstream flow through 120" pipe for 885'
ROUTE MCUNGE          RT5UP   19    20        .36630       681.43       41.204       2.10915    1.600     2.907 CCODE =        .2
*S       SUB-BASIN 7
COMPUTE NM HYD         7.00    -    30        .03350        66.49        3.913       2.18983    1.600     3.101 PER IMP=   79.50
*S  Add Sub-basin 7 to upstream flow in pipe
ADD HYD             RT5UP&6&7 20&30  31        .39980       747.93       45.117       2.11591    1.600     2.923
*S  Route Sub-basin 7 and upstream flow through 126" pipe for 760'
ROUTE MCUNGE          RT7UP   31    21        .39980       729.73       44.963       2.10870    1.600     2.852 CCODE =        .2
*S       SUB-BASIN 6A
COMPUTE NM HYD           6A    -    51        .27620       451.78       29.806       2.02337    1.650     2.556 PER IMP=   69.20
*S  Route Sub-basin 6A through 2500' of 66" pipe
ROUTE MCUNGE           RT6A   51    52        .27620       451.17       29.806       2.02338    1.700     2.552 CCODE =        .2
*S       SUB-BASIN 6B
COMPUTE NM HYD           6B    -     6        .07550       184.93        7.873       1.95532    1.500     3.827 PER IMP=   65.00
*S Add Sub-Basin 6B to the Routed 6A
ADD HYD              RT6A&6B 52& 6  53        .35170       534.75       37.679       2.00877    1.650     2.376
*S  Add Sub-basin 6A and 6B to upstream flow in pipe
ADD HYD              RT5UP&6 21&53  22        .75150      1253.30       82.642       2.06193    1.650     2.606
*S        SUB-BASIN 313
COMPUTE NM HYD       313.00    -     7        .05940       122.50        6.488       2.04812    1.550     3.222 PER IMP=   70.70
*S Add Sub-basin 313 to upstream flow in pipe
ADD HYD             RT6UP&313 22& 7  23        .81090      1361.68       89.131       2.06092    1.600     2.624
*S  Route Sub-basin 313 and upstream flow through 156" pipe for 700'
ROUTE MCUNGE        RT313UP   23    24        .81090      1343.45       88.864       2.05476    1.650     2.589 CCODE =        .2
*S         SUB-BASIN 310
COMPUTE NM HYD       310.00    -     8        .01140        27.94        1.189       1.95532    1.500     3.830 PER IMP=   65.00
*S Add Sub-basin 310 to upstream flow in pipe
ADD HYD            RT313UP&310 24& 8  25        .82230      1358.65       90.053       2.05338    1.650     2.582
*S  Route Sub-basin 310 and upstream flow through 156" pipe for 1000'
ROUTE MCUNGE        RT310UP   25    26        .82230      1331.34       89.687       2.04504    1.650     2.530 CCODE =        .2
*S          SUB-BASIN 311S
COMPUTE NM HYD       311.01    -     9        .02920        72.19        3.090       1.98409    1.500     3.863 PER IMP=   66.70
*S Add Sub-basin 311S to upstream flow in pipe
ADD HYD           RT310UP&311S 26& 9  27        .85150      1370.55       92.777       2.04295    1.650     2.515
*S  Route Sub-basin 311S and upstream flow through 156" pipe for 150'
ROUTE MCUNGE       RT311SUP   27    28        .85150      1370.55       92.777       2.04295    1.650     2.515 CCODE =        .0
*S          SUB-BASIN 311N
COMPUTE NM HYD       311.02    -    10        .05060       109.82        5.979       2.21552    1.550     3.391 PER IMP=   80.90
*S Add Sub-basin 311N to upstream flow in pipe
ADD HYD           RT311SUP&311 28&10  29        .90210      1463.34       98.756       2.05262    1.650     2.535
*S  Route Sub-basin 311N and upstream flow through 156" pipe for 1250'
ROUTE MCUNGE       RT311NUP   29    30        .90210      1407.20       98.074       2.03846    1.650     2.437 CCODE =        .2
*S               SUB-BASIN 312S

                               FROM  TO                    PEAK         RUNOFF                 TIME TO   CFS       PAGE =    3
                   HYDROGRAPH   ID   ID        AREA      DISCHARGE      VOLUME      RUNOFF     PEAK     PER
COMMAND          IDENTIFICATION  NO.  NO.     (SQ MI)       (CFS)       (AC-FT)    (INCHES)   (HOURS)   ACRE       NOTATION

COMPUTE NM HYD       312.00    -    11        .01270        33.05        1.484       2.19032    1.500     4.066 PER IMP=   79.30
*S Add Sub-basin 312S to upstream flow in pipe
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ADD HYD          RT311NUP&312 30&11  31      .91480     1425.39     99.558     2.04057   1.650   2.435
*S  Route Sub-basin 312S and upstream flow through 156" pipe for 100'
ROUTE MCUNGE         RT312SUP   31   32      .91480     1425.39     99.558     2.04057   1.650   2.435 CCODE =      .0
*S                SUB-BASIN 8
COMPUTE NM HYD          8.00     -   33      .01760       29.84      2.235     2.38065   1.700   2.649 PER IMP=  90.00
*S Add Sub-basin 8 to upstream flow in pipe
ADD HYD            RT312SUP&8 32&33  34      .93240     1453.35    101.793     2.04699   1.650   2.435
*S******************FROM FORMER BHI REPORT ON LYONS SD_ MODIFIED FOR INCREASED
*S*** FLOWS
*S*****************************************************************************
*S* THE DOWNSTREAM FACE OF LAS VENTANAS DRAINAGE FACILITY DRAINS EAST TO *****
*S* BUENA VISTA AVE, TO LA PAZ RD, THRU BASIN 314, AND FINALLY TO POND AT*****
*S* NORTH SIDE OF PARADISE BLVD***********************************************
*S*
*S***************PIEDRAS MARCADAS WATERSHED***********************************
*S************** CALC BASIN 316 FLOW ***************
COMPUTE NM HYD        316.00     -    1      .03000       60.16      2.421     1.51308   1.500   3.133 PER IMP=  45.00
*S********* ROUTE 316 THRU 313N PARADISE*******
ROUTE MCUNGE           RT316      1    2      .03000       53.34      2.386     1.49151   1.750   2.778 CCODE =      .1
*S************** CALC BASIN 313N FLOW ***************
COMPUTE NM HYD          313N     -    3      .07800      135.26      8.065     1.93878   1.600   2.709 PER IMP=  65.00
*S*** ADD RT316 TO 313N********
ADD HYD               313NUP  2& 3    4      .10800      171.30     10.452     1.81453   1.700   2.478
*S************** CALC BASIN 314 FLOW ***************
COMPUTE NM HYD        314.00     -    5      .08900      185.78      7.273     1.53229   1.500   3.262 PER IMP=  43.00
*S*** ADD 313NUP TO 314********
ADD HYD           AP1-314UP  4& 5     6      .19700      296.39     17.725     1.68702   1.550   2.351
*S************** CALC BASIN 314.1 FLOW ***************
COMPUTE NM HYD    AP2-314.1      -    7      .03600       74.63      2.867     1.49321   1.500   3.239 PER IMP=  40.00
*S*** ADD 314UP TO 314.1 FOR DISCHARGE INTO POND********
ADD HYD           AP314.1UP  6& 7     8      .23300      363.30     20.592     1.65707   1.550   2.436
*S****ROUTE AP314.1UP FLOW THROUGH PARK POND W/ ASSUMED DISCHARGE.  ASSUME 48" D
ROUTE RESERVOIR AP3-RT314.1P  8       9      .23300      108.05     20.592     1.65707   2.050    .725 AC-FT=     9.449
*S********* ROUTE DISCHARGE THRU PIPE TO UNSER LYONS *******
ROUTE MCUNGE          113.40      9   10      .23300      108.02     20.584     1.65640   2.150    .724 CCODE =      .1
*S************** CALC BASIN 312 FLOW ***************
COMPUTE NM HYD        312.00     -   11      .20200      349.49     19.641     1.82308   1.600   2.703 PER IMP=  59.10
*S*** ADD 113.4 TO 312********
ADD HYD           AP4-312UP 10&11    12      .43500      403.28     40.224     1.73380   1.600   1.449
*S*****ADD NEW FLOW FROM SOUTH UNSER SD  (6/01)
ADD HYD               NewAP4 34&12   35     1.36740     1853.85    142.017     1.94735   1.650   2.118
*S********* ROUTE DISCHARGE THRU PIPE TO ESSEX 144" for 738'*******
ROUTE MCUNGE           RT312UP   35   13     1.36740     1853.85    142.017     1.94735   1.650   2.118 CCODE =      .0
*S************** CALC BASIN 312.1 FLOW ***************
COMPUTE NM HYD      AP5-312.1    -   14      .01400       32.56      1.361     1.82319   1.500   3.634 PER IMP=  59.00
*S*** ADD RT312UP TO 312.1********
ADD HYD             AP312.1 13&14    15     1.38140     1871.64    143.378     1.94609   1.650   2.117
*S********* ROUTE DISCHARGE THRU PIPE TO ALDER 144" for 1120******
ROUTE MCUNGE           RT312.1   15   16     1.38140     1857.49    143.306     1.94512   1.650   2.101 CCODE =      .2
*S*CALABACILLAS WATERSHED***
*S************** CALC BASIN 101 FLOW ***************

                             FROM  TO                   PEAK       RUNOFF              TIME TO    CFS      PAGE =    4
                 HYDROGRAPH   ID   ID        AREA     DISCHARGE    VOLUME     RUNOFF     PEAK     PER
COMMAND        IDENTIFICATION NO.  NO.     (SQ MI)      (CFS)      (AC-FT)   (INCHES)  (HOURS)   ACRE      NOTATION

COMPUTE NM HYD        101.00     -   17      .05100      103.51      4.959     1.82319   1.550   3.171 PER IMP=  59.00
*S************** CALC BASIN 105 FLOW ***************
COMPUTE NM HYD        105.00     -   18      .02100       48.83      2.042     1.82319   1.500   3.633 PER IMP=  59.00
*S*** ADD 101 TO 105********
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ADD HYD              105UP 17&18  19        .07200       146.78       7.001      1.82318    1.550    3.185
*S********* ROUTE 105UP TO LYONS*******
ROUTE MCUNGE        RT105UP   19   20        .07200       146.47       6.985      1.81910    1.600    3.179 CCODE =       .1
*S************** CALC BASIN 105.1 FLOW ***************
COMPUTE NM HYD        105.10    -    21        .00900        20.94        .875      1.82319    1.500    3.635 PER IMP=  59.00
*S*** ADD 105UP TO 105.1********
ADD HYD             105.1UP 20&21  22        .08100       161.00       7.860      1.81954    1.600    3.106
*S************** CALC BASIN 107 FLOW ***************
COMPUTE NM HYD        107.00    -    23        .06700       119.80       6.515      1.82319    1.600    2.794 PER IMP=  59.00
*S************** CALC BASIN 108 FLOW ***************
COMPUTE NM HYD        108.00    -    24        .01000        23.26        .972      1.82319    1.500    3.635 PER IMP=  59.00
*S*** ADD 107 TO 108********
ADD HYD              108UP 23&24  25        .07700       137.35       7.487      1.82318    1.550    2.787
*S*** ADD RT312.1 TO AP108********
ADD HYD           AP6-AP108UP 16&25  26       1.45840      1979.92     150.793      1.93868    1.650    2.121
*S************** CALC BASIN 108.1 FLOW ***************
COMPUTE NM HYD        108.10    -    27        .01100        25.59       1.070      1.82319    1.500    3.634 PER IMP=  59.00
*S*** ADD 108.1 TO 105.1UP********
ADD HYD          AP7-AP108.1U 27&22  28        .09200       178.76       8.930      1.81997    1.600    3.036
*S********* ROUTE DISCHARGE THRU PIPE TO IRVING 144" for 500'*******
ROUTE MCUNGE        RT312.1    26   29       1.45840      1834.36     148.629      1.91085    1.700    1.965 CCODE =       .2
*S*** ADD RT312.1 TO 108.1UP********
ADD HYD            AP108.1UP 29&28  30       1.55040      1983.23     157.559      1.90546    1.650    1.999
FINISH
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COMMAND          IDENTIFICATION  NO.  NO.       (SQ MI)      (CFS)         (AC-FT)     (INCHES)   (HOURS)     ACRE       NOTATION

*S*                     PROJECT NAME:  LYONS BLVD STORM DRAIN
*S*                                    MINI DRAINAGE MANAGEMENT PLAN
*S*                     JOB NO.   00280C4.01
*S*                     DATE:  JUNE, 2001
*S*
*S*                     INPUT FILE NAME:  Opt2_04.HYM
*S*                     OUTUPUT FILE NAME:  Opt2_04.out
*S*                     FILES LOCATION:  BHI-MAIN\00280\HYDRO\DESIGN\AHYMO
*S*    COMMENTS:
*S*         7-2-01:  Divided Sub-basin 6 into 6A and 6B and adjusted pipes
*S*            6-01:  Added one large pond near intersection of Paradise
*S*                   and Lyons
*S*
*S*         6-19-01:  Added the BHI study of the LYONS SD done in 99
*S*                   and modified for the additional flows
*S*
*S*
*S*         6-01:  Added Basin 8
*S*
*S*         5-16-01:  Revised Basins 1&2 and added Basin 7
*S*
*S*         5-9-01:  Basin 315 has been broken into several smaller basins
*S*
*S*
*S                      4-2-01:  Basins are based on those used in previous reports
*S                      in this area, originally from Molzen-Corbin's Piedras
*S                      Marcadas Arroyo Analysis (1991); however, basins
*S                      have been modified to reflect new mapping and the
*S                      maximum drainable area (based on slope).
*S
*S ////////////////////////////////////////////////////////////////////////
RAINFALL  TYPE= 2                                                                                         RAIN24=    2.700
SEDIMENT BULK                                                                                             PK BF =     1.02
*S
*S       SUB-BASIN 1
COMPUTE NM HYD           1.00   -     1        .03540        88.50        3.818       2.02214    1.500     3.906 PER IMP=  69.00
*S
*S Route Basin 1 through 4.5' pipe for 1350'
ROUTE MCUNGE               RT1    1   12       .03540        77.57        3.759       1.99087    1.550     3.424 CCODE =      .2
*S       SUB-BASIN 2
COMPUTE NM HYD           2.00   -     2        .02490        65.15        2.902       2.18492    1.500     4.088 PER IMP=  79.10
*S  Add Sub-basin 2 and the Routed Sub-basin 1
ADD HYD                 RT1&2 12& 2   13       .06030       136.94        6.660       2.07098    1.500     3.548
*S  Route Sub-basin 2 and the upstream flow through 920' of 66" pipe
ROUTE MCUNGE             RT2UP   13   14       .06030       130.44        6.611       2.05566    1.550     3.380 CCODE =      .2
*S       SUB-BASIN 3
COMPUTE NM HYD           3.00   -     3        .10070       185.06       11.639       2.16716    1.650     2.871 PER IMP=  78.00
*S  Add Sub-basin 3 to upstream flow in pipe
ADD HYD               RT2UP&3 14& 3   15       .16100       308.27       18.250       2.12539    1.600     2.992
*S  Route Sub-basin 3 and the upstream flow through 530' of 90" pipe

                                FROM  TO                     PEAK          RUNOFF                  TIME TO    CFS       PAGE =    2
                   HYDROGRAPH    ID   ID         AREA      DISCHARGE       VOLUME       RUNOFF      PEAK      PER
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COMMAND         IDENTIFICATION   NO.  NO.       (SQ MI)      (CFS)        (AC-FT)     (INCHES)   (HOURS)    ACRE      NOTATION

ROUTE MCUNGE            RT3UP    15   16        .16100       300.99       18.201      2.11970     1.600     2.921 CCODE =       .2
*S        SUB-BASIN 4
COMPUTE NM HYD           4.00    -     4        .16200       361.61       18.848      2.18149     1.550     3.488 PER IMP=   78.80
*S  Add Sub-basin 4 to upstream flow in pipe
ADD HYD               RT3UP&4  16& 4  17        .32300       638.94       37.049      2.15069     1.550     3.091
*S   Route Sub-basin 4 and upstream flow through 465' of 114" pipe
ROUTE MCUNGE            RT4UP    17   18        .32300       624.22       36.899      2.14196     1.600     3.020 CCODE =       .2
*S        SUB-BASIN 5
COMPUTE NM HYD           5.00    -     5        .04330       106.46        4.542      1.96678     1.500     3.842 PER IMP=   65.70
*S  Add Sub-basin 5 to upstream flow in pipe
ADD HYD               RT4UP&5  18& 5  19        .36630       707.27       41.441      2.12126     1.550     3.017
*S  Route Sub-basin 5 and upstream flow through 120" pipe for 885'
ROUTE MCUNGE            RT5UP    19   20        .36630       681.43       41.204      2.10915     1.600     2.907 CCODE =       .2
*S        SUB-BASIN 7
COMPUTE NM HYD           7.00    -    30        .03350        66.49        3.913      2.18983     1.600     3.101 PER IMP=   79.50
*S  Add Sub-basin 7 to upstream flow in pipe
ADD HYD             RT5UP&6&7 20&30   31        .39980       747.93       45.117      2.11591     1.600     2.923
*S  Route Sub-basin 7 and upstream flow through 126" pipe for 760'
ROUTE MCUNGE            RT7UP    31   21        .39980       729.73       44.963      2.10870     1.600     2.852 CCODE =       .2
*S        SUB-BASIN 6A
COMPUTE NM HYD             6A    -    51        .27620       451.78       29.806      2.02337     1.650     2.556 PER IMP=   69.20
*S  Route Sub-basin 6A through 2500' of 66" pipe
ROUTE MCUNGE             RT6A    51   52        .27620       451.17       29.806      2.02338     1.700     2.552 CCODE =       .2
*S        SUB-BASIN 6B
COMPUTE NM HYD             6B    -     6        .07550       184.93        7.873      1.95532     1.500     3.827 PER IMP=   65.00
*S Add Sub-Basin 6B to the Routed 6A
ADD HYD               RT6A&6B  52& 6  53        .35170       534.75       37.679      2.00877     1.650     2.376
*S  Add Sub-basin 6A and 6B to upstream flow in pipe
ADD HYD               RT5UP&6  21&53  22        .75150      1253.30       82.642      2.06193     1.650     2.606
*S         SUB-BASIN 313
COMPUTE NM HYD         313.00    -     7        .05940       122.50        6.488      2.04812     1.550     3.222 PER IMP=   70.70
*S Add Sub-basin 313 to upstream flow in pipe
ADD HYD             RT6UP&313  22& 7  23        .81090      1361.68       89.131      2.06092     1.600     2.624
*S  Route Sub-basin 313 and upstream flow through 156" pipe for 700'
ROUTE MCUNGE          RT313UP    23   24        .81090      1343.45       88.864      2.05476     1.650     2.589 CCODE =       .2
*S          SUB-BASIN 310
COMPUTE NM HYD         310.00    -     8        .01140        27.94        1.189      1.95532     1.500     3.830 PER IMP=   65.00
*S Add Sub-basin 310 to upstream flow in pipe
ADD HYD           RT313UP&310  24& 8  25        .82230      1358.65       90.053      2.05338     1.650     2.582
*S  Route Sub-basin 310 and upstream flow through 156" pipe for 1000'
ROUTE MCUNGE          RT310UP    25   26        .82230      1331.34       89.687      2.04504     1.650     2.530 CCODE =       .2
*S            SUB-BASIN 311S
COMPUTE NM HYD         311.01    -     9        .02920        72.19        3.090      1.98409     1.500     3.863 PER IMP=   66.70
*S Add Sub-basin 311S to upstream flow in pipe
ADD HYD          RT310UP&311S  26& 9  27        .85150      1370.55       92.777      2.04295     1.650     2.515
*S  Route Sub-basin 311S and upstream flow through 156" pipe for 150'
ROUTE MCUNGE         RT311SUP    27   28        .85150      1370.55       92.777      2.04295     1.650     2.515 CCODE =       .0
*S            SUB-BASIN 311N
COMPUTE NM HYD         311.02    -    10        .05060       109.82        5.979      2.21552     1.550     3.391 PER IMP=   80.90
*S Add Sub-basin 311N to upstream flow in pipe
ADD HYD          RT311SUP&311  28&10  29        .90210      1463.34       98.756      2.05262     1.650     2.535
*S                SUB-BASIN 312S

                                 FROM  TO                  PEAK        RUNOFF                 TIME TO    CFS       PAGE =    3
                   HYDROGRAPH     ID   ID        AREA     DISCHARGE    VOLUME      RUNOFF      PEAK      PER
COMMAND         IDENTIFICATION   NO.  NO.       (SQ MI)      (CFS)        (AC-FT)     (INCHES)   (HOURS)    ACRE      NOTATION

COMPUTE NM HYD         312.00    -    11        .01270        33.05        1.484      2.19032     1.500     4.066 PER IMP=   79.30
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*S Add Sub-basin 312S to upstream flow into the pond
ADD HYD          RT311NUP&312 29&11   30         .91480      1481.53     100.239      2.05453    1.650    2.530
*S                SUB-BASIN 8
COMPUTE NM HYD            8.00    -     31         .01760        29.84       2.235      2.38065    1.700    2.649 PER IMP=   90.00
*S Add Sub-basin 8 to upstream flow into the pond
ADD HYD            RT312SUP&8 30&31   32         .93240      1509.49     102.474      2.06069    1.650    2.530
*S  ROUTE FLOW THROUGH POND WITH 60" OUTFLOW PIPE
ROUTE RESERVOIR       Pondout   32   41         .93240       173.98      99.187      1.99459    2.500     .292 AC-FT=   65.410
*S  Route POND OUTFLOW through 72" pipe for 300'
ROUTE MCUNGE          RT311NUP   41   33         .93240       173.93      99.166      1.99416    2.500     .291 CCODE =       .2
*S******************FROM FORMER BHI REPORT ON LYONS SD_ MODIFIED FOR INCREASED
*S*** FLOWS
*S****************************************************************************
*S* THE DOWNSTREAM FACE OF LAS VENTANAS DRAINAGE FACILITY DRAINS EAST TO *****
*S* BUENA VISTA AVE, TO LA PAZ RD, THRU BASIN 314, AND FINALLY TO POND AT*****
*S* NORTH SIDE OF PARADISE BLVD**********************************************
*S*
*S****************PIEDRAS MARCADAS WATERSHED**********************************
*S************** CALC BASIN 316 FLOW **************
COMPUTE NM HYD          316.00    -      1         .03000        60.16       2.421      1.51308    1.500    3.133 PER IMP=   45.00
*S********* ROUTE 316 THRU 313N PARADISE*******
ROUTE MCUNGE            RT316    1     2         .03000        53.34       2.386      1.49151    1.750    2.778 CCODE =       .1
*S************** CALC BASIN 313N FLOW **************
COMPUTE NM HYD            313N    -      3         .07800       135.26       8.065      1.93878    1.600    2.709 PER IMP=   65.00
*S*** ADD RT316 TO 313N********
ADD HYD                 313NUP  2& 3     4         .10800       171.30      10.452      1.81453    1.700    2.478
*S************** CALC BASIN 314 FLOW **************
COMPUTE NM HYD          314.00    -      5         .08900       185.78       7.273      1.53229    1.500    3.262 PER IMP=   43.00
*S*** ADD 313NUP TO 314********
ADD HYD             AP1-314UP  4& 5     6         .19700       296.39      17.725      1.68702    1.550    2.351
*S************** CALC BASIN 314.1 FLOW **************
COMPUTE NM HYD        AP2-314.1    -      7         .03600        74.63       2.867      1.49321    1.500    3.239 PER IMP=   40.00
*S*** ADD 314UP TO 314.1 FOR DISCHARGE INTO POND********
ADD HYD             AP314.1UP  6& 7     8         .23300       363.30      20.592      1.65707    1.550    2.436
*S****ROUTE AP314.1UP FLOW THROUGH PARK POND W/ ASSUMED DISCHARGE.  ASSUME 48" D
ROUTE RESERVOIR AP3-RT314.1P     8     9         .23300       108.05      20.592      1.65707    2.050     .725 AC-FT=    9.449
*S********* ROUTE DISCHARGE THRU PIPE TO UNSER LYONS *******
ROUTE MCUNGE            113.40     9    10         .23300       108.02      20.584      1.65640    2.150     .724 CCODE =       .1
*S************** CALC BASIN 312 FLOW **************
COMPUTE NM HYD          312.00    -     11         .20200       349.49      19.641      1.82308    1.600    2.703 PER IMP=   59.10
*S*** ADD 113.4 TO 312********
ADD HYD             AP4-312UP 10&11   12         .43500       403.28      40.224      1.73380    1.600    1.449
*S*****ADD NEW FLOW FROM SOUTH UNSER SD  (6/01)
ADD HYD                 NewAP4 33&12   35        1.36740       437.98     139.390      1.91134    1.650     .500
*S********* ROUTE DISCHARGE THRU PIPE TO ESSEX 84"*******
ROUTE MCUNGE            RT312UP   35    13        1.36740       435.37     139.330      1.91051    1.650     .497 CCODE =       .1
*S************** CALC BASIN 312.1 FLOW **************
COMPUTE NM HYD        AP5-312.1    -     14         .01400        32.56       1.361      1.82319    1.500    3.634 PER IMP=   59.00
*S*** ADD RT312UP TO 312.1********
ADD HYD              AP312.1 13&14   15        1.38140       453.16     140.691      1.90962    1.650     .513
*S********* ROUTE THROUGH PIPE TO MH9 84"*******

                                  FROM   TO                       PEAK       RUNOFF                   TIME TO     CFS       PAGE =    4
                      HYDROGRAPH   ID    ID          AREA      DISCHARGE    VOLUME       RUNOFF       PEAK       PER
COMMAND             IDENTIFICATION NO.   NO.       (SQ MI)       (CFS)      (AC-FT)     (INCHES)    (HOURS)     ACRE       NOTATION

