MARYVALE BASEBALL PARK
DRAINAGE REPORT

WOOD/PATEL

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MARYVALE BASEBALL PARK
DRAINAGE REPORT

Prepared For: **Ellerbe Becket**
Two Arizona Center
400 North Fifth Street
Suite 1100
Phoenix, AZ 85004

Submitted to: **City of Phoenix**
200 West Washington Street
Phoenix, AZ 85003

and

Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, AZ 85009

Submitted By: **Wood, Patel & Associates, Inc.**
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Date Signed
ARIZONA, U.S.A.

December 11, 1996
WP #96398

WOOD/PATEL

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS

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December 19, 1996

Mr. Michael A. Bornhoeft, ASLA
City of Phoenix
Engineering & Architectural Services Dept.
200 West Washington Street
Suite 700
Phoenix, AZ 85003

Re: **Maryvale Baseball Park**
Drainage Report
WP #96398.00

Dear Mr. Bornhoeft:

We are pleased to submit five (5) sets of the Drainage Report in conjunction with the Maryvale Baseball Park.

The report incorporates design requirements for the detention basin and other major flood control components to meet the guidelines from the Maryvale Mitigation Study by the Flood Control District of Maricopa County. Numerous modifications from the Mitigation Study were required to make the joint flood control/playfield/parking work as per our scope of work and per our working sessions with various agencies/departments involved. Accordingly, the grading and drainage design presented in this document meets those general goals.

Chronology of Events

July 15, 1996	Preliminary Drainage Report submitted to Agencies.
July/August, 1996	Received comments from Paul Kienow and Ray Acúna, City of Phoenix; Russ Miracle, Flood Control District of Maricopa County.
August 5, 1996	Submitted responses to the review comments.
September 4, 1996	Per request from Ray Acúna, submitted Preliminary Drainage Report dated July 15, 1996 to Peter Johnson, P.E., Street Transportation City of Phoenix.
September 30, 1996	Received comments from Peter Johnson, P.E., Street Transportation City of Phoenix.
October 1, 1996	Submitted responses to Peter Johnson, P.E., Street Transportation City of Phoenix.

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October 23, 1996 Per request from Mike Bornhoeft, submitted Preliminary Drainage Report dated July 15, 1996 to Jesse Gonzales in conjunction with Mass Grading Design Review.

December 19, 1996 This submittal which substantiates the hydraulic/hydrologic design for the drainage system and incorporates comments from the review Agencies.

Submittal Suggestions

1 set - Michael Bornhoeft, ASLA, City of Phoenix
1 set - Ray Acúna, P.E., Floodplain Department, City of Phoenix
1 set - Paul Kienow, P.E., Engineers, City of Phoenix
1 set - Jesse Gonzales, Development Services, City of Phoenix
1 set - Peter Johnson, P.E., Street Transportation, City of Phoenix

For your information, additional submittal are currently being made to the following:

1. Russ Miracle, P.E., Flood Control District of Maricopa County (3 sets)
2. Joe Bruder, Ellerbe-Becket (1 set)
3. Rick Pfannenstiel, Kitchell (1 set).

Due to the City's aggressive construction schedule, it is respectfully requested that you provide input/approval on or before January 20, 1997.

Should you have any questions regarding this submittal, please feel free to call.

Sincerely,

WOOD, PATEL & ASSOCIATES, INC.

Ashok C. Patel, P.E., R.L.S.
Project Manager, Drainage

ACP/djp

Enclosures (Design Plans)

cc: Darrel Wood, Tim Huval, Wood/Patel

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1.0 INTRODUCTION

Wood, Patel & Associates, Inc. (Wood/Patel) is contracted with Ellerbe-Becket, who is in turn contracted with the City of Phoenix for the design of the Maryvale Baseball Park. This stadium facility will be used for spring training by the Milwaukee Brewers. The facility consists of six (6) baseball practice fields as can be seen on Figure 1.

The concept of flood control for the project site was originally formulated by the Flood Control District of Maricopa County (FCDMC) and is summarized in the *Maryvale Area Flooding Mitigation Project, Phase I, Pre-Design Report, FCD 93-94, dated April 5, 1996 (Maryvale Mitigation Study)*. Significant modifications were made to the FCDMC concept to facilitate the baseball park while still maintaining flood control requirements. As a result, the southern portion of the baseball park referred to as "detention basin" in this report is proposed as a multi-use facility. Accordingly, ballfields #5 and #6 and parking area "B" will be used for the flood control detention basin.

On July 15, 1996, Wood/Patel prepared a preliminary drainage report for this project. In this report, supporting data was provided to substantiate the feasibility of flood control features within the Maryvale Baseball Park. The analysis included in the report was appropriate for a 10% plan submittal and it demonstrated the workability of the proposed major flood control components. The report was submitted to the City of Phoenix, FCDMC, and Ellerbe-Becket. Subsequently, several comments were received from the submittal. A review response was submitted on August 5, 1996. Additional design modifications were further discussed with the agencies and, as appropriate, have been incorporated in the design.

This report has been updated to include the Agency review comments as well as detailed hydraulic analysis to substantiate the design plans.

A summary of the proposed major flood control components is as follows:

Onsite Major Flood Control Components Including Their Design Frequencies: (Designed with this Project)

- 36-inch outfall pipe from field #5 to 51st Avenue storm drain (Line "A") (10-year).

- Detention basin which consists of field #5, #6 and parking area B (10-year).

- 72-inch storm drain from 51st Avenue (Line "C") feeding field #5 (10-year).

- 60-inch storm drain from Whitton Avenue channel on north side of Grand Canal (Line "Q") feeding field #5 (1-2 year).

- Main ballfield pump station hydrologic model (10-100 year).

Offsite Major Flood Control Components Including Their Design Frequencies: (Only Preliminary Design with this Project)

- Existing 72-inch 51st Avenue storm drain (Line "D"). Plugged north of Crittenden Lane near Mitchell Drive feeding Line "C" (10-year).

- Existing 54-inch Crittenden Lane storm drain, Line "X" (Site "B", as depicted in Mitigation Study) feeding 72-inch storm drain in 51st Avenue (1-5 year).

- Future 42-inch Crittenden Lane Storm Drain (Line "Y") (1-5 year).

- Future Whitton Avenue channel (Site "C", as depicted in Mitigation Study) feeding Line "Q" (1-2 year).

2.0 GENERAL DRAINAGE PATTERN

The southern portion of this site is located within a FEMA Flood Zone "A" as delineated on Panel 2110 of 4350 of the Flood Insurance Rate Maps (Figure 2) for Maricopa County dated April 15, 1988.

Zone "A" is defined as:

> *Areas of 100-year flood; base flood elevations, and flood hazard factors not determined.*

The flood control facilities proposed in this report will result in an improved/reduced floodplain for this area via the detention basin constricting the floodplain area. However, it is not within the scope nor is it the intent of this report to revise the current floodplain map. From past technical meetings with the City of Phoenix and the FCDMC, it was decided that 58 acre-feet of stormwater runoff will be detained onsite. The 58 acre-foot value is more than the FEMA 100-year floodplain volume of 13 acre-feet currently depicted on the FIRM. Thus, adjacent (east and west) neighborhoods will benefit from the flood reduction provided by the proposed flood volume storage and other major flood control components.

The north portion (remainder of the site) is located in FEMA Zone "B".

Zone "B" is defined as:

> *Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood.*

Ballfield # 1 consists of a depressed field approximately 15 feet below natural ground and is not in the FEMA 100-year floodplain. The depressed field itself will be dewatered by a pumping facility and a 12-inch pressure storm drain system, ultimately connecting directly to the existing 24-inch gravity storm

drain within Maryvale Parkway. For the pump station hydrologic models, see HEC-1 in the Appendix under Hydraulics (Tab II). The remaining site will surface-drain toward the southwest (the natural slope of the ground) to ballfields #5 and #6 or be intercepted by minor storm drains. Ballfields #5 and #6 will drain to the 51st Avenue storm drain via the 36-inch line "A". The two ballfields, #5 and #6, and parking "B" are located north of and adjacent to the Grand Canal and will be depressed sufficiently to hold the required volume of floodwaters (58 acre-feet). The depressed detention basin area will drain within a 36-hour time period.

The project does not provide onsite retention per the conventional approach since the existing and proposed storm drains will be used to collect and convey both offsite and onsite runoff to the detention basin. In major rainfall/runoff events, onsite retention will be mixed in with the regional runoff and be held in the depressed ballfields #5 and #6 and parking area "B" next to the Grand Canal. Modifications will be made to the existing 72" storm drain system in 51st Avenue (full plugging of the line) to divert runoff to the depressed basin area, via Line "C". For hydraulic calculations for this proposed 72-inch diversion storm drain, Line "C", see Table 2 in the Appendix under Hydraulics (Tab II).

Runoff from the west can reach the depressed basin area by means of the future Whitton Avenue channel and the proposed 60-inch pipe system (Line "Q") along the north side of the Grand Canal. This runoff area will be referred to as Site "C" (to be consistent with the site designation in the Maryvale Mitigation Study) for purposes of this report.

Onsite runoff, originating north of Maryvale Parkway and east of ballfield # 1, will be collected in an existing 24-inch storm drain, Line "E", in Maryvale Parkway and conveyed to the 51st Avenue storm drain. Maryvale Parkway has a high point located south of ballfield # 1; flow east of this point flows towards the east and is collected in the existing storm drain. A portion of the area to the west will drain via a proposed 18-inch storm drain, Line "F", into Line "E" see Table 4 in the Appendix under Hydraulics (Tab II). The remainder of runoff in Maryvale Parkway, west of the high point, will flow to the west to Clarendon Avenue. The later runoff is very small.

Offsite runoff originating west of the ballfield # 1 and north of Maryvale Parkway will drain towards the southwest along Clarendon Avenue.

Some offsite runoff, originating in the Maryvale Plaza Shopping Center south of Indian School Road, is retained in the plaza's parking lots adjacent to Indian School Road. This is modeled in HEC-1 by removing the retained volume using divert operations.

For purposes of this report, the area east of 51st Avenue along Crittenden Lane will be referred to as Site "B" (per Maryvale Mitigation Study designation). Preliminary Storm Drain Plans have been developed for Crittenden Lane and are in the Appendix (Tab IV). Runoff approaching the ballpark site from Site "B" will follow three paths. Initial flow, about 115 cfs, will be conveyed within the existing Crittenden 54-inch storm drain, Line "X". Excess flow, about 110 cfs, will be conveyed via a proposed secondary Crittenden Lane storm drain, Line "Y" (48-inch in diameter). Both lines "X" and "Y" within Crittenden Lane will discharge into the existing 72-inch pipe in 51st Avenue. Preliminary hydraulic analysis (HEC-2) of flow along Crittenden Lane demonstrates that to convey about 50 cfs of surface runoff in Crittenden Lane, essentially all adjacent homes will be flooded. This conveyance is possible within the roadway before overflowing can occur into the Grand Canal. The results of the HEC-2 analysis are included in the Appendix under Hydraulics (Tab III). The combined capacity of the Crittenden Lane storm drains (existing and proposed) is estimated to be over 200 cfs, as shown in Table 8 in the Appendix under Hydraulics (Tab III).

3.0 PROPOSED STORM DRAIN SYSTEM

The proposed drainage system consists of the ballfield/parking lot detention basin as discussed previously, as well as a proposed storm drain system connecting to a proposed detention basin. See Figure 1 for an illustration of the proposed major drainage facilities and construction plans for a profile of specific storm drain elements. These elements are discussed in detail below.

- A connection is proposed in between the existing 72-inch storm drain (Line "D") within 51st Avenue and the proposed 72-inch storm drain within the project site (Line "C").

- The new 72-inch storm drain diversion pipe (Line "C") mentioned above, will convey flow from the 51st Avenue storm drain to a surge structure at the southeast corner of field #5.

- An inlet structure stub is proposed at the southwest corner of the project site to intercept future flow arriving via Whitton Avenue Channel along the north side of the Grand Canal from Site "C". A proposed 60-inch storm drain (Line "Q") will convey this flow towards the east to a surge structure on the south side of field #5.

- A pumping facility and storage system is proposed to dewater the main stadium (Field #1). This system is designed to handle the 10-year storm event. A 12-inch pressure line from the pump station will connect into the existing 24-inch gravity storm drain in Maryvale Parkway.

- A proposed 18-inch storm drain in the parking areas immediately south of the Maryvale Parkway will tie into the existing 24-inch storm drain in Whitton Avenue.

- A detention basin is proposed consisting of fields # 5 and # 6 and parking "B" and will detain onsite and offsite runoff from the 10-year storm.

- Proposed 30-inch outlet pipe (Line "P"), and 36-inch outlet pipe (Line "B") one from each of the surge structures, will combine at a junction structure near the southeast corner of field #5. A 36-inch basin outfall pipe (Line "A") will convey outflow to the existing 51st Avenue storm drain.

- A connector structure is proposed for the connection of the proposed 30-inch surge basin outlet storm drain (Line "A") with the existing 72-inch storm drain at 51st Avenue.

4.0 HYDROLOGY

4.1 Rainfall

The 10-year and 100-year precipitation depths were used in the original Maryvale Mitigation Study HEC-1 model and in the Maryvale Baseball Park HEC-1 model contained herein.

4.2 Hydrologic Modeling

The hydrologic analysis was performed using the U.S. Army Corps of Engineers computer program HEC-1. The HEC-1 model developed for the Maryvale Mitigation Study has been approved by the FCDMC and was used as a base model, or starting point, for the hydrologic analyses in this project. Several modifications to the approved model needed to be made in order to reflect the proposed storm drains and the detention basin configuration.

The original approved HEC-1 model was developed as part of a regional mitigation area, as opposed to an analysis for a specific site. Modifications made by Wood/Patel incorporated site-specific details based on the proposed design for the baseball park and include more detail in the modeling of flows approaching the site from the east.

To accomplish this, Wood/Patel made the following modifications to the approved HEC-1 model:

1. The Maryvale Mitigation Study original drainage subarea "K" between 51st and 55th Avenues was subdivided into four smaller areas defined by the proposed baseball park development. (See the HEC-1 Schematic Diagram, Figure 4)

2. Within the subdivided drainage subarea "K", retention in the Maryvale Plaza Shopping Center parking lot at the southwest corner of Indian School Road and 51st Avenue was accounted for using divert operation.

3. The existing Maryvale Parkway storm drain, which connects to the 51st Avenue storm drain, is included in the HEC-1 model.

4. The proposed storm drains and detention basin are included in the HEC-1 model.

5. A divert operation was added at the 54th Avenue alignment over the Grand Canal to remove flow in excess of 110 cfs (capacity of proposed pipe, Line Q).

6. No flow was allowed to continue south in the 51st Avenue storm drain at concentration point C51; the entire flow is diverted to the west and enters the proposed baseball park detention basin.

7. The divert operation D47C has been deactivated; Crittenden Lane street and storm drain flows are now routed together, rather than separately. The storm drain flow is removed at 51st Avenue, as described in item 8 below.

8. A divert operation was added just east of 51st Avenue to divert flow in excess of the Crittenden Lane street capacity plus storm drain capacity over the Grand Canal.

9. A divert operation was added east of 51st Avenue to divert the Crittenden Lane storm drain flow (115 cfs) into the 51st Avenue storm drain. The remaining Crittenden Lane street flow will be either surface-routed to the baseball park detention basin or routed via a new 48-inch pipe to the 72" pipe in 51st Avenue.

10. Storm drain flows along Crittenden Lane (routing operation 48) east of 51st Avenue were subdivided into two separate routing reaches.

11. The original detention basin SB was modified for the proposed baseball park detention basin configuration and outlet works; the

basin configuration includes storage in the field # 5, parking lot "B" and field #6.

Based on the revised baseball park HEC-1 model and per the proposed grading and drainage design, the following information for the detention basin flood pool was derived:

BASEBALL PARK DETENTION BASIN FLOOD POOL SUMMARY					
Frequency	**Peak Inflow (cfs)**	**Peak Outflow (cfs)**	**Flood Pool Elev. (cfs)**	**Drain Time (Hrs.)**	**Remarks**
1-Year	96	42	1095.8	3.8	Floods Fld. #5
2-Year	153	46	1097.2	6.75	Floods Fld. #5
10-Year	344	55	1100.4	11.75	Floods Fld. #5, #6 & Lot B
100-Year	667	64(b)	1103.3 (a)	20.2	Floods Fld. #5, #6 & Lot B

(a) Since the detention basin is designed for the 10-year storm, the 100-year flow (estimated 224-64 = 160 cfs) is anticipated to overtop the basin.

(b) This represents pipe outflow only; total outflow value (estimated 224 cfs) will be higher since it will also include weir flow over the Grand Canal.

The results of the ballpark HEC-1 analysis, schematic diagram (Figure 4), and the detention basin hydrographs are included in the Appendix under Hydrology (Tab I). The Appendix also includes preliminary hydraulic analysis in conjunction with the proposed storm drains as discussed in the following sections.

5.0 OFFSITE AREAS

51st Avenue:

The 51st Avenue 72-inch storm drain (Line "D") was analyzed from Indian School Road to the proposed detention basin. These preliminary hydraulic calculations are located in Table 2 in the Appendix under Hydraulics (Tab III). The capacity of this system is determined to be about 210 cfs. Since the sag curve in 51st Avenue is not practical for directing overland flow into the proposed retention basin, as described in the Crittenden Lane discussion, it is recommended that additional inlets be constructed within 51st Avenue immediately south of Mitchell Drive to intercept overland flow and take advantage of the excess capacity available in this system.

The 72-inch pipe capacity is adequate to convey the 10-year flow originating from the drainage area north of Mitchell Drive along 51st Avenue (Tab III). To insure the 10-year flow can be intercepted by the existing catch basins feeding to the 72-inch pipe, the following approach was taken:

1. Review available existing catch basins.

2. Estimate their average interception capacity based on their openings and roadway longitudinal slope etc.

3. Determine total interception capacity of all catch basins.

4. Check if the intercepted flow can be conveyed by the existing storm drain using a pipe flowing full assumption (based on slope-area method).

5. Where only limited data on the catch basin/storm drain detail is available, use street slope from the topographic maps and assume that the pipe slope equals street slope and then estimate approximate storm drain capacity.

Based on above procedure as supported by calculations in the Appendix (Tab III, 51st Avenue Storm Drain), it was estimated that about 210 cfs can be intercepted and conveyed by the existing 72-inch 51st Avenue pipe immediately

south of Indian School Road. As result, it was found that additional catch basins north of Mitchell Drive were not necessary. Two large catch basins each having 38 L.F. curb opening are proposed near Mitchell Drive at the 72-inch pipe connection. These basins will capture an estimated 19 cfs.

Site "B": Crittenden Lane:

> *Any improvements to the Crittenden Lane storm drain facility will be performed under a separate contract by FCDMC. Wood/Patel's Scope of Work is to identify on a preliminary basis a drainage concept that will complement an overall flood mitigation.*

As part of the Maryvale Mitigation Study, a flood control reduction solution was proposed by the FCDMC. Accordingly, reduction of ponding area along Crittenden Lane, between 51st Avenue and 45th Avenue, was recommended by use of both surface and sub-surface conveyance.

Several options were considered in this area. The first option was to make enhancements to the existing storm drain system. As part of the baseball park drainage system, a large portion of the flow in the 72-inch pipe in 51st Avenue is diverted westerly, upstream of Crittenden Lane. As a result, the 72-inch pipe near Crittenden Lane will be running near empty. The improved hydraulic condition, thus created within the 72-inch 51st Avenue system, will increase the capacity of the existing 54-inch Crittenden Lane storm drain system by several fold, which will in itself provide some measure of flood relief in this area.

A second option analyzed was the regrading of 51st Avenue and a portion of Crittenden Lane (approximately 300 feet) to improve surface drainage. This solution was recommended in the Maryvale Mitigation Study. The analysis performed by Wood/Patel included calculations to determine the capacity of surface drainage (overland flow) in Crittenden Lane and the redesign of 51st Avenue to create a dip section to convey flow to the ballpark detention basin. Since Crittenden Lane slopes to the east, overland flow to the west will be limited by the weir capacity at the pavement breakover and the depth of 51st

Avenue ponding. The depth of ponding was assumed at the canal bank elevation and the Crittenden Lane street capacity was estimated at 50 cfs. Unfortunately, this capacity cannot be realized until the entire area, including homes, floods to the elevation of the top of Grand Canal bank. In order to convey this flow overland to the detention basin a sag vertical curve would be required in 51st Avenue. Due to the close relative grades of Crittenden Lane and 51st Avenue, along with avoiding reconstruction of the Grand Canal Bridge, the design speed on 51st Avenue would need to be reduced from current 50 mph to 25 mph, which is not acceptable per the City traffic regulations.

Routing the flow north within the east side frontage road along 51st Avenue and then within a storm drain to the detention basin was then considered. Lowering the frontage road would create unacceptable grades on the residential driveways fronting the road. A grade differential between 51st Avenue and the frontage road might require a retaining wall within the median. Also, utility relocation, more specifically for the water line, would be required to maintain adequate ground cover.

The final and recommended option analyzed a new parallel storm drain within Crittenden Lane from 50th Avenue to 51st Avenue (Line "Y"). This system would extend further to the east than the Crittenden Lane pavement replacement option in the Maryvale Mitigation Study. This system would tie into the 51st Avenue storm drain and would complement the existing storm drain (Line "X"). Based on input from Russ Miracle, P.E., FCDMC in a meeting dated 10-15-96, the storm drain Line "Y", could be extended easterly in three separate lengths. These three optional lengths will provide various levels of flood mitigation (1-year, 2-year and 5-year storms). Supporting data including cost analysis for these three options is included in the Appendix (Tab III, Site "B").

It is also recommended that the existing 54-inch storm drain in Crittenden Lane be improved by upgrading the inlets along its entire alignment to take advantage of its improved capacity. For preliminary hydraulic calculations for site "B", see Table 8 in the Appendix under Hydraulics (Tab III). This recommended option will increase Crittenden Lane storm drain capacity from 54 cfs existing to 225 cfs with the storm drain upgrades.

Site "C": Whitton Avenue Channel and Grand Canal 60-Inch Storm Drain (Line "Q"):

> *Any improvements to Whitton Avenue channel will be performed under a separate contract by FCDMC. Wood/Patel's Scope of Work is to preliminarily recommend a drainage concept that will complement an overall flood mitigation.*

The Maryvale Mitigation Study's recommended solution for the area between 57th Avenue and the proposed detention basin is a concrete-lined channel immediately north of the Grand Canal. As proposed, this channel was designed to convey 100-year flows to a basin facility. However, due to constraints imposed on the proposed basin by the Maryvale Baseball Park design criteria, the hydraulic capacity of the proposed Whitton Avenue channel is significantly reduced. The remainder of the Site "C" system recommended herein is essentially the same as in the Maryvale Mitigation Study. Concrete spillways are proposed at 57th Avenue and 56th Drive to direct street flow into the proposed channel. The 56th Drive spillway will require the acquisition of a residential lot and the demolition of an existing single-family home. A culvert is proposed at the 55th Avenue crossing. A new storm drain lateral, extending north from this culvert, will collect overland flows in 55th Avenue.

The recommended Site "C" improvements varies from the Maryvale Mitigation Study Site "C" drainage solution in that the Whitton Avenue channel capacity is reduced to convey approximately the 2-year flows and the channel will no longer outfall directly into the basin at the southwest corner of the project site. For preliminary hydraulic calculations for this channel, see HEC-RAS output in the Appendix under Hydraulics (Tab III, Site "C").

From the southwest corner of the project site, the Site "C" flow will be conveyed in a 60-inch Grand Canal storm drain (Line "Q") to a surge structure on the south side of ballfield #5. For hydraulic calculations for this 60-inch storm drain, see Table 3 in the Appendix under Hydraulics (Tab II). Low initial flows continue east in a 30-inch pipe (Line "P") to the 36-inch surge basin outlet pipe (Line "A") and ultimately to the 72-inch storm drain in 51st Avenue.

Due to the design highwater elevation in the channel being significantly lower than the detention basin's design highwater elevation, a backflow preventer (flap gate) will be required at the inlet structure proposed for the southwest corner of the site where the proposed Whitton Avenue open channel transitions to closed conduit (Line "Q").