ROUTE MCUNGE           RT312.1    15    42        1.38140       449.64     140.663      1.90925    1.650     .509 CCODE =       .2
*S********* ROUTE DISCHARGE THRU PIPE TO ALDER 84"******
ROUTE MCUNGE           RT312.12   42    16        1.38140       449.64     140.663      1.90925    1.650     .509 CCODE =       .0
*S*CALABACILLAS WATERSHED***
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*S************** CALC BASIN 101 FLOW ***************
COMPUTE NM HYD        101.00   -    17         .05100       103.51       4.959       1.82319    1.550    3.171 PER IMP=  59.00
*S************** CALC BASIN 105 FLOW ***************
COMPUTE NM HYD        105.00   -    18         .02100        48.83       2.042       1.82319    1.500    3.633 PER IMP=  59.00
*S*** ADD 101 TO 105********
ADD HYD                105UP 17&18  19         .07200       146.78       7.001       1.82318    1.550    3.185
*S********* ROUTE 105UP TO LYONS*******
ROUTE MCUNGE         RT105UP   19   20         .07200       146.47       6.985       1.81910    1.600    3.179 CCODE =      .1
*S************** CALC BASIN 105.1 FLOW ***************
COMPUTE NM HYD        105.10   -    21         .00900        20.94        .875       1.82319    1.500    3.635 PER IMP=  59.00
*S*** ADD 105UP TO 105.1********
ADD HYD              105.1UP 20&21  22         .08100       161.00       7.860       1.81954    1.600    3.106
*S************** CALC BASIN 107 FLOW ***************
COMPUTE NM HYD        107.00   -    23         .06700       119.80       6.515       1.82319    1.600    2.794 PER IMP=  59.00
*S************** CALC BASIN 108 FLOW ***************
COMPUTE NM HYD        108.00   -    24         .01000        23.26        .972       1.82319    1.500    3.635 PER IMP=  59.00
*S*** ADD 107 TO 108********
ADD HYD                108UP 23&24  25         .07700       137.35       7.487       1.82318    1.550    2.787
*S*** ADD RT312.1 TO AP108********
ADD HYD          AP6-AP108UP 16&25  26        1.45840       572.08     148.151       1.90471    1.650     .613
*S************** CALC BASIN 108.1 FLOW ***************
COMPUTE NM HYD        108.10   -    27         .01100        25.59       1.070       1.82319    1.500    3.634 PER IMP=  59.00
*S*** ADD 108.1 TO 105.1UP********
ADD HYD         AP7-AP108.1U 27&22  28         .09200       178.76       8.930       1.81997    1.600    3.036
*S********* ROUTE DISCHARGE THRU PIPE TO IRVING 90" *******
ROUTE MCUNGE         RT312.1   26   29        1.45840       572.08     148.151       1.90471    1.650     .613 CCODE =      .0
*S*** ADD RT312.1 TO 108.1UP********
ADD HYD            AP108.1UP 29&28  30        1.55040       739.68     157.081       1.89968    1.650     .745
FINISH
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AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) -                         - VERSION:  1997.02c         RUN DATE (MON/DAY/YR) =07/03/2001
INPUT FILE = Opt3_03.HYM                                                                     USER NO.= AHYMO-S-9702c1BohanHu-AH

                              FROM  TO                         PEAK         RUNOFF                 TIME TO    CFS      PAGE =    1
                  HYDROGRAPH   ID   ID          AREA        DISCHARGE       VOLUME      RUNOFF       PEAK     PER
COMMAND         IDENTIFICATION NO.  NO.        (SQ MI)         (CFS)        (AC-FT)    (INCHES)    (HOURS)    ACRE     NOTATION

*S*                   PROJECT NAME:  LYONS BLVD STORM DRAIN
*S*                                  MINI DRAINAGE MANAGEMENT PLAN
*S*                   JOB NO.  00280C4.01
*S*                   DATE:  June 25, 2001
*S*
*S*                   INPUT FILE NAME:  Opt3_03.HYM
*S*                   OUTUPUT FILE NAME:  Opt3_03.out
*S*                   FILES LOCATION:  BHI-MAIN\00280\HYDRO\DESIGN\AHYMO
*S*    COMMENTS:
*S*         7-2-01:  Divided Sub-basin 6 into 6A and 6B and added a pond
*S*
*S*         6-25-01:  Added Three Ponds
*S*
*S*         5-16-01:  Revised Basins 1&2 and added Basin 7
*S*
*S*         5-9-01:  Basin 315 has been broken into several smaller basins
*S*
*S*
*S                    4-2-01:  Basins are based on those used in previous reports
*S                    in this area, originally from Molzen-Corbin's Piedras
*S                    Marcadas Arroyo Analysis (1991); however, basins
*S                    have been modified to reflect new mapping and the
*S                    maximum drainable area (based on slope).
*S
*S ///////////////////////////////////////////////////////////////////////////
RAINFALL  TYPE= 2                                                                                                     RAIN24=   2.700
SEDIMENT BULK                                                                                                         PK BF =    1.02
*S
*S        SUB-BASIN 1
COMPUTE NM HYD          1.00    -     1        .03540         88.50        3.818       2.02214     1.500      3.906 PER IMP=  69.00
*S
*S Route Basin 1 through 4.5' pipe for 1350'
ROUTE MCUNGE             RT1    1   12         .03540         77.57        3.759       1.99087     1.550      3.424 CCODE =      .2
*S        SUB-BASIN 2
COMPUTE NM HYD          2.00    -     2        .02490         65.15        2.902       2.18492     1.500      4.088 PER IMP=  79.10
*S  Add Sub-basin 2 and the Routed Sub-basin 1
ADD HYD                RT1&2  12&  2  13        .06030        136.94        6.660       2.07098     1.500      3.548
*S  Route Sub-basin 2 and the upstream flow through 920' of 66" pipe
ROUTE MCUNGE           RT2UP    13   14        .06030        130.44        6.611       2.05566     1.550      3.380 CCODE =      .2
*S       SUB-BASIN 3
COMPUTE NM HYD          3.00    -     3        .10070        185.06       11.639       2.16716     1.650      2.871 PER IMP=  78.00
*S  Add Sub-basin 3 to upstream flow (will go to Pond 1)
ADD HYD              RT2UP&3  14&  3  15        .16100        308.27       18.250       2.12539     1.600      2.992
*S       SUB-BASIN 4
COMPUTE NM HYD          4.00    -     4        .16200        361.61       18.848       2.18149     1.550      3.488 PER IMP=  78.80
*S  Add Sub-basin 4 to upstream flow to go to Pond 1
ADD HYD              RT3UP&4  15&  4  17        .32300        653.99       37.098       2.15353     1.550      3.164
*S       SUB-BASIN 5
COMPUTE NM HYD          5.00    -     5        .04330        106.46        4.542       1.96678     1.500      3.842 PER IMP=  65.70
*S  Route Sub-basin 5 through 54" pipe for 400'

                              FROM  TO                         PEAK         RUNOFF                 TIME TO    CFS      PAGE =    2
                  HYDROGRAPH   ID   ID          AREA        DISCHARGE       VOLUME      RUNOFF       PEAK     PER
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COMMAND        IDENTIFICATION  NO.  NO.       (SQ MI)      (CFS)       (AC-FT)    (INCHES)  (HOURS)    ACRE     NOTATION

ROUTE MCUNGE              RT5     5   18        .04330       96.17        4.442     1.92359    1.500    3.470 CCODE =       .2
*S  Add Sub-basin 5 to Pond 1 Inflow
ADD HYD             RT4UP&5 18&17  19        .36630      739.66       41.540     2.12635    1.550    3.155
*S       SUB-BASIN 7
COMPUTE NM HYD           7.00    -   30        .03350       66.49        3.913     2.18983    1.600    3.101 PER IMP=   79.50
*S  Add Sub-basin 7 to Pond1 Iflow
ADD HYD            RT5UP&6&7 19&30  20        .39980      801.79       45.453     2.13167    1.550    3.134
*S  ROUTE FLOW THROUGH POND 1
ROUTE RESERVOIR      Pond1out   20   43        .39980      108.30       45.065     2.11347    2.300     .423 AC-FT=   27.690
*S  Route Pond 1 Outflow through 60" pipe for 1645'
ROUTE MCUNGE            RT5UP   43   21        .39980      107.92       45.030     2.11186    2.350     .422 CCODE =       .2
*S       SUB-BASIN 6A
COMPUTE NM HYD              6A   -   51        .27620      451.78       29.806     2.02337    1.650    2.556 PER IMP=   69.20
*S  Route Sub-basin 6A through Pond 4
*S  ROUTE FLOW THROUGH POND WITH 42" OUTFLOW PIPE
ROUTE RESERVOIR      Pond4out   51   52        .27620       64.33       29.393     1.99533    2.450     .364 AC-FT=   17.982
*S  Route Pond 4 outflow through 2000' of 42" pipe
ROUTE MCUNGE             RT6A   52   53        .27620       64.32       29.384     1.99478    2.500     .364 CCODE =       .2
*S       SUB-BASIN 6B
COMPUTE NM HYD              6B   -    6        .07550      184.93        7.873     1.95532    1.500    3.827 PER IMP=   65.00
*S  Add Pond 4 outflow to 6B
ADD HYD              P4RT&6B 53& 6  54        .35170      186.00       37.258     1.98631    1.500     .826
*S        SUB-BASIN 313
COMPUTE NM HYD          313.00   -    7        .05940      122.50        6.488     2.04812    1.550    3.222 PER IMP=   70.70
*S Add Sub-basin 313 to Basin 6
ADD HYD            Pond2inflow 54& 7  22        .41110      292.98       43.746     1.99524    1.500    1.114
*S ROUTE FLOW THROUGH POND 2
*S  ROUTE FLOW THROUGH POND WITH 42" OUTFLOW PIPE
ROUTE RESERVOIR      Pond2out   22   41        .41110       49.22       42.435     1.93545    3.950     .187 AC-FT=   14.199
*S  Add outflow from Pond 2 to the Routed outflow from Pond 1
ADD HYD              P1RT&P2 21&41  23        .81090      148.49       87.466     2.02243    2.500     .286
*S  Route Combined flow through 66" pipe for 700'
ROUTE MCUNGE          RT313UP   23   24        .81090      148.30       87.431     2.02162    2.550     .286 CCODE =       .2
*S         SUB-BASIN 310
COMPUTE NM HYD          310.00   -    8        .01140       27.94        1.189     1.95532    1.500    3.830 PER IMP=   65.00
*S Add Sub-basin 310 to upstream flow in pipe
ADD HYD         RT313UP&310 24& 8  25        .82230      149.03       88.620     2.02070    2.550     .283
*S  Route Sub-basin 310 and upstream flow through 66" pipe for 1000'
ROUTE MCUNGE          RT310UP   25   26        .82230      148.77       88.578     2.01974    2.600     .283 CCODE =       .2
*S            SUB-BASIN 311S
COMPUTE NM HYD          311.01   -    9        .02920       72.19        3.090     1.98409    1.500    3.863 PER IMP=   66.70
*S Add Sub-basin 311S to upstream flow in pipe
ADD HYD         RT310UP&311S 26& 9  27        .85150      150.59       91.668     2.01852    2.550     .276
*S  Route Sub-basin 311S and upstream flow through 66" pipe for 150'
ROUTE MCUNGE         RT311SUP   27   28        .85150      150.59       91.668     2.01852    2.550     .276 CCODE =       .0
*S            SUB-BASIN 311N
COMPUTE NM HYD          311.02   -   10        .05060      109.82        5.979     2.21552    1.550    3.391 PER IMP=   80.90
*S Add Sub-basin 311N to upstream flow in pipe
ADD HYD         RT311SUP&311 28&10  29        .90210      210.02       97.647     2.02957    1.550     .364
*S               SUB-BASIN 312S
COMPUTE NM HYD          312.00   -   11        .01270       33.05        1.484     2.19032    1.500    4.066 PER IMP=   79.30
*S Add Sub-basin 312S to upstream flow into the pond

                               FROM   TO                     PEAK       RUNOFF               TIME TO    CFS       PAGE =   3
                  HYDROGRAPH    ID    ID          AREA     DISCHARGE    VOLUME     RUNOFF     PEAK      PER
COMMAND        IDENTIFICATION  NO.  NO.       (SQ MI)      (CFS)       (AC-FT)    (INCHES)  (HOURS)    ACRE     NOTATION

ADD HYD         RT311NUP&312 29&11  30        .91480      239.43       99.130     2.03180    1.550     .409
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*S            SUB-BASIN 8
COMPUTE NM HYD            8.00     -     31         .01760        29.84        2.235       2.38065     1.700     2.649 PER IMP=   90.00
*S Add Sub-basin 8 to upstream flow into the pond
ADD HYD             RT312SUP&8 30&31    32         .93240       257.78      101.365       2.03838     1.550      .432
*S  ROUTE FLOW THROUGH POND WITH 60" OUTFLOW PIPE
ROUTE RESERVOIR        Pondout     32    41         .93240       131.04      100.281       2.0166C     3.700      .220 AC-FT=   16.017
*S  Route POND OUTFLOW through 60" pipe for 1350'
ROUTE MCUNGE             RT311NUP   41    33         .93240       128.51      100.019       2.01133     3.800      .215 CCODE =      .2
*S*****************FROM FORMER BHI REPORT ON LYONS SD_ MODIFIED FOR INCREASED
*S*** FLOWS
*S***********************************************************************
*S* THE DOWNSTREAM FACE OF LAS VENTANAS DRAINAGE FACILITY DRAINS EAST TO *****
*S* BUENA VISTA AVE, TO LA PAZ RD, THRU BASIN 314, AND FINALLY TO POND AT*****
*S* NORTH SIDE OF PARADISE BLVD*****************************************************
*S*
*S****************PIEDRAS MARCADAS WATERSHED**********************************
*S************** CALC BASIN 316 FLOW ***************
COMPUTE NM HYD          316.00     -      1         .03000        60.16        2.421       1.51308     1.500     3.133 PER IMP=   45.00
*S********* ROUTE 316 THRU 313N PARADISE*******
ROUTE MCUNGE              RT316      1     2         .03000        53.34        2.386       1.49151     1.750     2.778 CCODE =      .1
*S************** CALC BASIN 313N FLOW ***************
COMPUTE NM HYD             313N     -      3         .07800       135.26        8.065       1.93878     1.600     2.709 PER IMP=   65.00
*S*** ADD RT316 TO 313N********
ADD HYD                  313NUP   2& 3     4         .10800       171.30       10.452       1.81453     1.700     2.478
*S************** CALC BASIN 314 FLOW ***************
COMPUTE NM HYD           314.00     -      5         .08900       185.78        7.273       1.53229     1.500     3.262 PER IMP=   43.00
*S*** ADD 313NUP TO 314********
ADD HYD              AP1-314UP   4& 5     6         .19700       296.39       17.725       1.68702     1.550     2.351
*S************** CALC BASIN 314.1 FLOW ***************
COMPUTE NM HYD       AP2-314.1     -      7         .03600        74.63        2.867       1.49321     1.500     3.239 PER IMP=   40.00
*S*** ADD 314UP TO 314.1 FOR DISCHARGE INTO POND********
ADD HYD              AP314.1UP   6& 7     8         .23300       363.30       20.592       1.65707     1.550     2.436
*S****ROUTE AP314.1UP FLOW THROUGH PARK POND W/ ASSUMED DISCHARGE.  ASSUME 48" D
ROUTE RESERVOIR AP3-RT314.1P      8     9         .23300       108.05       20.592       1.65707     2.050      .725 AC-FT=    9.449
*S********* ROUTE DISCHARGE THRU PIPE TO UNSER LYONS *******
ROUTE MCUNGE             113.40      9    10         .23300       108.02       20.584       1.65640     2.150      .724 CCODE =      .1
*S************** CALC BASIN 312 FLOW ***************
COMPUTE NM HYD           312.00     -     11         .20200       349.49       19.641       1.82308     1.600     2.703 PER IMP=   59.10
*S*** ADD 113.4 TO 312********
ADD HYD              AP4-312UP 10&11    12         .43500       403.28       40.224       1.73380     1.600     1.449
*S*****ADD NEW FLOW FROM SOUTH UNSER SD  (6/01)
ADD HYD                  NewAP4 33&12    35        1.36740       423.97      140.243       1.92304     1.650      .484
*S********* ROUTE DISCHARGE THRU PIPE TO ESSEX 84"*******
ROUTE MCUNGE            RT312UP    35    13        1.36740       422.38      140.183       1.92221     1.650      .483 CCODE =      .1
*S************** CALC BASIN 312.1 FLOW ***************
COMPUTE NM HYD       AP5-312.1     -     14         .01400        32.56        1.361       1.82319     1.500     3.634 PER IMP=   59.00
*S*** ADD RT312UP TO 312.1********
ADD HYD              AP312.1 13&14    15        1.38140       440.17      141.544       1.92120     1.650      .498
*S********* ROUTE THROUGH PIPE TO MH9 84"*******
ROUTE MCUNGE            RT312.1    15    42        1.38140       438.48      141.520       1.92088     1.650      .496 CCODE =      .2
*S********* ROUTE DISCHARGE THRU PIPE TO ALDER 78"******

                                  FROM   TO                      PEAK       RUNOFF                TIME TO    CFS       PAGE =    4
                      HYDROGRAPH    ID   ID         AREA      DISCHARGE    VOLUME      RUNOFF      PEAK      PER
COMMAND           IDENTIFICATION   NO.  NO.       (SQ MI)       (CFS)      (AC-FT)    (INCHES)   (HOURS)    ACRE       NOTATION

ROUTE MCUNGE            RT312.12    42    16        1.38140       438.48      141.520       1.92088     1.650      .496 CCODE =      .0
*S*CALABACILLAS WATERSHED***
*S************** CALC BASIN 101 FLOW ***************
COMPUTE NM HYD           101.00     -     17         .05100       103.51        4.959       1.82319     1.550     3.171 PER IMP=   59.00
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*S************** CALC BASIN 105 FLOW ****************
COMPUTE NM HYD        105.00    -   18         .02100         48.83       2.042      1.82319     1.500    3.633 PER IMP=  59.00
*S*** ADD 101 TO 105********
ADD HYD                105UP 17&18  19         .07200        146.78       7.001      1.82318     1.550    3.185
*S********* ROUTE 105UP TO LYONS*******
ROUTE MCUNGE         RT105UP   19   20         .07200        146.47       6.985      1.81910     1.600    3.179 CCODE =       .1
*S************** CALC BASIN 105.1 FLOW ****************
COMPUTE NM HYD        105.10    -   21         .00900         20.94        .875      1.82319     1.500    3.635 PER IMP=  59.00
*S*** ADD 105UP TO 105.1********
ADD HYD              105.1UP 20&21  22         .08100        161.00       7.860      1.81954     1.600    3.106
*S************** CALC BASIN 107 FLOW ****************
COMPUTE NM HYD        107.00    -   23         .06700        119.80       6.515      1.82319     1.600    2.794 PER IMP=  59.00
*S************** CALC BASIN 108 FLOW ****************
COMPUTE NM HYD        108.00    -   24         .01000         23.26        .972      1.82319     1.500    3.635 PER IMP=  59.00
*S*** ADD 107 TO 108********
ADD HYD                108UP 23&24  25         .07700        137.35       7.487      1.82318     1.550    2.787
*S*** ADD RT312.1 TO AP108********
ADD HYD          AP6-AP108UP 16&25  26        1.45840        560.91     149.007      1.91572     1.650     .601
*S************** CALC BASIN 108.1 FLOW ****************
COMPUTE NM HYD        108.10    -   27         .01100         25.59       1.070      1.82319     1.500    3.634 PER IMP=  59.00
*S*** ADD 108.1 TO 105.1UP********
ADD HYD         AP7-AP108.1U 27&22  28         .09200        178.76       8.930      1.81997     1.600    3.036
*S********* ROUTE DISCHARGE THRU PIPE TO IRVING 78" *******
ROUTE MCUNGE         RT312.1   26   29        1.45840        560.91     149.007      1.91572     1.650     .601 CCODE =       .0
*S*** ADD RT312.1 TO 108.1UP********
ADD HYD            AP108.1UP 29&28  30        1.55040        728.51     157.937      1.91004     1.650     .734
FINISH
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AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) -                   - VERSION:  1997.02c      RUN DATE (MON/DAY/YR) =07/23/2003
INPUT FILE = P:\00289\hydro\PMDam\Pmd102.HYM                                         USER NO.= AHYMO-S-9702c1BohanHu-AH

                            FROM  TO                   PEAK       RUNOFF               TIME TO   CFS      PAGE =   1
                 HYDROGRAPH  ID   ID         AREA    DISCHARGE    VOLUME     RUNOFF     PEAK     PER
COMMAND        IDENTIFICATION NO.  NO.      (SQ MI)     (CFS)      (AC-FT)   (INCHES)  (HOURS)   ACRE     NOTATION

*SUMMARY             1 MID. B. PIEDRAS- DEV CONDS WITH BULK - MODIFIED 7/95
START                                                                                            TIME=        .00
RAINFALL  TYPE= 2                                                                                RAIN24=    2.660
SEDIMENT BULK                                                                                    PK BF =     1.00
*S*
*S*************************************************************************
*S***** ANALYSIS FOR LAS VENTANAS SUBDIVISION DRAINAGE MASTER PLAN ***********
*S*                                                                       *
*S* TWO MAIN SYSTEMS CONVEY FLOWS TO THE LARGE POND IN BASIN 316.  THIS   *
*S* POND IS CALLED "LAS VENTANAS DRAINAGE FACILITY NO. 1" (LVDF NO. 1).    *
*S* THE TWO MAIN SYSTEMS CONSIST OF ONE IN THE NORTH AND ONE IN THE SOUTH *
*S* PART OF THE SUBDIVISION.  NORTH IS THE "WEST BRANCH CALABACILLAS      *
*S* DIVERSION SYSTEM", AND SOUTH IS THE "NORTH BRANCH PIEDRAS MARCADAS    *
*S* SYSTEM".                                                              *
*S*************************************************************************
*S******* W BRANCH CALABACILLAS DIVERSION SYSTEM FOR LAS VENTANAS  ***********
*S* MAIN CHANNEL IS "WEST BRANCH CALABACILLAS DIVERSION CHANNEL" *************
*S*
*S************** CALC BASIN 502 FLOW ***************
COMPUTE NM HYD        502.00    -    1        .03400       74.39      3.148     1.73601   1.500    3.419 PER IMP=  59.00
*S********* ROUTE DISCHARGE THRU BASIN 503W 36" PIPE  (REACH 1)*******
ROUTE                 503W.1    1    2        .03400       70.85      3.148     1.73603   1.550    3.256
*S****ROUTE 502 FLOW THROUGH POND IN NEIGHBORHOOD PARK AT W SIDE OF 503W ****
ROUTE RESERVOIR       503W.2    2    3        .03400       13.24      3.148     1.73595   2.100     .608 AC-FT=    1.647
*S********* ROUTE DISCHARGE THRU 36" PIPE IN BASIN 503W (REACH 2) *******
ROUTE                 503W.3    3    2        .03400       13.24      3.148     1.73594   2.100     .608
*S************** CALC BASIN 503W FLOW ***************
COMPUTE NM HYD          503W    -    1        .14100      218.31     11.614     1.54445   1.600    2.419 PER IMP=  46.00
*S** DIVIDE 503W FLOWS INTO OVERLAND & PIPE FLOWS **************
*S*  100 CFS TO 42" PIPE IN RAINBOW (REACH 4) **************
DIVIDE HYD            503M.1    1    6        .11168      100.00      9.199     1.54445   1.450    1.399
                      503M.2  and    4        .02932      118.31      2.415     1.54445   1.600    6.304
*S***** ROUTE RAINBOW PIPE FLOWS SOUTH TO RAINBOW & LOOP RD INTERSECTION*******
ROUTE                503M.11    6    7        .11168      103.68      9.199     1.54445   1.500    1.451
*S***ROUTE OVERLAND FLOWS SOUTH ON RAINBOW BLVD ****
ROUTE                503M.21    4    8        .02932      117.74      2.416     1.54471   1.600    6.274
*S*** ADD 503W OVERLAND AND PIPE FLOWS AT RAINBOW & LOOP RD*********
ADD HYD               503W.5   7& 8  9        .14100      218.17     11.615     1.54450   1.600    2.418
*S*** ADD 503W FLOWS TO ROUTED FLOWS FROM 503W POND
ADD HYD               503W.6   2& 9  3        .17500      228.34     14.762     1.58169   1.600    2.039
*S************** CALC BASIN 504E FLOW ***************
COMPUTE NM HYD          504E    -    1        .07400      102.64      6.095     1.54445   1.650    2.167 PER IMP=  46.00
*S** DIVIDE 504E FLOWS; (LOWER PART OF 504E IS ADDED LATER AT PARK) ******
DIVIDE HYD            504E.1    1    2        .03700       51.32      3.048     1.54444   1.650    2.167
                      504E.2  and    5        .03700       51.32      3.048     1.54444   1.650    2.167
*S** ADD UPPER PART OF BASIN 504E TO ROUTED FLOWS FROM 503W POND **********
ADD HYD               503W.7   3& 5  4        .21200      278.35     17.810     1.57519   1.600    2.051
*S** DIVIDE COMBINED FLOWS INTO OVERLAND AND PIPE FLOWS ******
DIVIDE HYD           503W.71    4    7        .19523      185.00     16.401     1.57519   1.550    1.481
                     503W.72  and    8        .01677       93.35      1.409     1.57519   1.600    8.697
*S* ROUTE PIPE FLOWS IN 54" PIPE (REACH 3) TO W BRANCH CALABACILLAS DIV CHAN ***
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                              FROM  TO                    PEAK         RUNOFF               TIME TO     CFS      PAGE =    2
                  HYDROGRAPH   ID   ID         AREA     DISCHARGE      VOLUME      RUNOFF      PEAK     PER
COMMAND       IDENTIFICATION   NO.  NO.      (SQ MI)       (CFS)       (AC-FT)     (INCHES) (HOURS)     ACRE     NOTATION