6.0 SUMMARY AND CONCLUSIONS

The following summary and conclusions are made in conjunction with the Maryvale Baseball Park Preliminary Grading and Drainage Study & Design.

- The hydrology from the previously approved FCDMC Maryvale Mitigation Study report was used as a basis for the Maryvale Baseball Park's preliminary drainage report.

- Modifications to the approved hydrology of the Maryvale Mitigation Study were necessary to accommodate the ballfield's site-specific flood control components.

- A minimum of 58 acre-feet detention storage is proposed on the baseball park site. The storage will be located within the detention basin consisting of fields #5 and #6, and the parking lot "B", all located along the north side of the Grand Canal.

- Drain Time: The proposed detention basin is designed to handle a 10-year storm event. It would also be capable of accepting some storage volume for the floods in excess of a 10-year storm. The drain time for the 58 acre-foot storage volume is estimated to be less than 36 hours.

- Mixed-Use Concern: The health, safety, and welfare of guests and personnel of the Maryvale Baseball Park are of concern due to the mixed usage of the southerly portion of the site for both parking lot/ballfields and for a flood control detention basin.

  For the majority of the time, the flood control facility will be water free. Provisions are strongly recommended to prevent access to the parking lot/ballfields for any use when a potential for flooding exists. Additionally, posting of flood hazard signs and associated risk notices the general public should be integrated into the onsite features to enhance public safety and awareness.

- 51st Avenue: In order to take advantage of the possible future improved hydraulic capacity of the 51st Avenue storm drain (Line "D"), the drainage inlet interception in 51st Avenue immediately south of Mitchell Drive will be enhanced by adding two large catch basins.

- Site "B" - Crittenden Lane: By taking advantage of the possible future improved hydraulic condition in the existing 54-inch storm drain (Line "X") in the Crittenden Lane and the 51st Avenue storm drain and by constructing a new parallel 42-inch storm drain (Line "Y") between 50th Avenue and 51st Avenue, the sub-surface capacity could be increased to over 200 cfs.

- Site "C" - Whitton Avenue Channel and Grand Canal Storm Drain (Line "Q"): A concrete channel north of the Grand Canal could be built in the future which could convey flows (up to the 2-year event) from 57th Avenue to the southwest corner of the site. A 60-inch storm drain is proposed as part of this project to intercept and convey the Whitton Avenue Channel flow to Ballfield #5. In the interim, the 60-inch pipe will be plugged at the west end of this project so that a future connection can be made with the Whitton Avenue Channel.

  Incidentals to this system will include future acquisition of a residential lot and demolition of the residential structure in order to accommodate a spillway at 57th Avenue, a future culvert crossing at 55th Avenue, a future storm drain lateral in 55th Avenue, and channel right-of-way acquisition.

7.0 BIBLIOGRAPHY

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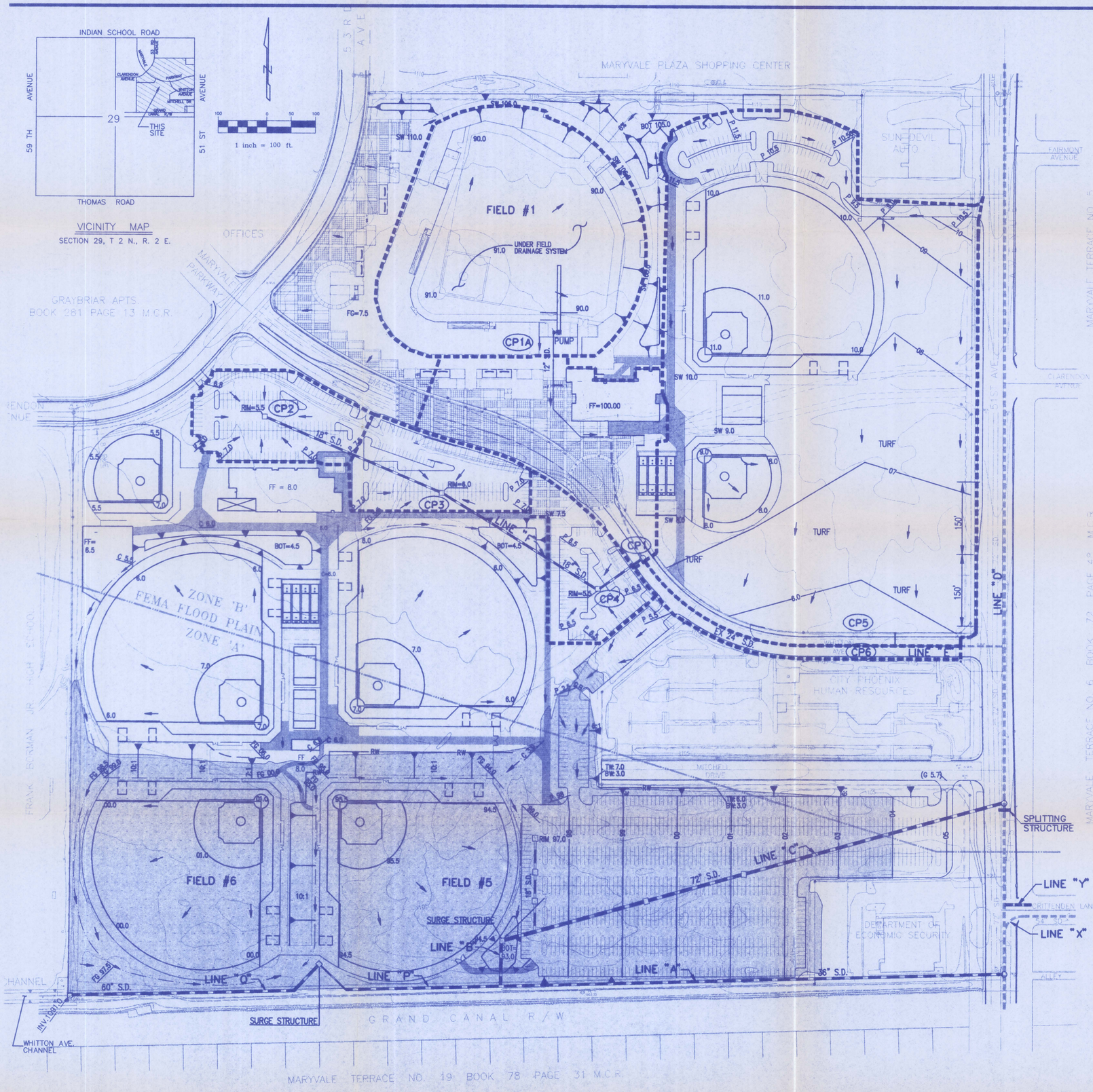
Flood Control District of Maricopa County, *Drainage Design Manual for Maricopa County, Arizona, Volume II - Hydraulics,* November 1991.

Kenney Aerial Mapping, Inc., Topographic Mapping prepared for Maryvale Area Drainage Master Study Scale 1" = 200', 1' and 2' contour interval, flown March 28, 1994.

U.S. Army Corps of Engineers, *HEC-1 Flood Hydrograph Package,* September 1990.

Flood Control District of Maricopa County, Coe & Van Loo, *Maryvale Area Flooding Mitigation Project, Pre-design Report,* April 5, 1996.



NOTES

1. The project does not provide onsite retention per the conventional approach since the existing and proposed storm drains will be used to collect and convey both offsite and onsite runoff to the detention basin. In major rainfall/runoff events, onsite retention will be mixed in with the regional runoff and be held in the depressed ballfields #5 and #6 and parking area 'B' next to the Grand Canal. The proposed basin will provide over 58 acre feet of flood storage.
2. The flood control concept presented has been accepted by all agencies involved.
3. All of Whitton Avenue and Maryvale Parkway rights-of-way are to be abandoned as part of this project. The roadway shown between 51st Avenue and Clarendon Avenue is to be a private drive.

LEGEND

- PROPOSED STORM DRAIN — 30" S.D.
- PROPOSED CONTOUR — 08
- PROPOSED RETAINING WALL — RW
- FEMA FLOOD BOUNDARY
- PROPOSED SWALE
- PROPOSED DETENTION
- PROPOSED FLOOD PLAIN
- CONCENTRATION POINT FOR LINE F DRAINAGE — CP1
- DRAINAGE AREA BOUNDARY LINE

Revision	Date	No.

CITY OF PHOENIX
ENGINEERING & ARCHITECTURAL SERVICES
200 W. WASHINGTON STREET
PHOENIX, AZ 85003
TELEPHONE 602.262.6011

MILWAUKEE BREWERS

MARYVALE BASEBALL PARK

PRELIMINARY: NOT FOR CONSTRUCTION

WOOD/PATEL
CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS

Wood, Patel & Associates, Inc.
1550 East Missouri, # 203, Phoenix, Az 85014
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ELLERBE BECKET

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WOOD/PATEL ASSOCIATES
Civil Engineers
Hydrologists
Land Surveyors
(602) 234-1344

Grading and Drainage Plan
FIGURE 1

Scale 1" = 100'

Date November 19, 1996 Comm. No. 9604-962
In Charge Huval
Drawn By
Checked By Wood

1 OF 1

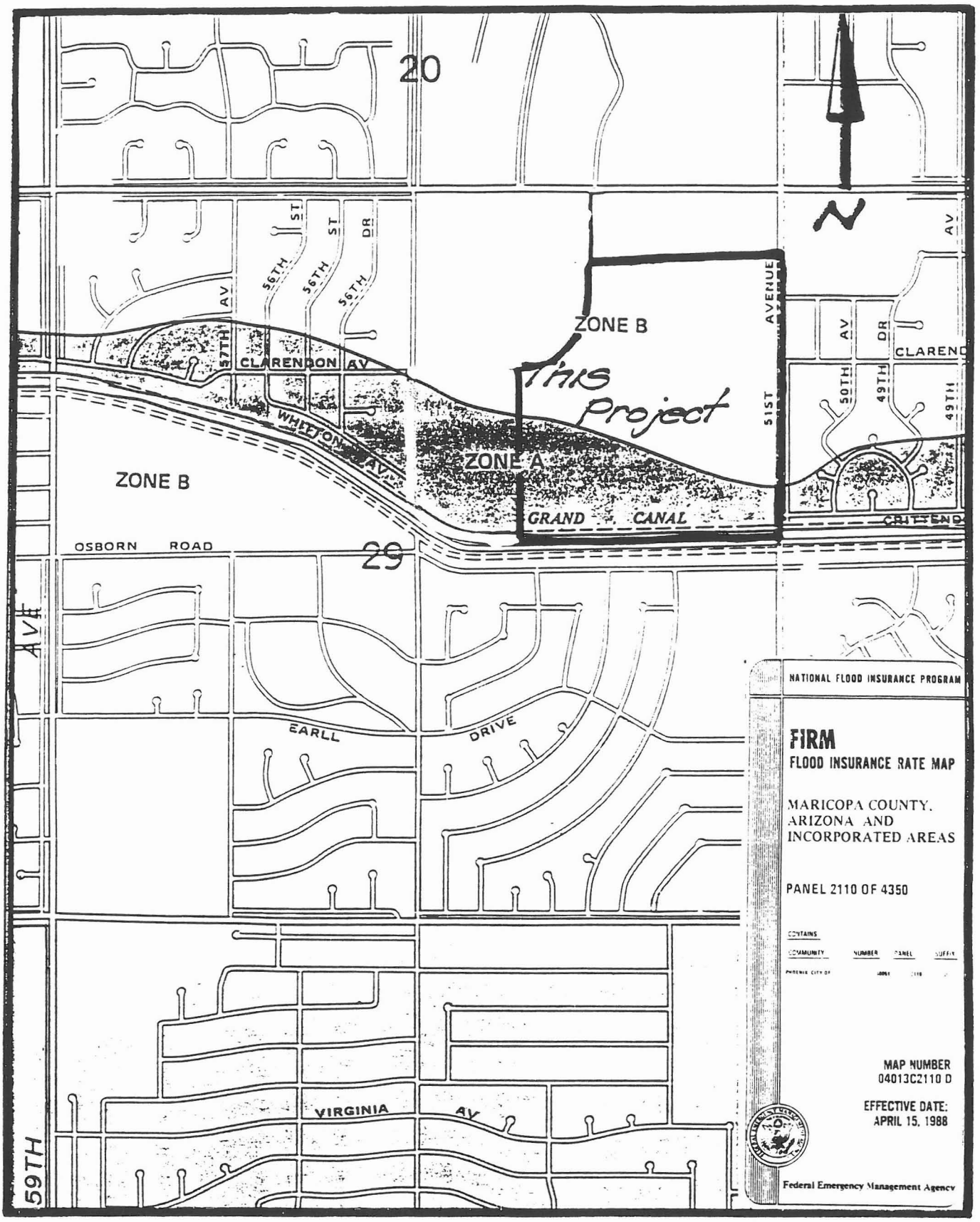
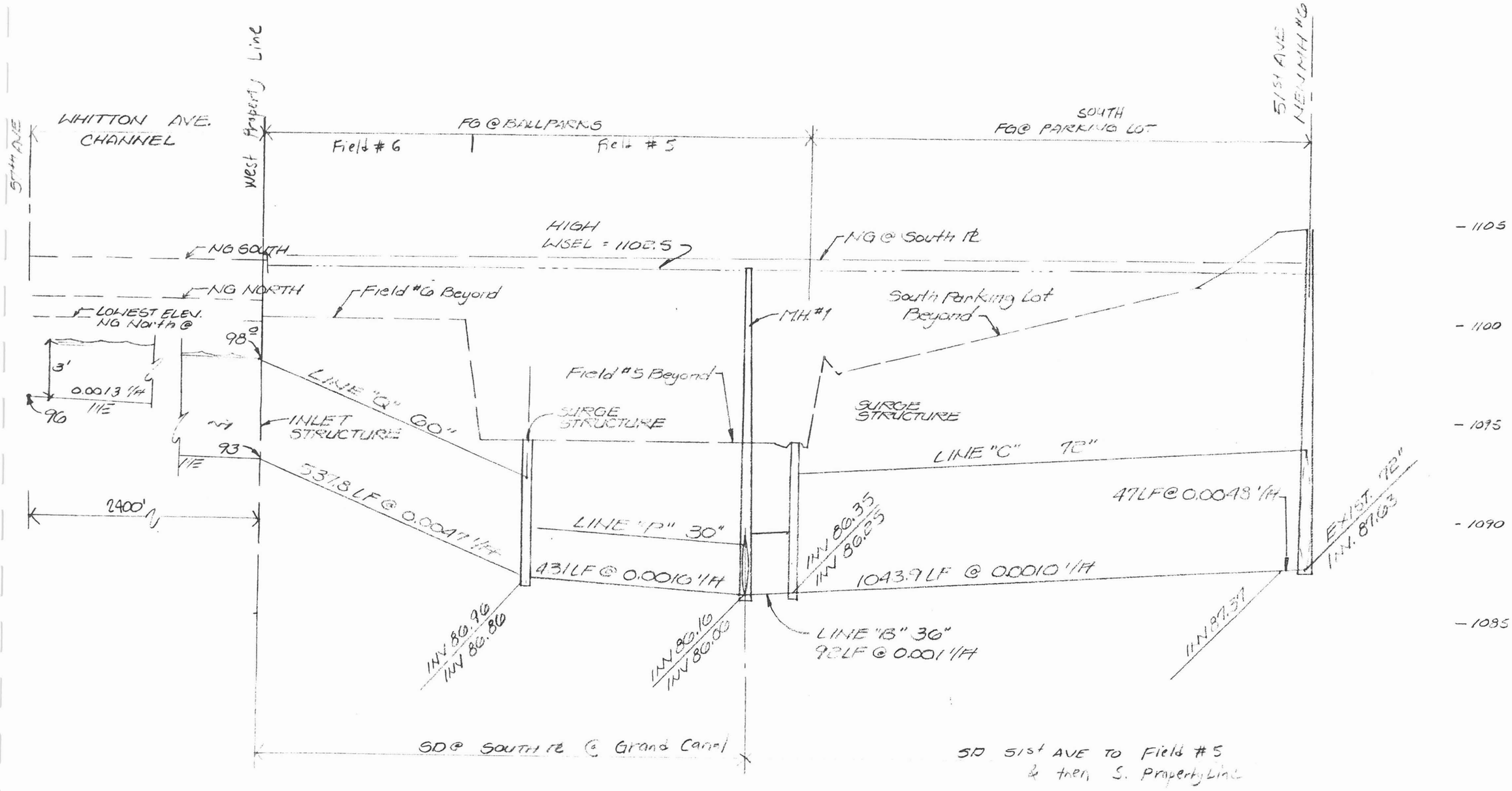

20
N
ZONE B
This Project
ZONE A
ZONE B
CLARENDON AV
WHITTON AV
GRAND CANAL
OSBORN ROAD
29
EARLL DRIVE
VIRGINIA AV
59TH AVE
57TH AV
56TH ST
56TH ST
56TH DR
51ST AVENUE
50TH AV
49TH DR
49TH AV
CRITTEND
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS
PANEL 2110 OF 4350
CONTAINS
COMMUNITY NUMBER PANEL SUFFIX
PHOENIX, CITY OF 4001 2110 J
MAP NUMBER
04013C2110 D
EFFECTIVE DATE:
APRIL 15, 1988
Federal Emergency Management Agency

FIGURE 2

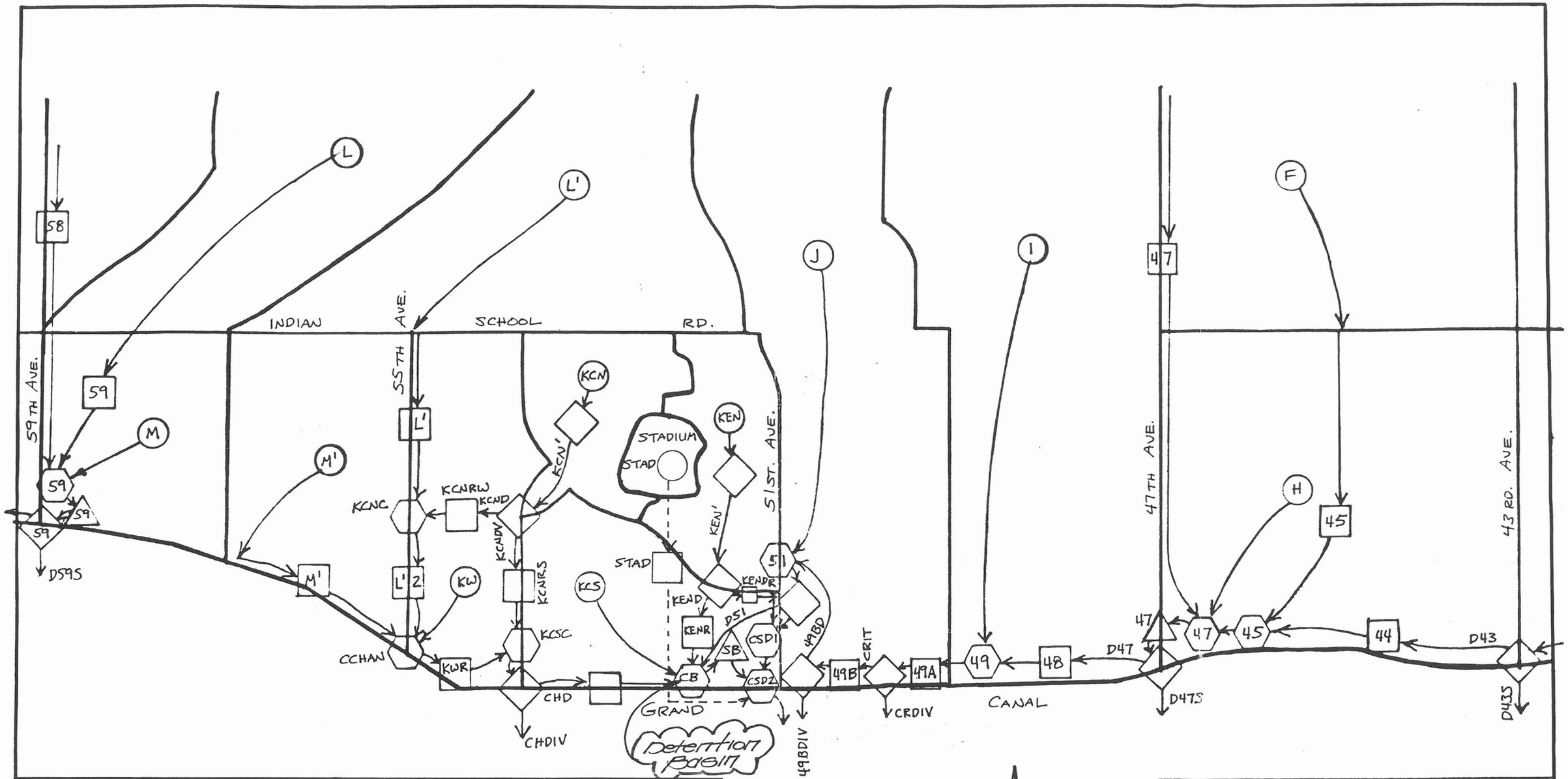


NOTE: FOR PLAN & PROFILE OF PROPOSED SYSTEM, SEE IMPROVEMENT PLANS FOR MARYVALE BASEBALL PARK.

STORM DRAIN PROFILE

Figure 3

MARYVALE
BASEBALL PARK
JGT 12/96
WP# 96378



SUMMARY OF PEAK FLOWS, cfs

Concentration Point	Description	2-year	10-year	100-year
C51	51st Avenue flow from north	76	213	474
49B	Crittenden Lane (incl. SD) flow from east	146	241	241
CHD	Storm drain flow from west	108	108	108
CB	Basin Inflow	153	344	667
SB	Basin Outflow (pipe)	46	55	64

N

APPROXIMATE SCALE
1" = 700'

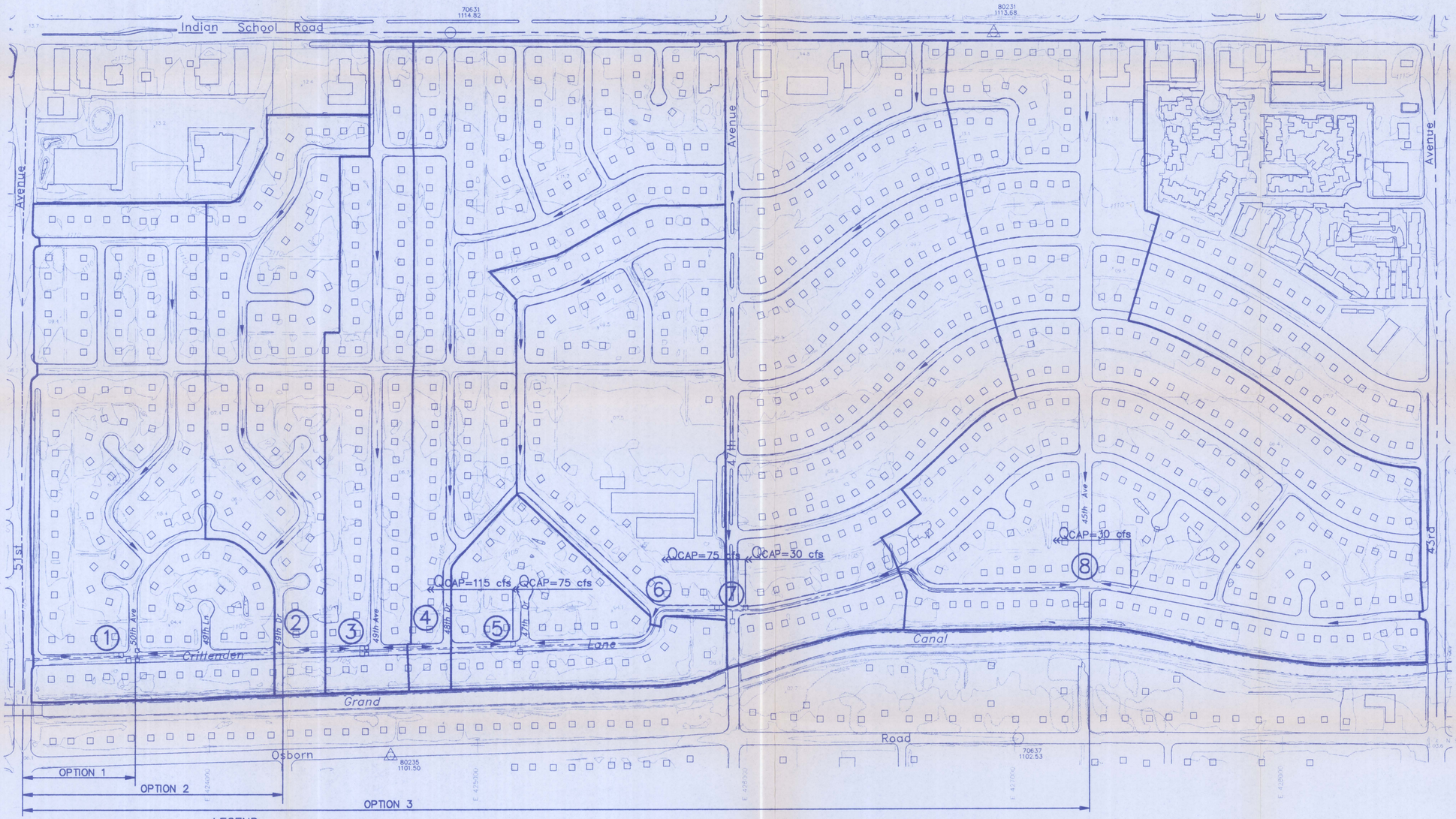
MARYVALE BASEBALL COMPLEX

HEC-1 SCHEMATIC DIAGRAM

WOOD/PATEL ASSOCIATES
Civil Engineers
Hydrologists
Land Surveyors
(602) 234-1344

FIGURE 4	SHEET 1 OF 1
DATE 10/16/96	JOB NO. 96398
DESIGN	CHECK
DRAWN	FILE

SCALE: 1" = 200'



LEGEND

- Existing Storm Drain & Catch Basins
- Option 1: Additional Storm Drain & Catch Basins (51st Ave to 50th Ave)
- Option 2: Additional Storm Drain & Catch Basins (51st Ave to 49th Ave)
- Option 3: Additional Storm Drain & Catch Basins (51st Ave to 45th Ave)
- (1) Rational Method Concentration Point
- Drainage Subarea Boundary Line
- Direction of Runoff
- QCAP East Storm Drain Capacity

Revision	Date	No.