ROUTE                 503M.4    7    3        .19523       184.99      16.401       1.57519    1.800    1.481
*S***ROUTE OVERLAND FLOWS EAST TO W BR CALAB DIV CHAN ****
ROUTE                503M.41    8    9        .01677        71.91       1.409       1.57565    1.700    6.699
*S*** ADD OVERLAND AND PIPE FLOWS AT  W BR CALAB DIV CHAN *********
ADD HYD              503M.42  9& 3  10        .21200       256.77      17.811       1.57522    1.700    1.892
*S*
*S************** CALC BASIN 503M FLOW ***************
COMPUTE NM HYD          503M   -     1        .07200        91.01       5.931       1.54445    1.700    1.975 PER IMP=  46.00
*S***** ROUTE FLOWS SE VIA W BRANCH CALABACILLAS DIV CHAN ************
ROUTE                 503M.3    1    7        .07200        91.36       5.931       1.54445    1.700    1.983
*S*** ADD COMBINED FLOWS TO ROUTED FLOWS FROM W BR CALAB DIV CHAN
ADD HYD               503M.5 10& 7   8        .28400       348.14      23.741       1.56742    1.700    1.915
*S* ROUTE W. BRANCH CALAB DIV CHAN TO NEIGHBORHOOD PARK IN E. 503/504 *****
ROUTE                 503M.6    8    7        .28400       338.28      23.741       1.56742    1.750    1.861
*S** ADD DIVIDED FLOWS FROM 504E TO CHAN FLOWS AT PARK IN E. 503/504 ******
ADD HYD               503M.7  2& 7   5        .32100       381.74      26.789       1.56477    1.750    1.858
*S************** CALC BASIN 316NW FLOWS ********************
COMPUTE NM HYD         316NW   -     1        .05500       113.32       4.624       1.57621    1.500    3.219 PER IMP=  50.00
*S*************** ADD 316NW FLOW TO CHAN FLOWS ***********
ADD HYD              316NW.1  5& 1   2        .37600       431.65      31.412       1.56644    1.700    1.794
*S********* ROUTE THRU W BRANCH CALABACILLAS DIV CHAN TO LVDF NO. 1 ****
ROUTE                316NW.2    2    3        .37600       427.05      31.412       1.56644    1.750    1.775
*S************** CALC BASIN 316NE FLOWS ********************
COMPUTE NM HYD         316NE   -     1        .04000        76.70       3.230       1.51399    1.500    2.996 PER IMP=  47.00
*S*************** ADD 316NE FLOW TO LAS VENTANAS DRAINAGE FACILITY NO. 1 *****
*S**  SUM IS TOTAL OF FLOWS FROM W BR CALABACILLAS DIVERSION SYSTEM **********
ADD HYD              316NE.1  3& 1  23        .41600       457.73      34.642       1.56139    1.750    1.719
*S*
*S************** CALC BASIN 503E FLOW ***************
*S** NOTE: BASIN 503E FLOW CAN'T BE ROUTED TO LVDF NO. 1 IN BASIN 316 *****
*S*******  503E FLOW IS DISCHARGED NORTH TO CALABACILLAS ******************
COMPUTE NM HYD        503E.1   -     1        .08000       112.72       6.590       1.54445    1.650    2.202 PER IMP=  46.00
*S*
*S*
*S*******************************************************************
*S******* NORTH BRANCH PIEDRAS MARCADAS SYSTEM FOR LAS VENTANAS *********
*S* MAIN CHANNEL IS "NORTH BRANCH PIEDRAS MARCADAS CHANNEL" *************
*S*
*S************** CALC BASIN 501 FLOW ***************
COMPUTE NM HYD        501.00   -     1        .27300       421.40      25.276       1.73601    1.600    2.412 PER IMP=  59.00
*S********* ROUTE 501 FLOWS SOUTH THRU "TRIBUTARY A" CHANNEL IN BASIN 504W *****
ROUTE                 504W.1    1    2        .27300       422.07      25.276       1.73601    1.650    2.416
*S************** CALC BASIN 504W FLOW ***************
COMPUTE NM HYD          504W   -     1        .04500        93.13       3.707       1.54445    1.500    3.234 PER IMP=  46.00
*S***** ADD 504W FLOWS TO "TRIB A" CHANNEL FLOWS
ADD HYD               504W.2  1& 2   5        .31800       482.42      28.983       1.70890    1.600    2.370
*S********* ROUTE "TRIB A" FLOW SOUTH & EAST THRU 504W TO 318BW *****
ROUTE                 504W.3    5    6        .31800       478.07      28.983       1.70891    1.650    2.349
*S************** CALC BASIN 318A FLOW *****************
COMPUTE NM HYD          318A   -     1        .04300        93.43       3.981       1.73601    1.500    3.395 PER IMP=  59.00
*S********* ROUTE 318A THRU 36" PIPE IN 318BW (REACH 5) *******
*S***** ROUTE 318A PIPE FLOWS EAST TO "TRIB A" CHAN *******
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                              FROM  TO                    PEAK         RUNOFF                TIME TO    CFS      PAGE =    3
                  HYDROGRAPH   ID   ID          AREA     DISCHARGE      VOLUME      RUNOFF     PEAK     PER
COMMAND       IDENTIFICATION   NO.  NO.      (SQ MI)      (CFS)        (AC-FT)    (INCHES)  (HOURS)    ACRE     NOTATION

ROUTE                318BW.1    1    4        .04300        91.05       3.981      1.73602    1.500    3.309
*S*********** ADD 318A TO "TRIB A" *****************
ADD HYD              318BW.2  4& 6    3        .36100       547.85      32.964      1.71213    1.600    2.371
*S********* ROUTE THRU "TRIB A" CHAN IN 318BW *******
ROUTE                318BW.3    3    2        .36100       543.61      32.964      1.71213    1.650    2.353
*S************** CALC BASIN 318BW FLOW *****************
COMPUTE NM HYD         318BW   -     1        .12200       248.67      11.296      1.73601    1.500    3.185 PER IMP=  59.00
*S*********** ADD 318BW TO ROUTED 501/504W/318A IN "TRIB A" *****************
ADD HYD              318BW.4  2& 1    3        .48300       739.23      44.260      1.71816    1.600    2.391
*S************** CALC BASIN 319A FLOW ***************
COMPUTE NM HYD          319A   -     1        .57200       935.79      52.960      1.73601    1.600    2.556 PER IMP=  59.00
*S********* ROUTE 319A DISCHARGE EAST THRU "TRIB B" CHAN IN 319B *******
ROUTE                 319B.1    1    2        .57200       936.29      52.960      1.73601    1.600    2.558
*S************** CALC BASIN 319B FLOW ***************
COMPUTE NM HYD          319B   -     1        .02300        48.22       1.959      1.59702    1.500    3.276 PER IMP=  50.00
*S*********** ADD 319A TO 319B "TRIB B" CHAN FLOWS *****************
ADD HYD               319B.2  1& 2    4        .59500       969.97      54.919      1.73064    1.600    2.547
*S********* ROUTE COMBINED 319A+B DISCHARGE IN "TRIB B" IN 318BW ********
ROUTE                318BW.5    4    5        .59500       970.10      54.919      1.73064    1.600    2.548
*S*********** ADD "TRIB A" TO "TRIB B" FLOWS AT WELL SITE PARK ************
ADD HYD             WELLSITE  3& 5    4       1.07800      1709.33      99.179      1.72505    1.600    2.478
*S** ROUTE THRU 318BE; "N BRANCH PIEDRAS MARCADAS CHANNEL" **************
ROUTE                318BE.1    4    3       1.07800      1693.32      99.179      1.72505    1.600    2.454
*S************** CALC BASIN 318BE FLOW *****************
COMPUTE NM HYD         318BE   -     1        .14800       218.05      12.771      1.61791    1.600    2.302 PER IMP=  51.00
*S****************** ADD 318BE TO N BRANCH PIEDRAS MARC CHAN *************
ADD HYD              318BE.2  3& 1    4       1.22600      1911.37     111.950      1.71212    1.600    2.436
*S**************CALC BASIN 317B **********************
COMPUTE NM HYD          317B   -     1        .13400       215.23      11.878      1.66202    1.600    2.510 PER IMP=  54.00
*S************* ADD 317B TO CHAN FLOWS (NOW INCLUDES 501/504W/318A+B/319A+B)
ADD HYD              318BE.3  4& 1    2       1.36000      2126.60     123.827      1.70718    1.600    2.443
*S********* ROUTE COMBINED FLOWS EAST IN N BRANCH PIEDRAS MARC CHAN ******
ROUTE                318BE.4    2   13       1.36000      2129.57     123.827      1.70718    1.650    2.447
*S**************CALC BASIN 601 **********************
COMPUTE NM HYD        601.00   -     1        .02000        43.77       1.852      1.73601    1.500    3.419 PER IMP=  59.00
*S**************ROUTE 601 FLOWS THRU 602, OVERLAND DOWN PASEOdelNORTE
ROUTE                 602.10    1    2        .02000        34.46       1.852      1.73604    1.550    2.692
*S**************CALC BASIN 602 **********************
COMPUTE NM HYD        602.00   -     1        .06400       100.72       5.825      1.70653    1.600    2.459 PER IMP=  57.00
*S*************** ADD 602 FLOW TO 601 FLOWS ***********
ADD HYD               602.20  2& 1    4        .08400       134.94       7.677      1.71354    1.600    2.510
*S**************ROUTE 601/602 FLOWS OVERLAND DOWN PdN
ROUTE                 602.30    4    5        .08400       109.23       7.677      1.71355    1.700    2.032
*S**************CALC BASIN 317A **********************
COMPUTE NM HYD          317A   -    20        .01700        37.20       1.574      1.73601    1.500    3.419 PER IMP=  59.00
*S*  FLOWS FROM BASIN 317A GO EAST, AND DO NOT ENTER LAS VENTANAS.  PER ADDENDUM
*S*  DATED 7/20/95.
*S***ROUTE 601/602/317A OVERLAND NORTH ON UNIVERSE BLVD ****
ROUTE                316SW.1    5   12        .08400        90.82       7.677      1.71355    1.850    1.689
*S*** ADD OVERLAND FLOW TO N BRANCH PIEDRAS MARCADAS CHAN FLOWS *********
ADD HYD              316SW.2 13&12    4       1.44400      2179.07     131.504      1.70755    1.650    2.358
*S**************CALC BASIN 316SW ***********************
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                               FROM  TO                  PEAK       RUNOFF               TIME TO   CFS       PAGE =   4
                 HYDROGRAPH     ID   ID        AREA    DISCHARGE    VOLUME     RUNOFF      PEAK    PER
COMMAND        IDENTIFICATION   NO.  NO.     (SQ MI)     (CFS)     (AC-FT)    (INCHES)   (HOURS)   ACRE       NOTATION

COMPUTE NM HYD          316SW     -     1      .07600      130.48       7.144     1.76261    1.600    2.683 PER IMP=  60.00
*S*************** ADD 316SW TO CHAN FLOWS ***********
ADD HYD               316SW.3  1& 4    5     1.52000     2297.59     138.648     1.71030    1.650    2.362
*S***** ROUTE COMBINED FLOWS THRU N BRANCH PM CHAN IN BASIN 316SW *******
ROUTE                 316SW.4     5    3     1.52000     2312.53     138.648     1.71030    1.650    2.377
*S** SUM N BRANCH PIED MARC CHAN AND W BRANCH CALABACILLAS DIVERSION CHAN ***
ADD HYD               316SW.5 23& 3    2     1.93600     2747.52     173.290     1.67830    1.650    2.217
*S************** CALC BASIN 316SE ***********************
COMPUTE NM HYD          316SE     -     1      .06500      118.83       6.335     1.82754    1.550    2.856 PER IMP=  65.00
*S*
*S*************** ADD 316SE TO SUMMED CHANNEL FLOWS ***************
ADD HYD               316SE.1  1& 2    3     2.00100     2848.25     179.626     1.68315    1.650    2.224
*S******  CALC BASIN 314BM *************
*S** NOTE: 314BM IS THE PART OF BASIN 314B THAT IS IN LVDF NO. 1****
COMPUTE NM HYD          314BM     -     1      .02740       38.70       1.214      .83098    1.500    2.207 PER IMP=  10.00
*S** ADD 314BM TO THE FLOWS GOING INTO LVDF NO. 1 ********
*S* SUM IS TOTAL INTO LAS VENTANAS DRAINAGE FACILITY NO. 1 IN BASIN 316
ADD HYD               316SE.2  1& 3    2     2.02840     2870.51     180.841     1.67164    1.650    2.211
*S*
*S*
*S**    ROUTE SUMMED FLOWS THRU LAS VENTANAS DETENTION DAM
*S**    (FORMERLY KNOWN AS LVDF NO. 1)
*S**    USE 32" ORIFICE PLATE TO LIMIT PRINCIPAL SPILLWYA DISCHARGE
*S**    TO 80 CFS FOR WATER MATCHING THE CREST OF THE EMERGENCY SPILLWAY
*S**    AT ELEVATION 5405
*S*      (EXISTING 100 YR FLOW INTO POND AREA=250CFS)
*S**    5/31/00 Interpolated between 5404 and 5405 for outflow
*S**    5/31/00 Changed storage to match "Reserved" Volumes
ROUTE RESERVOIR      POND_ONE     2    4     2.02840       75.74     155.396     1.43644    3.450     .058 AC-FT=  133.111
*S* ROUTE LVDF NO. 1 DISCHARGE THRU 42" PIPE (REACH 6) NORTH TO 314BN
ROUTE                 314BN.1     4    3     2.02840       75.73     155.075     1.43347    3.550     .058
*S************** CALC BASIN 315B ***********************
*S***  NOTE: 315B DOES NOT GET INTO LVDF NO. 1 IN BASIN 316 **************
COMPUTE NM HYD           315B     -    21      .04700      104.82       4.434     1.76881    1.500    3.485 PER IMP=  60.00
*S* FLOWS FROM 315B ARE NOT ALLOWED TO DISCHARGE OFF SITE AS IN EXIST CONDITIONS
*S**  ASSUME FLOWS CAN DISCHARGE OFFSITE, CHANGE ID FROM 1 TO 21 - DJG - 9/27/02
*S******  CALC BASIN 314BS *************
*S*****   NOTE:  FLOW FROM 314BS GOES EASTWARD OUT OF LAS VENTANAS (NO POND)
COMPUTE NM HYD          314BS     -    22      .02330       32.91       1.033      .83098    1.500    2.207 PER IMP=  10.00
*S******  CALC BASIN 314BN  ***********
COMPUTE NM HYD          314BN     -     1      .02740       37.36       1.214      .83098    1.500    2.131 PER IMP=  10.00
*S**** ADD 314BN TO PIPE DISCHARGE FROM LVDF NO. 1 ****
ADD HYD                320.10  3& 1    2     2.05580       75.90     156.289     1.42544    3.200     .058
*S******************CALCULATE BASIN 320 ********************
COMPUTE NM HYD         320.00     -     1      .19000      286.27      15.853     1.56445    1.600    2.354 PER IMP=  49.00
*S* FLOWS FROM 320 ARE NOT ALLOWED TO DISCHARGE OFF SITE AS IN EXIST CONDITIONS
*S* ROUTE 320 THRU "LVDF NO. 2" AT E. END OF 320, ORIFICE=30" ***
ROUTE RESERVOIR      POND_TWO     1    4      .19000       31.76      15.853     1.56444    2.350     .261 AC-FT=    9.713
*S* ROUTE LVDF NO. 2 DISCHARGE THROUGH 36" PIPE (REACH 7) EAST
ROUTE                  320.11     4    5      .19000       31.76      15.853     1.56444    2.400     .261
*S** ADD REACH 7 FLOWS TO REACH 6. BECOMES A 54" PIPE (REACH 8) *******
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                              FROM  TO                    PEAK         RUNOFF                TIME TO   CFS      PAGE =   5
                  HYDROGRAPH   ID   ID         AREA     DISCHARGE      VOLUME     RUNOFF      PEAK     PER
COMMAND       IDENTIFICATION   NO.  NO.      (SQ MI)       (CFS)       (AC-FT)   (INCHES)   (HOURS)    ACRE     NOTATION

ADD HYD               320.20  2& 5   3       2.24580       107.29     172.142      1.43720    2.550     .075
*S***** ROUTE THRU 54" PIPE (REACH 8) NORTH TO IRVING BLVD ***
ROUTE                 505.10    3    2       2.24580       107.28     171.995      1.43597    2.600     .075
*S*******************CALCULATE BASIN 505 *********************
COMPUTE NM HYD        505.00   -     1        .02200        35.77       1.225      1.04368    1.500    2.540 PER IMP=  20.00
*S*************** ADD 505 FLOW TO FLOWS ***********
*S**** FLOW TOWARDS CALABACILLAS AT NE COR LAS VENTANAS DRAINAGE
ADD HYD               505.20  1& 2  15       2.26780       108.80     173.219      1.43216    2.050     .075
*S****END OF LAS VENTANAS DRAINAGE ANALYSIS
COMPUTE NM HYD          314A   -     3        .08600       143.70       7.962      1.73598    1.600    2.611 PER IMP=  59.10
*S****GET NORTH PIECE (PANHANDLE) OF 313 INTO SYSTEM TO CALABACILLAS******
*S*******************CALCULATE BASIN 313N *********************
COMPUTE NM HYD        313.10   -     6        .06500       114.35       6.018      1.73598    1.550    2.749 PER IMP=  59.10
*S****** ADD 314A/316R/313N FLOWS INTO LAST SECTION OF PIPE INTO PARK POND***
ADD HYD               113.30  3&22   4        .10930       169.50       8.995      1.54305    1.550    2.423
ADD HYD               113.20  4& 6   5        .17430       283.85      15.013      1.61500    1.550    2.545
*S***** ROUTE 316R/314A/313N TOTAL INTO LAST SECTION OF PIPE INTO PARK POND***
ROUTE                 113.40    5    2        .17430       283.63      15.013      1.61500    1.600    2.543
*S*******************CALCULATE BASIN 311.1 *********************
COMPUTE NM HYD        314.10   -     3        .03500        68.88       2.639      1.41366    1.500    3.075 PER IMP=  40.00
*S****** ADD 314.1 AND 314A/316R/313N FOR DISCH. INTO POND*****
ADD HYD               113.30  3& 2   4        .20930       341.67      17.652      1.58133    1.550    2.551
*S********* ROUTE THRU PARK POND WITH ASSUMED DISCHARGE ***********************
*S*** ASSUME 48" DISCHARGE PIPE *****************************
ROUTE RESERVOIR       507.20    4    5        .20930       101.94      17.652      1.58133    2.000     .761 AC-FT=    7.683
*S***** ROUTE POND DISCH. THRU PIPE TO UNSER LYONS******
ROUTE                 113.40    5    2        .20930       101.94      17.652      1.58133    2.000     .761
*S*********** CALCULATE BASIN 312 **********************
COMPUTE NM HYD        312.00   -     1        .21100       304.64      19.536      1.73598    1.650    2.256 PER IMP=  59.10
*S****** ADD POND DISCH. AND 312 ***********
ADD HYD               113.30  1& 2   4        .42030       382.97      37.187      1.65896    1.650    1.424
*S*****  CALCULATE BASIN 311N ************
COMPUTE NM HYD          311N   -     1        .04800       105.97       4.444      1.73598    1.500    3.450 PER IMP=  59.10
*S************** CALCULATE BASIN 311S ****************
COMPUTE NM HYD          311S   -     3        .04800       105.97       4.444      1.73598    1.500    3.450 PER IMP=  59.10
*S*                 ROUTE THRU STORM DRAIN TO BASIN 311N
ROUTE                  311SR    3    6        .04800        99.31       4.444      1.73599    1.500    3.233
*S****** ADD ROUTED 311S TO 311N ***********
*S*                 TOTAL FLOW IN LYON BLVD SD SOUTH OF PARADISE
*S*                 SIN 312 THAT IS SOUTH OF PARADISE IS ADDED IN ON NORTH SIDE)
*S*                 COMBINED 100 YR FLOW LIMITED TO 212 CFS
ADD HYD                 311T  6& 1   7        .09600       205.28       8.888      1.73598    1.500    3.341
ADD HYD               113.40  7& 4   8        .51630       510.02      46.076      1.67329    1.600    1.543
*S** NOW RT. 312/314/316R THRU PIPE TO CALABACILLLAS****
ROUTE                 112.20    8   14        .51630       503.34      46.076      1.67329    1.650    1.523
*S************** ID14 IS DISCHARGE FROM 312 TO CAB.******
*S**** DOWN TO PDN CHANNEL BASINS******
*S*********** NOW CALCULATE BASIN 315W *************
*S*** NOTE:   (BHI ANALYSIS BY NM) FROM 315W
COMPUTE NM HYD        315.10   -     3        .13300       293.36      12.314      1.73598    1.500    3.446 PER IMP=  59.10
*S*************** ADD 315B TO 315W
ADD HYD               115.20 21& 3   1        .18000       398.18      16.748      1.74455    1.500    3.456
*S*
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                              FROM  TO                    PEAK        RUNOFF              TIME TO    CFS      PAGE =   6
                 HYDROGRAPH    ID   ID        AREA     DISCHARGE      VOLUME     RUNOFF     PEAK     PER
COMMAND        IDENTIFICATION  NO.  NO.     (SQ MI)      (CFS)        (AC-FT)   (INCHES)  (HOURS)   ACRE      NOTATION

*S*************** ADD 317A TO 315B AND 315W
ADD HYD              315.20 20& 1  19      .19700      435.38      18.322    1.74381    1.500    3.453
*S***** ROUTE THIS FLOW TO WEST EDGE OF 309 THRU PDN CHANNEL****
ROUTE                116.00  19     2      .19700      395.88      18.322    1.74381    1.550    3.140
*S*********** NOW CALCULATE BASIN 315S **************
COMPUTE NM HYD       315.20   -     3      .18000      396.83      16.665    1.73598    1.500    3.445 PER IMP=   59.10
*S*************** ADD 315S FLOW TO PDN CHANNEL FLOW @ W. EDGE 309***
ADD HYD              116.20  2& 3   1      .37700      756.55      34.987    1.74007    1.500    3.136
*S***** ROUTE THIS FLOW TO EAST EDGE OF 309 THRU PDN CHANNEL****
ROUTE                116.00   1     2      .37700      763.83      34.987    1.74007    1.550    3.166
*S************* CALCULATE BASIN 309S *********************
COMPUTE NM HYD         309S   -     3      .04800      105.97       4.444    1.73598    1.500    3.450 PER IMP=   59.10
*S*************** ADD 309S FLOW TO PDN CHANNEL FLOW @ E. EDGE 309***
ADD HYD              116.20  2& 3   1      .42500      856.22      39.431    1.73961    1.550    3.148
*S***** ROUTE THIS FLOW THRU 302W IN PDN CHANNEL*****
ROUTE                116.00   1     2      .42500      869.26      39.431    1.73961    1.550    3.196
*S*********** NOW CALCULATE BASIN 315N*************
COMPUTE NM HYD       315.00   -     1      .18000      396.83      16.665    1.73598    1.500    3.445 PER IMP=   59.10
*S********* ROUTE 315N THRU INTERCEPTOR CHANNEL TO THE TOP OF B302W BOUNDRY***
ROUTE                115.01   1     3      .18000      359.84      16.665    1.73598    1.550    3.124
*S************* CALCULATE BASIN 309N *********************
COMPUTE NM HYD       309.00   -     4      .04800      105.97       4.444    1.73598    1.500    3.450 PER IMP=   59.10
*S************* ROUTE 309 THRU PROPOSED CULVERT 3 ***********
ROUTE                109.00   4     5      .04800      106.38       4.444    1.73599    1.500    3.463
*S**ROUTE CULVERT DISCHARGE THROUGH SMALL CHANNEL TO THE TOP OF B302W****
ROUTE                115.01   5     6      .04800      101.38       4.444    1.73599    1.550    3.300
*S**INTERCEPTOR CHANNEL ALSO PICKS UP PART OF 304, WE'LL CALL IT 304S**
*S************* CALCULATE BASIN 304S *********************
COMPUTE NM HYD       304.00   -     4      .03500       77.28       3.241    1.73598    1.500    3.450 PER IMP=   59.10
*S ADD TO GET THE TOTAL AT THE NORTH BOUNDRY OF B302W**
ADD HYD              304.10  3& 6   7      .22800      461.22      21.110    1.73598    1.550    3.161
ADD HYD              304.20  4& 7   8      .26300      528.60      24.350    1.73598    1.550    3.140
*S *ROUTE 315N/309N/304S FLOWS THRU INTERCEPTOR CHANNEL TO END OF B302W @ PDN**
ROUTE                115.01   8     9      .26300      534.96      24.350    1.73598    1.550    3.178
*S*************** CALCULATE BASIN 302W *********************
COMPUTE NM HYD       302.00   -     1      .04500       99.35       4.166    1.73598    1.500    3.450 PER IMP=   59.10
*S**** ADD INTERCEPTOR FLOW TO 302W FLCW @ POND IN 302W***
ADD HYD              116.20  9& 1   4      .30800      621.59      28.516    1.73598    1.550    3.153
*S****ROUTE COMBINED FLOW THROUGH POND**
*S*  REMOVE POND PER AMAFCA INSTRUCTION
*S>>>ADD INTERCEPTOR/302 FLOW TO THE PDN CHANNEL FLOW**
ADD HYD              116.30  2& 4   5      .73300     1490.85      67.948    1.73809    1.550    3.178
COMPUTE NM HYD      SHENO1W   -    20      .10350      121.70       7.919    1.43452    1.700    1.837 PER IMP=   40.00
ADD HYD              116.31  5&20   5      .83650     1576.10      75.866    1.70052    1.550    2.944
*S***ADD OUTFLOW FROM SHENO1W TO FLOW FROM 302W
*S***** ROUTE THIS FLOW THRU 302E IN PDN CHANNEL*****
ROUTE                116.00   5     2      .83650     1556.35      75.866    1.70052    1.550    2.907
*S*************** CALCULATE BASIN 302E *********************
COMPUTE NM HYD       302.00   -     1      .08900       76.85       2.679     .56450    1.550    1.349 PER IMP=    6.20
*S*************** ADD 302E FLOW TO PDN CHANNEL FLOW @ EAST END OF 302***
ADD HYD              116.20  2& 1  19      .92550     1633.20      78.546    1.59128    1.550    2.757
*S****** ID=19 IS FLOW AT CULVERT AT PDN IN B302*****
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                              FROM  TO                    PEAK         RUNOFF                     TIME TO   CFS       PAGE =    7
                  HYDROGRAPH   ID   ID           AREA   DISCHARGE      VOLUME      RUNOFF       PEAK     PER
COMMAND         IDENTIFICATION NO.  NO.        (SQ MI)    (CFS)        (AC-FT)    (INCHES)    (HOURS)    ACRE       NOTATION