CITY OF PHOENIX
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MARYVALE BASEBALL PARK
CRITTENDEN LANE STORM DRAIN
DRAINAGE AREA MAP

Scale

Date October 4, 1996
In Charge T. Huval
Drawn By L. Cowles
Checked By D. Wood
Comm. No.

1 OF 1

FIGURE 5

W/P #96398

N:/960505/5050AM.DWG

APPENDIX

I. HYDROLOGY

HEC-1:	Input/Output (10-Year)
Hydrograph:	Detention Basin (100-Year)
Diskette:	HEC-1, 10-Year and 100-Year

```
****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              MAY   1991              *
*           VERSION 4.0.1E             *
*     Lahey F77L-EM/32 version 5.01    *
*       Dodson & Associates, Inc.      *
*  RUN DATE  10/14/96  TIME  11:24:03  *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 551-1748             *
*                                      *
****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

10-YEAR STORM

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID        MARYVALE BASEBALL PARK
  2           ID        FLOOD CONTROL FACILITIES
  3           ID        WOOD, PATEL & ASSOCIATES, INC.
  4           ID        ************************************************
  5           ID        BASED ON MODEL FROM
  6           ID        MARYVALE FLOOD MITIGATION STUDY
  7           ID        FLOOD CONTROL DISTRICT OF MARICOPA COUNTY (CVL)
  8           ID        DESIGN CONDITION - DETENTION BASIN ADDITIONS
  9           ID        ************************************************
 10           ID        10-YEAR, 6-HOUR STORM
 11           ID        FILE: mv10ye3.dat          DATE:   10/14/96
 12           ID        JOB #: 96398
 13           ID        ***
 14           ID        *** THE FOLLOWING CHANGES HAVE BEEN MADE BY WOOD/PATEL IN CONJUNCTION
 15           ID        *** WITH THE DESIGN OF THE MARYVALE BASEBALL PARK FLOOD CONTROL
 16           ID        *** FACILITIES
 17           ID        ***
 18           ID        9/17/96: OUTFLOWS IN SB RATING CURVE MODIFIED
 19           ID        ***
 20           ID        9/16/96: 25 CFS DIVERT AT C51 REDUCED TO 0 CFS
 21           ID                 SV RECORD IN RATING CURVE AT SB MODIFIED
 22           ID        ***
 23           ID        8/13/96: FLOW FROM STAD REMOVED
 24           ID        ***
 25           ID        7/29/96: TC AND R AT BASIN H CORRECTED
 26           ID        ***
 27           ID        7/10/96: FLOW IN EXCESS OF 108 CFS REMOVED AT CCHAN
 28           ID        ***
 29           ID        7/7/96:  DETENTION BASIN VOLUMES UPDATED
 30           ID        ***
 31           ID        7/3/96:  DETENTION BASIN OUTFLOW VALUES UPDATED; CRITTENDEN STREET/
 32           ID                 STORM DRAIN DIVERSION INTO 51ST AVE STORM DRAIN MODIFIED
 33           ID        ***
 34           ID        6/4/96:  25 CFS MAX STORM DRAIN DIVERT TO SOUTH AT C51
 35           ID        ***
 36           ID        5/22/96: FLOW IN EXCESS OF 70 CFS REMOVED AT CCHAN
 37           ID        ***
              *DIAGRAM
 38           IT       5                    300
 39           IO       5       0
 40           IN      15
 41           JD    1.95    0.01
 42           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 43           PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 44           PC    .962    .972    .983    .991   1.000
 45           JD    1.94    0.50
 46           JD    1.91    2.80
 47           PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
 48           PC    .087    .100    .120    .163    .252    .451    .694    .837    .900    .938
 49           PC    .950    .963    .975    .988   1.000
 50           JD    1.80    16.0
 51           PC    .000    .015    .020    .030    .048    .063    .076    .090    .105    .119
 52           PC    .135    .152    .175    .222    .304    .472    .670    .796    .868    .912
 53           PC    .946    .960    .973    .987   1.000
 54           JD    1.58    90.0
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 55           PC    .000    .021    .035    .051    .071    .087    .105    .125    .143    .160
 56           PC    .179    .201    .232    .281    .364    .500    .658    .773    .841    .888
 57           PC    .927    .945    .964    .982   1.000
 58           JD    1.11   500.0
 59           PC    .000    .024    .043    .059    .078    .098    .119    .141    .162    .186
 60           PC    .212    .239    .271    .321    .408    .515    .627    .735    .814    .864
 61           PC    .907    .930    .954    .977   1.000
              *

 62           KK       A
 63           KM   SUB-BASIN A
 64           KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 65           KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .999
 66           KM     L =  .47  Kb = .029  Adj. Slope =   14.8
 67           BA    .095
 68           LG    .150    .250   4.300    .620  55.000
 69           UC    .308    .211
 70           UA       0       5      16      30      65      77      84      90      94      97
 71           UA     100
              *

 72           KK       B
 73           KM   SUB-BASIN B
 74           KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 75           KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .996
 76           KM     L = 1.03  Kb = .026  Adj. Slope =   16.5
 77           BA    .294
 78           LG    .150    .250   5.670    .279  55.000
 79           UC    .446    .311
 80           UA       0       5      16      30      65      77      84      90      94      97
 81           UA     100
              *

 82           KK     D39        FLOW DIVERSION AT 39TH AVE
 83           DT    D39S
 84           DI       0      50     200     600
 85           DQ       0      84      84      84
              *

 86           KK       C
 87           KM   SUB-BASIN C
 88           KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 89           KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .997
 90           KM     L =  .93  Kb = .027  Adj. Slope =   22.8
 91           BA    .209
 92           LG    .145    .250   3.500    .392  57.630
 93           UC    .371    .282
 94           UA       0       5      16      30      65      77      84      90      94      97
 95           UA     100
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  96          KK     R39
  97          KM        ROUTING SUBBASIN C ALONG 39TH AVE. TO CP 40
  98          RS       1    ELEV       0
  99          RC   0.025   0.016   0.025    1600  0.0042
 100          RX    69.7    69.8    69.9      70     130   130.1   130.2   130.3
 101          RY       5       2       1       0       0       1       2       5
              *

 102          KK     C40        CONCENTRATION POINT 40 - COMBINGING B AND C
 103          HC       2
              *

 104          KK     R40        ROUTE 40 TO C43
 105          RS       2    ELEV       0
 106          RC   0.050   0.035   0.050    2700   .0015
 107          RX     450     458     462     482     484     562     566     570
 108          RY       5       2       1       0       0       1       2       5
              *

 109          KK       D
 110          KM   SUB-BASIN D
 111          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 112          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .998
 113          KM     L =  .97  Kb = .027  Adj. Slope =   21.6
 114          BA    .168
 115          LG    .146    .250   3.500    .391  57.230
 116          UC    .392    .353
 117          UA       0       5      16      30      65      77      84      90      94      97
 118          UA     100
              *

 119          KK     R43        ROUTE 43 - CARRYS SUBBASIN D TO C43
 120          RS       1    ELEV       0
 121          RC   0.020   0.016   0.020    2150  0.0037
 122          RX   439.7   439.8   439.9     440     560   560.1   560.2   560.3
 123          RY       5       2       1       0       0       1       2       5
              *

 124          KK       E
 125          KM   SUB-BASIN E
 126          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 127          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .997
 128          KM     L =  .78  Kb = .027  Adj. Slope =   11.4
 129          BA    .197
 130          LG    .132    .250   5.980    .274  64.010
 131          UC    .438    .307
 132          UA       0       5      16      30      65      77      84      90      94      97
 133          UA     100
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 134          KK     C43        CONCENTRATION POINT 43
 135          HC       3
              *

 136          KK     S43        STORAGE ROUTING
 137          RS       1    FLOW      -1
 138          SV       0    0.01      .1    .645    4.77    6.79   29.76
 139          SE    1104  1104.1    1105    1106  1106.8    1107    1108
 140          SQ       0      27      27      27      27      54    1815
              *

 141          KK     D43        FLOW DIVERSION AT 43RD AVE
 142          DT    D43S
 143          DI       0      27      27      27      27      54    1815
 144          DQ       0      27      27      27      27      27      27
              *

 145          KK     R44        ROUTE 44
 146          RS       1    ELEV      -1
 147          RC   0.025   0.016   0.025    1300  0.0027
 148          RX   469.7   469.8   469.9     470     530   530.1   530.2   530.3
 149          RY       5       2       1       0       0       1       2       5
              *

 150          KK       F
 151          KM   SUB-BASIN F
 152          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 153          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .993
 154          KM     L = 1.18  Kb = .041  Adj. Slope =   20.7
 155          BA    .500
 156          LG    .111    .345   4.740    .234  11.550
 157          UC    .654    .392
 158          UA       0       5      16      30      65      77      84      90      94      97
 159          UA     100
              *

 160          KK     R45        ROUTE 45
 161          RS       2    ELEV       0
 162          RC   0.020   0.016   0.020    2200  0.0039
 163          RX    69.7    69.8    69.9      70     135   135.1   135.2   135.3
 164          RY       5       2       1       0       0       1       2       5
              *

 165          KK     C45
 166          HC       2
              *

 167          KK       G
 168          KM   SUB-BASIN G
 169          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 170          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .998
 171          KM     L =  .80  Kb = .028  Adj. Slope =    3.0
 172          BA    .121
 173          LG    .150    .250   3.550    .403  55.000
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 174          UC    .829    .837
 175          UA       0       5      16      30      65      77      84      90      94      97
 176          UA     100
              *

 177          KK     R47        ROUTE 47
 178          RS       5    ELEV       0
 179          RC   0.025   0.016   0.025    7350  0.0043
 180          RX    54.7    54.8    54.9      55     145   145.1   145.2   145.3
 181          RY       5       2       1       0       0       1       2       5
              *

 182          KK       H
 183          KM   SUB-BASIN H
 184          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 185          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .997
 186          KM     L = 1.03  Kb = .027  Adj. Slope =    8.2
 187          BA    .217
 188          LG    .233    .250   4.740    .309  37.470
 189          UC   0.896   0.801
 190          UA       0       5      16      30      65      77      84      90      94      97
 191          UA     100
              *

 192          KK     C47
 193          HC       3
              *

 194          KK     S47        STORAGE ROUTING AT 47TH AVE
 195          RS       1    FLOW      -1
 196          SV       0    0.01    4.04    6.31   28.74
 197          SE    1104  1104.1  1104.8    1105    1106
 198          SQ       0     105     115     182    1988
              *

 199          KK     D47        DIVERSION AT 47TH AVE CANAL OVERFLOW SOUTH
 200          DT    D47S
 201          DI       0     155     165     210    2038
 202          DQ       0       0       0      22     825
              *
              * KK  D47C        FLOW DIVERSION THROUGH CRITTENDEN STORM DRAIN
              * DT  CRIT
              * DI     0     155     200    2000
              * DQ     0     155     155     155
              *

 203          KK     R48        ROUTE 48
 204          RS       2    ELEV       0
 205          RC   0.030   0.016   0.030    2650   .0020
 206          RX    64.7    64.8    64.9      65     135   135.1   135.2   135.3
 207          RY       5       2       1       0       0       1       2       5
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 208          KK       I
 209          KM   SUB-BASIN I
 210          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 211          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .994
 212          KM     L = 1.46  Kb = .025  Adj. Slope =   15.0
 213          BA    .445
 214          LG    .241    .254   3.810    .343  29.760
 215          UC    .600    .451
 216          UA       0       5      16      30      65      77      84      90      94      97
 217          UA     100
              *

 218          KK     C49        CONCENTRATION POINT 49
 219          HC       2
              *

 220          KK    R49A        ROUTE 49A
 221          KM   ROUTE C49 ALONG CRITTENDEN LN
 222          RS       2    ELEV       0
 223          RC   0.030   0.016   0.030    1325   .0020
 224          RX    64.7    64.8    64.9      65     135   135.1   135.2   135.3
 225          RY       5       2       1       0       0       1       2       5
              *

 226          KK    CRIT
 227          KM   DIVERT FLOW IN EXCESS OF CRITTENDEN STORM DRAIN + STREET CAPACITY
 228          DT   CRDIV
 229          DI       0     240    1000
 230          DQ       0       0     760
              *

 231          KK    R49B        ROUTE 49B
 232          KM   ROUTE CRIT ALONG CRITTENDEN LN
 233          RS       2    ELEV       0
 234          RC   0.030   0.016   0.030    1325   .0020
 235          RX    64.7    64.8    64.9      65     135   135.1   135.2   135.3
 236          RY       5       2       1       0       0       1       2       5
              *

 237          KK    49BD
 238          KM   DIVERT 200 CFS INTO 51ST AVE STORM DRAIN
 239          DT   49BDV
 240          DI       0     200    1000
 241          DQ       0     200     200
              *

 242          KK       J
 243          KM   SUB-BASIN J
 244          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 245          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .995
 246          KM     L = 1.60  Kb = .026  Adj. Slope =   12.3
 247          BA    .388
 248          LG    .200    .252   3.500    .378  44.870
 249          UC    .700    .622
```

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 250          UA       0       5      16      30      65      77      84      90      94      97
 251          UA     100
              *

 252          KK     C51
 253          HC       2
              *

 254          KK     D51        STORM DRAIN DIVERSION TO SOUTH
 255          DT    D51S
 256          DI       0     .01    4000
 257          DQ       0     .01     .01
              *

 258          KK      L'
 259          KM   SUB-BASIN L'
 260          KM   6-HOUR RAINFALL, PATTERN NO. 1.05 WAS USED TO FIND TC & R FOR THIS BASIN
 261          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .993
 262          KM     L = 1.98  Kb = .024  Adj. Slope =   14.0
 263          BA    .228
 264          LG    .217    .250   5.360    .285  45.930
 265          UC    .729    .640
 266          UA       0       5      16      30      65      77      84      90      94      97
 267          UA     100
              *

 268          KK     RL'
 269          RS       1    ELEV       0
 270          RC   0.030   0.016   0.030    2300   .0028
 271          RX    49.7    49.8    49.9      50     150   150.1   150.2   150.3
 272          RY       3       2       1       0       0       1       2       3
              *

 273          KK     KCN
 274          KM   SUB-BASIN KCN
 275          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 276          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF 1.000
 277          KM     L =  .35  Kb = .035  Adj. Slope =   20.0
 278          BA    .038
 279          LG    .153    .290   4.430    .304  41.200
 280          UC    .329    .300
 281          UA       0       5      16      30      65      77      84      90      94      97
 282          UA     100
              *

 283          KK    KCN'
 284          KM   RETENTION IN PARKING LOT WITHIN BASIN KCN; DIVERT FIRST 0.6 AC-FT OF 20
 285          KM   PERCENT OF BASIN RUNOFF
 286          DT   KCNRT     0.6
 287          DI       0   10000
 288          DQ       0    2000
              *
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 208          KK       I
 209          KM   SUB-BASIN I
 210          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 211          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .994
 212          KM     L = 1.46  Kb = .025  Adj. Slope =   15.0
 213          BA    .445
 214          LG    .241    .254   3.810    .343  29.760
 215          UC    .600    .451
 216          UA       0       5      16      30      65      77      84      90      94      97
 217          UA     100
              *

 218          KK     C49        CONCENTRATION POINT 49
 219          HC       2
              *

 220          KK    R49A        ROUTE 49A
 221          KM   ROUTE C49 ALONG CRITTENDEN LN
 222          RS       2    ELEV       0
 223          RC   0.030   0.016   0.030    1325   .0020
 224          RX    64.7    64.8    64.9      65     135   135.1   135.2   135.3
 225          RY       5       2       1       0       0       1       2       5
              *

 226          KK    CRIT
 227          KM   DIVERT FLOW IN EXCESS OF CRITTENDEN STORM DRAIN + STREET CAPACITY
 228          DT   CRDIV
 229          DI       0     240    1000
 230          DQ       0       0     760
              *

 231          KK    R49B        ROUTE 49B
 232          KM   ROUTE CRIT ALONG CRITTENDEN LN
 233          RS       2    ELEV       0
 234          RC   0.030   0.016   0.030    1325   .0020
 235          RX    64.7    64.8    64.9      65     135   135.1   135.2   135.3
 236          RY       5       2       1       0       0       1       2       5
              *

 237          KK    49BD
 238          KM   DIVERT 200 CFS INTO 51ST AVE STORM DRAIN
 239          DT   49BDV
 240          DI       0     200    1000
 241          DQ       0     200     200
              *

 242          KK       J
 243          KM   SUB-BASIN J
 244          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 245          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .995
 246          KM     L = 1.60  Kb = .026  Adj. Slope =   12.3
 247          BA    .388
 248          LG    .200    .252   3.500    .378  44.870
 249          UC    .700    .622
```

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 250          UA       0       5      16      30      65      77      84      90      94      97
 251          UA     100
              *

 252          KK     C51
 253          HC       2
              *

 254          KK     D51        STORM DRAIN DIVERSION TO SOUTH
 255          DT    D51S
 256          DI       0     .01    4000
 257          DQ       0     .01     .01
              *

 258          KK      L'
 259          KM   SUB-BASIN L'
 260          KM   6-HOUR RAINFALL, PATTERN NO. 1.05 WAS USED TO FIND TC & R FOR THIS BASIN
 261          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .993
 262          KM     L = 1.98  Kb = .024  Adj. Slope =   14.0
 263          BA    .228
 264          LG    .217    .250   5.360    .285  45.930
 265          UC    .729    .640
 266          UA       0       5      16      30      65      77      84      90      94      97
 267          UA     100
              *

 268          KK     RL'
 269          RS       1    ELEV       0
 270          RC   0.030   0.016   0.030    2300   .0028
 271          RX    49.7    49.8    49.9      50     150   150.1   150.2   150.3
 272          RY       3       2       1       0       0       1       2       3
              *

 273          KK     KCN
 274          KM   SUB-BASIN KCN
 275          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 276          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF 1.000
 277          KM     L =  .35  Kb = .035  Adj. Slope =   20.0
 278          BA    .038
 279          LG    .153    .290   4.430    .304  41.200
 280          UC    .329    .300
 281          UA       0       5      16      30      65      77      84      90      94      97
 282          UA     100
              *

 283          KK    KCN'
 284          KM   RETENTION IN PARKING LOT WITHIN BASIN KCN; DIVERT FIRST 0.6 AC-FT OF 20
 285          KM   PERCENT OF BASIN RUNOFF
 286          DT   KCNRT     0.6
 287          DI       0   10000
 288          DQ       0    2000
              *
```

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 289          KK    KCND
 290          KM   DIVERT 50 PERCENT OF KCN TO SOUTH
 291          DT   KCNDV
 292          DI       0    1000
 293          DQ       0     500
              *

 294          KK   KCNRW
 295          KM   ROUTE KCND ALONG CLARENDON ST TO 55TH AVE
 296          RS       1    FLOW      -1
 297          RC    .030    .016    .030     750   .0023
 298          RX    49.7    49.8    49.9      50     130   130.1   130.2   130.3
 299          RY       3       2       1       0       0       1       2       3
              *

 300          KK    KCNC
 301          KM   COMBINE KCNR AND RL'
 302          HC       2
              *

 303          KK    RL'2
 304          KM   ROUTE KCNC SOUTH ALONG 55TH AVE TO GRAND CANAL
 305          RS       1    ELEV       0
 306          RC    .030    .016    .030    1000   .0033
 307          RX    49.7    49.8    49.9      50     150   150.1   150.2   150.3
 308          RY       3       2       1       0       0       1       2       3
              *

 309          KK      M'
 310          KM   SUB-BASIN M'
 311          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 312          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .998
 313          KM     L =  .64  Kb = .027  Adj. Slope =   15.2
 314          BA     .09
 315          LG    .235    .150   8.050    .117  34.940
 316          UC    .342    .215
 317          UA       0       5      16      30      65      77      84      90      94      97
 318          UA     100
              *

 319          KK     RM'
 320          RS       1    ELEV       0
 321          RC    .030    .016    .030     840    .002
 322          RX       0       1       2      12      20      30      31      32
 323          RY     100     100     100      95      95     100     100     100
              *

 324          KK      KW
 325          KM   SUB-BASIN KW
 326          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 327          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .999
 328          KM     L =  .53  Kb = .035  Adj. Slope =   17.0
 329          BA    .069
 330          LG    .153    .290   4.430    .304  41.200
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 331          UC    .475    .447
 332          UA       0       5      16      30      65      77      84      90      94      97
 333          UA     100
              *

 334          KK   CCHAN        COMBINATION OF FLOW IN CHANNEL ALONG CANAL
 335          KM   COMBINE RM', RL'2, AND KW
 336          HC       3
              *

 337          KK     KWR
 338          KM   ROUTE CCHAN EAST TO CP KCSC
 339          RS       1    ELEV       0
 340          RC    .030    .016    .030     840    .002
 341          RX       0       1       2      12      20      30      31      32
 342          RY     100     100     100      95      95     100     100     100
              *

 343          KK   KCNDV
 344          KM   RETRIEVE DIVERTED FLOW
 345          DR   KCNDV
              *

 346          KK   KCNRS
 347          KM   ROUTE KCNDV SOUTH TO CP KCSC
 348          RS       1    FLOW      -1
 349          RC    .030    .016    .030    1000   .0033
 350          RX    49.7    49.8    49.9      50     130   130.1   130.2   130.3
 351          RY       3       2       1       0       0       1       2       3
              *
              * DDM   ***** Inserted *****
              *

 352          KK    KCSC
 353          KM   COMBINE KWR AND KCNR
 354          HC       2
              *
              * DDM   ***** Inserted *****
              *

 355          KK     CHD
 356          KM   REMOVE FLOW IN EXCESS OF 108 CFS
 357          DT   CHDIV
 358          DI       0     108    1000
 359          DQ       0       0     892
              *

 360          KK     KEN
 361          KM   SUB-BASIN KEN
 362          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 363          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .999
 364          KM     L =  .44  Kb = .035  Adj. Slope =   16.0
 365          BA    .050
 366          LG    .153    .290   4.430    .304  41.200
 367          UC    .429    .414
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 289          KK    KCND
 290          KM   DIVERT 50 PERCENT OF KCN TO SOUTH
 291          DT   KCNDV
 292          DI       0    1000
 293          DQ       0     500
              *

 294          KK   KCNRW
 295          KM   ROUTE KCND ALONG CLARENDON ST TO 55TH AVE
 296          RS       1    FLOW      -1
 297          RC    .030    .016    .030     750   .0023
 298          RX    49.7    49.8    49.9      50     130   130.1   130.2   130.3
 299          RY       3       2       1       0       0       1       2       3
              *

 300          KK    KCNC
 301          KM   COMBINE KCNR AND RL'
 302          HC       2
              *

 303          KK    RL'2
 304          KM   ROUTE KCNC SOUTH ALONG 55TH AVE TO GRAND CANAL
 305          RS       1    ELEV       0
 306          RC    .030    .016    .030    1000   .0033
 307          RX    49.7    49.8    49.9      50     150   150.1   150.2   150.3
 308          RY       3       2       1       0       0       1       2       3
              *

 309          KK      M'
 310          KM   SUB-BASIN M'
 311          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 312          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .998
 313          KM     L =  .64  Kb = .027  Adj. Slope =   15.2
 314          BA     .09
 315          LG    .235    .150   8.050    .117  34.940
 316          UC    .342    .215
 317          UA       0       5      16      30      65      77      84      90      94      97
 318          UA     100
              *

 319          KK     RM'
 320          RS       1    ELEV       0
 321          RC    .030    .016    .030     840    .002
 322          RX       0       1       2      12      20      30      31      32
 323          RY     100     100     100      95      95     100     100     100
              *

 324          KK      KW
 325          KM   SUB-BASIN KW
 326          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 327          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .999
 328          KM     L =  .53  Kb = .035  Adj. Slope =   17.0
 329          BA    .069
 330          LG    .153    .290   4.430    .304  41.200
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 331          UC    .475    .447
 332          UA       0       5      16      30      65      77      84      90      94      97
 333          UA     100
              *

 334          KK   CCHAN        COMBINATION OF FLOW IN CHANNEL ALONG CANAL
 335          KM   COMBINE RM', RL'2, AND KW
 336          HC       3
              *

 337          KK     KWR
 338          KM   ROUTE CCHAN EAST TO CP KCSC
 339          RS       1    ELEV       0
 340          RC    .030    .016    .030     840    .002
 341          RX       0       1       2      12      20      30      31      32
 342          RY     100     100     100      95      95     100     100     100
              *

 343          KK   KCNDV
 344          KM   RETRIEVE DIVERTED FLOW
 345          DR   KCNDV
              *

 346          KK   KCNRS
 347          KM   ROUTE KCNDV SOUTH TO CP KCSC
 348          RS       1    FLOW      -1
 349          RC    .030    .016    .030    1000   .0033
 350          RX    49.7    49.8    49.9      50     130   130.1   130.2   130.3
 351          RY       3       2       1       0       0       1       2       3
              *
              * DDM   ***** Inserted *****
              *

 352          KK    KCSC
 353          KM   COMBINE KWR AND KCNR
 354          HC       2
              *
              * DDM   ***** Inserted *****
              *

 355          KK     CHD
 356          KM   REMOVE FLOW IN EXCESS OF 108 CFS
 357          DT   CHDIV
 358          DI       0     108    1000
 359          DQ       0       0     892
              *

 360          KK     KEN
 361          KM   SUB-BASIN KEN
 362          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 363          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .999
 364          KM     L =  .44  Kb = .035  Adj. Slope =   16.0
 365          BA    .050
 366          LG    .153    .290   4.430    .304  41.200
 367          UC    .429    .414
```

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 368          UA       0       5      16      30      65      77      84      90      94      97
 369          UA     100
              *

 370          KK    KEN'
 371          KM   RETENTION IN PARKING LOT WITHIN BASIN KEN
 372          KM   DIVERT 0.9 AC-FT OF FIRST 25 PERCENT OF BASIN RUNOFF
 373          DT   KENRT     0.9
 374          DI       0   10000
 375          DQ       0    2500
              *

 376          KK    KEND
 377          KM   DIVERT FIRST 32 CFS INTO STORM DRAIN ALONG MARYVALE PARKWAY/CLARENDON AVE
 378          DT   KENDV
 379          DI       0      32    1000
 380          DQ       0      32      32
              *

 381          KK    KENR
 382          KM   ROUTE KEND SOUTH TO BASIN
 383          RS       1    FLOW      -1
 384          RC    .030    .016    .030     550   .0029
 385          RX       0      .1      .2      .3    50.3    50.4    50.5    50.6
 386          RY     100     100     100      95      95     100     100     100
              *

 387          KK     KCS
 388          KM   SUB-BASIN KCS
 389          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 390          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .999
 391          KM     L =  .25  Kb = .035  Adj. Slope =   18.0
 392          BA    .068
 393          LG    .153    .290   4.430    .304  41.200
 394          UC    .271    .133
 395          UA       0       5      16      30      65      77      84      90      94      97
 396          UA     100
              *

 397          KK      CB
 398          KM   COMBINE KENR, KCS, D51, AND CHD AT PRACTICE FIELDS/PARKING LOT
 399          HC       4
              *

 400          KK      SB        STORAGE ROUTING
 401          RS       1    STOR       0
 402          SV       0       0     0.3    1.60     4.9     8.9    13.4    19.2    27.2    38.9
 403          SV    55.7    67.9    70.9      75
 404          SE  1086.2    1091    1094    1095    1096    1097    1098    1099    1100    1101
 405          SE  1102.2  1103.0  1103.2  1103.8
 406          SQ       0    28.2    37.1    39.8    42.4    45.4    48.1    51.0    53.8    56.7
 407          SQ    60.0    62.4    63.0    1350
              *
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 408          KK   KENDV
 409          KM   RETRIEVE DIVERTED 32 CFS STORM DRAIN FLOW
 410          DR   KENDV
              *

 411          KK   KENDR
 412          KM   ROUTE KENDV EAST TO 51ST AVE IN MARYVALE PKWY STORM DRAIN
 413          RD     400     .02    .013            CIRC       2
              *

 414          KK   RTN51
 415          KM   RETRIEVE 51ST AVE
 416          DR    D51S
              *

 417          KK   49BDV
 418          KM   RETRIEVE CRITTENDEN STORM DRAIN FLOW
 419          DR   49BDV
              *

 420          KK    CSD1
 421          KM   COMBINE 51ST AVE, CRITTENDEN, AND MARYVALE PKWY STORM DRAIN FLOWS
 422          HC       3    2.54
              *

 423          KK    STAD
 424          KM   RUNOFF FROM BALL FIELD # 1
 425          KM   8/13/96:  AREA SET SMALL TO ELIMINATE STAD FROM MODEL; FLOW WILL BE PUMPED
 426          KM     L =  .095  Kb = .14  Adj. Slope =  10.0
 427          BA    .001
 428          LG    .153    .290   4.430    .304    .000
 429          UC     .42     .30
 430          UA       0       5      16      30      65      77      84      90      94      97
 431          UA     100
              *
              *  ROUTING OPERATION DEACTIVATED FOR 10-YEAR STORM BECAUSE RUNOFF FROM STAD IS
              *  TOO SMALL
              *
              *  KK RSTAD
              *  KM ROUTE RUNOFF FROM STAD THROUGH 36-INCH PIPE TO 51ST AVENUE STORM DRAIN
              *  RD  2310   .0038    .013            CIRC       3
              *

 432          KK    CSD2        TOTAL STORM DRAIN FLOW INCL. BASIN OUTLET & FIELD # 1 RUNOFF
 433          KM   COMBINE CSD1 WITH BASIN OUTFLOW
 434          HC       3
              *

 435          KK       L
 436          KM   SUB-BASIN L
 437          KM   6-HOUR RAINFALL, PATTERN NO. 1.05 WAS USED TO FIND TC & R FOR THIS BASIN
 438          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .993
 439          KM     L = 1.98  Kb = .024  Adj. Slope =   14.0
 440          BA    .313
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 441          LG    .217    .250   5.360    .285  45.930
 442          UC    .729    .640
 443          UA       0       5      16      30      65      77      84      90      94      97
 444          UA     100
              *

 445          KK     R59
 446          RS       2    ELEV       0
 447          RC   0.025   0.016   0.025    2600   .0021
 448          RX    89.7    89.8    89.9      90     310   310.1   310.2   310.3
 449          RY       5       2       1       0       0       1       2       5
              *

 450          KK       M
 451          KM   SUB-BASIN M
 452          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 453          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .998
 454          KM     L =  .64  Kb = .027  Adj. Slope =   15.2
 455          BA   .0820
 456          LG    .235    .150   8.050    .117  34.940
 457          UC    .342    .215
 458          UA       0       5      16      30      65      77      84      90      94      97
 459          UA     100
              *

 460          KK       N
 461          KM   SUB-BASIN N
 462          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 463          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .995
 464          KM     L = 1.12  Kb = .025  Adj. Slope =   12.2
 465          BA    .383
 466          LG    .150    .250   4.430    .341  55.000
 467          UC    .521    .340
 468          UA       0       5      16      30      65      77      84      90      94      97
 469          UA     100
              *

 470          KK     RCM        ROUTING N ALONG CAMELBACK ROAD
 471          RS       2    ELEV       0
 472          RC   0.025   0.016   0.025    2600  0.0025
 473          RX    44.7    44.8    44.9      45     155   155.1   155.2   155.3
 474          RY       5       2       1       0       0       1       2       5
              *

 475          KK       O
 476          KM   SUB-BASIN O
 477          KM   6-HOUR RAINFALL, PATTERN NO. 1.16 WAS USED TO FIND TC & R FOR THIS BASIN
 478          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .991
 479          KM     L = 1.29  Kb = .030  Adj. Slope =   15.7
 480          BA    .658
 481          LG    .202    .225   4.740    .329  49.420
 482          UC    .613    .335
 483          UA       0       5      16      30      65      77      84      90      94      97
 484          UA     100
              *
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 485          KK     CCM
 486          HC       2
              *

 487          KK     RCP        ROUTING ALONG CAMPBELL
 488          RS       3    ELEV       0
 489          RC   0.025   0.016   0.025    5200  0.0026
 490          RX   159.7   159.8   159.9     160     340   340.1   340.2   340.3
 491          RY       5       2       1       0       0       1       2       5
              *

 492          KK       P
 493          KM   SUB-BASIN P
 494          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 495          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .995
 496          KM     L = 1.37  Kb = .025  Adj. Slope =   17.9
 497          BA    .397
 498          LG    .250    .250   5.050    .288  30.000
 499          UC    .529    .398
 500          UA       0       5      16      30      65      77      84      90      94      97
 501          UA     100
              *

 502          KK     CCP
 503          HC       2
              *

 504          KK     DGC        FLOW DIVERTS INTO GOLF COURSE AND SOUTH IN 59TH AVE
 505          DT    DGCW
 506          DI     108     213     934    1758
 507          DQ       0       0     721    1545
              *

 508          KK     R58
 509          RS       1    ELEV       0
 510          RC   0.025   0.016   0.025    1500   .0021
 511          RX    89.7    89.8    89.9      90     310   310.1   310.2   310.3
 512          RY       5       2       1       0       0       1       2       5
              *

 513          KK     C59        CONCENTRATION POINT 59
 514          HC       3
              *

 515          KK     S59        STORAGE ROUTING
 516          RS       1    FLOW      -1
 517          SV       0    0.01    2.31    9.93   15.88   46.45
 518          SE    1099  1099.1    1100  1100.8    1101    1102
 519          SQ       0     220     220     267     378    2689
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 520          KK    D59W        FLOW DIVERSION STORM DRAIN SOUTH AND SHEET FLOW WEST
 521          DT    D59S
 522          DI       0     220     220     267     378    2689
 523          DQ       0     272     272     272     272    1030
              *

 524          KK   RTNGC        FLOW INTO GOLF COURSE FROM 59TH AVE OVERTOPPING
 525          DR    DGCW
              *

 526          KK     RGC        ROUTE THROUGH GOLF COURSE
 527          RS       6    ELEV       0
 528          RC   0.035   0.035   0.035    4600  0.0027
 529          RX    39.7    39.8    39.9      40     160   160.1   160.2   160.3
 530          RY       5       2       1       0       0       1       2       5
              *

 531          KK       Q
 532          KM   SUB-BASIN Q
 533          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 534          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .994
 535          KM     L = 1.38  Kb = .050  Adj. Slope =   15.3
 536          BA    .475
 537          LG    .230    .250   6.290    .259  17.750
 538          UC   1.004    .733
 539          UA       0       5      16      30      65      77      84      90      94      97
 540          UA     100
              *

 541          KK     CGC        CONCENTRATION POINT AT GOLF COURSE
 542          HC       2
              *

 543          KK     SGC        STORAGE ROUTING IN GOLF COURSE
 544          RS       1    FLOW      -1
 545          SV       0    1.93    5.25    9.27   14.63   20.86   28.00      32
 546          SE    1100    1101    1102    1103    1104    1105    1106  1106.5
 547          SQ       0       0       0       0       0     477    2326    3000
              *

 548          KK     R63
 549          RS       1    ELEV       0
 550          RC   0.025   0.016   0.025    1450  0.0020
 551          RX    44.7    44.8    44.9      45     155   155.1   155.2   155.3
 552          RY       5       2       1       0       0       1       2       5
              *

 553          KK       R
 554          KM   SUB-BASIN R
 555          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 556          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .998
 557          KM     L =  .74  Kb = .027  Adj. Slope =   11.4
 558          BA    .179
 559          LG    .250    .150   7.780    .130  30.000
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 560          UC    .425    .301
 561          UA       0       5      16      30      65      77      84      90      94      97
 562          UA     100
              *

 563          KK     C63
 564          HC       3
              *

 565          KK      SA        STORAGE ROUTING IN DETENTION BASIN A
 566          RS       1    FLOW      -1
 567          SV       0   46.23   47.09   75.44   87.74   114.1     115
 568          SE    1087  1093.9    1094    1097    1098    1099    1100
 569          SQ       0      54      54      57     190    1135    4582
              *

 570          KK     DSA        FLOW DIVERSION FROM DET. BASIN A THROUGH 30" PIPE WEST
 571          DT    DSAW
 572          DI      35    1324    1678    2282    3778    8709
 573          DQ      20      20      20      20      20      20
              *

 574          KK    DWRA        FLOW DIVERSION THROUGH 36" PIPE EAST FROM DET. BASIN A
 575          KM                AND REMAINING FLOW WEIRING OVER CANAL
 576          DT    DSAE
 577          DI      35    1324    1678    2282    3778    8709
 578          DQ      35      35      35      35      35      35
              *

 579          KK  RTNSAE
 580          DR    DSAE
              *

 581          KK   RTN59
 582          DR    D59S
              *

 583          KK     C60
 584          HC       2    3.02
              *

 585          KK       S
 586          KM   SUB-BASIN S
 587          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 588          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .996
 589          KM     L =  .70  Kb = .026  Adj. Slope =   20.6
 590          BA    .300
 591          LG    .150    .250   4.430    .341  55.000
 592          UC    .317    .155
 593          UA       0       5      16      30      65      77      84      90      94      97
 594          UA     100
              *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 595          KK     R57        ROUTE NEAR 57TH AVE
 596          RS       3    ELEV       0
 597          RC   0.025   0.016   0.025    5200  0.0028
 598          RX   114.7   114.8   114.9     115     285   285.1   285.2   285.3
 599          RY       5       2       1       0       0       1       2       5
              *

 600          KK       T
 601          KM   SUB-BASIN T
 602          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 603          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .995
 604          KM     L =  .97  Kb = .025  Adj. Slope =   15.3
 605          BA    .361
 606          LG    .157    .250   4.430    .342  56.390
 607          UC    .429    .252
 608          UA       0       5      16      30      65      77      84      90      94      97
 609          UA     100
              *

 610          KK     C58
 611          HC       2
              *

 612          KK     RMO        ROUTE NEAR MISSOURI
 613          RS       3    ELEV       0
 614          RC   0.020   0.016   0.020    5200  0.0028
 615          RX    49.7    49.8    49.9      50     350   350.1   350.2   350.3
 616          RY       5       2       1       0       0       1       2       5
              *

 617          KK       U
 618          KM   SUB-BASIN U
 619          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 620          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .998
 621          KM     L =  .96  Kb = .028  Adj. Slope =   15.2
 622          BA    .130
 623          LG    .198    .250   4.430    .332  51.460
 624          UC    .463    .485
 625          UA       0       5      16      30      65      77      84      90      94      97
 626          UA     100
              *

 627          KK     RBH        ROUTE ALONG BETHANY HOME
 628          RS       1    ELEV       0
 629          RC   0.020   0.016   0.020    1330  0.0035
 630          RX    59.7    59.8    59.9      60     140   140.1   140.2   140.3
 631          RY       5       2       1       0       0       1       2       5
              *
```

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 632          KK       V
 633          KM   SUB-BASIN V
 634          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 635          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .998
 636          KM     L =  .71  Kb = .027  Adj. Slope =   12.9
 637          BA    .172
 638          LG    .208    .150   7.500    .152  48.050
 639          UC    .392    .272
 640          UA       0       5      16      30      65      77      84      90      94      97
 641          UA     100
              *

 642          KK     CBH
 643          HC       2
              *

 644          KK     R61        ROUTE NEAR 61ST AVE
 645          RS       3    ELEV       0
 646          RC   0.025   0.016   0.025    4200  0.0045
 647          RX    34.7    34.8    34.9      35     360   360.1   360.2   360.3
 648          RY       5       2       1       0       0       1       2       5
              *

 649          KK       W
 650          KM   SUB-BASIN W
 651          KM   6-HOUR RAINFALL, PATTERN NO. 1.16 WAS USED TO FIND TC & R FOR THIS BASIN
 652          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .991
 653          KM     L = 1.47  Kb = .024  Adj. Slope =   16.1
 654          BA    .656
 655          LG    .241    .150   8.280    .102  36.060
 656          UC    .546    .328
 657          UA       0       5      16      30      65      77      84      90      94      97
 658          UA     100
              *

 659          KK     CCK
 660          HC       3
              *

 661          KK     RCK        ROUTE NEAR CAMELBACK ROAD
 662          RS       4    ELEV       0
 663          RC   0.025   0.016   0.025    6300  0.0023
 664          RX    49.7    49.8    49.9      50     350   350.1   350.2   350.3
 665          RY       5       2       1       0       0       1       2       5
              *

 666          KK       X
 667          KM   SUB-BASIN X
 668          KM   6-HOUR RAINFALL, PATTERN NO. 1.00 WAS USED TO FIND TC & R FOR THIS BASIN
 669          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .994
 670          KM     L = 1.17  Kb = .025  Adj. Slope =   12.7
 671          BA    .469
 672          LG    .246    .150   7.780    .130  34.310
 673          UC    .521    .314
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 674          UA        0        5       16       30       65       77       84       90       94       97
 675          UA      100
              *

 676          KK      C67
 677          HC        2
 678          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
NPUT
LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

 NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

  62          A
              .
              .
  72          .           B
              .           .
              .           .
  83          .           .-------->    D39S
  82          .         D39
              .           .
              .           .
  86          .           .           C
              .           .           V
              .           .           V
  96          .           .         R39
              .           .           .
              .           .           .
 102          .         C40............
              .           V
              .           V
 104          .         R40
              .           .
              .           .
 109          .           .           D
              .           .           V
              .           .           V
 119          .           .         R43
              .           .           .
              .           .           .
 124          .           .           .           E
              .           .           .           .
              .           .           .           .
 134          .         C43........................
              .           V
              .           V
 136          .         S43
              .           .
              .           .
 142          .           .-------->    D43S
 141          .         D43
              .           V
              .           V
 145          .         R44
              .           .
              .           .
 150          .           .           F
              .           .           V
              .           .           V
 160          .           .         R45
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              .           .           .
 165          .         C45............
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167          .          .          G
             .          .          V
             .          .          V
177          .          .        R47
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             .          .          .
182          .          .          .          H
             .          .          .          .
             .          .          .          .
192          .        C47........................
             .          V
             .          V
194          .        S47
             .          .
             .          .
200          .          .-------->   D47S
199          .        D47
             .          V
             .          V
203          .        R48
             .          .
             .          .
208          .          .          I
             .          .          .
             .          .          .
218          .        C49............
             .          V
             .          V
220          .       R49A
             .          .
             .          .
228          .          .-------->  CRDIV
226          .       CRIT
             .          V
             .          V
231          .       R49B
             .          .
             .          .
239          .          .-------->  49BDV
237          .       49BD
             .          .
             .          .
242          .          .          J
             .          .          .
             .          .          .
252          .        C51............
             .          .
             .          .
255          .          .-------->   D51S
254          .        D51
             .          .
             .          .
258          .          .         L'
             .          .          V
             .          .          V
268          .          .        RL'
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             .          .          .
273          .          .          .         KCN
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286             .          .          .          .-------->   KCNRT
283             .          .          .       KCN'
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291             .          .          .          .-------->   KCNDV
289             .          .          .       KCND
                .          .          .          V
                .          .          .          V
294             .          .          .      KCNRW
                .          .          .          .
                .          .          .          .
300             .          .       KCNC............
                .          .          V
                .          .          V
303             .          .       RL'2
                .          .          .
                .          .          .
309             .          .          .         M'
                .          .          .          V
                .          .          .          V
319             .          .          .        RM'
                .          .          .          .
                .          .          .          .
324             .          .          .          .          KW
                .          .          .          .           .
                .          .          .          .           .
334             .          .      CCHAN........................
                .          .          V
                .          .          V
337             .          .        KWR
                .          .          .
                .          .          .
345             .          .          .          .<--------   KCNDV
343             .          .          .      KCNDV
                .          .          .          V
                .          .          .          V
346             .          .          .      KCNRS
                .          .          .          .
                .          .          .          .
352             .          .       KCSC............
                .          .          .
                .          .          .
357             .          .          .-------->   CHDIV
355             .          .        CHD
                .          .          .
                .          .          .
360             .          .          .        KEN
                .          .          .          .
                .          .          .          .
373             .          .          .          .-------->   KENRT
370             .          .          .       KEN'
                .          .          .          .
                .          .          .          .
378             .          .          .          .-------->   KENDV
376             .          .          .       KEND
                .          .          .          V
                .          .          .          V
381             .          .          .       KENR
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                .          .          .          .
387             .          .          .          .        KCS
                .          .          .          .          .
                .          .          .          .          .
397             .        CB.................................
                .         V
                .         V
400             .        SB
                .          .
                .          .
410             .          .          .<-------   KENDV
408             .          .      KENDV
                .          .          V
                .          .          V
411             .          .      KENDR
                .          .          .
                .          .          .
416             .          .          .          .<-------    D51S
414             .          .          .      RTN51
                .          .          .          .
                .          .          .          .
419             .          .          .          .          .<-------   49BDV
417             .          .          .          .      49BDV
                .          .          .          .          .
                .          .          .          .          .
420             .          .      CSD1......................
                .          .          .
                .          .          .
423             .          .          .       STAD
                .          .          .          .
                .          .          .          .
432             .      CSD2......................
                .          .
                .          .
435             .          .          L
                .          .          V
                .          .          V
445             .          .        R59
                .          .          .
                .          .          .
450             .          .          .          M
                .          .          .          .
                .          .          .          .
460             .          .          .          .          N
                .          .          .          .          V
                .          .          .          .          V
470             .          .          .          .        RCM
                .          .          .          .          .
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475             .          .          .          .          .          O
                .          .          .          .          .          .
                .          .          .          .          .          .
485             .          .          .          .        CCM............
                .          .          .          .          V
                .          .          .          .          V
487             .          .          .          .        RCP
                .          .          .          .          .
                .          .          .          .          .
492             .          .          .          .          .          P
                .          .          .          .          .          .
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                .           .           .           .           .           .
502             .           .           .           .         CCP............
                .           .           .           .           .
                .           .           .           .           .
505             .           .           .           .           .-------->    DGCW
504             .           .           .           .         DGC
                .           .           .           .           V
                .           .           .           .           V
508             .           .           .           .         R58
                .           .           .           .           .
                .           .           .           .           .
513             .           .         C59........................
                .           .           V
                .           .           V
515             .           .         S59
                .           .           .
                .           .           .
521             .           .           .-------->    D59S
520             .           .       D59W
                .           .           .
                .           .           .
525             .           .           .           .<--------    DGCW
524             .           .           .       RTNGC
                .           .           .           V
                .           .           .           V
526             .           .           .         RGC
                .           .           .           .
                .           .           .           .
531             .           .           .           .           Q
                .           .           .           .           .
                .           .           .           .           .
541             .           .           .         CGC............
                .           .           .           V
                .           .           .           V
543             .           .           .         SGC
                .           .           .           V
                .           .           .           V
548             .           .           .         R63
                .           .           .           .
                .           .           .           .
553             .           .           .           .           R
                .           .           .           .           .
                .           .           .           .           .
563             .           .         C63........................
                .           .           V
                .           .           V
565             .           .          SA
                .           .           .
                .           .           .
571             .           .           .-------->    DSAW
570             .           .         DSA
                .           .           .
                .           .           .
576             .           .           .-------->    DSAE
574             .           .       DWRA
                .           .           .
                .           .           .
580             .           .           .           .<--------    DSAE
579             .           .           .      RTNSAE
                .           .           .           .
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                .         .         .         .
 582            .         .         .         .          .<-------    D59S
 581            .         .         .         .      RTN59
                .         .         .         .          .
                .         .         .         .          .
 583            .         .         .       C60............
                .         .         .         .
                .         .         .         .
 585            .         .         .         .          S
                .         .         .         .          V
                .         .         .         .          V
 595            .         .         .         .        R57
                .         .         .         .          .
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 600            .         .         .         .          .          T
                .         .         .         .          .          .
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 610            .         .         .         .        C58............
                .         .         .         .          V
                .         .         .         .          V
 612            .         .         .         .        RMO
                .         .         .         .          .
                .         .         .         .          .
 617            .         .         .         .          .          U
                .         .         .         .          .          V
                .         .         .         .          .          V
 627            .         .         .         .          .        RBH
                .         .         .         .          .          .
                .         .         .         .          .          .
 632            .         .         .         .          .          .          V
                .         .         .         .          .          .          .
                .         .         .         .          .          .          .
 642            .         .         .         .          .        CBH............
                .         .         .         .          .          V
                .         .         .         .          .          V
 644            .         .         .         .          .        R61
                .         .         .         .          .          .
                .         .         .         .          .          .
 649            .         .         .         .          .          .          W
                .         .         .         .          .          .          .
                .         .         .         .          .          .          .
 659            .         .         .         .        CCK........................
                .         .         .         .          V
                .         .         .         .          V
 661            .         .         .         .        RCK
                .         .         .         .          .
                .         .         .         .          .
 666            .         .         .         .          .          X
                .         .         .         .          .          .
                .         .         .         .          .          .
 676            .         .         .         .        C67............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
****************************************                                    ****************************************
*                                      *                                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                    *   U.S. ARMY CORPS OF ENGINEERS       *
*              MAY   1991              *                                    *   HYDROLOGIC ENGINEERING CENTER      *
*            VERSION 4.0.1E            *                                    *         609 SECOND STREET            *
*     Lahey F77L-EM/32 version 5.01    *                                    *      DAVIS, CALIFORNIA 95616         *
*       Dodson & Associates, Inc.      *                                    *          (916) 551-1748              *
*  RUN DATE  10/14/96  TIME  11:24:03  *                                    *                                      *
****************************************                                    ****************************************
```