*S************ CALCULATE BASIN 313S *************************
COMPUTE NM HYD        313.00    -     3       .08900       173.55        8.240     1.73598    1.550     3.047 PER IMP=  59.10
*S********* ROUTE B313S FLOW (ID3) THRU PROPOSED CULVERT 2 *****
ROUTE                 113.40    3    12       .08900       175.14        8.240     1.73599    1.550     3.075
*S** ID12 IS DISCHARGE THRU PROPOSED CULVERT TWO AND HEAD OF P.N. PARK CAYNON**
*S********** CALCULATE BASIN 310 *************
COMPUTE NM HYD        310.00    -     1       .01500        33.13        1.389     1.73598    1.500     3.451 PER IMP=  59.10
*S********* ROUTE COMBINED (11/20/02:NOW ONLY BASIN 310) FLOWS THRU CULVERT ONE
ROUTE                 110.00    1     6       .01500        33.27        1.389     1.73602    1.500     3.466
*S****** TAKE DISCHARGE FROM CULVERT 2 AND ROUTE THRU 308,2 SECT. *******
ROUTE                 108.00   12     3       .08900       161.64        8.240     1.73599    1.600     2.838
*S************ CALCULATE BASIN 308 ***********************
COMPUTE NM HYD        308.00    -     4       .03600        47.78        1.746      .90934    1.500     2.074 PER IMP=  22.10
*S*********** ADD ROUTE FROM 313 AND 308 *******************
ADD HYD               108.10  3& 4    1       .12500       201.80        9.986     1.49791    1.550     2.523
*S********** ROUTE THIS FLOW PART WAY DOWN MAIN BRANCH ******
ROUTE                 104.10    1     3       .12500       150.67        9.986     1.49791    1.650     1.883
*S************ CALCULATE BASIN 307 ***********************
COMPUTE NM HYD        307.00    -     4       .06500       131.80        5.447     1.57132    1.500     3.168 PER IMP=  52.00
*S************ ROUTE CULVERT 1 DISCHARGE THRU 307 ********
ROUTE                 107.00    6    10       .01500        27.62        1.389     1.73601    1.550     2.877
*S**** ADD 307/310/311R INTO  PLAYA IN 307 **********
ADD HYD               307.40  4&10    9       .08000       155.17        6.836     1.60219    1.500     3.031
*S********* ROUTE  THRU PLAYA IN 307 ************************
ROUTE RESERVOIR       507.20    9     4       .08000       104.75        6.176     1.44758    1.650     2.046 AC-FT=     2.222
*S**** ROUTE OUTFLOW TO PM MAIN BRANCH ******
ROUTE                 104.40    4     5       .08000        72.68        6.175     1.44733    1.750     1.420
*S********** ADD (307+308) AT PM POINT ********
ADD HYD               104.20  3& 5    4       .20500       218.85       16.161     1.47817    1.700     1.668
*S************ CALCULATE BASIN 306 ***********************
COMPUTE NM HYD        306.00    -     3       .03100        68.49        2.873     1.73776    1.500     3.452 PER IMP=  59.20
*S*********** ROUTE THRU PLAYA IN BASIN 306 ********
ROUTE RESERVOIR       506.00    3     1       .03100        16.96        2.216     1.34028    1.900      .855 AC-FT=     1.477
*S******* ROUTE POND DISCHARGE THRU 305 **************
ROUTE                 105.00    1     5       .03100        16.48        2.212     1.33808    2.050      .831
*S********** CALCULATE BASIN 305 ***********************
COMPUTE NM HYD        305.00    -     3       .02700        47.32        1.891     1.31316    1.500     2.739 PER IMP=  40.50
ADD HYD               105.10  5& 3    1       .05800        47.39        4.103     1.32648    1.500     1.277
*S********* ROUTE 305T TO PM PART WAY DOWN 304*******************
ROUTE                 104.60    1     5       .05800        45.24        4.103     1.32628    1.550     1.219
*S****** ADD 305T TO 307-308 ROUTES AT MAIN BRANCH PART WAY DOWN 304*****
ADD HYD               104.70  4& 5    3       .26300       250.19       20.264     1.44468    1.700     1.486
*S***** ROUTE REMAINING 700' TO END OF BASIN 304 *************
ROUTE                 104.80    3     2       .26300       248.77       20.263     1.44461    1.700     1.478
*S************ CALCULATE BASIN 304 ***********************
COMPUTE NM HYD        304.00    -     3       .18500       236.35        9.600      .97296    1.500     1.996 PER IMP=  25.00
*S***** ADD 304 TO ALL FLOWS @ END OF 304 TO GET TOTAL FLOW THERE ****
ADD HYD               104.11  2& 3    1       .44800       389.85       29.863     1.24984    1.600     1.360
ROUTE                 103.00    1     2       .44800       299.27       29.856     1.24957    1.800     1.044
*S*************** CALCULATE BASIN 303 **********************
COMPUTE NM HYD        303.00    -     3       .16500        97.30        4.968      .56450    1.650      .921 PER IMP=   6.20
*S************* ADD 304T ROUTE AND 303 *****************
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AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) -                    - VERSION:  1997.02c      RUN DATE (MON/DAY/YR) =07/23/2003
INPUT FILE = P:\00289\hydro\PMDam\Pmd103.HYM                                          USER NO.= AHYMO-S-9702c1BohanHu-AH

                              FROM  TO                    PEAK         RUNOFF                TIME TO     CFS        PAGE =    1
                  HYDROGRAPH   ID   ID         AREA     DISCHARGE      VOLUME      RUNOFF      PEAK      PER
COMMAND         IDENTIFICATION NO.  NO.      (SQ MI)      (CFS)        (AC-FT)    (INCHES)   (HOURS)    ACRE       NOTATION

*SUMMARY             1 MID. B. PIEDRAS- DEV CONDS WITH BULK - MODIFIED 7/95
START                                                                                                             TIME=       .00
RAINFALL  TYPE= 2                                                                                                 RAIN24=   2.660
SEDIMENT BULK                                                                                                     PK BF =    1.00
*S*
*S****************************************************************************
*S***** ANALYSIS FOR LAS VENTANAS SUBDIVISION DRAINAGE MASTER PLAN ***********
*S*                                                                          *
*S* TWO MAIN SYSTEMS CONVEY FLOWS TO THE LARGE POND IN BASIN 316.  THIS      *
*S* POND IS CALLED "LAS VENTANAS DRAINAGE FACILITY NO. 1" (LVDF NO. 1).      *
*S* THE TWO MAIN SYSTEMS CONSIST OF ONE IN THE NORTH AND ONE IN THE SOUTH    *
*S* PART OF THE SUBDIVISION.  NORTH IS THE "WEST BRANCH CALABACILLAS         *
*S* DIVERSION SYSTEM", AND SOUTH IS THE "NORTH BRANCH PIEDRAS MARCADAS       *
*S* SYSTEM".                                                                 *
*S****************************************************************************
*S******* W BRANCH CALABACILLAS DIVERSION SYSTEM FOR LAS VENTANAS  ***********
*S* MAIN CHANNEL IS "WEST BRANCH CALABACILLAS DIVERSION CHANNEL" *************
*S*
*S************** CALC BASIN 502 FLOW ***************
COMPUTE NM HYD          502.00    -    1        .03400        74.39       3.148      1.73601    1.500      3.419 PER IMP=  59.00
*S********* ROUTE DISCHARGE THRU BASIN 503W 36" PIPE  (REACH 1)*******
ROUTE                   503W.1    1    2        .03400        70.85       3.148      1.73603    1.550      3.256
*S****ROUTE 502 FLOW THROUGH POND IN NEIGHBORHOOD PARK AT W SIDE OF 503W ****
ROUTE RESERVOIR         503W.2    2    3        .03400        13.24       3.148      1.73595    2.100       .608 AC-FT=    1.647
*S********* ROUTE DISCHARGE THRU 36" PIPE IN BASIN 503W (REACH 2) *******
ROUTE                   503W.3    3    2        .03400        13.24       3.148      1.73594    2.100       .608
*S************** CALC BASIN 503W FLOW ***************
COMPUTE NM HYD            503W    -    1        .14100       218.31      11.614      1.54445    1.600      2.419 PER IMP=  46.00
*S** DIVIDE 503W FLOWS INTO OVERLAND & PIPE FLOWS **************
*S*  100 CFS TO 42" PIPE IN RAINBOW (REACH 4) **************
DIVIDE HYD               503M.1   1    6        .11168       100.00       9.199      1.54445    1.450      1.399
                         503M.2  and   4        .02932       118.31       2.415      1.54445    1.600      6.304
*S***** ROUTE RAINBOW PIPE FLOWS SOUTH TO RAINBOW & LOOP RD INTERSECTION*******
ROUTE                   503M.11   6    7        .11168       103.68       9.199      1.54445    1.500      1.451
*S***ROUTE OVERLAND FLOWS SOUTH ON RAINBOW BLVD ****
ROUTE                   503M.21   4    8        .02932       117.74       2.416      1.54471    1.600      6.274
*S*** ADD 503W OVERLAND AND PIPE FLOWS AT RAINBOW & LOOP RD*********
ADD HYD                  503W.5  7& 8  9        .14100       218.17      11.615      1.54450    1.600      2.418
*S*** ADD 503W FLOWS TO ROUTED FLOWS FROM 503W POND
ADD HYD                  503W.6  2& 9  3        .17500       228.34      14.762      1.58169    1.600      2.039
*S************** CALC BASIN 504E FLOW ***************
COMPUTE NM HYD            504E    -    1        .07400       102.64       6.095      1.54445    1.650      2.167 PER IMP=  46.00
*S** DIVIDE 504E FLOWS; (LOWER PART OF 504E IS ADDED LATER AT PARK) ******
DIVIDE HYD               504E.1   1    2        .03700        51.32       3.048      1.54444    1.650      2.167
                         504E.2  and   5        .03700        51.32       3.048      1.54444    1.650      2.167
*S** ADD UPPER PART OF BASIN 504E TO ROUTED FLOWS FROM 503W POND **********
ADD HYD                  503W.7  3& 5  4        .21200       278.35      17.810      1.57519    1.600      2.051
*S** DIVIDE COMBINED FLOWS INTO OVERLAND AND PIPE FLOWS ******
DIVIDE HYD              503W.71   4    7        .19523       185.00      16.401      1.57519    1.550      1.481
                        503W.72  and   8        .01677        93.35       1.409      1.57519    1.600      8.697
*S* ROUTE PIPE FLOWS IN 54" PIPE (REACH 3) TO W BRANCH CALABACILLAS DIV CHAN ***
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                              FROM  TO                    PEAK        RUNOFF                 TIME TO    CFS       PAGE =   2
                  HYDROGRAPH   ID   ID          AREA     DISCHARGE      VOLUME      RUNOFF     PEAK    PER
COMMAND       IDENTIFICATION   NO.  NO.       (SQ MI)       (CFS)      (AC-FT)     (INCHES)  (HOURS)    ACRE      NOTATION

ROUTE                 503M.4    7    3        .19523        184.99      16.401      1.57519    1.800    1.481
*S***ROUTE OVERLAND FLOWS EAST TO W BR CALAB DIV CHAN ****
ROUTE                503M.41    8    9        .01677         71.91       1.409      1.57565    1.700    6.699
*S*** ADD OVERLAND AND PIPE FLOWS AT  W BR CALAB DIV CHAN *********
ADD HYD              503M.42  9& 3  10        .21200        256.77      17.811      1.57522    1.700    1.892
*S*
*S************** CALC BASIN 503M FLOW ***************
COMPUTE NM HYD          503M   -     1        .07200         91.01       5.931      1.54445    1.700    1.975 PER IMP=  46.00
*S***** ROUTE FLOWS SE VIA W BRANCH CALABACILLAS DIV CHAN ************
ROUTE                 503M.3    1    7        .07200         91.36       5.931      1.54445    1.700    1.983
*S*** ADD COMBINED FLOWS TO ROUTED FLOWS FROM W BR CALAB DIV CHAN
ADD HYD               503M.5 10& 7   8        .28400        348.14      23.741      1.56742    1.700    1.915
*S* ROUTE W. BRANCH CALAB DIV CHAN TO NEIGHBORHOOD PARK IN E. 503/504 *****
ROUTE                 503M.6    8    7        .28400        338.28      23.741      1.56742    1.750    1.861
*S** ADD DIVIDED FLOWS FROM 504E TO CHAN FLOWS AT PARK IN E. 503/504 ******
ADD HYD               503M.7  2& 7   5        .32100        381.74      26.789      1.56477    1.750    1.858
*S************** CALC BASIN 316NW FLOWS *********************
COMPUTE NM HYD         316NW   -     1        .05500        113.32       4.624      1.57621    1.500    3.219 PER IMP=  50.00
*S*************** ADD 316NW FLOW TO CHAN FLOWS ***********
ADD HYD              316NW.1  5& 1   2        .37600        431.65      31.412      1.56644    1.700    1.794
*S********* ROUTE THRU W BRANCH CALABACILLAS DIV CHAN TO LVDF NO. 1 ****
ROUTE                316NW.2    2    3        .37600        427.05      31.412      1.56644    1.750    1.775
*S************** CALC BASIN 316NE FLOWS *********************
COMPUTE NM HYD         316NE   -     1        .04000         76.70       3.230      1.51399    1.500    2.996 PER IMP=  47.00
*S*************** ADD 316NE FLOW TO LAS VENTANAS DRAINAGE FACILITY NO. 1 *****
*S**  SUM IS TOTAL OF FLOWS FROM W BR CALABACILLAS DIVERSION SYSTEM ***********
ADD HYD              316NE.1  3& 1  23        .41600        457.73      34.642      1.56139    1.750    1.719
*S*
*S************** CALC BASIN 503E FLOW ***************
*S** NOTE: BASIN 503E FLOW CAN'T BE ROUTED TO LVDF NO. 1 IN BASIN 316 *****
*S*******  503E FLOW IS DISCHARGED NORTH TO CALABACILLAS *******************
COMPUTE NM HYD        503E.1   -     1        .08000        112.72       6.590      1.54445    1.650    2.202 PER IMP=  46.00
*S*
*S*
*S************************************************************************
*S******* NORTH BRANCH PIEDRAS MARCADAS SYSTEM FOR LAS VENTANAS *********
*S* MAIN CHANNEL IS "NORTH BRANCH PIEDRAS MARCADAS CHANNEL" *************
*S*
*S************** CALC BASIN 501 FLOW ***************
COMPUTE NM HYD        501.00   -     1        .27300        421.40      25.276      1.73601    1.600    2.412 PER IMP=  59.00
*S********* ROUTE 501 FLOWS SOUTH THRU "TRIBUTARY A" CHANNEL IN BASIN 504W *****
ROUTE                 504W.1    1    2        .27300        422.07      25.276      1.73601    1.650    2.416
*S************** CALC BASIN 504W FLOW ***************
COMPUTE NM HYD          504W   -     1        .04500         93.13       3.707      1.54445    1.500    3.234 PER IMP=  46.00
*S***** ADD 504W FLOWS TO "TRIB A" CHANNEL FLOWS
ADD HYD               504W.2  1& 2   5        .31800        482.42      28.983      1.70890    1.600    2.370
*S********* ROUTE "TRIB A" FLOW SOUTH & EAST THRU 504W TO 318BW *****
ROUTE                 504W.3    5    6        .31800        478.07      28.983      1.70891    1.650    2.349
*S************** CALC BASIN 318A FLOW *****************
COMPUTE NM HYD          318A   -     1        .04300         93.43       3.981      1.73601    1.500    3.395 PER IMP=  59.00
*S********* ROUTE 318A THRU 36" PIPE IN 318BW (REACH 5) *******
*S***** ROUTE 318A PIPE FLOWS EAST TO "TRIB A" CHAN *******
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                              FROM  TO                    PEAK         RUNOFF               TIME TO    CFS      PAGE =   3
                  HYDROGRAPH   ID   ID         AREA     DISCHARGE      VOLUME      RUNOFF     PEAK     PER
COMMAND       IDENTIFICATION   NO.  NO.      (SQ MI)      (CFS)        (AC-FT)    (INCHES)  (HOURS)    ACRE     NOTATION

ROUTE                318BW.1     1    4       .04300        91.05       3.981      1.73602    1.500    3.309
*S*********** ADD 318A TO "TRIB A" *****************
ADD HYD              318BW.2  4& 6    3       .36100       547.85      32.964      1.71213    1.600    2.371
*S********* ROUTE THRU "TRIB A" CHAN IN 318BW *******
ROUTE                318BW.3     3    2       .36100       543.61      32.964      1.71213    1.650    2.353
*S************** CALC BASIN 318BW FLOW *****************
COMPUTE NM HYD         318BW     -    1       .12200       248.67      11.296      1.73601    1.500    3.185 PER IMP=  59.00
*S*********** ADD 318BW TO ROUTED 501/504W/318A IN "TRIB A" *****************
ADD HYD              318BW.4  2& 1    3       .48300       739.23      44.260      1.71816    1.600    2.391
*S************** CALC BASIN 319A FLOW ***************
COMPUTE NM HYD          319A     -    1       .57200       935.79      52.960      1.73601    1.600    2.556 PER IMP=  59.00
*S********* ROUTE 319A DISCHARGE EAST THRU "TRIB B" CHAN IN 319B *******
ROUTE                 319B.1     1    2       .57200       936.29      52.960      1.73601    1.600    2.558
*S************** CALC BASIN 319B FLOW ***************
COMPUTE NM HYD          319B     -    1       .02300        48.22       1.959      1.59702    1.500    3.276 PER IMP=  50.00
*S*********** ADD 319A TO 319B "TRIB B" CHAN FLOWS *****************
ADD HYD               319B.2  1& 2    4       .59500       969.97      54.919      1.730,4    1.600    2.547
*S********* ROUTE COMBINED 319A+B DISCHARGE IN "TRIB B" IN 318BW ********
ROUTE                318BW.5     4    5       .59500       970.10      54.919      1.73064    1.600    2.548
*S*********** ADD "TRIB A" TO "TRIB B" FLOWS AT WELL SITE PARK ************
ADD HYD             WELLSITE  3& 5    4      1.07800      1709.33      99.179      1.72505    1.600    2.478
*S** ROUTE THRU 318BE; "N BRANCH PIEDRAS MARCADAS CHANNEL" **************
ROUTE                318BE.1     4    3      1.07800      1693.32      99.179      1.72505    1.600    2.454
*S************** CALC BASIN 318BE FLOW *****************
COMPUTE NM HYD         318BE     -    1       .14800       218.05      12.771      1.61791    1.600    2.302 PER IMP=  51.00
*S****************** ADD 318BE TO N BRANCH PIEDRAS MARC CHAN *************
ADD HYD              318BE.2  3& 1    4      1.22600      1911.37     111.950      1.71212    1.600    2.436
*S**************CALC BASIN 317B ***********************
COMPUTE NM HYD          317B     -    1       .13400       215.23      11.878      1.66202    1.600    2.510 PER IMP=  54.00
*S************* ADD 317B TO CHAN FLOWS (NOW INCLUDES 501/504W/318A+B/319A+B)
ADD HYD              318BE.3  4& 1    2      1.36000      2126.60     123.827      1.70718    1.600    2.443
*S********* ROUTE COMBINED FLOWS EAST IN N BRANCH PIEDRAS MARC CHAN ******
ROUTE                318BE.4     2   13      1.36000      2129.57     123.827      1.70718    1.650    2.447
*S**************CALC BASIN 601 ***********************
COMPUTE NM HYD        601.00     -    1       .02000        43.77       1.852      1.73601    1.500    3.419 PER IMP=  59.00
*S**************ROUTE 601 FLOWS THRU 602, OVERLAND DOWN PASEOdelNORTE
ROUTE                 602.10     1    2       .02000        34.46       1.852      1.73604    1.550    2.692
*S**************CALC BASIN 602 ***********************
COMPUTE NM HYD        602.00     -    1       .06400       100.72       5.825      1.70653    1.600    2.459 PER IMP=  57.00
*S*************** ADD 602 FLOW TO 601 FLOWS ***********
ADD HYD               602.20  2& 1    4       .08400       134.94       7.677      1.71354    1.600    2.510
*S**************ROUTE 601/602 FLOWS OVERLAND DOWN PdN
ROUTE                 602.30     4    5       .08400       109.23       7.677      1.71355    1.700    2.032
*S**************CALC BASIN 317A ***********************
COMPUTE NM HYD          317A     -   20       .01700        37.20       1.574      1.73601    1.500    3.419 PER IMP=  59.00
*S*  FLOWS FROM BASIN 317A GO EAST, AND DO NOT ENTER LAS VENTANAS.  PER ADDENDUM
*S*  DATED 7/20/95.
*S***ROUTE 601/602/317A OVERLAND NORTH ON UNIVERSE BLVD ****
ROUTE                316SW.1     5   12       .08400        90.82       7.677      1.71355    1.850    1.689
*S*** ADD OVERLAND FLOW TO N BRANCH PIEDRAS MARCADAS CHAN FLOWS *********
ADD HYD              316SW.2 13&12    4      1.44400      2179.07     131.504      1.70755    1.650    2.358
*S**************CALC BASIN 316SW ***********************
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                              FROM  TO                     PEAK         RUNOFF                TIME TO    CFS      PAGE =    4
                  HYDROGRAPH   ID   ID          AREA      DISCHARGE      VOLUME      RUNOFF     PEAK     PER
COMMAND       IDENTIFICATION   NO.  NO.        (SQ MI)       (CFS)      (AC-FT)     (INCHES)   (HOURS)    ACRE     NOTATION

COMPUTE NM HYD         316SW   -     1         .07600       130.48       7.144      1.76261    1.600    2.683 PER IMP=   60.00
*S*************** ADD 316SW TO CHAN FLOWS ***********
ADD HYD              316SW.3  1& 4   5        1.52000      2297.59     138.648      1.71030    1.650    2.362
*S***** ROUTE COMBINED FLOWS THRU N BRANCH PM CHAN IN BASIN 316SW *******
ROUTE                316SW.4   5     3        1.52000      2312.53     138.648      1.71030    1.650    2.377
*S** SUM N BRANCH PIED MARC CHAN AND W BRANCH CALABACILLAS DIVERSION CHAN ***
ADD HYD              316SW.5 23& 3   2        1.93600      2747.52     173.290      1.67830    1.650    2.217
*S************** CALC BASIN 316SE **********************
COMPUTE NM HYD         316SE   -     1         .06500       118.83       6.335      1.82754    1.550    2.856 PER IMP=   65.00
*S*
*S*************** ADD 316SE TO SUMMED CHANNEL FLOWS ***************
ADD HYD              316SE.1  1& 2   3        2.00100      2848.25     179.626      1.68315    1.650    2.224
*S******  CALC BASIN 314BM *************
*S** NOTE: 314BM IS THE PART OF BASIN 314B THAT IS IN LVDF NO. 1****
COMPUTE NM HYD         314BM   -     1         .02740        38.70       1.214       .83098    1.500    2.207 PER IMP=   10.00
*S** ADD 314BM TO THE FLOWS GOING INTO LVDF NO. 1 ********
*S* SUM IS TOTAL INTO LAS VENTANAS DRAINAGE FACILITY NO. 1 IN BASIN 316
ADD HYD              316SE.2  1& 3   2        2.02840      2870.51     180.841      1.67164    1.650    2.211
*S*
*S*
*S**    ROUTE SUMMED FLOWS THRU LAS VENTANAS DETENTION DAM
*S**    (FORMERLY KNOWN AS LVDF NO. 1)
*S**    USE 32" ORIFICE PLATE TO LIMIT PRINCIPAL SPILLWYA DISCHARGE
*S**    TO 80 CFS FOR WATER MATCHING THE CREST OF THE EMERGENCY SPILLWAY
*S**    AT ELEVATION 5405
*S*      (EXISTING 100 YR FLOW INTO POND AREA=250CFS)
*S**    5/31/00 Interpolated between 5404 and 5405 for outflow
*S**    5/31/00 Changed storage to match "Reserved" Volumes
ROUTE RESERVOIR     POND_ONE   2     4        2.02840        75.74     155.396      1.43644    3.450     .058 AC-FT=  133.111
*S* ROUTE LVDF NO. 1 DISCHARGE THRU 42" PIPE (REACH 6) NORTH TO 314BN
ROUTE                314BN.1   4     3        2.02840        75.73     155.075      1.43347    3.550     .058
*S************** CALC BASIN 315B **********************
*S***  NOTE: 315B DOES NOT GET INTO LVDF NO. 1 IN BASIN 316 **************
COMPUTE NM HYD          315B   -    21         .04700       104.82       4.434      1.76881    1.500    3.485 PER IMP=   60.00
*S* FLOWS FROM 315B ARE NOT ALLOWED TO DISCHARGE OFF SITE AS IN EXIST CONDITIONS
*S**  ASSUME FLOWS CAN DISCHARGE OFFSITE, CHANGE ID FROM 1 TO 21 - DJG - 9/27/02
*S******  CALC BASIN 314BS *************
*S*****   NOTE:  FLOW FROM 314BS GOES EASTWARD OUT OF LAS VENTANAS (NO POND)
COMPUTE NM HYD         314BS   -    22         .02330        32.91       1.033       .83098    1.500    2.207 PER IMP=   10.00
*S******  CALC BASIN 314BN  ***********
COMPUTE NM HYD         314BN   -     1         .02740        37.36       1.214       .83098    1.500    2.131 PER IMP=   10.00
*S*** ADD 314BN TO PIPE DISCHARGE FROM LVDF NO. 1 ****
ADD HYD               320.10  3& 1   2        2.05580        75.90     156.289      1.42544    3.200     .058
*S*******************CALCULATE BASIN 320 ********************
COMPUTE NM HYD        320.00   -     1         .19000       286.27      15.853      1.56445    1.600    2.354 PER IMP=   49.00
*S* FLOWS FROM 320 ARE NOT ALLOWED TO DISCHARGE OFF SITE AS IN EXIST CONDITIONS
*S* ROUTE 320 THRU "LVDF NO. 2" AT E. END OF 320, ORIFICE=30" ***
ROUTE RESERVOIR     POND_TWO   1     4         .19000        31.76      15.853      1.56444    2.350     .261 AC-FT=     9.713
*S* ROUTE LVDF NO. 2 DISCHARGE THROUGH 36" PIPE (REACH 7) EAST
ROUTE                 320.11   4     5         .19000        31.76      15.853      1.56444    2.400     .261
*S** ADD REACH 7 FLOWS TO REACH 6. BECOMES A 54" PIPE (REACH 8) *******
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                                 FROM  TO                      PEAK           RUNOFF                 TIME TO     CFS       PAGE =    5
                   HYDROGRAPH     ID   ID          AREA      DISCHARGE        VOLUME       RUNOFF     PEAK       PER
COMMAND        IDENTIFICATION    NO.   NO.       (SQ MI)       (CFS)          (AC-FT)     (INCHES)   (HOURS)     ACRE      NOTATION

ADD HYD                  320.20  2& 5   3         2.24580        107.29       172.142       1.43720     2.550      .075
*S***** ROUTE THRU 54" PIPE (REACH 8) NORTH TO IRVING BLVD ***
ROUTE                    505.10    3    2         2.24580        107.28       171.995       1.43597     2.600      .075
*S*******************CALCULATE BASIN 505 *********************
COMPUTE NM HYD           505.00   -     1          .02200         35.77         1.225       1.04368     1.500     2.540 PER IMP=   20.00
*S*************** ADD 505 FLOW TO FLOWS ***********
*S**** FLOW TOWARDS CALABACILLAS AT NE COR LAS VENTANAS DRAINAGE
ADD HYD                  505.20  1& 2  15         2.26780        108.80       173.219       1.43216     2.050      .075
*S****END OF LAS VENTANAS DRAINAGE ANALYSIS
COMPUTE NM HYD             314A   -     3          .08600        143.70         7.962       1.73598     1.600     2.611 PER IMP=   59.10
*S****GET NORTH PIECE (PANHANDLE) OF 313 INTO SYSTEM TO CALABACILLAS******
*S*******************CALCULATE BASIN 313N *********************
COMPUTE NM HYD           313.10   -     6          .06500        114.35         6.018       1.73598     1.550     2.749 PER IMP=   59.10
*S****** ADD 314A/316R/313N FLOWS INTO LAST SECTION OF PIPE INTO PARK POND***
ADD HYD                  113.30  3&22   4          .10930        169.50         8.995       1.54305     1.550     2.423
ADD HYD                  113.20  4& 6   5          .17430        283.85        15.013       1.61500     1.550     2.545
*S***** ROUTE 316R/314A/313N TOTAL INTO LAST SECTION OF PIPE INTO PARK POND***
ROUTE                    113.40    5    2          .17430        283.63        15.013       1.61500     1.600     2.543
*S*******************CALCULATE BASIN 314.1 *********************
COMPUTE NM HYD           314.10   -     3          .03500         68.88         2.639       1.41366     1.500     3.075 PER IMP=   40.00
*S****** ADD 314.1 AND 314A/316R/313N FOR DISCH. INTO POND*****
ADD HYD                  113.30  3& 2   4          .20930        341.67        17.652       1.58133     1.550     2.551
*S********* ROUTE THRU PARK POND WITH ASSUMED DISCHARGE ***********************
*S*** ASSUME 48" DISCHARGE PIPE *****************************
ROUTE RESERVOIR          507.20    4    5          .20930        101.94        17.652       1.58133     2.000      .761 AC-FT=     7.683
*S***** ROUTE POND DISCH. THRU PIPE TO UNSER LYONS******
ROUTE                    113.40    5    2          .20930        101.94        17.652       1.58133     2.000      .761
*S*********** CALCULATE BASIN 312 **********************
COMPUTE NM HYD           312.00   -     1          .21100        304.64        19.536       1.73598     1.650     2.256 PER IMP=   59.10
*S****** ADD POND DISCH. AND 312 ***********
ADD HYD                  113.30  1& 2   4          .42030        382.97        37.187       1.65896     1.650     1.424
*S*****  CALCULATE BASIN 311N ************
COMPUTE NM HYD             311N   -     1          .04800        105.97         4.444       1.73598     1.500     3.450 PER IMP=   59.10
*S********** CALCULATE BASIN 315NE (PORTION OF 315N THAT IS BOUNDED BY *********
*S*                   AND "TRACT 6" BOUNDARY AS SHOWN ON MAP IN LYON BLVD SD DMP)
COMPUTE NM HYD            315NE   -    40          .03900         86.10         3.611       1.73598     1.500     3.450 PER IMP=   59.10
*S*                  ROUTE THRU STORM DRAIN TO BASIN 313SA
ROUTE                    315NER   40   41          .03900         83.50         3.611       1.73600     1.500     3.345
*S********** CALCULATE BASIN 313SA (AREA NORTH OF LYON/UNSER) ************
COMPUTE NM HYD            313SA   -    42          .04700        103.76         4.352       1.73598     1.500     3.450 PER IMP=   59.10
*S*                  ADD ROUTED 315NE AND 313SA
ADD HYD              313SA310 41&42    43          .08600        187.27         7.962       1.73598     1.500     3.402
*S*                  ROUTE THRU STORM DRAIN TO BASIN 310
ROUTE                    313SAR   43   44          .08600        180.21         7.962       1.73599     1.500     3.274
*S********** CALCULATE BASIN 310 ************
COMPUTE NM HYD           310.00   -    45          .01500         33.13         1.389       1.73598     1.500     3.451 PER IMP=   59.10
*S*                  ADD ROUTED 313SA AND 310
ADD HYD              313SA310 44&45    46          .10100        213.34         9.351       1.73597     1.500     3.300
*S*                  ROUTE THRU STORM DRAIN TO BASIN 311S
ROUTE                      310R   46   47          .10100        211.93         9.351       1.73598     1.550     3.279
*S************** CALCULATE BASIN 311S ****************
COMPUTE NM HYD             311S   -    48          .04800        105.97         4.444       1.73598     1.500     3.450 PER IMP=   59.10
*S*                  ADD ROUTED 310 AND 311S
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                                 FROM  TO                    PEAK        RUNOFF                 TIME TO   CFS      PAGE =   6
                    HYDROGRAPH    ID   ID        AREA      DISCHARGE     VOLUME      RUNOFF      PEAK     PER
COMMAND           IDENTIFICATION  NO.  NO.      (SQ MI)      (CFS)       (AC-FT)    (INCHES)   (HOURS)   ACRE      NOTATION

ADD HYD                310311S 47&48  49         .14900      312.32      13.795     1.73597    1.500    3.275
*S*                ROUTE THRU STORM DRAIN TO BASIN 311N
ROUTE                    311SR   49   50         .14900      305.11      13.795     1.73598    1.550    3.200
*S****** ADD ROUTED 311S TO 311N ***********
*S*                TOTAL FLOW IN LYON BLVD SD SOUTH OF PARADISE
*S*                SIN 312 THAT IS SOUTH OF PARADISE IS ADDED IN ON NORTH SIDE)
ADD HYD                   311T 50& 1  51         .19700      397.51      18.239     1.73598    1.550    3.153
*S****** ADD 311T TO POND DISCH. AND 312 ***********
ADD HYD                 113.40 51& 4   8         .61730      706.38      55.427     1.68354    1.600    1.788
*S** NOW RT. 312/314/316R THRU PIPE TO CALABACILLLAS****
ROUTE                   112.20   8    14         .61730      683.84      55.427     1.68354    1.650    1.731
*S************** ID14 IS DISCHARGE FROM 312 TO CAB.******
*S**** DOWN TO PDN CHANNEL BASINS******
*S*********** NOW CALCULATE BASIN 315W **************
*S*** NOTE:   (BHI ANALYSIS BY NM) FROM 315W
COMPUTE NM HYD          315.10   -     3         .13300      293.36      12.314     1.73598    1.500    3.446 PER IMP=  59.10
*S*************** ADD 315B TO 315W
ADD HYD                 115.20 21& 3   1         .18000      398.18      16.748     1.74455    1.500    3.456
*S*
*S*************** ADD 317A TO 315B AND 315W
ADD HYD                 315.20 20& 1  19         .19700      435.38      18.322     1.74381    1.500    3.453
*S***** ROUTE THIS FLOW TO WEST EDGE OF 309 THRU PDN CHANNEL****
ROUTE                   116.00   19    2         .19700      395.88      18.322     1.74381    1.550    3.140
*S*********** NOW CALCULATE BASIN 315S **************
COMPUTE NM HYD          315.20   -     3         .18000      396.83      16.665     1.73598    1.500    3.445 PER IMP=  59.10
*S*************** ADD 315S FLOW TO PDN CHANNEL FLOW @ W. EDGE 309***
ADD HYD                 116.20  2& 3   1         .37700      756.55      34.987     1.74007    1.500    3.136
*S***** ROUTE THIS FLOW TO EAST EDGE OF 309 THRU PDN CHANNEL****
ROUTE                   116.00    1    2         .37700      763.83      34.987     1.74007    1.550    3.166
*S************ CALCULATE BASIN 309S *********************
COMPUTE NM HYD            309S   -     3         .04800      105.97       4.444     1.73598    1.500    3.450 PER IMP=  59.10
*S*************** ADD 309S FLOW TO PDN CHANNEL FLOW @ E. EDGE 309***
ADD HYD                 116.20  2& 3   1         .42500      856.22      39.431     1.73961    1.550    3.148
*S***** ROUTE THIS FLOW THRU 302W IN PDN CHANNEL*****
ROUTE                   116.00    1    2         .42500      869.26      39.431     1.73961    1.550    3.196
*S*********** NOW CALCULATE BASIN 315N**************
COMPUTE NM HYD          315.00   -     1         .14100      310.98      13.055     1.73598    1.500    3.446 PER IMP=  59.10
*S********* ROUTE 315N THRU INTERCEPTOR CHANNEL TO THE TOP OF B302W BOUNDRY***
ROUTE                   115.01    1    3         .14100      278.83      13.055     1.73598    1.550    3.090
*S************ CALCULATE BASIN 309N *********************
COMPUTE NM HYD          309.00   -     4         .04800      105.97       4.444     1.73598    1.500    3.450 PER IMP=  59.10
*S************ ROUTE 309 THRU PROPOSED CULVERT 3 ***********
ROUTE                   109.00    4    5         .04800      106.38       4.444     1.73599    1.500    3.463
*S**ROUTE CULVERT DISCHARGE THROUGH SMALL CHANNEL TO THE TOP OF B302W****
ROUTE                   115.01    5    6         .04800      101.38       4.444     1.73599    1.550    3.300
*S**INTERCEPTOR CHANNEL ALSO PICKS UP PART OF 304, WE'LL CALL IT 304S**
*S************ CALCULATE BASIN 304S *********************
COMPUTE NM HYD          304.00   -     4         .03500       77.28       3.241     1.73598    1.500    3.450 PER IMP=  59.10
*S ADD TO GET THE TOTAL AT THE NORTH BOUNDRY OF B302W**
ADD HYD                 304.10  3& 6   7         .18900      380.21      17.499     1.73598    1.550    3.143
ADD HYD                 304.20  4& 7   8         .22400      447.59      20.739     1.73598    1.550    3.122
*S *ROUTE 315N/309N/304S FLOWS THRU INTERCEPTOR CHANNEL TO END OF B302W @ PDN**
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                                FROM  TO                       PEAK        RUNOFF               TIME TO    CFS       PAGE =   7
                   HYDROGRAPH    ID   ID          AREA       DISCHARGE     VOLUME      RUNOFF     PEAK     PER
COMMAND          IDENTIFICATION  NO.  NO.       (SQ MI)       (CFS)        (AC-FT)    (INCHES)  (HOURS)    ACRE      NOTATION

ROUTE                   115.01    8    9         .22400        453.25       20.739     1.73598    1.550    3.162
*S************** CALCULATE BASIN 302W **********************
COMPUTE NM HYD          302.00    -    1         .04500         99.35        4.166     1.73598    1.500    3.450 PER IMP=  59.10
*S**** ADD INTERCEPTOR FLOW TO 302W FLOW @ POND IN 302W***
ADD HYD                 116.20  9& 1   4         .26900        539.87       24.906     1.73598    1.550    3.136
*S****ROUTE COMBINED FLOW THROUGH POND**
*S*  REMOVE POND PER AMAFCA INSTRUCTION
*S>>>ADD INTERCEPTOR/302 FLOW TO THE PDN CHANNEL FLOW**
ADD HYD                 116.30  2& 4   5         .69400       1409.13       64.337     1.73820    1.550    3.173
COMPUTE NM HYD         SHENO1W   -    20         .10350        121.70        7.919     1.43452    1.700    1.837 PER IMP=  40.00
ADD HYD                 116.31  5&20   5         .79750       1494.38       72.255     1.69879    1.550    2.928
*S***ADD OUTFLOW FROM SHENO1W TO FLOW FROM 302W
*S***** ROUTE THIS FLOW THRU 302E IN PDN CHANNEL*****
ROUTE                   116.00    5    2         .79750       1475.12       72.255     1.69879    1.550    2.890
*S************** CALCULATE BASIN 302E **********************
COMPUTE NM HYD          302.00    -    1         .08900         76.85        2.679      .56450    1.550    1.349 PER IMP=   6.20
*S*************** ADD 302E FLOW TO PDN CHANNEL FLOW @ EAST END OF 302***
ADD HYD                 116.20  2& 1  19         .88650       1551.96       74.935     1.58491    1.550    2.735
*S****** ID=19 IS FLOW AT CULVERT AT PDN IN B302*****
*S*                 CALCULATE BASIN 313SB
COMPUTE NM HYD           313SB    -    3         .04200         92.73        3.889     1.73598    1.500    3.450 PER IMP=  59.10
*S*                 ROUTE BASIN 313SB THRU 308, 2 SECT.
ROUTE                   108.00    3   13         .04200         79.26        3.889     1.73599    1.550    2.949
*S************ CALCULATE BASIN 308 **********************
COMPUTE NM HYD          308.00    -    4         .03600         47.78        1.746      .90934    1.500    2.074 PER IMP=  22.10
*S*********** ADD ROUTE FROM 313 AND 308 ******************
ADD HYD                 108.10 13& 4   1         .07800        122.58        5.635     1.35445    1.550    2.456
*S********** ROUTE THIS FLOW PART WAY DOWN MAIN BRANCH ******
ROUTE                   104.10    1    3         .07800         84.59        5.635     1.35446    1.650    1.695
*S************ CALCULATE BASIN 307 **********************
COMPUTE NM HYD          307.00    -    4         .06500        131.80        5.447     1.57132    1.500    3.168 PER IMP=  52.00
*S************ ROUTE CULVERT 1 DISCHARGE THRU 307 *******
*S**** ADD 307/310/311R INTO  PLAYA IN 307 **********
*S********* ROUTE  THRU PLAYA IN 307 ***********************
ROUTE RESERVOIR         507.20    4    9         .06500         71.35        4.789     1.38146    1.650    1.715 AC-FT=    2.107
*S**** ROUTE OUTFLOW TO PM MAIN BRANCH ******
ROUTE                   104.40    9    5         .06500         49.76        4.788     1.38116    1.800    1.196
*S********** ADD (307+308) AT PM POINT ********
ADD HYD                 104.20  3& 5   4         .14300        127.04       10.423     1.36659    1.750    1.388
*S************ CALCULATE BASIN 306 **********************
COMPUTE NM HYD          306.00    -    3         .03100         68.49        2.873     1.73776    1.500    3.452 PER IMP=  59.20
*S*********** ROUTE THRU PLAYA IN BASIN 306 ********
ROUTE RESERVOIR         506.00    3    1         .03100         16.96        2.216     1.34028    1.900     .855 AC-FT=    1.477
*S******* ROUTE POND DISCHARGE THRU 305 **************
ROUTE                   105.00    1    5         .03100         16.48        2.212     1.33808    2.050     .831
*S********** CALCULATE BASIN 305 **********************
COMPUTE NM HYD          305.00    -    3         .02700         47.32        1.891     1.31316    1.500    2.739 PER IMP=  40.50
ADD HYD                 105.10  5& 3   1         .05800         47.39        4.103     1.32648    1.500    1.277
*S********* ROUTE 305T TO PM PART WAY DOWN 304*******************
ROUTE                   104.60    1    5         .05800         45.24        4.103     1.32628    1.550    1.219
*S****** ADD 305T TO 307-308 ROUTES AT MAIN BRANCH PART WAY DOWN 304*****
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                                  FROM  TO                     PEAK       RUNOFF                TIME TO    CFS      PAGE =   8
                     HYDROGRAPH    ID   ID        AREA       DISCHARGE    VOLUME     RUNOFF      PEAK      PER
COMMAND            IDENTIFICATION  NO.  NO.      (SQ MI)       (CFS)      (AC-FT)   (INCHES)    (HOURS)    ACRE      NOTATION

ADD HYD                  104.70  4& 5   3        .20100       157.67     14.525    1.35496     1.700     1.226
*S***** ROUTE REMAINING 700' TO END OF BASIN 304 *************
ROUTE                    104.80    3    2        .20100       157.96     14.524    1.35488     1.750     1.228
*S************ CALCULATE BASIN 304 *********************
COMPUTE NM HYD           304.00    -    3        .18500       236.35      9.600     .97296     1.500     1.996 PER IMP=  25.00
*S***** ADD 304 TO ALL FLOWS @ END OF 304 TO GET TOTAL FLOW THERE ****
ADD HYD                  104.11  2& 3   1        .38600       345.01     24.124    1.17183     1.550     1.397
ROUTE                    103.00    1    2        .38600       229.03     24.118    1.17151     1.750      .927
*S*************** CALCULATE BASIN 303 *********************
COMPUTE NM HYD           303.00    -    3        .16500        97.30      4.968     .56450     1.650      .921 PER IMP=   6.20
*S************* ADD 304T ROUTE AND 303 ****************
ADD HYD                  103.10  2& 3   1        .55100       313.28     29.085     .98974     1.700      .888
*S************** ROUTE FLOW THRU PROPOSED CULVERT 4 ***********
ROUTE                    103.20    1    2        .55100       313.57     29.085     .98974     1.700      .889
*S*** !!!!!!!!
*S************* ADD PDN CHANNEL FLOW FROM WEST TO MIDDLE BRANCH FLOW*****
ADD HYD                  103.10  2&19   5       1.43750      1774.49    104.020    1.35678     1.600     1.929
ROUTE                    101.00    5   13       1.43750      1806.83    104.019    1.35677     1.600     1.964
*S*>>> REPLACE BASIN 301 WITH HYMO RUN FROM SHENANDOAH ESTATES SUBDIVISION
*S>>>>>>>>>>>>>>CALCULATE BASIN SHENO1E
COMPUTE NM HYD         SHENO1E    -   10        .09600        40.09      2.395     .46784     1.700      .652 PER IMP=    .00
ROUTE RESERVOIR         POND-1   10   11        .09600        38.41      2.395     .46786     1.750      .625 AC-FT=     .324
ROUTE                     PIPE   11   30        .09600        38.37      2.399     .46859     1.767      .625
*S>>>>>>>>>>>>>>CALCULATE BASIN SHENO2
COMPUTE NM HYD          SHENO2    -   11        .02860        25.26       .714     .46784     1.500     1.380 PER IMP=    .00
ROUTE RESERVOIR         POND-2   11   12        .02860        20.28       .714     .46790     1.600     1.108 AC-FT=     .216
ROUTE                     PIPE   12   31        .02860        20.54       .712     .46693     1.633     1.122
ADD HYD                TOTPIPE 30&31  32        .12460        53.47      3.111     .46820     1.667      .671
ROUTE                  TOTPIPE   32   33        .12460        53.41      3.111     .46820     1.667      .670
*S>>>>>>>>>>>>>>CALCULATE BASIN SHENO3
COMPUTE NM HYD          SHENO3    -   12        .04501        90.18      3.481    1.45009     1.500     3.130 PER IMP=  40.00
DIVIDE HYD                O3SD   12   30        .04052        57.00      3.134    1.45008     1.450     2.198
                          O3ST  and   20        .00449        33.18       .347    1.45008     1.500    11.557
ROUTE                  TOTPIPE   30   31        .04052        57.51      3.059    1.41550     1.500     2.217
ADD HYD                TOTPIPE 31&33  30        .16512       103.99      6.171     .70068     1.633      .984
ROUTE                   CRSMT2   20   21        .00449        31.19       .339    1.41735     1.533    10.865
DIVIDE HYD                O3SD   21   31        .00328        16.80       .248    1.41726     1.500     8.006
                          O3ST  and   22        .00121        14.39       .091    1.41726     1.533    18.632
ADD HYD                TOTPIPE 31&30  33        .16840       108.34      6.418     .71457     1.600     1.005
*S>>>>>>>>>>>>>>CALCULATE BASIN SHENA
COMPUTE NM HYD           SHENA    -    1        .01820        35.23      1.392    1.43452     1.500     3.024 PER IMP=  40.00
DIVIDE HYD                 ASD    1   10        .01461        16.00      1.118    1.43450     1.400     1.711
                           AST  and   11        .00359        19.23       .274    1.43450     1.500     8.376
ADD HYD                TOTPIPE 10&33  30        .18302       124.34      7.505     .76892     1.600     1.062
ROUTE                     PIPE   30   31        .18302       124.64      7.506     .76897     1.633     1.064
ADD HYD                   A&O3 11&22  21        .00479        32.06       .364    1.42505     1.500    10.448
DIVIDE HYD             CRESSSD   21   30        .00479        32.06       .364    1.42505     1.500    10.448
                       CRESSST  and   22        .00000          .00       .000     .00000     -.033      .000
ADD HYD                TOTPIPE 31&30  32        .18781       133.04      7.870     .78572     1.600     1.107
ROUTE                     PIPE   32   30        .18781       133.83      7.870     .78568     1.533     1.113
ROUTE                  BURMART   22   21        .00000          .00       .000     .00000     -.033      .000
*S>>>>>>>>>>>>>>CALCULATE BASIN SHENB3
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                                   FROM  TO                      PEAK       RUNOFF                TIME TO   CFS       PAGE =   9
                        HYDROGRAPH  ID    ID        AREA       DISCHARGE    VOLUME     RUNOFF      PEAK     PER
COMMAND             IDENTIFICATION  NO.   NO.     (SQ MI)        (CFS)     (AC-FT)    (INCHES)   (HOURS)    ACRE      NOTATION