```
                    MARYVALE BASEBALL PARK
                    FLOOD CONTROL FACILITIES
                    WOOD, PATEL & ASSOCIATES, INC.
                    ************************************************
                    BASED ON MODEL FROM
                    MARYVALE FLOOD MITIGATION STUDY
                    FLOOD CONTROL DISTRICT OF MARICOPA COUNTY (CVL)
                    DESIGN CONDITION - DETENTION BASIN ADDITIONS
                    ************************************************
                    10-YEAR, 6-HOUR STORM
                    FILE: mv10ye3.dat         DATE:   10/14/96
                    JOB #: 96398
                    ***
                    *** THE FOLLOWING CHANGES HAVE BEEN MADE BY WOOD/PATEL IN CONJUNCTION
                    *** WITH THE DESIGN OF THE MARYVALE BASEBALL PARK FLOOD CONTROL
                    *** FACILITIES
                    ***
                    9/17/96: OUTFLOWS IN SB RATING CURVE MODIFIED
                    ***
                    9/16/96: 25 CFS DIVERT AT C51 REDUCED TO 0 CFS
                             SV RECORD IN RATING CURVE AT SB MODIFIED
                    ***
                    8/13/96: FLOW FROM STAD REMOVED
                    ***
                    7/29/96: TC AND R AT BASIN H CORRECTED
                    ***
                    7/10/96: FLOW IN EXCESS OF 108 CFS REMOVED AT CCHAN
                    ***
                    7/7/96:  DETENTION BASIN VOLUMES UPDATED
                    ***
                    7/3/96:  DETENTION BASIN OUTFLOW VALUES UPDATED; CRITTENDEN STREET/
                             STORM DRAIN DIVERSION INTO 51ST AVE STORM DRAIN MODIFIED
                    ***
                    6/4/96:  25 CFS MAX STORM DRAIN DIVERT TO SOUTH AT C51
                    ***
                    5/22/96: FLOW IN EXCESS OF 70 CFS REMOVED AT CCHAN
                    ***

 39 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN           5  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1    0  STARTING DATE
```

```
          ITIME        0000  STARTING TIME
             NQ         300  NUMBER OF HYDROGRAPH ORDINATES
         NDDATE      2    0  ENDING DATE
         NDTIME        0055  ENDING TIME
         ICENT           19  CENTURY MARK

      COMPUTATION INTERVAL    0.08 HOURS
           TOTAL TIME BASE   24.92 HOURS

ENGLISH UNITS
     DRAINAGE AREA          SQUARE MILES
     PRECIPITATION DEPTH    INCHES
     LENGTH, ELEVATION      FEET
     FLOW                   CUBIC FEET PER SECOND
     STORAGE VOLUME         ACRE-FEET
     SURFACE AREA           ACRES
     TEMPERATURE            DEGREES FAHRENHEIT

41 JD        INDEX STORM NO. 1
                STRM        1.95  PRECIPITATION DEPTH
                TRDA        0.01  TRANSPOSITION DRAINAGE AREA

42 PI          PRECIPITATION PATTERN
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.01      0.01      0.01      0.01      0.01      0.01      0.03
                0.03      0.03      0.05      0.05      0.05      0.15      0.15      0.15      0.03      0.03
                0.03      0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00

45 JD        INDEX STORM NO. 2
                STRM        1.94  PRECIPITATION DEPTH
                TRDA        0.50  TRANSPOSITION DRAINAGE AREA

 0 PI          PRECIPITATION PATTERN
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.01      0.01      0.01      0.01      0.01      0.01      0.03
                0.03      0.03      0.05      0.05      0.05      0.15      0.15      0.15      0.03      0.03
                0.03      0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00

46 JD        INDEX STORM NO. 3
                STRM        1.91  PRECIPITATION DEPTH
                TRDA        2.80  TRANSPOSITION DRAINAGE AREA

47 PI          PRECIPITATION PATTERN
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.01      0.01      0.01      0.01      0.01      0.01      0.03
                0.03      0.03      0.07      0.07      0.07      0.08      0.08      0.08      0.05      0.05
                0.05      0.02      0.02      0.02      0.01      0.01      0.01      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00
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50 JD          INDEX STORM NO. 4
                     STRM        1.80  PRECIPITATION DEPTH
                     TRDA       16.00  TRANSPOSITION DRAINAGE AREA

51 PI           PRECIPITATION PATTERN
                  0.01      0.01      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.01
                  0.01      0.01      0.00      0.01      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.01      0.00      0.00      0.00      0.00      0.01      0.01      0.01
                  0.01      0.01      0.01      0.01      0.01      0.01      0.02      0.02      0.02      0.03
                  0.03      0.03      0.06      0.06      0.06      0.07      0.07      0.07      0.04      0.04
                  0.04      0.02      0.02      0.02      0.01      0.01      0.01      0.01      0.01      0.01
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00

54 JD          INDEX STORM NO. 5
                     STRM        1.58  PRECIPITATION DEPTH
                     TRDA       90.00  TRANSPOSITION DRAINAGE AREA

55 PI           PRECIPITATION PATTERN
                  0.01      0.01      0.01      0.00      0.00      0.00      0.01      0.01      0.01      0.01
                  0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01
                  0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01
                  0.01      0.01      0.01      0.01      0.01      0.01      0.02      0.02      0.02      0.03
                  0.03      0.03      0.05      0.05      0.05      0.05      0.05      0.05      0.04      0.04
                  0.04      0.02      0.02      0.02      0.02      0.02      0.02      0.01      0.01      0.01
                  0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01
                  0.01      0.01

58 JD          INDEX STORM NO. 6
                     STRM        1.11  PRECIPITATION DEPTH
                     TRDA      500.00  TRANSPOSITION DRAINAGE AREA

59 PI           PRECIPITATION PATTERN
                  0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01
                  0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01
                  0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01
                  0.01      0.01      0.01      0.01      0.01      0.01      0.02      0.02      0.02      0.03
                  0.03      0.03      0.04      0.04      0.04      0.04      0.04      0.04      0.04      0.04
                  0.04      0.03      0.03      0.03      0.02      0.02      0.02      0.01      0.01      0.01
                  0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01
                  0.01      0.01
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RUNOFF SUMMARY

FLOW IN CUBIC FEET PER SECOND

TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	A	114.	4.08	13.	3.	3.	0.09		
HYDROGRAPH AT	B	305.	4.17	43.	11.	10.	0.29		
DIVERSION TO	D39S	84.	3.83	26.	7.	6.	0.29		
HYDROGRAPH AT	D39	221.	4.17	17.	4.	4.	0.29		
HYDROGRAPH AT	C	235.	4.17	31.	8.	8.	0.21		
ROUTED TO	R39	224.	4.17	31.	8.	8.	0.21		
2 COMBINED AT	C40	444.	4.17	48.	12.	12.	0.50		
ROUTED TO	R40	337.	4.42	48.	12.	12.	0.50		
HYDROGRAPH AT	D	169.	4.17	25.	6.	6.	0.17		
ROUTED TO	R43	146.	4.33	25.	6.	6.	0.17		
HYDROGRAPH AT	E	216.	4.17	31.	8.	8.	0.20		
3 COMBINED AT	C43	556.	4.42	99.	25.	24.	0.87		
ROUTED TO	S43	481.	4.58	94.	25.	24.	0.87		
DIVERSION TO	D43S	27.	3.42	27.	8.	8.	0.87		
HYDROGRAPH AT	D43	454.	4.58	67.	17.	16.	0.87		
ROUTED TO	R44	454.	4.58	67.	17.	16.	0.87		
HYDROGRAPH AT	F	337.	4.25	46.	12.	11.	0.50		
ROUTED TO	R45	331.	4.33	46.	12.	11.	0.50		
2 COMBINED AT	C45	623.	4.58	104.	26.	25.	1.37		
HYDROGRAPH AT	G	64.	4.42	17.	4.	4.	0.12		
ROUTED TO	R47	51.	5.33	17.	4.	4.	0.12		
HYDROGRAPH AT	H	102.	4.42	26.	7.	6.	0.22		
3 COMBINED AT	C47	694.	4.58	139.	35.	34.	1.71		
ROUTED TO	S47	616.	4.75	139.	35.	34.	1.71		
DIVERSION TO	D47S	200.	4.75	26.	7.	6.	1.71		
HYDROGRAPH AT	D47	415.	4.75	113.	29.	28.	1.71		

ROUTED TO	R48	408.	4.83	113.	29.	28.	1.71
HYDROGRAPH AT	I	307.	4.25	50.	12.	12.	0.44
2 COMBINED AT	C49	503.	4.83	151.	39.	37.	2.15
ROUTED TO	R49A	500.	4.83	151.	39.	37.	2.15
DIVERSION TO	CRDIV	260.	4.83	34.	8.	8.	2.15
HYDROGRAPH AT	CRIT	240.	4.25	118.	30.	29.	2.15
ROUTED TO	R49B	241.	4.33	118.	30.	29.	2.15
DIVERSION TO	49BDV	200.	4.25	107.	28.	27.	2.15
HYDROGRAPH AT	49BD	41.	4.33	11.	3.	3.	2.15
HYDROGRAPH AT	J	238.	4.33	51.	13.	12.	0.39
2 COMBINED AT	C51	213.	4.42	55.	14.	14.	2.54
DIVERSION TO	D51S	0.	0.08	0.	0.	0.	2.54
HYDROGRAPH AT	D51	213.	4.42	55.	14.	14.	2.54
HYDROGRAPH AT	L'	138.	4.33	30.	8.	7.	0.23
ROUTED TO	RL'	125.	4.50	30.	8.	7.	0.23
HYDROGRAPH AT	KCN	39.	4.17	5.	1.	1.	0.04
DIVERSION TO	KCNRT	8.	4.17	1.	0.	0.	0.04
HYDROGRAPH AT	KCN'	31.	4.17	4.	1.	1.	0.04
DIVERSION TO	KCNDV	16.	4.17	2.	0.	0.	0.04
HYDROGRAPH AT	KCND	16.	4.17	2.	0.	0.	0.04
ROUTED TO	KCNRW	13.	4.25	2.	0.	0.	0.04
2 COMBINED AT	KCNC	135.	4.50	32.	8.	8.	0.27
ROUTED TO	RL'2	133.	4.58	32.	8.	8.	0.27
HYDROGRAPH AT	M'	118.	4.08	13.	3.	3.	0.09
ROUTED TO	RM'	117.	4.17	13.	3.	3.	0.09
HYDROGRAPH AT	KW	54.	4.25	9.	2.	2.	0.07
3 COMBINED AT	CCHAN	228.	4.33	53.	14.	13.	0.43
ROUTED TO	KWR	227.	4.33	53.	14.	13.	0.43
HYDROGRAPH AT	KCNDV	16.	4.17	2.	0.	0.	0.04
ROUTED TO	KCNRS	13.	4.25	2.	0.	0.	0.04

2 COMBINED AT	KCSC	240.	4.33	55.	14.	13.	0.43
DIVERSION TO	CHDIV	132.	4.33	15.	4.	4.	0.43
HYDROGRAPH AT	CHD	108.	4.00	40.	10.	10.	0.43
HYDROGRAPH AT	KEN	42.	4.17	6.	2.	2.	0.05
DIVERSION TO	KENRT	10.	4.17	2.	0.	0.	0.05
HYDROGRAPH AT	KEN'	31.	4.17	5.	1.	1.	0.05
DIVERSION TO	KENDV	31.	4.17	5.	1.	1.	0.05
HYDROGRAPH AT	KEND	0.	0.08	0.	0.	0.	0.05
ROUTED TO	KENR	0.	0.08	0.	0.	0.	0.05
HYDROGRAPH AT	KCS	100.	4.08	9.	2.	2.	0.07
4 COMBINED AT	CB	344.	4.33	102.	26.	25.	3.08
ROUTED TO	SB	55.	6.17	54.	26.	25.	3.08
HYDROGRAPH AT	KENDV	31.	4.17	5.	1.	1.	0.05
ROUTED TO	KENDR	31.	4.17	5.	1.	1.	0.05
HYDROGRAPH AT	RTN51	0.	0.08	0.	0.	0.	2.54
HYDROGRAPH AT	49BDV	200.	4.25	107.	28.	27.	2.15
3 COMBINED AT	CSD1	220.	4.25	111.	29.	28.	2.54
HYDROGRAPH AT	STAD	1.	4.17	0.	0.	0.	0.00
3 COMBINED AT	CSD2	264.	4.42	159.	54.	52.	5.62
HYDROGRAPH AT	L	189.	4.33	41.	11.	10.	0.31
ROUTED TO	R59	170.	4.58	41.	11.	10.	0.31
HYDROGRAPH AT	M	108.	4.08	12.	3.	3.	0.08
HYDROGRAPH AT	N	364.	4.25	56.	14.	14.	0.38
ROUTED TO	RCM	346.	4.33	56.	14.	14.	0.38
HYDROGRAPH AT	O	565.	4.25	90.	23.	22.	0.66
2 COMBINED AT	CCM	786.	4.25	140.	35.	34.	1.04
ROUTED TO	RCP	725.	4.50	139.	35.	34.	1.04
HYDROGRAPH AT	P	300.	4.25	44.	11.	11.	0.40
2 COMBINED AT	CCP	855.	4.50	176.	45.	43.	1.44
DIVERSION TO	DGCW	642.	4.50	79.	20.	19.	1.44

HYDROGRAPH AT	DGC	213.	4.08	96.	25.	24.	1.44
ROUTED TO	R58	213.	5.42	96.	25.	24.	1.44
3 COMBINED AT	C59	372.	4.58	144.	37.	36.	1.83
ROUTED TO	S59	278.	5.58	144.	37.	36.	1.83
DIVERSION TO	D59S	272.	5.58	144.	37.	36.	1.83
HYDROGRAPH AT	D59W	6.	5.58	1.	0.	0.	1.83
HYDROGRAPH AT	RTNGC	642.	4.50	79.	20.	19.	1.44
ROUTED TO	RGC	583.	4.83	79.	20.	19.	1.44
HYDROGRAPH AT	Q	192.	4.42	44.	11.	11.	0.47
2 COMBINED AT	CGC	956.	4.75	141.	35.	34.	0.47
ROUTED TO	SGC	922.	4.83	140.	35.	34.	0.47
ROUTED TO	R63	896.	4.83	140.	35.	34.	0.47
HYDROGRAPH AT	R	191.	4.17	24.	6.	6.	0.18
3 COMBINED AT	C63	879.	4.83	161.	41.	39.	2.49
ROUTED TO	SA	55.	6.58	51.	27.	26.	2.49
DIVERSION TO	DSAW	20.	4.92	20.	16.	15.	2.49
HYDROGRAPH AT	DSA	35.	6.58	31.	11.	11.	2.49
DIVERSION TO	DSAE	34.	6.58	30.	11.	11.	2.49
HYDROGRAPH AT	DWRA	0.	6.58	0.	0.	0.	2.49
HYDROGRAPH AT	RTNSAE	34.	6.58	30.	11.	11.	2.49
HYDROGRAPH AT	RTN59	272.	5.58	144.	37.	36.	1.83
2 COMBINED AT	C60	302.	5.67	160.	47.	46.	3.02
HYDROGRAPH AT	S	437.	4.08	44.	11.	11.	0.30
ROUTED TO	R57	297.	4.42	44.	11.	11.	0.30
HYDROGRAPH AT	T	412.	4.17	53.	13.	13.	0.36
2 COMBINED AT	C58	577.	4.25	95.	24.	23.	0.66
ROUTED TO	RMO	478.	4.58	95.	24.	23.	0.66
HYDROGRAPH AT	U	103.	4.25	18.	5.	4.	0.13
ROUTED TO	RBH	98.	4.33	18.	5.	4.	0.13
HYDROGRAPH AT	V	203.	4.17	26.	7.	6.	0.17

2 COMBINED AT	CBH	287.	4.17	44.	11.	11.	0.30
ROUTED TO	R61	208.	4.58	44.	11.	11.	0.30
HYDROGRAPH AT	W	631.	4.25	92.	23.	22.	0.66
3 COMBINED AT	CCK	946.	4.50	219.	56.	53.	1.62
ROUTED TO	RCK	880.	4.83	217.	56.	53.	1.62
HYDROGRAPH AT	X	471.	4.17	64.	16.	16.	0.47
2 COMBINED AT	C67	998.	4.75	272.	70.	67.	2.09

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING

(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	INTERPOLATED TO COMPUTATION INTERVAL DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)
FOR STORM = 1 STORM AREA (SQ MI) =				0.01					
KENDR	MANE	0.49	31.38	250.68	0.90	5.00	31.15	250.00	0.90

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2407E+01 EXCESS=0.0000E+00 OUTFLOW=0.2407E+01 BASIN STORAGE=0.3779E-04 PERCENT ERROR= 0.0

FOR STORM = 2 STORM AREA (SQ MI) =				0.50					
KENDR	MANE	0.50	31.18	250.53	0.90	5.00	30.95	250.00	0.90

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2391E+01 EXCESS=0.0000E+00 OUTFLOW=0.2391E+01 BASIN STORAGE=0.3737E-04 PERCENT ERROR= 0.0

FOR STORM = 3 STORM AREA (SQ MI) =				2.80					
KENDR	MANE	0.54	19.83	255.34	0.78	5.00	19.82	255.00	0.78

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2079E+01 EXCESS=0.0000E+00 OUTFLOW=0.2079E+01 BASIN STORAGE=0.3788E-04 PERCENT ERROR= 0.0

FOR STORM = 4 STORM AREA (SQ MI) =				16.00					
KENDR	MANE	0.58	14.15	255.17	0.66	5.00	14.14	255.00	0.66

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1757E+01 EXCESS=0.0000E+00 OUTFLOW=0.1757E+01 BASIN STORAGE=0.3734E-04 PERCENT ERROR= 0.0

FOR STORM = 5 STORM AREA (SQ MI) =				90.00					
KENDR	MANE	0.64	8.37	255.73	0.51	5.00	8.37	255.00	0.51

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1348E+01 EXCESS=0.0000E+00 OUTFLOW=0.1348E+01 BASIN STORAGE=0.3724E-04 PERCENT ERROR= 0.0

FOR STORM = 6 STORM AREA (SQ MI) =				500.00					
KENDR	MANE	0.73	4.37	261.15	0.34	5.00	4.36	260.00	0.34

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.9106E+00 EXCESS=0.0000E+00 OUTFLOW=0.9106E+00 BASIN STORAGE=0.3724E-04 PERCENT ERROR= 0.0

*** NORMAL END OF HEC-1 ***

INTERPOLATED HYDROGRAPH AT SB Detention Basin (100 year)

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	28.	1		0615	76	155.	1		1230	151	58.	1		1845	226	50.
1		0005	2	0.	1		0620	77	142.	1		1235	152	58.	1		1850	227	50.
1		0010	3	1.	1		0625	78	124.	1		1240	153	58.	1		1855	228	50.
1		0015	4	3.	1		0630	79	101.	1		1245	154	58.	1		1900	229	49.
1		0020	5	5.	1		0635	80	79.	1		1250	155	58.	1		1905	230	49.
1		0025	6	7.	1		0640	81	66.	1		1255	156	58.	1		1910	231	49.
1		0030	7	9.	1		0645	82	63.	1		1300	157	57.	1		1915	232	49.
1		0035	8	10.	1		0650	83	63.	1		1305	158	57.	1		1920	233	49.
1		0040	9	12.	1		0655	84	63.	1		1310	159	57.	1		1925	234	49.
1		0045	10	14.	1		0700	85	63.	1		1315	160	57.	1		1930	235	48.
1		0050	11	16.	1		0705	86	63.	1		1320	161	57.	1		1935	236	48.
1		0055	12	17.	1		0710	87	63.	1		1325	162	57.	1		1940	237	48.
1		0100	13	19.	1		0715	88	63.	1		1330	163	57.	1		1945	238	48.
1		0105	14	20.	1		0720	89	63.	1		1335	164	57.	1		1950	239	48.
1		0110	15	22.	1		0725	90	63.	1		1340	165	57.	1		1955	240	47.
1		0115	16	23.	1		0730	91	63.	1		1345	166	57.	1		2000	241	47.
1		0120	17	23.	1		0735	92	63.	1		1350	167	57.	1		2005	242	47.
1		0125	18	24.	1		0740	93	63.	1		1355	168	57.	1		2010	243	47.
1		0130	19	25.	1		0745	94	62.	1		1400	169	56.	1		2015	244	47.
1		0135	20	26.	1		0750	95	62.	1		1405	170	56.	1		2020	245	46.
1		0140	21	26.	1		0755	96	62.	1		1410	171	56.	1		2025	246	46.
1		0145	22	27.	1		0800	97	62.	1		1415	172	56.	1		2030	247	46.
1		0150	23	27.	1		0805	98	62.	1		1420	173	56.	1		2035	248	46.
1		0155	24	28.	1		0810	99	62.	1		1425	174	56.	1		2040	249	46.
1		0200	25	28.	1		0815	100	62.	1		1430	175	56.	1		2045	250	46.
1		0205	26	28.	1		0820	101	62.	1		1435	176	56.	1		2050	251	45.
1		0210	27	29.	1		0825	102	62.	1		1440	177	56.	1		2055	252	45.
1		0215	28	29.	1		0830	103	62.	1		1445	178	56.	1		2100	253	45.
1		0220	29	29.	1		0835	104	62.	1		1450	179	56.	1		2105	254	45.
1		0225	30	29.	1		0840	105	62.	1		1455	180	55.	1		2110	255	44.
1		0230	31	29.	1		0845	106	62.	1		1500	181	55.	1		2115	256	44.
1		0235	32	30.	1		0850	107	61.	1		1505	182	55.	1		2120	257	44.
1		0240	33	30.	1		0855	108	61.	1		1510	183	55.	1		2125	258	44.
1		0245	34	31.	1		0900	109	61.	1		1515	184	55.	1		2130	259	44.
1		0250	35	31.	1		0905	110	61.	1		1520	185	55.	1		2135	260	43.
1		0255	36	32.	1		0910	111	61.	1		1525	186	55.	1		2140	261	43.
1		0300	37	33.	1		0915	112	61.	1		1530	187	55.	1		2145	262	43.
1		0305	38	35.	1		0920	113	61.	1		1535	188	55.	1		2150	263	43.
1		0310	39	37.	1		0925	114	61.	1		1540	189	55.	1		2155	264	42.
1		0315	40	37.	1		0930	115	61.	1		1545	190	55.	1		2200	265	42.
1		0320	41	38.	1		0935	116	61.	1		1550	191	54.	1		2205	266	42.
1		0325	42	38.	1		0940	117	61.	1		1555	192	54.	1		2210	267	42.
1		0330	43	39.	1		0945	118	61.	1		1600	193	54.	1		2215	268	41.
1		0335	44	40.	1		0950	119	60.	1		1605	194	54.	1		2220	269	41.
1		0340	45	41.	1		0955	120	60.	1		1610	195	54.	1		2225	270	41.
1		0345	46	42.	1		1000	121	60.	1		1615	196	54.	1		2230	271	41.
1		0350	47	44.	1		1005	122	60.	1		1620	197	54.	1		2235	272	41.
1		0355	48	45.	1		1010	123	60.	1		1625	198	54.	1		2240	273	40.
1		0400	49	47.	1		1015	124	60.	1		1630	199	54.	1		2245	274	40.
1		0405	50	49.	1		1020	125	60.	1		1635	200	53.	1		2250	275	40.