COMPUTE NM HYD              SHENB3    -     1      .00420          8.43       .325     1.45009     1.500     3.135 PER IMP=  40.00
DIVIDE HYD                  MARTSD    1    39      .00258          2.00       .199     1.45001     1.350     1.211
                            MARTST  and    29      .00162          6.43       .125     1.45001     1.500     6.198
ADD HYD                    TOTPIPE 30&39    1      .19039        135.83      8.061      .79389     1.533     1.115
ROUTE                         PIPE    1    30      .19039        136.18      8.061      .79385     1.533     1.118
ADD HYD                       BUS1 21&29   20      .00162          6.43       .125     1.44721     1.500     6.198
ROUTE                     CUMBURS1   20    21      .00162          5.28       .125     1.45039     1.567     5.092
*S>>>>>>>>>>>>>>CALCULATE BASIN SHENB2
COMPUTE NM HYD              SHENB2    -     3      .00670         12.90       .518     1.45009     1.500     3.009 PER IMP=  40.00
ADD HYD                       B2ST 21& 3   20      .00832         17.61       .632     1.42436     1.533     3.307
DIVIDE HYD                  NBURSD   20    32      .00832         17.61       .632     1.42436     1.533     3.307
                            NBURST  and    22      .00000           .00       .000      .00000     -.033      .000
ADD HYD                    TOTPIPE 30&32   31      .19871        153.79      8.693      .82025     1.533     1.209
*S>>>>>>>>>>>>>>CALCULATE BASIN SHENB1
COMPUTE NM HYD              SHENB1    -     2      .01060         19.03       .719     1.27203     1.500     2.806 PER IMP=  30.00
DIVIDE HYD                    B1SD    2    30      .00685          5.40       .465     1.27200     1.400     1.232
                              B1ST  and    20      .00375         13.63       .255     1.27200     1.500     5.677
ADD HYD                       B1ST 20&22   21      .00375         13.63       .254     1.27039     1.500     5.676
ADD HYD                   TOTPIPES 31&30   32      .20556        159.19      9.143      .83397     1.533     1.210
*S>>>>>>>>>>>>>>CALCULATE BASIN SHENC1
COMPUTE NM HYD              SHENC1    -     4      .00570         11.16       .421     1.38510     1.500     3.060 PER IMP=  36.00
*S>>>>>>>>>>>>>>CALCULATE BASIN SHENO4
COMPUTE NM HYD              SHENO4    -    49      .00280          5.62       .217     1.45009     1.500     3.138 PER IMP=  40.00
ADD HYD                         ID  4&49   48      .00850         16.79       .638     1.40644     1.500     3.086
ROUTE                     CUMBURS4   48    22      .00850         13.96       .623     1.37463     1.567     2.566
*S>>>>>>>>>>>>>>CALCULATE BASIN SHENC2
COMPUTE NM HYD              SHENC2    -     5      .00350          6.10       .271     1.45009     1.550     2.724 PER IMP=  40.00
ADD HYD                      INLET 22& 5   29      .01200         19.85       .888     1.38704     1.567     2.585
DIVIDE HYD                  SBURSD   29    35      .00940          9.00       .695     1.38704     1.433     1.496
                            SBURST  and    25      .00260         10.85       .192     1.38704     1.567     6.518
ADD HYD                   TOTPIPES 32&35   30      .21496        168.19      9.838      .85815     1.533     1.223
ADD HYD                      INLET 21&25   20      .00635         23.37       .447     1.31815     1.533     5.747
DIVIDE HYD                 BURSUMP   20    31      .00419         10.65       .294     1.31815     1.467     3.973
                           BURESID  and    29      .00217         12.72       .152     1.31815     1.533     9.177
ADD HYD                   TOTPIPES 30&31   32      .21914        178.84     10.133      .86695     1.533     1.275
ROUTE                         PIPE   32    31      .21914        179.14     10.133      .86695     1.533     1.277
ROUTE                    BASINABCT   29    22      .00217         13.11       .153     1.32054     1.533     9.457
*S>>>>>>>>>>>>>>CALCULATE BASIN SHEND2
COMPUTE NM HYD              SHEND2    -     9      .00270          5.42       .209     1.45009     1.500     3.138 PER IMP=  40.00
DIVIDE HYD                 SFRYLSD    9    33      .00160          1.20       .124     1.44997     1.350     1.168
                           SFRYLST  and    25      .00110          4.22       .085     1.44997     1.500     6.025
ADD HYD                   TOTPIPES 31&33   30      .22075        180.34     10.252      .87075     1.533     1.276
ADD HYD                      INLET 25&22   21      .00326         16.96       .237     1.36398     1.533     8.124
ROUTE                         PIPE   30    31      .22075        180.28     10.252      .87076     1.533     1.276
*S>>>>>>>>>>>>>>CALCULATE BASIN SHEND3
COMPUTE NM HYD              SHEND3    -     7      .00180          3.62       .139     1.45009     1.500     3.143 PER IMP=  40.00
ADD HYD                      INLET 21& 7   23      .00506         20.33       .373     1.38329     1.533     6.275
DIVIDE HYD                WCUMCCSD   23    35      .00364          8.80       .268     1.38329     1.467     3.778
                          WCUMCCST  and    25      .00142         11.53       .105     1.38329     1.533    12.667
ADD HYD                   TOTPIPES 31&35   30      .22439        189.08     10.520      .87907     1.533     1.317
*S>>>>>>>>>>>>>>CALCULATE BASIN SHEND1
COMPUTE NM HYD              SHEND1    -     6      .01820         36.47      1.408     1.45009     1.500     3.131 PER IMP=  40.00
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                              FROM  TO                    PEAK         RUNOFF               TIME TO    CFS     PAGE =  10
                  HYDROGRAPH   ID   ID         AREA     DISCHARGE      VOLUME      RUNOFF    PEAK      PER
COMMAND       IDENTIFICATION   NO.  NO.      (SQ MI)      (CFS)        (AC-FT)    (INCHES)  (HOURS)    ACRE    NOTATION

DIVIDE HYD             NCCSD     6  36        .01547        19.20       1.197       1.45007    1.400    1.939
                       NCCST   and  26        .00273        17.27        .211       1.45007    1.500    9.894
ADD HYD             TOTPIPES 30&36  31        .23986       208.28      11.686        .91351    1.533    1.357
ADD HYD                INLET 25&26   6        .00415        27.14        .313       1.41581    1.500   10.221
ADD HYD             TOTPIPES  6&31   7        .24401       234.55      11.999        .92205    1.533    1.502
ROUTE                   PIPE     7  30        .24401       235.06      12.000        .92206    1.533    1.505
*S>>>>>>>>>>>>>>CALCULATE BASIN SHENE1
COMPUTE NM HYD        SHENE1   -     1        .01230        24.65        .951       1.45009    1.500    3.132 PER IMP=  40.00
*S>>>>>>>>>>>>>>CALCULATE BASIN SHENE2
COMPUTE NM HYD        SHENE2   -     3        .00760        15.24        .588       1.45009    1.500    3.133 PER IMP=  40.00
ADD HYD                INLET  1& 3  10        .01990        39.89       1.539       1.45006    1.500    3.132
ROUTE                   PIPE    10  14        .01990        39.60       1.505       1.41812    1.500    3.109
*S********* ADD FLOW FROM SHENANDOAH TO FLOW IN MIDDLE BRANCH AT GOLF COURSE **
ADD HYD               101.40 30&13   4       1.68151      2020.86     113.074       1.26085    1.600    1.878
*S>>>>>>>>>>>>>>CALCULATE - BASIN BETWEEN CHANNEL AND GOLF COURSE
COMPUTE NM HYD        301.10   -     3        .02580        49.54       2.191       1.59219    1.500    3.000 PER IMP=  58.00
*S********* ADD FLOW FROM 301.1 TO MIDDLE BRANCH AT GOLF COURSE **
ADD HYD               301.11  3& 4  15       1.70731      2055.26     115.179       1.26491    1.600    1.881
*S**>>>  TOTAL UPSTREAM OF GOLF COURSE IN MIDDLE BRANCH **
*S*** ID 15 IS DISCHARGE UPSTREAM OF GOLF COURSE IN MIDDLE BRANCH ***********
*S************** NORTH BRANCH *****************************************
*S*************** CALCULATE BASIN 204.1 **********************
COMPUTE NM HYD        204.00   -     1        .10200       218.10       8.755       1.60944    1.500    3.341 PER IMP=  50.00
*S*                 ASSUME ALL OF BASIN 204.1 ENTERS PARADISE BLVD. SD
*S*                 UTE 204.1 FLOW THRU 72" PARADISE BLVD. SD TO GOLF COURSE RD.
ROUTE                 201.20     1  64        .10200       194.68       8.755       1.60945    1.550    2.982
*S*************** CALCULATE BASIN 204.3 **********************
COMPUTE NM HYD        204.30   -     3        .08500       118.37       5.604       1.23610    1.550    2.176 PER IMP=  30.00
*S************ ROUTE THRU POND IN GOLF COURSE ********
ROUTE RESERVOIR       204.31     3   2        .08500          .43        .744        .16407   13.650     .008 AC-FT=    5.000
*S********* ROUTE DISCHARGE FROM POND TO FAIRFAX (MID-POINT)******
ROUTE                 204.32     2   6        .08500          .41        .733        .16166   14.600     .008
*S*************** CALCULATE BASIN 204.4 **********************
COMPUTE NM HYD        204.40   -     3        .09500       151.56       6.263       1.23610    1.550    2.493 PER IMP=  30.00
*S********* ROUTE 204.4 THROUGH GOLF COURSE TO FAIRFAX MIDPOINT*****
ROUTE                 204.32     3   5        .09500       150.87       6.263       1.23610    1.550    2.481
*S**** ADD 204.4R AND 204.3R ROUTES***
ADD HYD               204.42  5& 6   7        .18000       150.91       6.996        .72872    1.550    1.310
*S**** ROUTE THIS TOTAL AT FAIRFAX MIDPOINT TO DISCHARGE AT PARADISE****
ROUTE                 204.39     7   2        .18000       145.23       6.989        .72806    1.600    1.261
*S*************** CALCULATE BASIN 204.2 **********************
COMPUTE NM HYD        204.20   -     3        .04900        85.82       3.787       1.44917    1.550    2.736 PER IMP=  42.00
*S**** ADD 204.2 TO TOTAL ROUTES DOWN FAIRFAX *****
ADD HYD               204.21  2& 3   1        .22900       219.23      10.777        .88236    1.600    1.496
*S*************** CALCULATE BASIN 204.5 **********************
COMPUTE NM HYD        204.50   -     3        .09000        72.56       4.440        .92497    1.700    1.260 PER IMP=  15.00
*S**** ADD 204.5 TO 204.2-204.4 SUBBASINS **********
ADD HYD               204.99  1& 3   4        .31900       281.61      15.216        .89438    1.600    1.379
*S*************** ROUTE THRU CULVERT UNDER P.H. BLVD. ***********
*S************* CULVERT CAN'T HANDLE THIS FLOW *******************
*S************ ROUTE THRU POND AREA TO SIMULATE FLOW OVER ROAD ********
ROUTE RESERVOIR       506.00     4   3        .31900       305.71      15.214        .89426    1.600    1.497 AC-FT=     .350
*S*************** CALCULATE BASIN 205.1 - PARADISE RIDGE SUB'D *****
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                                FROM  TO                         PEAK       RUNOFF                TIME TO   CFS      PAGE =  11
                    HYDROGRAPH    ID  ID          AREA      DISCHARGE      VOLUME     RUNOFF       PEAK    PER
COMMAND           IDENTIFICATION  NO. NO.        (SQ MI)       (CFS)       (AC-FT)    (INCHES)   (HOURS)   ACRE      NOTATION

COMPUTE NM HYD        205.10    -     1        .03500         79.85       3.396      1.81930    1.500    3.565 PER IMP=  62.13
*S**** ROUTE 205.1 FLOW IN 72" STORM DRAIN DOWN PARADISE BLVD. TO GOLF COURSE RD
*S*    APPROXIMATELY AT BASIN 204.5 ***************
ROUTE                 201.20    1    66        .03500         66.81       3.396      1.81932    1.550    2.982
*S*************** CALCULATE BASIN 205.2 ***********************
COMPUTE NM HYD        205.20    -     2        .17500        296.52      16.202      1.73598    1.600    2.648 PER IMP=  59.10
*S********** ADD 205.2 AND 205.1R ****************************
ADD HYD               205TOTA 2&66   67        .21000        361.29      19.598      1.74987    1.550    2.688
*S********** ADD 205TOTA AND 204.1R ****************************
*S*** ASSUME THIS IS TOTAL IN PARADISE BLVD. SD JUST WEST OF GOLF COURSE
ADD HYD               205TOT 67&64   68        .31200        555.96      28.354      1.70396    1.550    2.784
*S********** ADD 204.2-204.5 AND 205TOT ****************************
ADD HYD               204.00 3&68     1        .63100        844.23      43.568      1.29462    1.600    2.091
*S**** ROUTE FLOW IN 96" PIPE TO TOP OF BASIN 202.2 ***************
ROUTE                 201.20    1     2        .63100        832.44      43.566      1.29454    1.600    2.061
*S************** COMPUTE BASIN 203 ***********************
COMPUTE NM HYD        203.00    -     3        .12980        104.83       6.328       .91407    1.650    1.262 PER IMP=  24.00
*S**************** CALCULATE BASIN 202.1 ***********************
COMPUTE NM HYD        202.10    -     4        .04220         91.74       3.868      1.71856    1.500    3.397 PER IMP=  58.00
*S******* ROUTE 202.1 FLOW THROUGH BASIN 202.2 *****************
*S**** ROUTE FLOW IN 96" PIPE TO TOP OF BASIN 202.2 ***************
ROUTE                 201.20    4     5        .04220         86.29       3.868      1.71857    1.550    3.195
*S******* ADD ROUTED BASIN 202.1 AND BASIN ************************
ADD HYD               203.00 5& 3     6        .17200        177.64      10.196      1.11144    1.600    1.614
*S********** ADD THE UPPER BASINS (204-205) TO 201.1/203
ADD HYD               201.10 6& 2     4        .80300       1010.08      53.761      1.25532    1.600    1.965
*S*************** COMPUTE BASIN 202.2 **************************
COMPUTE NM HYD        202.20    -     5        .04330         94.13       3.969      1.71856    1.500    3.397 PER IMP=  58.00
*S***** ADD 202.2 AND UPPER BASINS,(COMPARE AT THIS NODE)******
ADD HYD               202.30 4& 5     1        .84630       1075.37      57.730      1.27902    1.600    1.985
*S**** ROUTE NEW HYDRAGRAPH THROUGH THE END OF BASIN 202.3*****
*S**** ROUTE FLOW IN 96" PIPE TO TOP OF BASIN 202.2 ***************
ROUTE                 201.20    1     4        .84630       1080.88      57.729      1.27900    1.600    1.996
*S*************** COMPUTE BASIN 202.3 ***********************
COMPUTE NM HYD        202.30    -     3        .02050         43.78       1.879      1.71856    1.500    3.337 PER IMP=  58.00
*S************** CALCULATE BASIN 202.4 ***********************
COMPUTE NM HYD        202.40    -     5        .04010         87.18       3.675      1.71855    1.500    3.397 PER IMP=  58.00
*S****************** ADD 202.3 TO 202.4  ************************
ADD HYD               202.40 5& 3     2        .06060        130.96       5.554      1.71855    1.500    3.377
*S******** ADD THE UPPER BASINS TO 202.3/202.4 TO END ************
ADD HYD               202.00 2& 4     5        .90690       1172.95      63.283      1.30837    1.600    2.021
*S************** CALCULATE BASIN 202.5 *********************** CHECK AREA
COMPUTE NM HYD        202.50    -     3        .02050         44.57       1.879      1.71856    1.500    3.397 PER IMP=  58.00
*S******** ADD ALL UPPER N. B. BASINS TO 202.35 ************
ADD HYD               202.00 3& 5     6        .92740       1203.87      65.162      1.31744    1.600    2.028
*S******* ID 6 IS TOTAL DISCHARGE AT PASEO DEL NORTE FROM NORTH BRANCH ***
*S**** ROUTE NORTH BRANCH FLOW AT PASEO/GOLF COURSE TO MIDDLE BRANCH *****
*S****           ROUTE FLOW IN 90" PIPE         ***************
ROUTE                 202.51    6    16        .92740       1215.06      65.161      1.31741    1.600    2.047
*S******* ID 16 IS TOTAL DISCHARGE IN NORTH BRANCH PIPE AT MIDDLE BRANCH ***
*S************** MAIN BRANCH INTO DAM *********************************
*S*************** CALCULATE BASIN 103 ***********************
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                              FROM  TO               PEAK       RUNOFF              TIME TO   CFS      PAGE =  12
                HYDROGRAPH     ID   ID      AREA    DISCHARGE   VOLUME    RUNOFF     PEAK     PER
COMMAND       IDENTIFICATION   NO.  NO.   (SQ MI)     (CFS)     (AC-FT)  (INCHES)   (HOURS)   ACRE      NOTATION

COMPUTE NM HYD       103.00    -     2     .05810     128.35      5.385   1.73776    1.500    3.452 PER IMP=  59.20
*S********** ROUTE THRU STORM DRAIN UNDER NORTENA AND GOLF C. RD.********
ROUTE                103.10    2     3     .05810     128.35      5.385   1.73777    1.500    3.452
*S***>>> ADD SHEHANDOAH BASIN E FLOWS TO BASIN 103 *****
ADD HYD              103.10   3&14   4     .07800     167.94      6.742   1.62072    1.500    3.364
*S**>>> FLOW DOWNSTREAM OF GOLF COURSE IN MIDDLE BEFORE ADDING N. BRANCH
ADD HYD              103.20  15& 4  15    1.78531    2175.21    121.921   1.28046    1.600    1.904
*S**>>> TOTAL FLOW DOWNSTRAM OF GOLF COURSE MIDDLE AND NORTH BRANCHES
ADD HYD              103.20  15&16  17    2.71271    3390.24    185.137   1.27965    1.600    1.953
ROUTE                102.10   17    13    2.71271    3354.39    185.137   1.27965    1.600    1.932
*S**>>> TOTAL FLOW IN MIDDLE BRANCH UPSTREAM OF RANCHO SERENA
*S*>>>>*********** CALCULATE BASIN 102 *********************
COMPUTE NM HYD     RANCHO_O1    -     1     .00566       7.49       .257    .85203    1.500    2.069 PER IMP=  16.00
ROUTE               NORT&SER    1     4     .00566       6.39       .253    .83843    1.567    1.764
COMPUTE NM HYD     RANCHO_O2    -     2     .00786       8.57       .279    .66441    1.500    1.705 PER IMP=   9.00
ADD HYD             RANCHO12   2& 4   1     .01352      14.35       .529    .73308    1.533    1.659
DIVIDE HYD            SERENO    1     2     .00676       7.18       .264    .73308    1.533    1.659
                      BUTTER   and    3     .00676       7.18       .264    .73308    1.533    1.659
ROUTE               SER&LARG    2    23     .00676       6.66       .264    .73264    1.600    1.539
ROUTE             BUTTER&DAM    3    24     .00676       4.99       .264    .73170    1.633    1.154
COMPUTE NM HYD    BASIN_102R    -     1     .01107      23.75       .971   1.64507    1.500    3.352 PER IMP=  52.00
ADD HYD            BUTTERTOT   1&24  55     .01783      26.31      1.211   1.27304    1.500    2.306
COMPUTE NM HYD      BASIN_E1    -     1     .00215       4.62       .189   1.64506    1.500    3.361 PER IMP=  52.00
ADD HYD             SER&LARG   1&23   4     .00891      10.47       .448    .94276    1.567    1.837
COMPUTE NM HYD      BASIN_F1    -     1     .00807      16.84       .673   1.56383    1.500    3.261 PER IMP=  47.00
ROUTE               TO_BSN_H    1     3     .00807      16.51       .657   1.52590    1.500    3.197
COMPUTE NM HYD       BASIN_H    -     2     .00192       3.84       .147   1.43384    1.500    3.123 PER IMP=  39.00
ADD HYD             LARG&DOR   2& 3   1     .00999      20.35       .800   1.50199    1.500    3.183
ROUTE               TO_BSN_G    1     3     .00999      20.41       .800   1.50159    1.533    3.193
COMPUTE NM HYD       BASIN_G    -     2     .00279       6.03       .247   1.66131    1.500    3.377 PER IMP=  53.00
ADD HYD             LARG&QUI   2& 3   1     .01278      26.00      1.041   1.52706    1.533    3.179
ROUTE               TOSERENO    1     3     .01278      26.36      1.041   1.52685    1.533    3.223
COMPUTE NM HYD      BASIN_F2    -     2     .00415       9.11       .378   1.71006    1.500    3.429 PER IMP=  56.00
ADD HYD             LARG&SER   2& 3   1     .01693      34.78      1.409   1.56067    1.533    3.210
DIVIDE HYD              PIPE    1     2     .01550      23.00      1.290   1.56067    1.467    2.318
                        STRT   and    3     .00143      11.78       .119   1.56067    1.533   12.895
ROUTE               STORMDRN    2     5     .01550      23.75      1.290   1.56053    1.467    2.394
ADD HYD             SER&LARG   4& 3   1     .01034      22.17       .567   1.02810    1.533    3.351
ROUTE               TOCHANNL    1     4     .01034      22.39       .567   1.02775    1.533    3.384
ADD HYD             CHNNLTOT   4& 5   9     .02584      45.55      1.857   1.34738    1.533    2.754
COMPUTE NM HYD      BASIN_B1    -     1     .00340       7.62       .322   1.77505    1.500    3.504 PER IMP=  60.00
ROUTE               LARG&ENC    1     3     .00340       6.94       .313   1.72502    1.533    3.189
COMPUTE NM HYD      BASIN_B2    -     1     .00408       9.00       .376   1.72631    1.500    3.448 PER IMP=  57.00
ADD HYD             LARG&ENC   1& 3   5     .00748      15.43       .678   1.70078    1.500    3.223
COMPUTE NM HYD      BASIN_A1    -     1     .00567      12.50       .522   1.72630    1.500    3.446 PER IMP=  57.00
ROUTE               ALGR&ENC    1     3     .00567      11.48       .508   1.67856    1.533    3.163
COMPUTE NM HYD      BASIN_A2    -     2     .00426       9.15       .374   1.64507    1.500    3.356 PER IMP=  52.00
ADD HYD             ENC&LARG   2& 3   4     .00993      19.95       .872   1.64621    1.533    3.140
ADD HYD             A1A2B1B2   4& 5   7     .01741      35.22      1.550   1.66965    1.533    3.161
ROUTE               A1A2B1B2    7     4     .01741      35.63      1.549   1.66875    1.533    3.198
COMPUTE NM HYD       BASINA3    -     3     .00209       4.37       .174   1.56383    1.500    3.269 PER IMP=  47.00
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                              FROM  TO                     PEAK         RUNOFF                TIME TO    CFS      PAGE =  13
                  HYDROGRAPH   ID   ID          AREA     DISCHARGE      VOLUME      RUNOFF      PEAK     PER
COMMAND       IDENTIFICATION   NO.  NO.       (SQ MI)      (CFS)        (AC-FT)     (INCHES)  (HOURS)    ACRE     NOTATION

ADD HYD               TOTA&B  3& 4   7         .01950        39.69        1.719     1.65320    1.533    3.180
ROUTE               STORMDRN    7   10         .01950        39.75        1.719     1.65322    1.533    3.185
COMPUTE NM HYD       BASIN_C   -     3         .00046          .82         .027     1.10888    1.500    2.797 PER IMP=  19.00
COMPUTE NM HYD       BASIN_D   -     4         .00024          .38         .010      .80017    1.500    2.445 PER IMP=    .00
COMPUTE NM HYD      BASIN_I1   -    11         .00045          .98         .036     1.51209    1.500    3.388 PER IMP=  37.00
COMPUTE NM HYD      BASIN_I2   -    12         .00168         3.45         .122     1.36719    1.500    3.209 PER IMP=  27.00
*S************* ADD RANCHO2 BASINS (F-H) INTO CHANNEL AT RANCHO SERENO ****
ADD HYD               102.20 13& 9  14        2.73855      3393.67      186.958     1.28005    1.600    1.936
*S************* ADD RANCHO2 BASIN I-2 INTO CHANNEL AT RANCHO SERENO********
ADD HYD               102.20 14&12  13        2.74023      3396.11      187.048     1.27988    1.600    1.936
*S************* ADD RANCHO2 BASIN I-1 INTO CHANNEL AT RANCHO SERENO********
ADD HYD               102.30 13&11  97        2.74068      3396.79      187.084     1.27991    1.600    1.937
*S************* ADD RANCHO BASINS C, D, DIVIDED FLOW FROM RANCHO12 AND
*S************* STORM DRAIN FLOW FROM BASINS A AND B
*S*                         ASSUME ALL THIS RUNOFF GOES DIRECTLY INTO DAM. ADD IN LATER
ADD HYD               102.40  3& 4  88         .00070         1.20         .037     1.00255    1.500    2.677
ADD HYD               102.50 88&10  98         .02020        40.88        1.756     1.63021    1.533    3.162
ADD HYD               102.60 98&55  99         .03803        66.40        2.967     1.46275    1.533    2.728
*S**>>>********* CALCULATE MC BASIN 101.1 **********************
COMPUTE NM HYD        101.10   -    95         .17600       388.27       16.312     1.73776    1.500    3.447 PER IMP=  59.20
COMPUTE NM HYD        101.20   -     2         .07025       123.73        5.688     1.51815    1.550    2.752 PER IMP=  44.19
ROUTE                 402.10    2    1         .07025       124.15        5.688     1.51816    1.550    2.761
COMPUTE NM HYD        101.30   -     2         .02675        54.99        2.166     1.51815    1.500    3.212 PER IMP=  44.19
*S*********** ADD 101.3 to routed flow from 101.2 ***************************
ADD HYD               101.11  2& 1   1         .09700       173.20        7.854     1.51815    1.550    2.790
ROUTE                 402.10    1    2         .09700       174.19        7.854     1.51815    1.550    2.806
*S*********** TOTAL FLOW IN MIDDLE BRAHCH DOWNSTREAM OF RANCHO SERENA **********
ADD HYD               101.11  2&97  18        2.83768      3551.33      194.752     1.28683    1.600    1.955
ROUTE                 102.10   18   19        2.83768      3503.29      194.753     1.28683    1.600    1.929
*S**>>> TOTAL FLOW IN MIDDLE BRANCH UPSTREAM OF RANCHO SERENA
*S********* ID 19 IS TOTAL FLOW INTO DAM from Middle Branch   **********
*S**************** SOUTH BRANCH  ******************
*S***************** CALCULATE BASIN 404 **********************
COMPUTE NM HYD        404.00   -     2         .19500       361.19       14.473     1.39167    1.500    2.894 PER IMP=  44.00
*S**************** ROUTE THIS FLOW THRU 404.1 *********************
ROUTE                 404.01    2    1         .19500       318.67       14.473     1.39167    1.550    2.553
*S*************** CALCULATE BASIN 404.1 **********************
COMPUTE NM HYD        404.10   -     2         .11500       253.87       10.658     1.73776    1.500    3.449 PER IMP=  59.20
*S************ ADD 404.1 AND  404 ROUTE    ***************************
ADD HYD               404.02  1& 2   3         .31000       540.23       25.132     1.52005    1.550    2.723
*S*********** ROUTE THIS FLOW THRU 403.3 LARGE CHANNEL*****************
ROUTE                 403.01    3    1         .31000       542.29       25.132     1.52005    1.550    2.733
*S************** CALCULATE BASIN 403.3 **********************
COMPUTE NM HYD        403.30   -     2         .03700        81.77        3.426     1.73601    1.500    3.453 PER IMP=  59.00
*S********** ROUTE THIS FLOW THRU 10' CONCRETE CHANNEL *****************
ROUTE                 403.02    2    3         .03700        82.18        3.426     1.73602    1.500    3.470
*S************ ADD 403.3R AND TOTAL ROUTE  ***************************
ADD HYD               403.03  3& 1   4         .34700       614.68       28.557     1.54308    1.550    2.768
COMPUTE NM HYD        403.20   -     2         .01400        30.95        1.296     1.73601    1.500    3.454 PER IMP=  59.00
*S********** ROUTE THIS FLOW THRU 10' CONCRETE CHANNEL (S.)****************
ROUTE                 403.21    2    3         .01400        31.24        1.296     1.73605    1.500    3.487
*S****** ADD 403.2R AND TOTAL ROUTE IN LARGE CHANNEL (ID=4)*********************
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                              FROM  TO                   PEAK        RUNOFF               TIME TO     CFS       PAGE =  14
                   HYDROGRAPH  ID   ID       AREA      DISCHARGE     VOLUME     RUNOFF      PEAK      PER
COMMAND          IDENTIFICATION NO.  NO.    (SQ MI)      (CFS)       (AC-FT)   (INCHES)   (HOURS)     ACRE      NOTATION

ADD HYD               403.22  3& 4   1       .36100     642.56       29.853     1.55056     1.550      2.781
*S*** DIVIDE TOTAL INFLOW;PIPE CAP. W/8-9' HEAD IS 265 CFS, REST IS OVERFLOW***
*S****** DIVIDE HYD BETWEEN PIPE CAPACITY AND STREET FLOW****
DIVIDE HYD            403.11    1    3       .28227     265.00       23.343     1.55056     1.450      1.467
                      403.12  and    7       .07873     377.56        6.511     1.55056     1.550      7.493
*S************** ROUTE PIPE FLOW THRU 403 STORM DRAIN TO  GOLF C. RD.***********
ROUTE                 403.19    3    5       .28227     267.05       23.343     1.55056     1.500      1.478
*S********** ROUTE OVERFLOW DOWN FIREWHEEL AND ACROSS BASIN 403*****
ROUTE                 403.21    7    6       .07873     354.13        6.511     1.55066     1.600      7.028
*S******** ADD OVERLAND AND PIPE FLOW FROM MAIN CHANNEL THRU 403*****
ADD HYD               403.40  5& 6   4       .36100     619.17       29.854     1.55058     1.600      2.680
*S***************** CALCULATE BASIN 403 **********************
COMPUTE NM HYD        403.00    -    2       .06800     127.74        6.296     1.73601     1.550      2.935 PER IMP=   59.00
*S*************** ADD 403 AND THE ROUTES THRU 403 **************************
ADD HYD               403.40  4& 2   3       .42900     736.09       36.150     1.57997     1.600      2.681
*S***************** CALCULATE BASIN 402 **********************
COMPUTE NM HYD        402.00    -    2       .09300     205.42        8.611     1.73601     1.500      3.451 PER IMP=   59.00
*S*********** ROUTE 402 THRU PIPE TO G.C. ROAD    ********************
ROUTE                 402.10    2    1       .09300     205.87        8.611     1.73602     1.500      3.459
*S************* ADD 402R AND TOTAL ROUTES FROM 403 ID=3  ***********************
ADD HYD               402.20  1& 3   6       .52200     890.48       44.760     1.60777     1.550      2.665
*S****************** CALCULATE BASIN 403.1 **********************
COMPUTE NM HYD        403.10    -    2       .03000      66.30        2.778     1.73601     1.500      3.453 PER IMP=   59.00
*S****** DIVIDE HYD BETWEEN PIPE CAPACITY AND STREET FLOW****
DIVIDE HYD            403.11    2   22       .02811      46.70        2.602     1.73600     1.450      2.596
                      403.12  and    3       .00189      19.60         .175     1.73600     1.500     16.173
*S********** ROUTE 403.1 PIPE FLOW THRU PIPE TO SOUTH BRANCH*****************
ROUTE                 403.11   22    1       .02811      46.36        2.602     1.73603     1.550      2.577
*S********** ROUTE LEFTOVER STREET FLOW DOWN GOLF COURSE********
ROUTE                 403.21    3    4       .00189       9.08         .176     1.74010     1.550      7.492
*S************** ADD OVERLAND AND PIPE FLOW FROM 403.1******
ADD HYD               403.19  1& 4   1       .03000      55.44        2.778     1.73624     1.550      2.888
*S*** ADD 403.1ROUTES  AND TOTAL ROUTE ID=6 FOR TOT. @ BUTTERFIELD AND G.C.****
ADD HYD               403.12  1& 6   7       .55200     945.92       47.538     1.61476     1.550      2.678
*S*** DIVIDE HYD BETWEEN PIPE CAPACITY AND OVERLAND LEFTOVER THRU 401***
DIVIDE HYD            401.10    7   77       .50218     618.00       43.248     1.61476     1.500      1.923
                      401.20  and    3       .04982     327.92        4.291     1.61476     1.550     10.284
*S************ ROUTE NEW PIPE TOTAL THRU 401 PIPE TO DAM  *********************
ROUTE                 401.10   77    1       .50218     617.52       43.248     1.61475     1.700      1.921
*S********** ROUTE LEFTOVER STREET FLOW OVERLAND THRU 401********
ROUTE                 401.21    3    4       .04982     217.26        4.291     1.61491     1.650      6.813
*S*************** ADD OVERLAND AND PIPE ROUTES THRU 401******
ADD HYD               401.99  1& 4   5       .55200     834.31       47.539     1.61477     1.650      2.362
*S***************** CALCULATE BASIN 401 **********************
COMPUTE NM HYD        401.00    -    2       .20600     309.50       19.073     1.73601     1.650      2.348 PER IMP=   59.00
*S*********** ADD BASIN 401 TO ROUTES*********************
*S************* TOTAL SOUTH BRANCH FLOW *****************
*S*************** ID=3 IS SOUTH BRANCH FLOW *************************
ADD HYD               403.12  2& 5   3       .75800    1143.81       66.612     1.64772     1.650      2.358
*S**** NOW ADD SOUTH BRANCH FLOW (ID3) TO NORTH/MAIN FLOW (ID=18)********
*S********** TOTAL INTO PIEDRAS MARCADAS DAM *******************
ADD HYD               100.00 19& 3   1      3.59568    4618.62      261.364     1.36291     1.600      2.007
*S*                 ADD FLOW FROM BASIN 101.10 DIRECTLY INTO DAM
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                              FROM  TO                    PEAK         RUNOFF                TIME TO    CFS      PAGE =  15
                  HYDROGRAPH   ID   ID          AREA    DISCHARGE      VOLUME      RUNOFF      PEAK     PER
COMMAND       IDENTIFICATION   NO.  NO.       (SQ MI)     (CFS)        (AC-FT)    (INCHES)   (HOURS)    ACRE     NOTATION

ADD HYD                 TOT1  1&95   2        3.77168     4882.32     277.676      1.38040     1.600    2.023
*S*                 FROM MISC RANCHO SERENO BASINS (BASIN 102) DIRECTLY INTO DAM
ADD HYD                 TOT2  2&99   1        3.80971     4938.33     278.276      1.36957     1.600    2.025
*S********** ROUTE THRU PIEDRAS MARCADAS DAM ********
*S*                 MOVE - THIS RATING CURVE DOES NOT REFLECT WHAT EXISTS TODAY.
*S*                  IS A GATED OUTLET SO FLOW OUT ONLY THRU EMERGENCY SPILLWAY.
FINISH
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OPTION 1 - TOTAL

ITEM #	SHORT DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
343.132	ART PVMT,R&R,W/M	3000	SY	$25.00	$75,000.00
701.200	TRCH, BF, > 60" SWR, 8'-12'	1300	LF	$46.00	$59,800.00
701.320	BF MATL, SELECT	149000	CY	$6.00	$894,000.00
910.023	54" RCP, III	1400	LF	$106.00	$148,400.00
910.027	66" RCP, III	3400	LF	$135.00	$459,000.00
910.035	90" RCP, III	530	LF	$243.00	$128,790.00
910.037	96" RCP, III	910	LF	$290.00	$263,900.00
910.0XX	114" RCP, III	470	LF	$475.00	$223,250.00
910.0XX	120" RCP, III	890	LF	$580.00	$516,200.00
910.0XX	10' X 9' CBC	760	LF	$620.00	$471,200.00
910.0XX	11' X 10' CBC	800	LF	$680.00	$544,000.00
910.0XX	11' X 11' CBC	1600	LF	$710.00	$1,136,000.00
910.0XX	12' X 12' CBC	3100	LF	$770.00	$2,387,000.00
910.105	DRNG LN REM, >48"	910	LF	$18.00	$16,380.00
920.210X	MH, TEE TYPE	28	EA	$5,500.00	$154,000.00
1020.00X	BASALT ROCK REMOVAL	199570	CY	$50.00	$9,978,500.00
					=============
				SUB TOTAL	$17,455,000.00
				10% Contingencies	$1,746,000.00
				SUB TOTAL	$19,201,000.00
				22% Soft Costs	$4,224,000.00
				SUB TOTAL	$23,425,000.00
				6% Tax	$1,406,000.00
				ESTIMATED CONSTRUCTION COST	$24,831,000.00

OPTION 2 - TOTAL

ITEM #	SHORT DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
343.132	ART PVMT,R&R,W/M	3000	SY	$25.00	$75,000.00
701.200	TRCH, BF, > 60" SWR, 8'-12'	400	LF	$46.00	$18,400.00
701.320	BF MATL, SELECT	111000	CY	$6.00	$666,000.00
910.023	54" RCP, III	1400	LF	$106.00	$148,400.00
910.027	66" RCP, III	3400	LF	$135.00	$459,000.00
910.030	72" RCP, IV	300	LF	$185.50	$55,650.00
910.032	84" RCP, III	150	LF	$210.00	$31,500.00
910.033	84" RCP, IV	1700	LF	$224.00	$380,800.00
910.035	90" RCP, III	1000	LF	$242.50	$242,500.00
910.0XX	114" RCP, III	470	LF	$475.00	$223,250.00
910.0XX	120" RCP, III	890	LF	$580.00	$516,200.00
910.0XX	10' X 9' CBC	760	LF	$620.00	$471,200.00
910.0XX	12' X 12' CBC	1900	LF	$770.00	$1,463,000.00
920.210X	MH, TEE TYPE	28	EA	$5,500.00	$154,000.00
	65.4 ac-ft DETENTION POND	1	LS	$838,900.00	$838,900.00
1020.00X	BASALT ROCK REMOVAL	250000	CY	$50.00	$12,500,000.00
					==============
				SUB TOTAL	$18,244,000.00
				10% Contingencies	$1,824,000.00
				SUB TOTAL	$20,068,000.00
				22% Soft Costs	$4,415,000.00
				SUB TOTAL	$24,483,000.00
				Land for Pond (9 acres)	$450,000.00
				SUB TOTAL	$24,933,000.00
				6% Tax	$1,496,000.00
				ESTIMATED CONSTRUCTION COST	$26,429,000.00

OPTION 3 - TOTAL

ITEM #	SHORT DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
343.132	ART PVMT,R&R,W/M	3000	SY	$25.00	$75,000.00
701.200	TRCH, BF, > 60" SWR, 8'-12'	400	LF	$46.00	$18,400.00
701.320	BF MATL, SELECT	71200	CY	$6.00	$427,200.00
910.019	42" RCP, III	2000	LF	$70.00	$140,000.00
910.023	54" RCP, III	1800	LF	$106.00	$190,800.00
910.025	60" RCP, III	1900	LF	$121.00	$229,900.00
910.026	60" RCP, IV	1300	LF	$134.00	$174,200.00
910.027	66" RCP, III	3000	LF	$135.00	$405,000.00
910.0XX	78" RCP, III	800	LF	$180.00	$144,000.00
910.0XX	78" RCP, IV	200	LF	$197.00	$39,400.00
910.033	84" RCP, IV	1400	LF	$224.00	$313,600.00
920.210X	MH, TEE TYPE	28	EA	$5,500.00	$154,000.00
	14.2 ac-ft DETENTION POND	1	LS	$335,200.00	$335,200.00
	16 ac-ft DETENTION POND	1	LS	$360,100.00	$360,100.00
	18.0 ac-ft DETENTION POND	1	LS	$386,500.00	$386,500.00
	27.7 ac-ft DETENTION POND	1	LS	$500,700.00	$500,700.00
1020.00X	BASALT ROCK REMOVAL	155000	CY	$50.00	$7,750,000.00
					==============
				SUB TOTAL	$11,644,000.00
				10% Contingencies	$1,164,000.00
				SUB TOTAL	$12,808,000.00
				22% Soft Costs	$2,818,000.00
				SUB TOTAL	$15,626,000.00
				Land for Ponds (15 acres)	$750,000.00
				SUB TOTAL	$16,376,000.00
				6% Tax	$983,000.00
				ESTIMATED CONSTRUCTION COST	$17,359,000.00

PARADISE PORTION-ASSUMES NO BASALT EXCAVATION NECESSARY

ITEM #	SHORT DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
910.018	REM&REPL AC PVMT.	15900	SY	$23.00	$365,700.00
910.018	33" RCP, IV	500	LF	$42.50	$21,250.00
910.022	48" RCP, IV	1000	LF	$70.00	$70,000.00
910.028	60" RCP, IV	500	LF	$107.00	$53,500.00
910.028	66" RCP, IV	500	LF	$135.00	$67,500.00
910.030	72" RCP, IV	1060	LF	$130.00	$137,800.00
910.033	84" RCP, IV	500	LF	$185.00	$92,500.00
701.110	TRCH, BF,18-36" SWR,8-12'	500	LF	$15.00	$7,500.00
701.150	TRCH, BF, 42"-60" SWR, <8'	500	LF	$22.00	$11,000.00
701.160	TRCH, BF, 42"-60" SWR, 8'-12'	1000	LF	$25.00	$25,000.00
701.200	TRCH, BF, > 60" SWR, 8'-12'	2060	LF	$35.00	$72,100.00
920.210X	MH, TEE TYPE	3	EA	$5,500.00	$16,500.00
920.210	MH, 8'DIA, C or E, 6'-10' D	3	EA	$4,300.00	$12,900.00
					============
			SUB TOTAL	**SUB TOTAL**	$953,000.00
				10% Contingencies	$95,000.00
				SUB TOTAL	$1,048,000.00
				22% Soft Costs	$231,000.00
				SUB TOTAL	$1,279,000.00
				5.8125% Tax	$74,000.00
				ESTIMATED CONSTRUCTION COST	$1,353,000.00

OPTION 1 - PARADISE AND LYON BOULEVARDS STORM DRAINS ONLY

ITEM #	SHORT DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
343.132	ART PVMT,R&R,W/M	3000	SY	$25.00	$75,000.00
701.200	TRCH, BF, > 60" SWR, 8'-12'	1300	LF	$46.00	$59,800.00
701.320	BF MATL, SELECT	48895	CY	$6.00	$293,370.00
910.037	96" RCP, III	910	LF	$290.00	$263,900.00
910.0XX	11' X 10' CBC	800	LF	$680.00	$544,000.00
910.0XX	11' X 11' CBC	1600	LF	$710.00	$1,136,000.00
910.105	DRNG LN REM, >48"	910	LF	$18.00	$16,380.00
920.210X	MH, TEE TYPE	11	EA	$5,500.00	$60,500.00
1020.00X	BASALT ROCK REMOVAL	60908	CY	$50.00	$3,045,400.00
					=============
				SUB TOTAL	$5,494,000.00
				10% Contingencies	$549,000.00
				SUB TOTAL	$6,043,000.00
				22% Soft Costs	$1,329,000.00
				SUB TOTAL	$7,372,000.00
				5.8125% Tax	$428,000.00
				ESTIMATED CONSTRUCTION COST	$7,800,000.00
				PARADISE PORTION	$1,353,000.00
				TOTAL	$9,153,000.00

OPTION 2 - PARADISE AND LYON BOULEVARDS STORM DRAINS ONLY

ITEM #	SHORT DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
343.132	ART PVMT,R&R,W/M	3000	SY	$25.00	$75,000.00
701.200	TRCH, BF, > 60" SWR, 8'-12'	400	LF	$46.00	$18,400.00
701.320	BF MATL, SELECT	43055	CY	$6.00	$258,330.00
910.032	84" RCP, III	150	LF	$210.00	$31,500.00
910.033	84" RCP, IV	1700	LF	$224.00	$380,800.00
910.035	90" RCP, III	500	LF	$242.50	$121,250.00
920.210X	MH, TEE TYPE	11	EA	$5,500.00	$60,500.00
1020.00X	BASALT ROCK REMOVAL	47109	CY	$50.00	$2,355,450.00
					=============
				SUB TOTAL	$3,301,000.00
				10% Contingencies	$330,000.00
				SUB TOTAL	$3,631,000.00
				22% Soft Costs	$799,000.00
				SUB TOTAL	$4,430,000.00
				5.8125% Tax	$257,000.00
				ESTIMATED CONSTRUCTION COST	$4,687,000.00
				PARADISE PORTION	$1,353,000.00
				TOTAL	$6,040,000.00

OPTION 3 - PARADISE AND LYON BOULEVARDS STORM DRAINS ONLY

ITEM #	SHORT DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
343.132	ART PVMT,R&R,W/M	3000	SY	$25.00	$75,000.00
701.200	TRCH, BF, > 60" SWR, 8'-12'	400	LF	$46.00	$18,400.00
701.320	BF MATL, SELECT	24007	CY	$6.00	$144,042.00
910.0XX	78" RCP, III	800	LF	$180.00	$144,000.00
910.0XX	78" RCP, IV	200	LF	$197.00	$39,400.00
910.033	84" RCP, IV	1400	LF	$224.00	$313,600.00
920.210X	MH, TEE TYPE	11	EA	$5,500.00	$60,500.00
1020.00X	BASALT ROCK REMOVAL	27531	CY	$50.00	$1,376,550.00
					=============
				SUB TOTAL	$2,171,492.00
				10% Contingencies	$217,000.00
				SUB TOTAL	$2,388,492.00
				22% Soft Costs	$525,000.00
				SUB TOTAL	$2,913,492.00
				5.8125% Tax	$169,000.00
				ESTIMATED CONSTRUCTION COST	$3,082,000.00
				PARADISE PORTION	$1,353,000.00
				TOTAL	$4,435,000.00