1	0410	51	51.	*	1	1025	126	60.	*	1	1640	201	53.	*	1	2255	276	40.
1	0415	52	52.	*	1	1030	127	60.	*	1	1645	202	53.	*	1	2300	277	39.
1	0420	53	54.	*	1	1035	128	60.	*	1	1650	203	53.	*	1	2305	278	38.
1	0425	54	55.	*	1	1040	129	60.	*	1	1655	204	53.	*	1	2310	279	36.
1	0430	55	56.	*	1	1045	130	60.	*	1	1700	205	53.	*	1	2315	280	35.
1	0435	56	57.	*	1	1050	131	60.	*	1	1705	206	53.	*	1	2320	281	34.
1	0440	57	58.	*	1	1055	132	59.	*	1	1710	207	53.	*	1	2325	282	27.
1	0445	58	58.	*	1	1100	133	59.	*	1	1715	208	52.	*	1	2330	283	0.
1	0450	59	59.	*	1	1105	134	59.	*	1	1720	209	52.	*	1	2335	284	0.
1	0455	60	59.	*	1	1110	135	59.	*	1	1725	210	52.	*	1	2340	285	0.
1	0500	61	60.	*	1	1115	136	59.	*	1	1730	211	52.	*	1	2345	286	0.
1	0505	62	60.	*	1	1120	137	59.	*	1	1735	212	52.	*	1	2350	287	0.
1	0510	63	61.	*	1	1125	138	59.	*	1	1740	213	52.	*	1	2355	288	0.
1	0515	64	61.	*	1	1130	139	59.	*	1	1745	214	52.	*	2	0000	289	0.
1	0520	65	62.	*	1	1135	140	59.	*	1	1750	215	52.	*	2	0005	290	0.
1	0525	66	62.	*	1	1140	141	59.	*	1	1755	216	51.	*	2	0010	291	0.
1	0530	67	62.	*	1	1145	142	59.	*	1	1800	217	51.	*	2	0015	292	0.
1	0535	68	63.	*	1	1150	143	59.	*	1	1805	218	51.	*	2	0020	293	0.
1	0540	69	63.	*	1	1155	144	58.	*	1	1810	219	51.	*	2	0025	294	0.
1	0545	70	167.	*	1	1200	145	58.	*	1	1815	220	51.	*	2	0030	295	0.
1	0550	71	224.	*	1	1205	146	58.	*	1	1820	221	51.	*	2	0035	296	0.
1	0555	72	205.	*	1	1210	147	58.	*	1	1825	222	51.	*	2	0040	297	0.
1	0600	73	191.	*	1	1215	148	58.	*	1	1830	223	50.	*	2	0045	298	0.
1	0605	74	179.	*	1	1220	149	58.	*	1	1835	224	50.	*	2	0050	299	0.
1	0610	75	167.	*	1	1225	150	58.	*	1	1840	225	50.	*	2	0055	300	0.
				*					*					*				

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)					
		(CFS)				
+ 224.	5.83		76.	52.	50.	50.
		(INCHES)	0.230	0.629	0.629	0.629
		(AC-FT)	38.	103.	103.	103.

CUMULATIVE AREA = 3.08 SQ MI

II. HYDRAULICS
Onsite Flood Control Components Designed with this Project

Table 1.1:	Rating Curve for 36" Outfall Pipe, Line A
Table 1.2:	Detention Basin Outfall Pipe, Lines A & B
Table 2:	51st Avenue Storm Drain, Lines C & D
Hydrographs:	51st Avenue (10-Year)
	Detention Basin (10-Year)
Table 3:	Grand Canal Storm Drain, Line Q
	Detention Basin Rating Curve
Hydrographs:	Detention Basin (2-Year)
	Whitton Avenue (2-Year)
HEC-1:	Pump Station Hydrologic Model
Table 4:	Parking Lot Drainage, Line F

TABLE 1.1

Maryvale Baseball Park

Basin Outfall Capacity & Storage Volume Ratings
Rating Curve for 36" Outfall Pipe (Line "A"), (a)

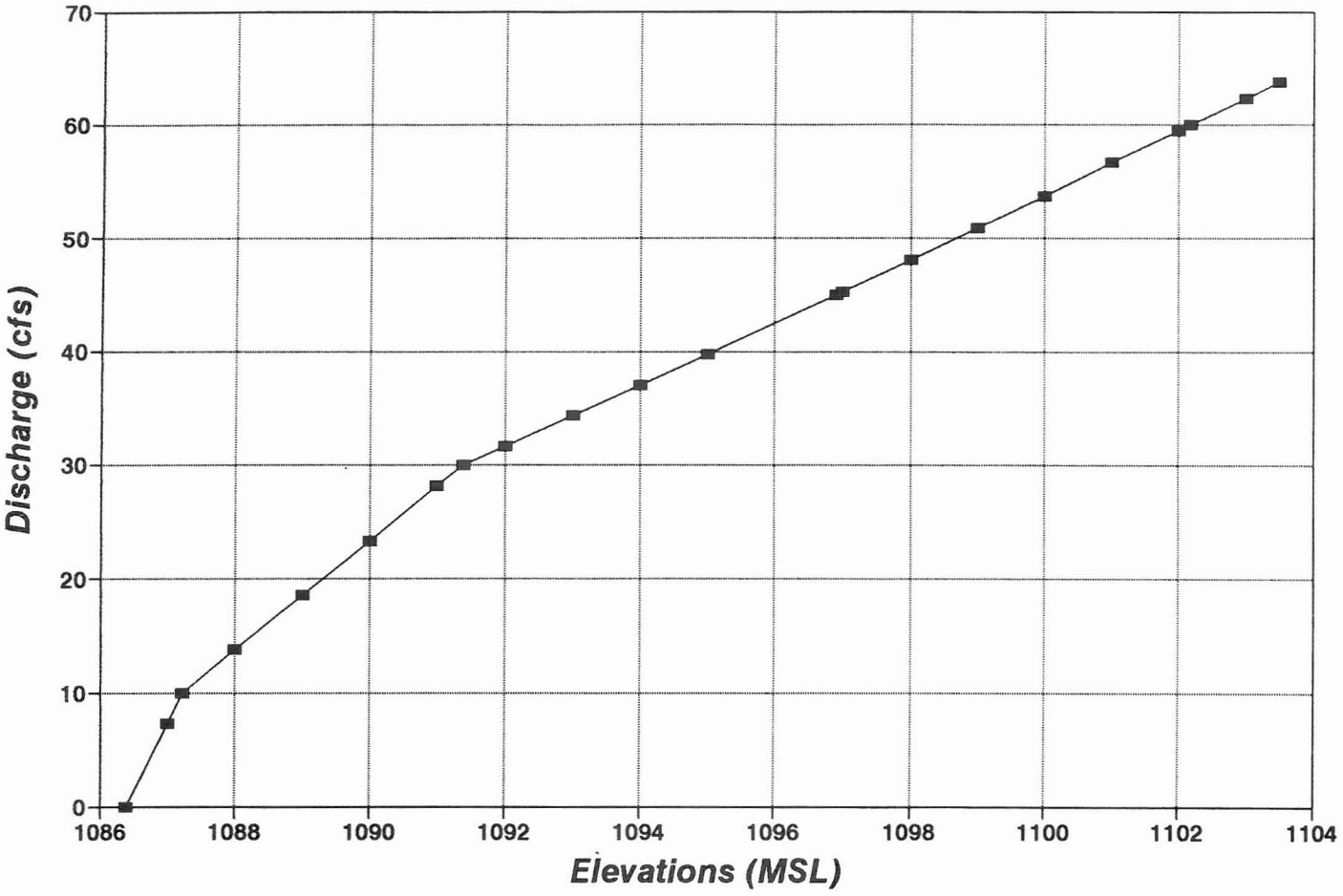
10/17/96

Water Surface Elevation	Depth of Flow at Inlet (ft)	Pipe Capacity(cfs)	Storage (b) Volume (Acft)
1086.4	0.0	0	
1087.0	0.6	7.3	
1087.2	***0.8***	***10.0***	
1088.0	1.6	13.8	
1089.0	2.6	18.6	
1090.0	3.6	23.4	
1091.0	4.6	28.2	
1091.4	***5.0***	***30.0***	
1092.0	5.6	31.7	
1093.0	6.6	34.4	0
1094.0	7.6	37.1	0.3
1095.0	8.6	39.8	1.6
1096.9	***10.5***	***45.0***	
1097.0	10.6	45.2	4.9
1098.0	11.6	48.1	13.4
1099.0	12.6	51.0	19.2
1100.0	13.6	53.8	27.2
1101.0	14.6	56.7	38.9
1102.0	15.6	59.5	52.7
1102.2	***15.8***	***60.0***	
1103.0	16.6	62.4	67.9
1103.5	17.1	63.8	
1104 (c)	17.6	800	

NOTES:

(a) Rating curve developed from Basin Outfall
(numbers in Italics) Storm Drain Pipe Hydraulic Analysis (see Table 1.2).
(b) Storage Volume is based on Computer Volumetric Analysis
(c) Outflow includes Pipe + Grand Canal bank over topping

Basin 36" Pipe Outfall Rating Curve
Maryvale Baseball Park



Wood/Patel & Associates

Table 1.2
Basin Outfall Storm Drain Pipe Hydraulic Analysis
Lines A & B

W/P Job # 96398
10/17/96

Detention Basin Outfall Pipe

From Exist Storm Drain in 51st Avenue to Basin (field #5)

Manning's "n"= 0.012

03:34 PM

STORM SEWER LINE STATION LOCATION	PIPE #	STATION	PIPE DIA (In)	REACH LENGTH (ft)	SLOPE OF REACH (ft/ft)	INVERT ELEV (ft)	NO. OF MANHOLES IN REACH	DESIGN Q (cfs)	VELOCITY (fps)	KJ	HEAD LOSSES FRICTION Hf (ft)	HEAD LOSSES JUNCTION LOSS (ft)	SLOPE OF ENERGY GRADE (ft/ft)	PREL GRADE LINE ELEV ENERGY	PREL GRADE LINE ELEV HYDRAULIC	NATURAL GROUND ELEVATION	DEPTH TO INVERT
51st Ave 72"SD		0				1084.95								1086.95	1086.95	***1104.8***	19.8
Line A	**1**		**36**	320	0.00145		1										
		320				1085.41		**10**	1.41	0.50	0.06	0.02	0.0003	1087.06	1087.03	***1103***	17.6
Line A	**2**		**36**	320	0.00145		1										
		640				1085.88		**10**	1.41	0.50	0.06	0.02	0.0002	1087.13	1087.10	***1103***	17.1
Line A	**3**		**36**	310	0.00145		1										
		950				1086.32		**10**	1.41	0.50	0.06	0.02	0.0002	1087.21	1087.18	***1103***	16.7
Surge Structure	**4**		**36**	60	0.00145		0										
		1010				1086.41		**10**	1.41	0.50	0.01	0.00	0.0002	1087.22	1087.19	***1094***	7.6
51st Ave 72"SD		0				1084.95								1088.95	1088.95	***1104.8***	19.8
Line A	**1**		**36**	320	0.00145		1										
		320				1085.41		**30**	4.24	0.50	0.55	0.14	0.0030	1089.92	1089.64	***1103***	17.6
Line A	**2**		**36**	320	0.00145		1										
		640				1085.88		**30**	4.24	0.50	0.55	0.14	0.0021	1090.61	1090.33	***1103***	17.1
Line A	**3**		**36**	310	0.00145		1										
		950				1086.32		**30**	4.24	0.50	0.53	0.14	0.0022	1091.28	1091.00	***1103***	16.7
Surge Structure	**4**		**36**	60	0.00145		0										
		1010				1086.41		**30**	4.24	0.50	0.10	0.00	0.0017	1091.38	1091.10	***1094***	7.6
51st Ave 72"SD		0				1084.95								1091.45	1091.45	***1104.8***	19.8
Line A	**1**		**36**	320	0.00145		1										
		320				1085.41		**45**	6.37	0.50	1.23	0.31	0.0068	1093.63	1093.00	***1103***	17.6
Line A	**2**		**36**	320	0.00145		1										
		640				1085.88		**45**	6.37	0.50	1.23	0.31	0.0048	1095.17	1094.55	***1103***	17.1
Line A	**3**		**36**	310	0.00145		1										
		950				1086.32		**45**	6.37	0.50	1.19	0.31	0.0049	1096.68	1096.05	***1103***	16.7
Surge Structure	**4**		**36**	60	0.00145		0										
		1010				1086.41		**45**	6.37	0.50	0.23	0.00	0.0039	1096.91	1096.29	***1094***	7.6
51st Ave 72"SD		0				1084.95								1092.45	1092.45	***1104.8***	19.8
Line A	**1**		**36**	320	0.00145		1										
		320				1085.41		**60**	8.49	0.50	2.19	0.56	0.0121	1096.32	1095.20	***1103***	17.6
Line A	**2**		**36**	320	0.00145		1										
		640				1085.88		**60**	8.49	0.50	2.19	0.56	0.0086	1099.07	1097.95	***1103***	17.1
Line A	**3**		**36**	310	0.00145		1										
		950				1086.32		**60**	8.49	0.50	2.12	0.56	0.0087	1101.75	1100.64	***1103***	16.7
Surge Structure	**4**		**36**	60	0.00145		0										
		1010				1086.41		**60**	8.49	0.50	0.41	0.00	0.0068	1102.17	1101.05	***1094***	7.6

Minor losses are ignored in computation.

q:\mvalebbp\basstdr.wq2

WOOD/PATEL ASSOCIATES
Civil Engineers
Hydrologists
Land Surveyors

PROJECT: Marysvale Baseball Park
PROJECT NO. 96398.02 SHEET NO. ____ OF ____
CALCULATED BY ____ DATE 9/96
CHECKED BY ____ DATE ____

Line 'C' (10-yr Design)

72" Storm Drain between Basin (Field #5) & 51st Ave

When peak occurs in exist 72" pipe at 51st Ave split structure,

$Q_{10} = 215 \pm cfs$ at ordinates 49 thru 65

at that time, Basin outflow is 54 cfs ± or WSEL = 1100.20 (See Table 5)

Based on this data, check pipe hydraulics for the 72' ϕ Line C in Table 2 on the following page.

from Table 2, which utilizes Starting Water Surface = 1100.20
∴ the capacity for 72' ϕ to convey 10-yr is OK.

Also check hydraulics of Pipe "D" along 51st Avenue (see Table 2)

Wood/Patel & Associates

TABLE 2

51ST AVENUE, EXISTING PIPE SYSTEM WITH OUTFALL TO BASIN VIA 72" PIPE ***LINES C & D*** 13-Dec-96

10 Year Design Flows

Manning's "n"= 0.012 04:53 PM

STORM DRAIN LINE STATION LOCATION	PIPE #	STATION	PIPE DIA (in)	REACH LENGTH (ft)	SLOPE OF REACH (ft/ft)	INVERT ELEV (ft)	DESIGN Q (cfs)	FULL PIPE DISCHARGE (cfs) (a)	VELOCITY (fps)	Kj	HEAD LOSSES FRICTION Hf (ft)	HEAD LOSSES JUNCTION LOSS (ft)	PREL GRADE LINE ELEV ENERGY	PREL GRADE LINE ELEV HYDRAULIC	NATURAL GROUND ELEVATION	CHECK NAT GRND VS. EGL (c)	DEPTH TO INVERT
Basin Outfall (Field #5)																	
		0				1086.5							1100.20	1100.20	***1103.00***	ok	16.5
Line C, through Parking Area	1		72	80	0.0010												
		80				1086.6	215	133.92	7.60	0.50	0.17	0.00	1101.27	1100.37	***1105.00***	ok	18.4
Line C, through Parking Area	2		72	350	0.0010												
		430				1086.9	215	133.92	7.60	0.50	0.77	0.00	1102.04	1101.14	***1105.00***	ok	18.1
Line C, through Parking Area	3		72	660	0.0010												
		1090				1087.6	215	131.88	7.60	0.50	1.44	0.00	1103.48	1102.58	***1105.00***	ok	17.5
@ 51st Ave 72" pipe Junction	4		72	115	0.0090												
		1205				1088.6	215	402.74	7.60	0.50	0.25	0.00	1102.29	1101.39	***1105.50***	ok	16.9
Line D, Within 51st Avenue	5		72	664	0.0051												
		1869				1092.0	215	301.71	7.60	0.50	1.45	0.00	1103.74	1102.84	***1108.00***	ok	16.0
Line D, Within 51st Avenue	6		72	656	0.0028												
		2525				1093.8	215	223.68	7.60	0.50	1.43	0.00	1105.18	1104.28	***1111.00***	ok	17.2

(a) Capacity is based on pipe flowing full without pressure head.This value is provided for information only.

(c) If natural ground is less than 1.4 feet above EGL, "pb" statement appears here.

Minor losses are ignored in computation.

INTERPOLATED HYDROGRAPH AT D51 (10-year)

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	23.	1		1230	151	0.	1		1845	226	0.
1		0005	2	0.	1		0620	77	21.	1		1235	152	0.	1		1850	227	0.
1		0010	3	0.	1		0625	78	18.	1		1240	153	0.	1		1855	228	0.
1		0015	4	0.	1		0630	79	16.	1		1245	154	0.	1		1900	229	0.
1		0020	5	1.	1		0635	80	14.	1		1250	155	0.	1		1905	230	0.
1		0025	6	2.	1		0640	81	12.	1		1255	156	0.	1		1910	231	0.
1		0030	7	2.	1		0645	82	11.	1		1300	157	0.	1		1915	232	0.
1		0035	8	3.	1		0650	83	9.	1		1305	158	0.	1		1920	233	0.
1		0040	9	3.	1		0655	84	8.	1		1310	159	0.	1		1925	234	0.
1		0045	10	4.	1		0700	85	7.	1		1315	160	0.	1		1930	235	0.
1		0050	11	4.	1		0705	86	6.	1		1320	161	0.	1		1935	236	0.
1		0055	12	4.	1		0710	87	5.	1		1325	162	0.	1		1940	237	0.
1		0100	13	5.	1		0715	88	5.	1		1330	163	0.	1		1945	238	0.
1		0105	14	5.	1		0720	89	4.	1		1335	164	0.	1		1950	239	0.
1		0110	15	5.	1		0725	90	3.	1		1340	165	0.	1		1955	240	0.
1		0115	16	6.	1		0730	91	3.	1		1345	166	0.	1		2000	241	0.
1		0120	17	6.	1		0735	92	2.	1		1350	167	0.	1		2005	242	0.
1		0125	18	6.	1		0740	93	2.	1		1355	168	0.	1		2010	243	0.
1		0130	19	6.	1		0745	94	1.	1		1400	169	0.	1		2015	244	0.
1		0135	20	6.	1		0750	95	1.	1		1405	170	0.	1		2020	245	0.
1		0140	21	7.	1		0755	96	1.	1		1410	171	0.	1		2025	246	0.
1		0145	22	7.	1		0800	97	1.	1		1415	172	0.	1		2030	247	0.
1		0150	23	7.	1		0805	98	1.	1		1420	173	0.	1		2035	248	0.
1		0155	24	7.	1		0810	99	1.	1		1425	174	0.	1		2040	249	0.
1		0200	25	7.	1		0815	100	0.	1		1430	175	0.	1		2045	250	0.
1		0205	26	7.	1		0820	101	0.	1		1435	176	0.	1		2050	251	0.
1		0210	27	7.	1		0825	102	0.	1		1440	177	0.	1		2055	252	0.
1		0215	28	7.	1		0830	103	0.	1		1445	178	0.	1		2100	253	0.
1		0220	29	7.	1		0835	104	0.	1		1450	179	0.	1		2105	254	0.
1		0225	30	7.	1		0840	105	0.	1		1455	180	0.	1		2110	255	0.
1		0230	31	7.	1		0845	106	0.	1		1500	181	0.	1		2115	256	0.
1		0235	32	7.	1		0850	107	0.	1		1505	182	0.	1		2120	257	0.
1		0240	33	8.	1		0855	108	0.	1		1510	183	0.	1		2125	258	0.
1		0245	34	8.	1		0900	109	0.	1		1515	184	0.	1		2130	259	0.
1		0250	35	8.	1		0905	110	0.	1		1520	185	0.	1		2135	260	0.
1		0255	36	9.	1		0910	111	0.	1		1525	186	0.	1		2140	261	0.
1		0300	37	9.	1		0915	112	0.	1		1530	187	0.	1		2145	262	0.
1		0305	38	10.	1		0920	113	0.	1		1535	188	0.	1		2150	263	0.
1		0310	39	11.	1		0925	114	0.	1		1540	189	0.	1		2155	264	0.
1		0315	40	13.	1		0930	115	0.	1		1545	190	0.	1		2200	265	0.
1		0320	41	15.	1		0935	116	0.	1		1550	191	0.	1		2205	266	0.
1		0325	42	18.	1		0940	117	0.	1		1555	192	0.	1		2210	267	0.
1		0330	43	21.	1		0945	118	0.	1		1600	193	0.	1		2215	268	0.
1		0335	44	27.	1		0950	119	0.	1		1605	194	0.	1		2220	269	0.
1		0340	45	34.	1		0955	120	0.	1		1610	195	0.	1		2225	270	0.
1		0345	46	44.	1		1000	121	0.	1		1615	196	0.	1		2230	271	0.
1		0350	47	59.	1		1005	122	0.	1		1620	197	0.	1		2235	272	0.
1		0355	48	77.	1		1010	123	0.	1		1625	198	0.	1		2240	273	0.
1		0400	49	100.	1		1015	124	0.	1		1630	199	0.	1		2245	274	0.
1		0405	50	124.	1		1020	125	0.	1		1635	200	0.	1		2250	275	0.
1		0410	51	147.	1		1025	126	0.	1		1640	201	0.	1		2255	276	0.