OPTION 4 - PARADISE AND LYON BOULEVARDS STORM DRAINS ONLY

ITEM #	SHORT DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
343.132	ART PVMT,R&R,W/M	3000	SY	$25.00	$75,000.00
701.200	TRCH, BF, > 60" SWR, 8'-12'	400	LF	$46.00	$18,400.00
701.320	BF MATL, SELECT	24334	CY	$6.00	$146,004.00
910.035	90" RCP, III	800	LF	$242.50	$194,000.00
910.035	90" RCP, IV	1600	LF	$260.00	$416,000.00
920.210X	MH, TEE TYPE	11	EA	$5,500.00	$60,500.00
1020.00X	BASALT ROCK REMOVAL	28804	CY	$50.00	$1,440,200.00
					==============
				SUB TOTAL	$2,350,000.00
				10% Contingencies	$235,000.00
				SUB TOTAL	$2,585,000.00
				22% Soft Costs	$569,000.00
				SUB TOTAL	$3,154,000.00
				5.8125% Tax	$183,000.00
				ESTIMATED CONSTRUCTION COST	$3,337,000.00
				PARADISE PORTION	$1,353,000.00
				TOTAL	$4,690,000.00

```
Design Log

====================================================================
Storm & Sanitary SelectCAD Design Log

Drainage File:  P:\00280\Hydro\Design\Control\NewSelectCad\John.sdb

Design File:  P:\00280\HYDRO\DESIGN\CONTROL\AMAFCA_BOARD03.DWG

Display Log:  P:\00280\HYDRO\DESIGN\CONTROL\design.log

Date:  Thursday, May 09, 2002 07:35:58 AM
=====================================================================

Designing pipe P6
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:   107.0000 cfs               Flow From: Injected Storm

            Status:      Fixed                       Slope:     0.0097 ft/ft
        Pipe Width:    48.0000 in              Pipe Height:    48.0000 in
     Depth of Flow:     2.5990 ft              Flow Status:    Partial
    Critical Depth:     3.1300 ft                 Capacity:   141.4722 cfs
          Velocity:    12.3747 ft/s
     Froude Number:     1.4497                 Flow Regime: SuperCritical


Designing manhole MH17

  Results:
        Total Flow:   107.0000 cfs               Flow From:   Upstream

            Status:      Fixed
     Chamber Width:     8.0000 ft           Chamber Length:     8.0000 ft


Designing pipe P7
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:   107.0000 cfs               Flow From:   Upstream

            Status:      Fixed                       Slope:     0.0307 ft/ft
        Pipe Width:    48.0000 in              Pipe Height:    48.0000 in
     Depth of Flow:     1.8200 ft              Flow Status:    Partial
    Critical Depth:     3.1300 ft                 Capacity:   251.7065 cfs
          Velocity:    19.2165 ft/s
     Froude Number:     2.8666                 Flow Regime: SuperCritical
```

```
Designing pipe P26

  Results:
        Total Flow:   169.8000 cfs              Flow From: Injected Storm

            Status:      Fixed                      Slope:     0.0050 ft/ft
       Pipe Width:    54.0000 in              Pipe Height:    54.0000 in
    Depth of Flow:     4.5000 ft              Flow Status:      Full
   Critical Depth:     3.7900 ft                 Capacity:   139.0519 cfs
         Velocity:    10.6763 ft/s
    Froude Number:     0.0000                 Flow Regime: Subcritical


Designing pipe P8
  WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:   276.8000 cfs              Flow From:   Upstream

            Status:      Fixed                      Slope:     0.0095 ft/ft
       Pipe Width:    66.0000 in              Pipe Height:    66.0000 in
    Depth of Flow:     3.8790 ft              Flow Status:    Partial
   Critical Depth:     4.6100 ft                 Capacity:   327.3063 cfs
         Velocity:    15.4511 ft/s
    Froude Number:     1.4415                 Flow Regime: SuperCritical


Designing manhole MH15

  Results:
        Total Flow:   276.8000 cfs              Flow From:   Upstream

            Status:      Fixed
    Chamber Width:     8.0000 ft          Chamber Length:     8.0000 ft


Designing pipe P9
  WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:   276.8000 cfs              Flow From:   Upstream

            Status:      Fixed                      Slope:     0.0045 ft/ft
       Pipe Width:    72.0000 in              Pipe Height:    72.0000 in
    Depth of Flow:     4.7990 ft              Flow Status:    Partial
   Critical Depth:     4.5500 ft                 Capacity:   283.1984 cfs
         Velocity:    11.4151 ft/s
    Froude Number:     0.8956                 Flow Regime: Subcritical
```

```
Designing pipe P30
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
         Total Flow:   121.2000 cfs              Flow From: Injected Storm

             Status:      Fixed                      Slope:     0.0200 ft/ft
         Pipe Width:    48.0000 in             Pipe Height:    48.0000 in
      Depth of Flow:     2.2250 ft             Flow Status:    Partial
     Critical Depth:     3.3100 ft                Capacity:   203.1423 cfs
           Velocity:    16.8679 ft/s
      Froude Number:     2.2123                Flow Regime: SuperCritical


Designing manhole MH14

  Results:
         Total Flow:   398.0000 cfs              Flow From:   Upstream

             Status:      Fixed
      Chamber Width:     8.0000 ft          Chamber Length:     8.0000 ft


Designing pipe P10
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
         Total Flow:   398.0000 cfs              Flow From:   Upstream

             Status:      Fixed                      Slope:     0.0181 ft/ft
         Pipe Width:    72.0000 in             Pipe Height:    72.0000 in
      Depth of Flow:     3.6930 ft             Flow Status:    Partial
     Critical Depth:     5.3200 ft                Capacity:   569.7723 cfs
           Velocity:    21.7918 ft/s
      Froude Number:     2.1724                Flow Regime: SuperCritical


Designing pipe P0
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
         Total Flow:   212.0000 cfs              Flow From: Injected Storm

             Status:      Fixed                      Slope:     0.0200 ft/ft
         Pipe Width:    72.0000 in             Pipe Height:    72.0000 in
      Depth of Flow:     2.4650 ft             Flow Status:    Partial
     Critical Depth:     3.9800 ft                Capacity:   598.9313 cfs
           Velocity:    19.3604 ft/s
      Froude Number:     2.5069                Flow Regime: SuperCritical
```

```
Designing manhole MH13

  Results:
         Total Flow:   610.0000 cfs                Flow From:   Upstream

             Status:      Fixed
      Chamber Width:    10.0000 ft            Chamber Length:    10.0000 ft


Designing pipe P11
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
         Total Flow:   610.0000 cfs                Flow From:   Upstream

             Status:      Fixed                        Slope:     0.0064 ft/ft
         Pipe Width:    90.0000 in              Pipe Height:    90.0000 in
      Depth of Flow:     6.1000 ft              Flow Status:    Partial
     Critical Depth:     6.3200 ft                 Capacity:   614.2974 cfs
           Velocity:    15.8496 ft/s
      Froude Number:     1.0890                 Flow Regime: SuperCritical


Designing pipe P12
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
         Total Flow:   610.0000 cfs                Flow From:   Upstream

             Status:      Fixed                        Slope:     0.0064 ft/ft
         Pipe Width:    90.0000 in              Pipe Height:    90.0000 in
      Depth of Flow:     6.1000 ft              Flow Status:    Partial
     Critical Depth:     6.3200 ft                 Capacity:   614.2974 cfs
           Velocity:    15.8496 ft/s
      Froude Number:     1.0890                 Flow Regime: SuperCritical


Designing pipe P31
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
         Total Flow:    31.4000 cfs                Flow From: Injected Storm

             Status:      Fixed                        Slope:     0.0200 ft/ft
         Pipe Width:    24.0000 in              Pipe Height:    24.0000 in
      Depth of Flow:     1.6060 ft              Flow Status:    Partial
     Critical Depth:     1.8800 ft                 Capacity:    31.9929 cfs
           Velocity:    11.6062 ft/s
      Froude Number:     1.5695                 Flow Regime: SuperCritical
```

```
Designing pipe P13
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
         Total Flow:   641.4000 cfs               Flow From:   Upstream

             Status:      Fixed                       Slope:     0.0064 ft/ft
         Pipe Width:    90.0000 in             Pipe Height:    90.0000 in
      Depth of Flow:     6.4960 ft             Flow Status:    Partial
     Critical Depth:     6.4500 ft                Capacity:   614.2974 cfs
           Velocity:    15.7741 ft/s
      Froude Number:     0.9857                Flow Regime:   Critical


Designing pipe P14
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
         Total Flow:   641.4000 cfs               Flow From:   Upstream

             Status:      Fixed                       Slope:     0.0064 ft/ft
         Pipe Width:    90.0000 in             Pipe Height:    90.0000 in
      Depth of Flow:     6.4960 ft             Flow Status:    Partial
     Critical Depth:     6.4500 ft                Capacity:   614.2974 cfs
           Velocity:    15.7741 ft/s
      Froude Number:     0.9857                Flow Regime:   Critical


Designing pipe P32
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
         Total Flow:     6.1000 cfs               Flow From: Injected Storm

             Status:      Fixed                       Slope:     0.0200 ft/ft
         Pipe Width:    24.0000 in             Pipe Height:    24.0000 in
      Depth of Flow:     0.5910 ft             Flow Status:    Partial
     Critical Depth:     0.8700 ft                Capacity:    31.9929 cfs
           Velocity:     7.8402 ft/s
      Froude Number:     2.1195                Flow Regime: SuperCritical


Designing pipe P15
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
         Total Flow:   647.5000 cfs               Flow From:   Upstream

             Status:      Fixed                       Slope:     0.0114 ft/ft
         Pipe Width:    90.0000 in             Pipe Height:    90.0000 in
      Depth of Flow:     5.0270 ft             Flow Status:    Partial
```

```
    Critical Depth:     6.4800 ft                 Capacity:   819.8627 cfs
          Velocity:    20.5651 ft/s
     Froude Number:     1.7160                Flow Regime: SuperCritical


Designing pipe P33
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:   100.2000 cfs               Flow From: Injected Storm

            Status:      Fixed                       Slope:     0.0200 ft/ft
       Pipe Width:    42.0000 in                Pipe Height:    42.0000 in
     Depth of Flow:     2.1660 ft               Flow Status:    Partial
    Critical Depth:     3.0700 ft                  Capacity:   142.2837 cfs
          Velocity:    16.0163 ft/s
     Froude Number:     2.0821                Flow Regime: SuperCritical


Designing pipe P16
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
        Total Flow:   747.7000 cfs               Flow From:   Upstream

            Status:      Fixed                       Slope:     0.0114 ft/ft
       Pipe Width:    90.0000 in                Pipe Height:    90.0000 in
     Depth of Flow:     5.6250 ft               Flow Status:    Partial
    Critical Depth:     6.8100 ft                  Capacity:   819.8627 cfs
          Velocity:    21.0334 ft/s
     Froude Number:     1.5852                Flow Regime: SuperCritical


Designing pipe P34

  Results:
        Total Flow:    12.2000 cfs               Flow From: Injected Storm

            Status:      Fixed                       Slope:     0.0050 ft/ft
       Pipe Width:    24.0000 in                Pipe Height:    24.0000 in
     Depth of Flow:     1.3070 ft               Flow Status:    Partial
    Critical Depth:     1.2500 ft                  Capacity:    15.9965 cfs
          Velocity:     5.6043 ft/s
     Froude Number:     0.9243                Flow Regime: Subcritical


Designing manhole MH7

  Results:
        Total Flow:   759.9000 cfs               Flow From:   Upstream
```

```
             Status:      Fixed
      Chamber Width:     8.0000 ft            Chamber Length:     8.0000 ft


Designing pipe P17
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
         Total Flow:   759.9000 cfs                Flow From:   Upstream

             Status:      Fixed                        Slope:     0.0301 ft/ft
         Pipe Width:    72.0000 in               Pipe Height:    72.0000 in
      Depth of Flow:     5.1300 ft               Flow Status:    Partial
     Critical Depth:     5.9300 ft                  Capacity:   734.2267 cfs
           Velocity:    29.5144 ft/s
      Froude Number:     2.1080                  Flow Regime: SuperCritical


Designing manhole MH6

  Results:
         Total Flow:   759.9000 cfs                Flow From:   Upstream

             Status:      Fixed
      Chamber Width:     8.0000 ft            Chamber Length:     8.0000 ft


Designing pipe P18
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
         Total Flow:   759.9000 cfs                Flow From:   Upstream

             Status:      Fixed                        Slope:     0.0278 ft/ft
         Pipe Width:    72.0000 in               Pipe Height:    72.0000 in
      Depth of Flow:     5.5880 ft               Flow Status:    Partial
     Critical Depth:     5.9300 ft                  Capacity:   706.6490 cfs
           Velocity:    27.7015 ft/s
      Froude Number:     1.6244                  Flow Regime: SuperCritical


Designing manhole MH5

  Results:
         Total Flow:   759.9000 cfs                Flow From:   Upstream

             Status:      Fixed
      Chamber Width:     8.0000 ft            Chamber Length:     8.0000 ft


Designing pipe P19
```

```
 WARNING:  Full flow velocity is greater than maximum (10.00)

Results:
       Total Flow:   759.9000 cfs              Flow From:   Upstream

           Status:      Fixed                     Slope:     0.0622 ft/ft
       Pipe Width:    72.0000 in            Pipe Height:    72.0000 in
    Depth of Flow:     3.7680 ft            Flow Status:    Partial
   Critical Depth:     5.9300 ft               Capacity:  1055.9190 cfs
         Velocity:    40.6361 ft/s
    Froude Number:     3.9904               Flow Regime: SuperCritical


Designing manhole MH4

Results:
       Total Flow:   759.9000 cfs              Flow From:   Upstream

           Status:      Fixed
    Chamber Width:     8.0000 ft         Chamber Length:     8.0000 ft


Designing pipe P20
 WARNING:  Full flow velocity is greater than maximum (10.00)

Results:
       Total Flow:   759.9000 cfs              Flow From:   Upstream

           Status:      Fixed                     Slope:     0.0543 ft/ft
       Pipe Width:    72.0000 in            Pipe Height:    72.0000 in
    Depth of Flow:     3.9480 ft            Flow Status:    Partial
   Critical Depth:     5.9300 ft               Capacity:   987.1497 cfs
         Velocity:    38.5057 ft/s
    Froude Number:     3.6465               Flow Regime: SuperCritical


Designing manhole MH3

Results:
       Total Flow:   759.9000 cfs              Flow From:   Upstream

           Status:      Fixed
    Chamber Width:     8.0000 ft         Chamber Length:     8.0000 ft


Designing pipe P21
 WARNING:  Full flow velocity is greater than maximum (10.00)

Results:
       Total Flow:   759.9000 cfs              Flow From:   Upstream
```

```
             Status:      Fixed                       Slope:     0.0840 ft/ft
         Pipe Width:    72.0000 in               Pipe Height:    72.0000 in
      Depth cf Flow:     3.4150 ft               Flow Status:    Partial
     Critical Depth:     5.9300 ft                  Capacity:   1227.7918 cfs
           Velocity:    45.7079 ft/s
      Froude Number:     4.8185                  Flow Regime: SuperCritical


Designing manhole MH2

  Results:
         Total Flow:   759.9000 cfs                Flow From:    Upstream

             Status:      Fixed
      Chamber Width:     8.0000 ft            Chamber Length:      8.0000 ft


Designing pipe P22
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
         Total Flow:   759.9000 cfs                Flow From:    Upstream

             Status:      Fixed                       Slope:     0.0967 ft/ft
         Pipe Width:    72.0000 in               Pipe Height:    72.0000 in
      Depth of Flow:     3.2700 ft               Flow Status:    Partial
     Critical Depth:     5.9300 ft                  Capacity:   1316.7411 cfs
           Velocity:    48.2141 ft/s
      Froude Number:     5.2349                  Flow Regime: SuperCritical


Designing manhole MH1

  Results:
         Total Flow:   759.9000 cfs                Flow From:    Upstream

             Status:      Fixed
      Chamber Width:     8.0000 ft            Chamber Length:      8.0000 ft


Designing pipe P23
   WARNING:  Full flow velocity is greater than maximum (10.00)

  Results:
         Total Flow:   759.9000 cfs                Flow From:    Upstream

             Status:      Fixed                       Slope:     0.0808 ft/ft
         Pipe Width:    72.0000 in               Pipe Height:    72.0000 in
      Depth of Flow:     3.4580 ft               Flow Status:    Partial
     Critical Depth:     5.9300 ft                  Capacity:   1203.5279 cfs
           Velocity:    45.0167 ft/s
```

```
     Froude Number:      4.7046                    Flow Regime: SuperCritical



   HGL/EGL Computations:


     Table A:

       Struct                                                         2          Dnstrm
   Rim
         ID          D        Q        L        V        d       dc      V /2g     Sf      Soffit  EGLdn    HGLdn   Tot Loss EGLup
   HGLup      Elev.
                   (in)     (cfs)     (ft)    (ft/s)    (ft)     (ft)     (ft)   (ft/ft)    (ft)    (ft)     (ft)     (ft)    (ft)
   (ft)       (ft)

     Outfall         -        -        -        -        -        -        -        -        -        -        -        -        -
   5259.50     -
        P23         72     759.90    92.95    45.02      -        -      31.49   0.0322  5259.25      -     5259.50      -        -
   5263.87     -
        MH1          -        -        -        -        -        -        -        -        -        -     5263.87      -        -
   5263.87 5273.00
        P22         72     759.90    25.12    48.21     3.27     5.93    36.13      -    5267.08      -     5264.35      -        -
   5265.99     -
        MH2          -        -        -        -        -        -        -        -        -        -     5265.99      -        -
   5265.99 5272.50
        P21         72     759.90    50.18    45.71     3.41     5.93    32.47      -    5268.83      -     5266.24      -        -
   5269.77     -
        MH3          -        -        -        -        -        -        -        -        -        -     5269.77      -        -
   5269.77 5274.00
        P20         72     759.90    63.86    38.51     3.95     5.93    23.04      -    5272.66      -     5270.61      -        -
   5273.64     -
        MH4          -        -        -        -        -        -        -        -        -        -     5273.64      -        -
   5273.64 5278.00
        P19         72     759.90   350.68    40.64     3.77     5.93    25.66      -    5275.99      -     5273.76      -        -
   5295.02     -
        MH5          -        -        -        -        -        -        -        -        -        -     5295.02      -        -
   5295.02 5300.50
        P18         72     759.90    96.04    27.70     5.59     5.93    11.93      -    5297.55      -     5297.14      -        -
   5299.59     -
        MH6          -        -        -        -        -        -        -        -        -        -     5299.59      -    5310.81
   5299.59 5311.50
        P17         72     759.90   231.68    26.88      -        -      11.23   0.0322  5300.00  5310.81  5299.59     7.46  5318.27
   5307.05     -
        MH7          -        -        -        -        -        -        -        -        -     5318.27  5307.05     1.52  5319.79
   5308.57 5312.00
        P16         90     747.70   498.71    16.92      -        -       4.45   0.0095  5308.52  5319.79  5308.57     4.73  5324.52
   5320.07     -
       Junction      -        -        -        -        -        -        -        -        -     5324.52  5320.07     0.61  5325.13
```

```
5320.68      -
    P15         90     647.50  500.03   14.66      -       -      3.34  0.0071 5314.16 5325.13 5320.68    3.56 5328.69
5325.35      -
    Junction    -        -       -        -        -       -       -       -       -    5328.69 5325.35    0.05 5328.74
5325.40      -
    P14         90     641.40  500.01   14.52      -       -      3.28  0.0070 5319.86 5328.74 5325.40    3.49 5332.23
5328.96      -
    Junction    -        -       -        -        -       -       -       -       -    5332.23 5328.96    0.00 5332.23
5328.96      -
    P13         90     641.40  120.00   14.52      -       -      3.28  0.0070 5323.06 5332.23 5328.96    0.84 5333.07
5329.79      -
    Junction    -        -       -        -        -       -       -       -       -    5333.07 5329.79    0.12 5333.19
5329.91      -
    P12         90     610.00  380.01   13.81      -       -      2.96  0.0063 5323.83 5333.19 5329.91    2.40 5335.59
5332.63      -
    Junction    -        -       -        -        -       -       -       -       -    5335.59 5332.63    0.00 5335.59
5332.63      -
    P11         90     610.00  351.24   13.81      -       -      2.96  0.0063 5326.26 5335.59 5332.63    2.22 5337.80
5334.84      -
    MH13        -        -       -        -        -       -       -       -       -    5337.80 5334.84    1.87 5339.67
5336.71 5340.00
    P10         72     398.00   61.79   14.08      -       -      3.08  0.0088 5336.48 5339.67 5336.71    0.55 5340.22
5337.14      -
    MH14        -        -       -        -        -       -       -       -       -    5340.22 5337.14    1.32 5341.54
5338.46 5340.00
    P9          72     276.80  500.00    9.79      -       -      1.49  0.0043 5337.80 5341.54 5338.46    2.14 5343.67
5342.19      -
    MH15        -        -       -        -        -       -       -       -       -    5343.67 5342.19    0.36 5344.03
5342.55 5343.00
    P8          66     276.80  500.02   11.65      -       -      2.11  0.0068 5339.56 5344.03 5342.55    3.40 5347.43
5345.32      -
    Junction    -        -       -        -        -       -       -       -       -    5347.43 5345.32    0.36 5347.79
5345.68      -
    P26         54     169.80   26.85   10.68      -       -      1.77  0.0075 5343.29 5347.79 5345.68    0.20 5347.99
5346.22      -

  New Branch    -        -       -        -        -       -       -       -       -       -       -       -    5318.27
5307.05      -
    MH7         -        -       -        -        -       -       -       -       -    5318.27 5307.05    3.49 5321.76
5310.54 5312.00
    P34         24      12.20   21.05    3.88      -       -      0.23  0.0029 5303.02 5321.76 5310.54    0.06 5321.82
5321.59      -

  New Branch    -        -       -        -        -       -       -       -       -       -       -       -    5324.52
5320.07      -
    P33         42     100.20   22.65   10.41      -       -      1.69  0.0099 5310.16 5324.52 5320.07    0.22 5324.75
5323.06      -

  New Branch    -        -       -        -        -       -       -       -       -       -       -       -    5328.69
5325.35      -
    P32         24       6.10   27.65    1.94      -       -      0.06  0.0007 5314.36 5328.69 5325.35    0.02 5328.71
```

```
5328.65     -

  New Branch     -       -       -       -       -       -       -       -       -       -       -       -   5333.07
5329.79     -
    P31         24     31.40   32.68    9.99     -       -     1.55  0.0193 5318.33 5333.07 5329.79    0.63 5333.70
5332.15     -

  New Branch     -       -       -       -       -       -       -       -       -       -       -       -   5337.80
5334.84     -
    MH13         -       -       -       -       -       -       -       -       -   5337.80 5334.84    0.50 5338.30
5335.34 5340.00
    P0          72    212.00   45.11    7.50     -       -     0.87  0.0025 5326.98 5338.30 5335.34    0.11 5338.42
5337.54     -

  New Branch     -       -       -       -       -       -       -       -       -       -       -       -   5340.22
5337.14     -
    MH14         -       -       -       -       -       -       -       -       -   5340.22 5337.14    0.57 5340.79
5337.71 5340.00
    P30         48    121.20   24.13    9.64     -       -     1.45  0.0071 5335.80 5340.79 5337.71    0.17 5340.96
5339.52     -

  New Branch     -       -       -       -       -       -       -       -       -       -       -       -   5347.43
5345.32     -
    P7          48    107.00  500.24   19.22     -       -     5.74  0.0055 5342.77     -   5345.32     -       -
5355.82     -
    MH17         -       -       -       -       -       -       -       -       -       -   5355.82     -       -
5355.82 5361.00
    P6          48    107.00  583.44   12.37    2.60    3.13   2.38     -   5358.00     -   5356.60     -       -
5362.22     -


  Table B:

                               Losses                        |                         Loss Coefficients
    Str ID       Hf       Hb     Hstr       Hc       He       Hj    Total |    Dstr      Ko       CD       Cd        Cq       Cp
Cb       K

  Outfall        -        -        -        -        -        -        -  |      -        -        -        -        -        -
 -       -
    P23        2.99       -        -        -        -        -      2.99 |      -        -        -        -        -        -
 -       -
    MH1          -        -        -        -        -        -        -  |      -        -        -        -        -        -
 -       -
    P22          -        -        -        -        -        -  SuperCrt |      -        -        -        -        -        -
 -       -
    MH2          -        -        -        -        -        -        -  |      -        -        -        -        -        -
 -       -
    P21          -        -        -        -        -        -  SuperCrt |      -        -        -        -        -        -
 -       -
    MH3          -        -        -        -        -        -        -  |      -        -        -        -        -        -
```

```
-       -
    P20           -       -       -       -       -       -  SuperCrt |     -       -       -       -       -       -
-       -
    MH4           -       -       -       -       -       -       -   |     -       -       -       -       -       -
-       -
    P19           -       -       -       -       -       -  SuperCrt |     -       -       -       -       -       -
-       -
    MH5           -       -       -       -       -       -       -   |     -       -       -       -       -       -
-       -
    P18           -       -       -       -       -       -  SuperCrt |     -       -       -       -       -       -
-       -
    MH6           -       -       -       -       -       -       -   |     -       -       -       -       -       -
-       -
    P17        7.46       -       -       -       -       -     7.46  |     -       -       -       -       -       -
-       -
    MH7           -       -    1.52       -       -       -     1.52  |   6.33   0.253   1.000   0.516   1.037   1.000
1.000   0.135
    P16        4.73       -       -       -       -       -     4.73  |     -       -       -       -       -       -
-       -
    Junction      -    0.08       -       -       -    0.53     0.61  |     -       -       -       -       -       -
-       -
    P15        3.56       -       -       -       -       -     3.56  |     -       -       -       -       -       -
-       -
    Junction      -       -       -       -       -    0.05     0.05  |     -       -       -       -       -       -
-       -
    P14        3.49       -       -       -       -       -     3.49  |     -       -       -       -       -       -
-       -
    Junction      -    0.00       -       -       -       -     0.00  |     -       -       -       -       -       -
-       -
    P13        0.84       -       -       -       -       -     0.84  |     -       -       -       -       -       -
-       -
    Junction      -    0.00       -       -       -    0.12     0.12  |     -       -       -       -       -       -
-       -
    P12        2.40       -       -       -       -       -     2.40  |     -       -       -       -       -       -
-       -
    Junction      -    0.00       -       -       -       -     0.00  |     -       -       -       -       -       -
-       -
    P11        2.22       -       -       -       -       -     2.22  |     -       -       -       -       -       -
-       -
    MH13          -       -    1.87       -       -       -     1.87  |  13.87   1.074   1.000   0.723   0.812   1.000
1.000   0.630
    P10        0.55       -       -       -       -       -     0.55  |     -       -       -       -       -       -
-       -
    MH14          -       -    1.32       -       -       -     1.32  |   5.70   1.045   1.000   0.485   0.847   1.000
1.000   0.429
    P9         2.14       -       -       -       -       -     2.14  |     -       -       -       -       -       -
-       -
    MH15          -       -    0.36       -       -       -     0.36  |   8.19   0.401   1.000   0.602   1.000   1.000
1.000   0.242
    P8         3.40       -       -       -       -       -     3.40  |     -       -       -       -       -       -
-       -
```

```
   Junction     -     0.17    -     -     0.19  Neg      0.36 |   -      -      -      -      -      -
 -    -
   P26         0.20    -      -     -      -     -       0.20 |   -      -      -      -      -      -
 -    -

  New Branch    -      -      -     -      -     -        -   |   -      -      -      -      -      -
 -    -
   MH7          -      -     3.49   -      -     -       3.49 |  6.33  1.103  1.000  0.516  0.546  1.000
1.000   0.311
   P34         0.06    -      -     -      -     -       0.06 |   -      -      -      -      -      -
 -    -

  New Branch    -      -      -     -      -     -        -   |   -      -      -      -      -      -
 -    -
   P33         0.22    -      -     -      -     -       0.22 |   -      -      -      -      -      -
 -    -

  New Branch    -      -      -     -      -     -        -   |   -      -      -      -      -      -
 -    -
   P32         0.02    -      -     -      -     -       0.02 |   -      -      -      -      -      -
 -    -

  New Branch    -      -      -     -      -     -        -   |   -      -      -      -      -      -
 -    -
   P31         0.63    -      -     -      -     -       0.63 |   -      -      -      -      -      -
 -    -

  New Branch    -      -      -     -      -     -        -   |   -      -      -      -      -      -
 -    -
   MH13         -      -     0.50   -      -     -       0.50 | 13.87  0.135  1.000  0.723  1.724  1.000
1.000   0.169
   P0          0.11    -      -     -      -     -       0.11 |   -      -      -      -      -      -
 -    -

  New Branch    -      -      -     -      -     -        -   |   -      -      -      -      -      -
 -    -
   MH14         -      -     0.57   -      -     -       0.57 |  5.70  1.436  1.000  0.485  0.267  1.000
1.000   0.186
   P30         0.17    -      -     -      -     -       0.17 |   -      -      -      -      -      -
 -    -

  New Branch    -      -      -     -      -     -        -   |   -      -      -      -      -      -
 -    -
   P7          2.78    -      -     -      -     -       2.78 |   -      -      -      -      -      -
 -    -
   MH17         -      -      -     -      -     -        -   |   -      -      -      -      -      -
 -    -
   P6           -      -      -     -      -     -   SuperCrt |   -      -      -      -      -      -
 -    -
```

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REVISED GEOTECHNICAL INVESTIGATION
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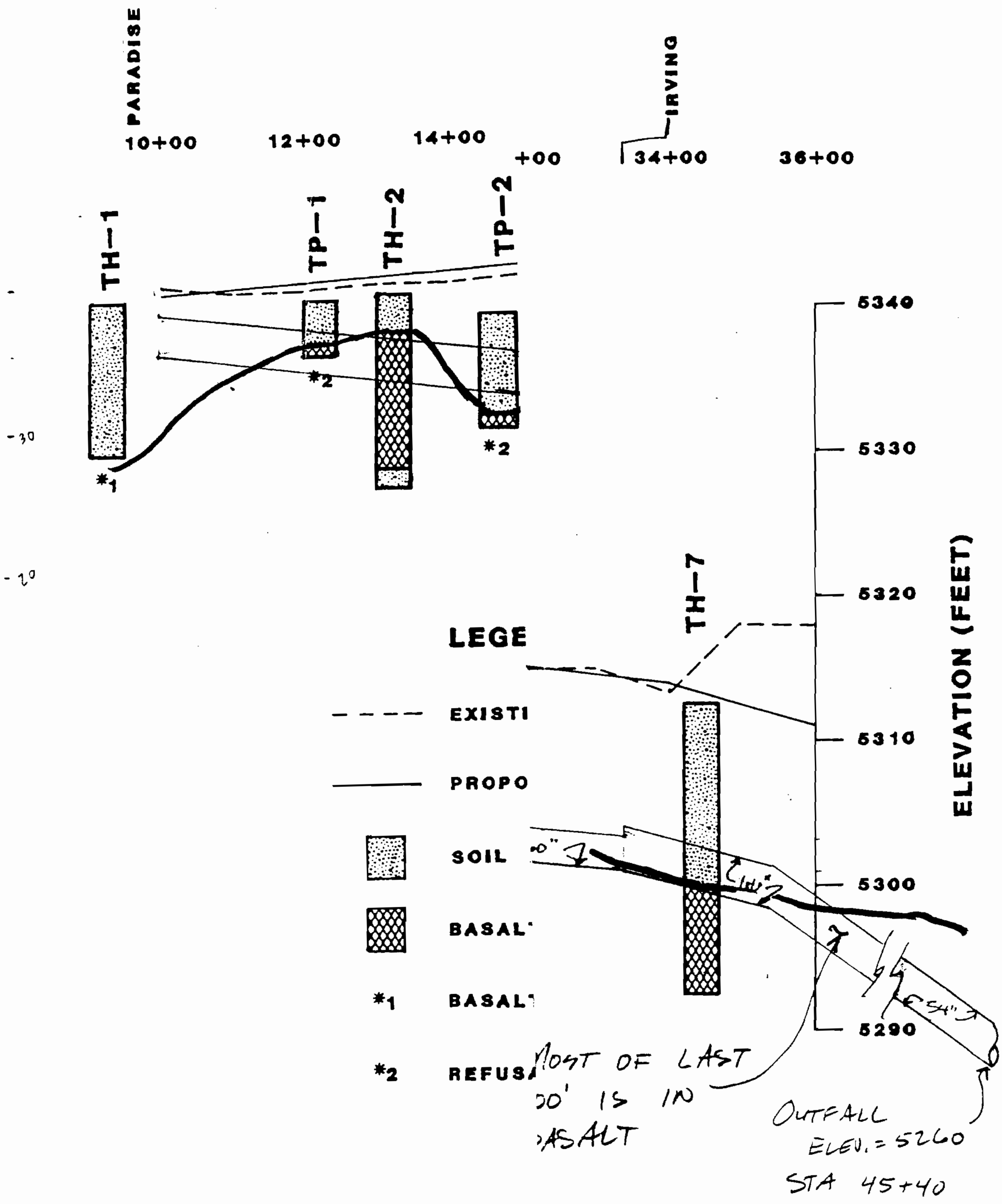
UNSER BLVD. FROM PARADISE BLVD.
TO THE BERNALILLO COUNTY LINE

Prepared for:

Leedshill-Herkenhoff, Inc.

Project No.: 90-1-10

April 9, 1990



PROJECT NO.: 90—1—10

FIGURE NO.: 23

EXHIBIT 1

Storm Drain Basin Map

(Primary Study Area)