1	0415	52	182.	*	1	1030	127	0.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	212.	*	1	1035	128	0.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	213.	*	1	1040	129	0.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	210.	*	1	1045	130	0.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	203.	*	1	1050	131	0.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	192.	*	1	1055	132	0.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	181.	*	1	1100	133	0.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	169.	*	1	1105	134	0.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	157.	*	1	1110	135	0.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	146.	*	1	1115	136	0.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	135.	*	1	1120	137	0.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	125.	*	1	1125	138	0.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	116.	*	1	1130	139	0.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	108.	*	1	1135	140	0.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	101.	*	1	1140	141	0.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	95.	*	1	1145	142	0.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	89.	*	1	1150	143	0.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	84.	*	1	1155	144	0.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	77.	*	1	1200	145	0.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	63.	*	1	1205	146	0.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	45.	*	1	1210	147	0.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	30.	*	1	1215	148	0.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	28.	*	1	1220	149	0.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	25.	*	1	1225	150	0.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 213.	4.42		55.	14.	14.	14.
		(INCHES)	0.203	0.206	0.206	0.206
		(AC-FT)	27.	28.	28.	28.

CUMULATIVE AREA = 2.54 SQ MI

INTERPOLATED HYDROGRAPH AT SB

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	28.	1		0615	76	55.	1		1230	151	46.	1		1845	226	0.
1		0005	2	0.	1		0620	77	55.	1		1235	152	46.	1		1850	227	0.
1		0010	3	1.	1		0625	78	55.	1		1240	153	46.	1		1855	228	0.
1		0015	4	1.	1		0630	79	55.	1		1245	154	46.	1		1900	229	0.
1		0020	5	2.	1		0635	80	55.	1		1250	155	45.	1		1905	230	0.
1		0025	6	3.	1		0640	81	55.	1		1255	156	45.	1		1910	231	0.
1		0030	7	4.	1		0645	82	55.	1		1300	157	45.	1		1915	232	0.
1		0035	8	5.	1		0650	83	55.	1		1305	158	45.	1		1920	233	0.
1		0040	9	6.	1		0655	84	55.	1		1310	159	44.	1		1925	234	0.
1		0045	10	7.	1		0700	85	55.	1		1315	160	44.	1		1930	235	0.
1		0050	11	8.	1		0705	86	55.	1		1320	161	44.	1		1935	236	0.
1		0055	12	9.	1		0710	87	55.	1		1325	162	44.	1		1940	237	0.
1		0100	13	9.	1		0715	88	55.	1		1330	163	44.	1		1945	238	0.
1		0105	14	10.	1		0720	89	55.	1		1335	164	43.	1		1950	239	0.
1		0110	15	11.	1		0725	90	55.	1		1340	165	43.	1		1955	240	0.
1		0115	16	12.	1		0730	91	55.	1		1345	166	43.	1		2000	241	0.
1		0120	17	12.	1		0735	92	55.	1		1350	167	43.	1		2005	242	0.
1		0125	18	12.	1		0740	93	54.	1		1355	168	42.	1		2010	243	0.
1		0130	19	13.	1		0745	94	54.	1		1400	169	42.	1		2015	244	0.
1		0135	20	13.	1		0750	95	54.	1		1405	170	40.	1		2020	245	0.
1		0140	21	14.	1		0755	96	54.	1		1410	171	40.	1		2025	246	0.
1		0145	22	14.	1		0800	97	54.	1		1415	172	39.	1		2030	247	0.
1		0150	23	14.	1		0805	98	54.	1		1420	173	39.	1		2035	248	0.
1		0155	24	14.	1		0810	99	54.	1		1425	174	39.	1		2040	249	0.
1		0200	25	14.	1		0815	100	54.	1		1430	175	39.	1		2045	250	0.
1		0205	26	15.	1		0820	101	54.	1		1435	176	39.	1		2050	251	0.
1		0210	27	15.	1		0825	102	54.	1		1440	177	38.	1		2055	252	0.
1		0215	28	15.	1		0830	103	54.	1		1445	178	38.	1		2100	253	0.
1		0220	29	15.	1		0835	104	53.	1		1450	179	38.	1		2105	254	0.
1		0225	30	16.	1		0840	105	53.	1		1455	180	38.	1		2110	255	0.
1		0230	31	16.	1		0845	106	53.	1		1500	181	37.	1		2115	256	0.
1		0235	32	16.	1		0850	107	53.	1		1505	182	37.	1		2120	257	0.
1		0240	33	17.	1		0855	108	53.	1		1510	183	36.	1		2125	258	0.
1		0245	34	17.	1		0900	109	53.	1		1515	184	36.	1		2130	259	0.
1		0250	35	18.	1		0905	110	53.	1		1520	185	35.	1		2135	260	0.
1		0255	36	19.	1		0910	111	53.	1		1525	186	33.	1		2140	261	0.
1		0300	37	20.	1		0915	112	52.	1		1530	187	27.	1		2145	262	0.
1		0305	38	22.	1		0920	113	52.	1		1535	188	0.	1		2150	263	0.
1		0310	39	25.	1		0925	114	52.	1		1540	189	0.	1		2155	264	0.
1		0315	40	28.	1		0930	115	52.	1		1545	190	0.	1		2200	265	0.
1		0320	41	29.	1		0935	116	52.	1		1550	191	0.	1		2205	266	0.
1		0325	42	30.	1		0940	117	52.	1		1555	192	0.	1		2210	267	0.
1		0330	43	33.	1		0945	118	52.	1		1600	193	0.	1		2215	268	0.
1		0335	44	37.	1		0950	119	52.	1		1605	194	0.	1		2220	269	0.
1		0340	45	38.	1		0955	120	51.	1		1610	195	0.	1		2225	270	0.
1		0345	46	38.	1		1000	121	51.	1		1615	196	0.	1		2230	271	0.
1		0350	47	40.	1		1005	122	51.	1		1620	197	0.	1		2235	272	0.
1		0355	48	41.	1		1010	123	51.	1		1625	198	0.	1		2240	273	0.
1		0400	49	42.	1		1015	124	51.	1		1630	199	0.	1		2245	274	0.
1		0405	50	43.	1		1020	125	51.	1		1635	200	0.	1		2250	275	0.
1		0410	51	44.	1		1025	126	51.	1		1640	201	0.	1		2255	276	0.
1		0415	52	45.	1		1030	127	50.	1		1645	202	0.	1		2300	277	0.

1	0420	53	47.	*	1	1035	128	50.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	48.	*	1	1040	129	50.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	49.	*	1	1045	130	50.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	50.	*	1	1050	131	50.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	51.	*	1	1055	132	50.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	51.	*	1	1100	133	49.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	52.	*	1	1105	134	49.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	52.	*	1	1110	135	49.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	53.	*	1	1115	136	49.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	53.	*	1	1120	137	49.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	54.	*	1	1125	138	49.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	54.	*	1	1130	139	48.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	54.	*	1	1135	140	48.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	55.	*	1	1140	141	48.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	55.	*	1	1145	142	48.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	55.	*	1	1150	143	48.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	55.	*	1	1155	144	47.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	55.	*	1	1200	145	47.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	55.	*	1	1205	146	47.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	55.	*	1	1210	147	47.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	55.	*	1	1215	148	47.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	55.	*	1	1220	149	47.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	55.	*	1	1225	150	46.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 55.	6.17		54.	26.	25.	25.
		(INCHES)	0.162	0.317	0.317	0.317
		(AC-FT)	27.	52.	52.	52.

CUMULATIVE AREA = 3.08 SQ MI

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	A	114.	4.08	13.	3.	3.	0.09		
+	HYDROGRAPH AT	B	305.	4.17	43.	11.	10.	0.29		
+	DIVERSION TO	D39S	84.	3.83	26.	7.	6.	0.29		
+	HYDROGRAPH AT	D39	221.	4.17	17.	4.	4.	0.29		
+	HYDROGRAPH AT	C	235.	4.17	31.	8.	8.	0.21		
+	ROUTED TO	R39	224.	4.17	31.	8.	8.	0.21		
+	2 COMBINED AT	C40	444.	4.17	48.	12.	12.	0.50		
+	ROUTED TO	R40	337.	4.42	48.	12.	12.	0.50		
+	HYDROGRAPH AT	D	169.	4.17	25.	6.	6.	0.17		
+	ROUTED TO	R43	146.	4.33	25.	6.	6.	0.17		
+	HYDROGRAPH AT	E	216.	4.17	31.	8.	8.	0.20		
+	3 COMBINED AT	C43	556.	4.42	99.	25.	24.	0.87		
+	ROUTED TO	S43	481.	4.58	94.	25.	24.	0.87		
+	DIVERSION TO	D43S	27.	3.42	27.	8.	8.	0.87		
+	HYDROGRAPH AT	D43	454.	4.58	67.	17.	16.	0.87		
+	ROUTED TO	R44	454.	4.58	67.	17.	16.	0.87		
+	HYDROGRAPH AT	F	337.	4.25	46.	12.	11.	0.50		
	ROUTED TO									

+	R45	331.	4.33	46.	12.	11.	0.50
2 COMBINED AT							
+	C45	623.	4.58	104.	26.	25.	1.37
HYDROGRAPH AT							
+	G	64.	4.42	17.	4.	4.	0.12
ROUTED TO							
+	R47	51.	5.33	17.	4.	4.	0.12
HYDROGRAPH AT							
+	H	102.	4.42	26.	7.	6.	0.22
3 COMBINED AT							
+	C47	694.	4.58	139.	35.	34.	1.71
ROUTED TO							
+	S47	616.	4.75	139.	35.	34.	1.71
DIVERSION TO							
+	D47S	200.	4.75	26.	7.	6.	1.71
HYDROGRAPH AT							
+	D47	415.	4.75	113.	29.	28.	1.71
ROUTED TO							
+	R48	408.	4.83	113.	29.	28.	1.71
HYDROGRAPH AT							
+	I	307.	4.25	50.	12.	12.	0.44
2 COMBINED AT							
+	C49	503.	4.83	151.	39.	37.	2.15
ROUTED TO							
+	R49A	500.	4.83	151.	39.	37.	2.15
DIVERSION TO							
+	CRDIV	260.	4.83	34.	8.	8.	2.15
HYDROGRAPH AT							
+	CRIT	240.	4.25	118.	30.	29.	2.15
ROUTED TO							
+	R49B	241.	4.33	118.	30.	29.	2.15
DIVERSION TO							
+	49BDV	200.	4.25	107.	28.	27.	2.15
HYDROGRAPH AT							
+	49BD	41.	4.33	11.	3.	3.	2.15
HYDROGRAPH AT							
+	J	238.	4.33	51.	13.	12.	0.39
2 COMBINED AT							
+	C51	213.	4.42	55.	14.	14.	2.54
DIVERSION TO							

+	D51S	0.	0.08	0.	0.	0.	2.54
HYDROGRAPH AT							
+	D51	213.	4.42	55.	14.	14.	2.54
HYDROGRAPH AT							
+	L'	138.	4.33	30.	8.	7.	0.23
ROUTED TO							
+	RL'	125.	4.50	30.	8.	7.	0.23
HYDROGRAPH AT							
+	KCN	39.	4.17	5.	1.	1.	0.04
DIVERSION TO							
+	KCNRT	8.	4.17	1.	0.	0.	0.04
HYDROGRAPH AT							
+	KCN'	31.	4.17	4.	1.	1.	0.04
DIVERSION TO							
+	KCNDV	16.	4.17	2.	0.	0.	0.04
HYDROGRAPH AT							
+	KCND	16.	4.17	2.	0.	0.	0.04
ROUTED TO							
+	KCNRW	13.	4.25	2.	0.	0.	0.04
2 COMBINED AT							
+	KCNC	135.	4.50	32.	8.	8.	0.27
ROUTED TO							
+	RL'2	133.	4.58	32.	8.	8.	0.27
HYDROGRAPH AT							
+	M'	118.	4.08	13.	3.	3.	0.09
ROUTED TO							
+	RM'	117.	4.17	13.	3.	3.	0.09
HYDROGRAPH AT							
+	KW	54.	4.25	9.	2.	2.	0.07
3 COMBINED AT							
+	CCHAN	228.	4.33	53.	14.	13.	0.43
ROUTED TO							
+	KWR	227.	4.33	53.	14.	13.	0.43
HYDROGRAPH AT							
+	KCNDV	16.	4.17	2.	0.	0.	0.04
ROUTED TO							
+	KCNRS	13.	4.25	2.	0.	0.	0.04
2 COMBINED AT							
+	KCSC	240.	4.33	55.	14.	13.	0.43
DIVERSION TO							

+		CHDIV	132.	4.33	15.	4.	4.	0.43
	HYDROGRAPH AT							
+		CHD	108.	4.00	40.	10.	10.	0.43
	HYDROGRAPH AT							
+		KEN	42.	4.17	6.	2.	2.	0.05
	DIVERSION TO							
+		KENRT	10.	4.17	2.	0.	0.	0.05
	HYDROGRAPH AT							
+		KEN'	31.	4.17	5.	1.	1.	0.05
	DIVERSION TO							
+		KENDV	31.	4.17	5.	1.	1.	0.05
	HYDROGRAPH AT							
+		KEND	0.	0.08	0.	0.	0.	0.05
	ROUTED TO							
+		KENR	0.	0.08	0.	0.	0.	0.05
	HYDROGRAPH AT							
+		KCS	100.	4.08	9.	2.	2.	0.07
	4 COMBINED AT							
+		CB	344.	4.33	102.	26.	25.	3.08
	ROUTED TO							
+		SB	55.	6.17	54.	26.	25.	3.08
	HYDROGRAPH AT							
+		KENDV	31.	4.17	5.	1.	1.	0.05
	ROUTED TO							
+		KENDR	31.	4.17	5.	1.	1.	0.05
	HYDROGRAPH AT							
+		RTN51	0.	0.08	0.	0.	0.	2.54
	HYDROGRAPH AT							
+		49BDV	200.	4.25	107.	28.	27.	2.15
	3 COMBINED AT							
+		CSD1	220.	4.25	111.	29.	28.	2.54
	HYDROGRAPH AT							
+		STAD	1.	4.17	0.	0.	0.	0.00
	3 COMBINED AT							
+		CSD2	264.	4.42	159.	54.	52.	5.62
	HYDROGRAPH AT							
+		L	189.	4.33	41.	11.	10.	0.31
	ROUTED TO							
+		R59	170.	4.58	41.	11.	10.	0.31
	HYDROGRAPH AT							

+	M	108.	4.08	12.	3.	3.	0.08
HYDROGRAPH AT							
+	N	364.	4.25	56.	14.	14.	0.38
ROUTED TO							
+	RCM	346.	4.33	56.	14.	14.	0.38
HYDROGRAPH AT							
+	O	565.	4.25	90.	23.	22.	0.66
2 COMBINED AT							
+	CCM	786.	4.25	140.	35.	34.	1.04
ROUTED TO							
+	RCP	725.	4.50	139.	35.	34.	1.04
HYDROGRAPH AT							
+	P	300.	4.25	44.	11.	11.	0.40
2 COMBINED AT							
+	CCP	855.	4.50	176.	45.	43.	1.44
DIVERSION TO							
+	DGCW	642.	4.50	79.	20.	19.	1.44
HYDROGRAPH AT							
+	DGC	213.	4.08	96.	25.	24.	1.44
ROUTED TO							
+	R58	213.	5.42	96.	25.	24.	1.44
3 COMBINED AT							
+	C59	372.	4.58	144.	37.	36.	1.83
ROUTED TO							
+	S59	278.	5.58	144.	37.	36.	1.83
DIVERSION TO							
+	D59S	272.	5.58	144.	37.	36.	1.83
HYDROGRAPH AT							
+	D59W	6.	5.58	1.	0.	0.	1.83
HYDROGRAPH AT							
+	RTNGC	642.	4.50	79.	20.	19.	1.44
ROUTED TO							
+	RGC	583.	4.83	79.	20.	19.	1.44
HYDROGRAPH AT							
+	Q	192.	4.42	44.	11.	11.	0.47
2 COMBINED AT							
+	CGC	956.	4.75	141.	35.	34.	0.47
ROUTED TO							
+	SGC	922.	4.83	140.	35.	34.	0.47
ROUTED TO							

+	R63	896.	4.83	140.	35.	34.	0.47
HYDROGRAPH AT							
+	R	191.	4.17	24.	6.	6.	0.18
3 COMBINED AT							
+	C63	879.	4.83	161.	41.	39.	2.49
ROUTED TO							
+	SA	55.	6.58	51.	27.	26.	2.49
DIVERSION TO							
+	DSAW	20.	4.92	20.	16.	15.	2.49
HYDROGRAPH AT							
+	DSA	35.	6.58	31.	11.	11.	2.49
DIVERSION TO							
+	DSAE	34.	6.58	30.	11.	11.	2.49
HYDROGRAPH AT							
+	DWRA	0.	6.58	0.	0.	0.	2.49
HYDROGRAPH AT							
+	RTNSAE	34.	6.58	30.	11.	11.	2.49
HYDROGRAPH AT							
+	RTN59	272.	5.58	144.	37.	36.	1.83
2 COMBINED AT							
+	C60	302.	5.67	160.	47.	46.	3.02
HYDROGRAPH AT							
+	S	437.	4.08	44.	11.	11.	0.30
ROUTED TO							
+	R57	297.	4.42	44.	11.	11.	0.30
HYDROGRAPH AT							
+	T	412.	4.17	53.	13.	13.	0.36
2 COMBINED AT							
+	C58	577.	4.25	95.	24.	23.	0.66
ROUTED TO							
+	RMO	478.	4.58	95.	24.	23.	0.66
HYDROGRAPH AT							
+	U	103.	4.25	18.	5.	4.	0.13
ROUTED TO							
+	RBH	98.	4.33	18.	5.	4.	0.13
HYDROGRAPH AT							
+	V	203.	4.17	26.	7.	6.	0.17
2 COMBINED AT							
+	CBH	287.	4.17	44.	11.	11.	0.30
ROUTED TO							

+	R61	208.	4.58	44.	11.	11.	0.30
HYDROGRAPH AT							
+	W	631.	4.25	92.	23.	22.	0.66
3 COMBINED AT							
+	CCK	946.	4.50	219.	56.	53.	1.62
ROUTED TO							
+	RCK	880.	4.83	217.	56.	53.	1.62
HYDROGRAPH AT							
+	X	471.	4.17	64.	16.	16.	0.47
2 COMBINED AT							
+	C67	998.	4.75	272.	70.	67.	2.09

WOOD/PATEL ASSOCIATES
Civil Engineers
Hydrologists
Land Surveyors

PROJECT Maryvale Baseball Stadium
PROJECT NO. 96398.02 SHEET NO. ____ OF ____
CALCULATED BY ____ DATE 9/96
CHECKED BY ____ DATE ____

Line 'O' (2-yr Design)
Grand Canal Storm Drain Serving Site "B" - Mitigation Study

When the peak occurs @ Grand Canal Channel/ West Property Line

$Q_2 = 110$ cfs ± at ordinates 51 thru 65 (hydrograph)

at that time, Basin outflow is 40 ~ 46 cfs, means WSEL = 1097.0 ± in basin (See Table 5)

based on this data, check pipe hydraulics for the 60" Φ (Line Q) in Table 3 on the following page.

From Table 3, it is evident that the 60" pipe has a 2-yr ± capacity (The capacity will diminish when basin HGL = Pipe inlet HGL)

Conclusion: The 60" pipe appears to carry 1-yr adequately.

It will also convey 2-yr peak for the rising limb of hydrograph. The capacity will diminish when the basin HGL = Pipe inlet HGL

Wood/Patel & Associates

TABLE 3

Grand Canal Storm Drain
LINE "Q"

60" PIPE ALONG NORTH SIDE OF GRAND CANAL
WEST PROPERTY LINE TO BALL FIELD # 5

Manning's "n"= 0.0125

STORM SEWER LINE STATION LOCATION	STATION	PIPE DIA (In)	REACH LENGTH (ft)	SLOPE OF REACH (ft/ft)	INVERT ELEV (ft)	NO. OF EXTRA MANHOLES IN REACH	DESIGN Q (cfs)	FULL PIPE DISCHARGE (cfs)	VELOCITY (fps)	KJ	HEAD LOSSES FRICTION Hf (ft)	HEAD LOSSES JUNCTION LOSS (ft)	HEAD LOSSES SH FO (ft)	PREL GRADE LINE ELEV ENERGY	PREL GRADE LINE ELEV HYDRAULIC	NATURAL GROUND ELEVATION	CHECK NAT GRND VS. EGL (c)	DEPTH TO INVERT
@ West Property Line																		
	0				1090.4									1097.00	1097.00	***1103.00***	ok	12.6
60" pipe Along Grand Canal		**60**	580	0.0011		0												
pipe Q	580				1091.0		**112**	86.51	5.70	0.50	0.99	0.00		1098.49	1097.99	***1102.00***	ok	11.0

INTERPOLATED HYDROGRAPH AT CHD (2-year)

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	18.	1		1230	151	0.	1		1845	226	0.
1		0005	2	0.	1		0620	77	17.	1		1235	152	0.	1		1850	227	0.
1		0010	3	0.	1		0625	78	16.	1		1240	153	0.	1		1855	228	0.
1		0015	4	0.	1		0630	79	14.	1		1245	154	0.	1		1900	229	0.
1		0020	5	0.	1		0635	80	13.	1		1250	155	0.	1		1905	230	0.
1		0025	6	0.	1		0640	81	12.	1		1255	156	0.	1		1910	231	0.
1		0030	7	1.	1		0645	82	11.	1		1300	157	0.	1		1915	232	0.
1		0035	8	1.	1		0650	83	10.	1		1305	158	0.	1		1920	233	0.
1		0040	9	1.	1		0655	84	9.	1		1310	159	0.	1		1925	234	0.
1		0045	10	1.	1		0700	85	8.	1		1315	160	0.	1		1930	235	0.
1		0050	11	2.	1		0705	86	7.	1		1320	161	0.	1		1935	236	0.
1		0055	12	2.	1		0710	87	7.	1		1325	162	0.	1		1940	237	0.
1		0100	13	2.	1		0715	88	6.	1		1330	163	0.	1		1945	238	0.
1		0105	14	2.	1		0720	89	5.	1		1335	164	0.	1		1950	239	0.
1		0110	15	2.	1		0725	90	5.	1		1340	165	0.	1		1955	240	0.
1		0115	16	3.	1		0730	91	4.	1		1345	166	0.	1		2000	241	0.
1		0120	17	3.	1		0735	92	4.	1		1350	167	0.	1		2005	242	0.
1		0125	18	3.	1		0740	93	3.	1		1355	168	0.	1		2010	243	0.
1		0130	19	3.	1		0745	94	3.	1		1400	169	0.	1		2015	244	0.
1		0135	20	3.	1		0750	95	3.	1		1405	170	0.	1		2020	245	0.
1		0140	21	3.	1		0755	96	3.	1		1410	171	0.	1		2025	246	0.
1		0145	22	3.	1		0800	97	2.	1		1415	172	0.	1		2030	247	0.
1		0150	23	3.	1		0805	98	2.	1		1420	173	0.	1		2035	248	0.
1		0155	24	4.	1		0810	99	2.	1		1425	174	0.	1		2040	249	0.
1		0200	25	4.	1		0815	100	1.	1		1430	175	0.	1		2045	250	0.
1		0205	26	4.	1		0820	101	1.	1		1435	176	0.	1		2050	251	0.
1		0210	27	4.	1		0825	102	1.	1		1440	177	0.	1		2055	252	0.
1		0215	28	4.	1		0830	103	1.	1		1445	178	0.	1		2100	253	0.
1		0220	29	4.	1		0835	104	1.	1		1450	179	0.	1		2105	254	0.
1		0225	30	4.	1		0840	105	1.	1		1455	180	0.	1		2110	255	0.
1		0230	31	4.	1		0845	106	1.	1		1500	181	0.	1		2115	256	0.
1		0235	32	4.	1		0850	107	1.	1		1505	182	0.	1		2120	257	0.
1		0240	33	4.	1		0855	108	0.	1		1510	183	0.	1		2125	258	0.
1		0245	34	5.	1		0900	109	0.	1		1515	184	0.	1		2130	259	0.
1		0250	35	5.	1		0905	110	0.	1		1520	185	0.	1		2135	260	0.
1		0255	36	5.	1		0910	111	0.	1		1525	186	0.	1		2140	261	0.
1		0300	37	5.	1		0915	112	0.	1		1530	187	0.	1		2145	262	0.
1		0305	38	5.	1		0920	113	0.	1		1535	188	0.	1		2150	263	0.
1		0310	39	6.	1		0925	114	0.	1		1540	189	0.	1		2155	264	0.
1		0315	40	6.	1		0930	115	0.	1		1545	190	0.	1		2200	265	0.
1		0320	41	6.	1		0935	116	0.	1		1550	191	0.	1		2205	266	0.
1		0325	42	7.	1		0940	117	0.	1		1555	192	0.	1		2210	267	0.
1		0330	43	8.	1		0945	118	0.	1		1600	193	0.	1		2215	268	0.
1		0335	44	10.	1		0950	119	0.	1		1605	194	0.	1		2220	269	0.
1		0340	45	12.	1		0955	120	0.	1		1610	195	0.	1		2225	270	0.
1		0345	46	16.	1		1000	121	0.	1		1615	196	0.	1		2230	271	0.
1		0350	47	21.	1		1005	122	0.	1		1620	197	0.	1		2235	272	0.
1		0355	48	31.	1		1010	123	0.	1		1625	198	0.	1		2240	273	0.
1		0400	49	51.	1		1015	124	0.	1		1630	199	0.	1		2245	274	0.
1		0405	50	79.	1		1020	125	0.	1		1635	200	0.	1		2250	275	0.
1		0410	51	101.	1		1025	126	0.	1		1640	201	0.	1		2255	276	0.
1		0415	52	108.	1		1030	127	0.	1		1645	202	0.	1		2300	277	0.

1	0420	53	108.	*	1	1035	128	0.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	107.	*	1	1040	129	0.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	104.	*	1	1045	130	0.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	98.	*	1	1050	131	0.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	92.	*	1	1055	132	0.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	86.	*	1	1100	133	0.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	80.	*	1	1105	134	0.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	73.	*	1	1110	135	0.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	66.	*	1	1115	136	0.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	60.	*	1	1120	137	0.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	54.	*	1	1125	138	0.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	49.	*	1	1130	139	0.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	43.	*	1	1135	140	0.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	39.	*	1	1140	141	0.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	35.	*	1	1145	142	0.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	31.	*	1	1150	143	0.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	29.	*	1	1155	144	0.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	27.	*	1	1200	145	0.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	25.	*	1	1205	146	0.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	24.	*	1	1210	147	0.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	23.	*	1	1215	148	0.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	21.	*	1	1220	149	0.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	20.	*	1	1225	150	0.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 108.	4.25		28.	7.	7.	7.
		(INCHES)	0.606	0.624	0.624	0.624
		(AC-FT)	14.	14.	14.	14.

CUMULATIVE AREA = 0.43 SQ MI

INTERPOLATED HYDROGRAPH AT SB

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	28.	1		0615	76	46.	1		1230	151	0.	1		1845	226	0.
1		0005	2	0.	1		0620	77	46.	1		1235	152	0.	1		1850	227	0.
1		0010	3	0.	1		0625	78	46.	1		1240	153	0.	1		1855	228	0.
1		0015	4	1.	1		0630	79	46.	1		1245	154	0.	1		1900	229	0.
1		0020	5	1.	1		0635	80	46.	1		1250	155	0.	1		1905	230	0.
1		0025	6	2.	1		0640	81	46.	1		1255	156	0.	1		1910	231	0.
1		0030	7	3.	1		0645	82	46.	1		1300	157	0.	1		1915	232	0.
1		0035	8	3.	1		0650	83	45.	1		1305	158	0.	1		1920	233	0.
1		0040	9	4.	1		0655	84	45.	1		1310	159	0.	1		1925	234	0.
1		0045	10	4.	1		0700	85	45.	1		1315	160	0.	1		1930	235	0.
1		0050	11	5.	1		0705	86	45.	1		1320	161	0.	1		1935	236	0.
1		0055	12	5.	1		0710	87	45.	1		1325	162	0.	1		1940	237	0.
1		0100	13	6.	1		0715	88	45.	1		1330	163	0.	1		1945	238	0.
1		0105	14	6.	1		0720	89	44.	1		1335	164	0.	1		1950	239	0.
1		0110	15	6.	1		0725	90	44.	1		1340	165	0.	1		1955	240	0.
1		0115	16	7.	1		0730	91	44.	1		1345	166	0.	1		2000	241	0.
1		0120	17	7.	1		0735	92	44.	1		1350	167	0.	1		2005	242	0.
1		0125	18	7.	1		0740	93	44.	1		1355	168	0.	1		2010	243	0.
1		0130	19	8.	1		0745	94	43.	1		1400	169	0.	1		2015	244	0.
1		0135	20	8.	1		0750	95	43.	1		1405	170	0.	1		2020	245	0.
1		0140	21	8.	1		0755	96	43.	1		1410	171	0.	1		2025	246	0.
1		0145	22	8.	1		0800	97	43.	1		1415	172	0.	1		2030	247	0.
1		0150	23	8.	1		0805	98	43.	1		1420	173	0.	1		2035	248	0.
1		0155	24	9.	1		0810	99	42.	1		1425	174	0.	1		2040	249	0.
1		0200	25	9.	1		0815	100	42.	1		1430	175	0.	1		2045	250	0.
1		0205	26	9.	1		0820	101	42.	1		1435	176	0.	1		2050	251	0.
1		0210	27	9.	1		0825	102	42.	1		1440	177	0.	1		2055	252	0.
1		0215	28	9.	1		0830	103	41.	1		1445	178	0.	1		2100	253	0.
1		0220	29	9.	1		0835	104	41.	1		1450	179	0.	1		2105	254	0.
1		0225	30	9.	1		0840	105	41.	1		1455	180	0.	1		2110	255	0.
1		0230	31	10.	1		0845	106	41.	1		1500	181	0.	1		2115	256	0.
1		0235	32	10.	1		0850	107	40.	1		1505	182	0.	1		2120	257	0.
1		0240	33	10.	1		0855	108	40.	1		1510	183	0.	1		2125	258	0.
1		0245	34	10.	1		0900	109	40.	1		1515	184	0.	1		2130	259	0.
1		0250	35	11.	1		0905	110	38.	1		1520	185	0.	1		2135	260	0.
1		0255	36	12.	1		0910	111	38.	1		1525	186	0.	1		2140	261	0.
1		0300	37	12.	1		0915	112	37.	1		1530	187	0.	1		2145	262	0.
1		0305	38	13.	1		0920	113	37.	1		1535	188	0.	1		2150	263	0.
1		0310	39	15.	1		0925	114	36.	1		1540	189	0.	1		2155	264	0.
1		0315	40	17.	1		0930	115	36.	1		1545	190	0.	1		2200	265	0.
1		0320	41	20.	1		0935	116	35.	1		1550	191	0.	1		2205	266	0.
1		0325	42	24.	1		0940	117	28.	1		1555	192	0.	1		2210	267	0.
1		0330	43	28.	1		0945	118	0.	1		1600	193	0.	1		2215	268	0.
1		0335	44	29.	1		0950	119	0.	1		1605	194	0.	1		2220	269	0.
1		0340	45	31.	1		0955	120	0.	1		1610	195	0.	1		2225	270	0.
1		0345	46	35.	1		1000	121	0.	1		1615	196	0.	1		2230	271	0.
1		0350	47	37.	1		1005	122	0.	1		1620	197	0.	1		2235	272	0.
1		0355	48	38.	1		1010	123	0.	1		1625	198	0.	1		2240	273	0.
1		0400	49	39.	1		1015	124	0.	1		1630	199	0.	1		2245	274	0.
1		0405	50	40.	1		1020	125	0.	1		1635	200	0.	1		2250	275	0.
1		0410	51	40.	1		1025	126	0.	1		1640	201	0.	1		2255	276	0.
1		0415	52	41.	1		1030	127	0.	1		1645	202	0.	1		2300	277	0.

1	0420	53	42.	*	1	1035	128	0.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	42.	*	1	1040	129	0.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	43.	*	1	1045	130	0.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	43.	*	1	1050	131	0.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	44.	*	1	1055	132	0.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	44.	*	1	1100	133	0.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	45.	*	1	1105	134	0.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	45.	*	1	1110	135	0.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	45.	*	1	1115	136	0.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	46.	*	1	1120	137	0.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	46.	*	1	1125	138	0.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	46.	*	1	1130	139	0.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	46.	*	1	1135	140	0.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	46.	*	1	1140	141	0.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	46.	*	1	1145	142	0.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	46.	*	1	1150	143	0.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	46.	*	1	1155	144	0.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	46.	*	1	1200	145	0.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	46.	*	1	1205	146	0.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	46.	*	1	1210	147	0.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	46.	*	1	1215	148	0.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	46.	*	1	1220	149	0.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	46.	*	1	1225	150	0.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 46.	5.75		43.	12.	12.	12.
		(INCHES)	0.129	0.147	0.147	0.147
		(AC-FT)	21.	24.	24.	24.

HEC-1

MARYVALE BASEBALL PARK PUMP STATION HYDROLOGIC MODEL

The main ball field pump station was modeled for the 10-year and 100-year storm events using HEC-1. Pump flows used in the HEC-1 models represent the mid-range flows of the pump performance curves, taking into account the range of total dynamic head the two pumps must operate against. Output printouts for the two HEC-1 models are included on the following pages.

The pump station consists of two 20-hp electric pumps and a 140-linear-foot 72" storage pipe with a volume of 3960 cu ft. This volume is sufficient to store approximately the 1-year storm without the pumps running, a scenario which could occur if electric power were interrupted during the storm event. In normal pump station operation (no interrupted power), the pump station could handle at least the 10-year event before the storage pipe reaches its capacity.

During the 100-year storm event, flow will exceed the capacity of the storage pipe and will pond on the field at a depth less than 0.5 feet for a period of approximately 2.3 hours.

NOTES\96398.D11

```
****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              MAY   1991              *
*           VERSION 4.0.1E             *
*     Lahey F77L-EM/32 version 5.01    *
*       Dodson & Associates, Inc.      *
*  RUN DATE  11/21/96  TIME  10:43:43  *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 551-1748             *
*                                      *
****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID        MARYVALE BASEBALL PARK
  2           ID        FLOOD CONTROL FACILITIES
  3           ID        WOOD, PATEL & ASSOCIATES, INC.
  4           ID        ************************************************
  5           ID        MARYVALE BASEBALL PARK
  6           ID        MAIN FIELD PUMP STATION MODEL
  7           ID        10-YEAR, 6-HOUR STORM
  8           ID        FILE:  PUMP10.DAT       DATE:  11/21/96
  9           ID        140 LF OF 6' DIAMETER STORAGE PIPE
 10           ID        JOB #: 96398
 11           ID        ***
              *DIAGRAM
 12           IT       1                    900
 13           IO       5       0
 14           IN      15
              *

 15           KK    STAD
 16           KM   RUNOFF FROM BALL FIELD # 1
 17           KM     L =  .095  Kb = .14  Adj. Slope =  10.0
 18           BA   .0096
 19           PB    1.95
 20           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 21           PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 22           PC    .962    .972    .983    .991   1.000
 23           LG    .153    .290   4.430    .304      14
 24           UC     .42     .30
 25           UA       0       5      16      30      65      77      84      90      94      97
 26           UA     100
              *

 27           KK      PS        140 LF OF 6' DIAMETER STORAGE PIPE
 28           KM        PUMP # 1 (SIMPLEX):  1150 GPM AT 29 FT TOTAL HEAD
 29           KM        PUMPS 1 & 2 (DUPLEX):  2200 GPM AT 32 FT TOTAL HEAD
 30           KO       1       2
 31           RS       1    ELEV    75.5       0
 32           SV       0   .0026   .0126   .0291   .0480   .0670   .0835   .0935   .0964  1.0964
 33           SE    75.5    79.5    80.5    81.5    82.5    83.5    84.5    85.5    90.0    91.0
 34           SQ     .01     .02     .03     .04     .05     .06     .07     .08     .09     .10
 35           WP                            PUMP
 36           WP    80.0     2.6    77.0    PUMP
 37           WP    81.0     2.3    77.0    PUMP
              *

 38           KK    PUMP
 39           KM    RETRIEVE PUMPED FLOW
 40           KO                                    21
 41           WR    PUMP
              *
 42           ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   15        STAD
                V
                V
   35           .------->    PUMP
   27          PS
                .
                .
   41           .            .<-------    PUMP
   38           .        PUMP

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
```

```
****************************************                                    ****************************************
*                                      *                                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                    *   U.S. ARMY CORPS OF ENGINEERS       *
*              MAY   1991              *                                    *   HYDROLOGIC ENGINEERING CENTER      *
*           VERSION 4.0.1E             *                                    *         609 SECOND STREET            *
*     Lahey F77L-EM/32 version 5.01    *                                    *      DAVIS, CALIFORNIA 95616         *
*       Dodson & Associates, Inc.      *                                    *          (916) 551-1748              *
*  RUN DATE  11/21/96  TIME  10:43:43  *                                    *                                      *
****************************************                                    ****************************************


                              MARYVALE BASEBALL PARK
                              FLOOD CONTROL FACILITIES
                              WOOD, PATEL & ASSOCIATES, INC.
                              ************************************************
                              MARYVALE BASEBALL PARK
                              MAIN FIELD PUMP STATION MODEL
                              10-YEAR, 6-HOUR STORM
                              FILE:  PUMP10.DAT       DATE:  11/21/96
                              140 LF OF 6' DIAMETER STORAGE PIPE
                              JOB #: 96398
                              ***

 13 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN           1  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1    0  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ         900  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      1    0  ENDING DATE
                     NDTIME        1459  ENDING TIME
                      ICENT          19  CENTURY MARK

                 COMPUTATION INTERVAL    0.02 HOURS
                      TOTAL TIME BASE   14.98 HOURS

         ENGLISH UNITS
              DRAINAGE AREA          SQUARE MILES
              PRECIPITATION DEPTH    INCHES
              LENGTH, ELEVATION      FEET
              FLOW                   CUBIC FEET PER SECOND
              STORAGE VOLUME         ACRE-FEET
              SURFACE AREA           ACRES
              TEMPERATURE            DEGREES FAHRENHEIT


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
 27 KK     *        PS  *             140 LF OF 6' DIAMETER STORAGE PIPE
```

```
*           *
**************

30 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          1  PRINT CONTROL
                     IPLOT          2  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

             HYDROGRAPH ROUTING DATA

31 RS          STORAGE ROUTING
                     NSTPS          1  NUMBER OF SUBREACHES
                      ITYP       ELEV  TYPE OF INITIAL CONDITION
                    RSVRIC      75.50  INITIAL CONDITION
                         X       0.00 WORKING R AND D COEFFICIENT

32 SV            STORAGE        0.0      0.0      0.0      0.0      0.0      0.1      0.1      0.1      0.1      1.1

33 SE          ELEVATION      75.50    79.50    80.50    81.50    82.50    83.50    84.50    85.50    90.00    91.00

34 SQ          DISCHARGE        0.       0.       0.       0.       0.       0.       0.       0.       0.       0.

36 WP          PUMPING DATA

                 PUMP ON    PUMPING    PUMP OFF
                ELEVATION     RATE    ELEVATION

                   80.0        3.        77.0
                   81.0        2.        77.0

                   ISTAD       PUMP  PUMP FLOW HYDROGRAPH IDENTIFICATION

                                                    ***
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HYDROGRAPH AT STATION PS

****

DA	MON	HRMN	ORD	PUMP Q	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	PUMP Q	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	0.	0.0	75.5	*	1		0730	451	0.	0.	0.0	79.5
1		0001	2	0.	0.	0.0	75.5	*	1		0731	452	0.	0.	0.0	79.5
1		0002	3	0.	0.	0.0	75.5	*	1		0732	453	0.	0.	0.0	79.5
1		0003	4	0.	0.	0.0	75.5	*	1		0733	454	0.	0.	0.0	79.5
1		0004	5	0.	0.	0.0	75.5	*	1		0734	455	0.	0.	0.0	79.5
1		0005	6	0.	0.	0.0	75.5	*	1		0735	456	0.	0.	0.0	79.5
1		0006	7	0.	0.	0.0	75.5	*	1		0736	457	0.	0.	0.0	79.5
1		0007	8	0.	0.	0.0	75.5	*	1		0737	458	0.	0.	0.0	79.5
1		0008	9	0.	0.	0.0	75.5	*	1		0738	459	0.	0.	0.0	79.5
1		0009	10	0.	0.	0.0	75.5	*	1		0739	460	0.	0.	0.0	79.5
1		0010	11	0.	0.	0.0	75.5	*	1		0740	461	0.	0.	0.0	79.5
1		0011	12	0.	0.	0.0	75.5	*	1		0741	462	0.	0.	0.0	79.5
1		0012	13	0.	0.	0.0	75.5	*	1		0742	463	0.	0.	0.0	79.5
1		0013	14	0.	0.	0.0	75.5	*	1		0743	464	0.	0.	0.0	79.5
1		0014	15	0.	0.	0.0	75.5	*	1		0744	465	0.	0.	0.0	79.5

1	0015	16	0.	0.	0.0	75.5	*	1	0745	466	0.	0.	0.0	79.5
1	0016	17	0.	0.	0.0	75.5	*	1	0746	467	0.	0.	0.0	79.5
1	0017	18	0.	0.	0.0	75.5	*	1	0747	468	0.	0.	0.0	79.5
1	0018	19	0.	0.	0.0	75.6	*	1	0748	469	0.	0.	0.0	79.5
1	0019	20	0.	0.	0.0	75.6	*	1	0749	470	0.	0.	0.0	79.5
1	0020	21	0.	0.	0.0	75.6	*	1	0750	471	0.	0.	0.0	79.5
1	0021	22	0.	0.	0.0	75.6	*	1	0751	472	0.	0.	0.0	79.5
1	0022	23	0.	0.	0.0	75.7	*	1	0752	473	0.	0.	0.0	79.5
1	0023	24	0.	0.	0.0	75.7	*	1	0753	474	0.	0.	0.0	79.5
1	0024	25	0.	0.	0.0	75.7	*	1	0754	475	0.	0.	0.0	79.5
1	0025	26	0.	0.	0.0	75.8	*	1	0755	476	0.	0.	0.0	79.5
1	0026	27	0.	0.	0.0	75.8	*	1	0756	477	0.	0.	0.0	79.5
1	0027	28	0.	0.	0.0	75.8	*	1	0757	478	0.	0.	0.0	79.5
1	0028	29	0.	0.	0.0	75.9	*	1	0758	479	0.	0.	0.0	79.5
1	0029	30	0.	0.	0.0	75.9	*	1	0759	480	0.	0.	0.0	79.5
1	0030	31	0.	0.	0.0	76.0	*	1	0800	481	0.	0.	0.0	79.5
1	0031	32	0.	0.	0.0	76.0	*	1	0801	482	0.	0.	0.0	79.5
1	0032	33	0.	0.	0.0	76.1	*	1	0802	483	0.	0.	0.0	79.4
1	0033	34	0.	0.	0.0	76.2	*	1	0803	484	0.	0.	0.0	79.4
1	0034	35	0.	0.	0.0	76.2	*	1	0804	485	0.	0.	0.0	79.4
1	0035	36	0.	0.	0.0	76.3	*	1	0805	486	0.	0.	0.0	79.4
1	0036	37	0.	0.	0.0	76.3	*	1	0806	487	0.	0.	0.0	79.4
1	0037	38	0.	0.	0.0	76.4	*	1	0807	488	0.	0.	0.0	79.4
1	0038	39	0.	0.	0.0	76.5	*	1	0808	489	0.	0.	0.0	79.4
1	0039	40	0.	0.	0.0	76.5	*	1	0809	490	0.	0.	0.0	79.4
1	0040	41	0.	0.	0.0	76.6	*	1	0810	491	0.	0.	0.0	79.4
1	0041	42	0.	0.	0.0	76.7	*	1	0811	492	0.	0.	0.0	79.4
1	0042	43	0.	0.	0.0	76.7	*	1	0812	493	0.	0.	0.0	79.4
1	0043	44	0.	0.	0.0	76.8	*	1	0813	494	0.	0.	0.0	79.4
1	0044	45	0.	0.	0.0	76.9	*	1	0814	495	0.	0.	0.0	79.4
1	0045	46	0.	0.	0.0	76.9	*	1	0815	496	0.	0.	0.0	79.4
1	0046	47	0.	0.	0.0	77.0	*	1	0816	497	0.	0.	0.0	79.4
1	0047	48	0.	0.	0.0	77.1	*	1	0817	498	0.	0.	0.0	79.4
1	0048	49	0.	0.	0.0	77.2	*	1	0818	499	0.	0.	0.0	79.4
1	0049	50	0.	0.	0.0	77.2	*	1	0819	500	0.	0.	0.0	79.4
1	0050	51	0.	0.	0.0	77.3	*	1	0820	501	0.	0.	0.0	79.4
1	0051	52	0.	0.	0.0	77.4	*	1	0821	502	0.	0.	0.0	79.4
1	0052	53	0.	0.	0.0	77.5	*	1	0822	503	0.	0.	0.0	79.4
1	0053	54	0.	0.	0.0	77.5	*	1	0823	504	0.	0.	0.0	79.4
1	0054	55	0.	0.	0.0	77.6	*	1	0824	505	0.	0.	0.0	79.4
1	0055	56	0.	0.	0.0	77.7	*	1	0825	506	0.	0.	0.0	79.4
1	0056	57	0.	0.	0.0	77.8	*	1	0826	507	0.	0.	0.0	79.4
1	0057	58	0.	0.	0.0	77.9	*	1	0827	508	0.	0.	0.0	79.4
1	0058	59	0.	0.	0.0	77.9	*	1	0828	509	0.	0.	0.0	79.4
1	0059	60	0.	0.	0.0	78.0	*	1	0829	510	0.	0.	0.0	79.4
1	0100	61	0.	0.	0.0	78.1	*	1	0830	511	0.	0.	0.0	79.4
1	0101	62	0.	0.	0.0	78.2	*	1	0831	512	0.	0.	0.0	79.4
1	0102	63	0.	0.	0.0	78.2	*	1	0832	513	0.	0.	0.0	79.3
1	0103	64	0.	0.	0.0	78.3	*	1	0833	514	0.	0.	0.0	79.3
1	0104	65	0.	0.	0.0	78.4	*	1	0834	515	0.	0.	0.0	79.3
1	0105	66	0.	0.	0.0	78.5	*	1	0835	516	0.	0.	0.0	79.3
1	0106	67	0.	0.	0.0	78.6	*	1	0836	517	0.	0.	0.0	79.3
1	0107	68	0.	0.	0.0	78.6	*	1	0837	518	0.	0.	0.0	79.3
1	0108	69	0.	0.	0.0	78.7	*	1	0838	519	0.	0.	0.0	79.3
1	0109	70	0.	0.	0.0	78.8	*	1	0839	520	0.	0.	0.0	79.3
1	0110	71	0.	0.	0.0	78.9	*	1	0840	521	0.	0.	0.0	79.3
1	0111	72	0.	0.	0.0	78.9	*	1	0841	522	0.	0.	0.0	79.3
1	0112	73	0.	0.	0.0	79.0	*	1	0842	523	0.	0.	0.0	79.3
1	0113	74	0.	0.	0.0	79.1	*	1	0843	524	0.	0.	0.0	79.3
1	0114	75	0.	0.	0.0	79.1	*	1	0844	525	0.	0.	0.0	79.3

1	0115	76	0.	0.	0.0	79.1	*	1	0845	526	0.	0.	0.0	79.3
1	0116	77	0.	0.	0.0	79.1	*	1	0846	527	0.	0.	0.0	79.3
1	0117	78	0.	0.	0.0	79.1	*	1	0847	528	0.	0.	0.0	79.3
1	0118	79	0.	0.	0.0	79.2	*	1	0848	529	0.	0.	0.0	79.3
1	0119	80	0.	0.	0.0	79.2	*	1	0849	530	0.	0.	0.0	79.3
1	0120	81	0.	0.	0.0	79.2	*	1	0850	531	0.	0.	0.0	79.3
1	0121	82	0.	0.	0.0	79.2	*	1	0851	532	0.	0.	0.0	79.3
1	0122	83	0.	0.	0.0	79.2	*	1	0852	533	0.	0.	0.0	79.3
1	0123	84	0.	0.	0.0	79.2	*	1	0853	534	0.	0.	0.0	79.3
1	0124	85	0.	0.	0.0	79.2	*	1	0854	535	0.	0.	0.0	79.3
1	0125	86	0.	0.	0.0	79.2	*	1	0855	536	0.	0.	0.0	79.2
1	0126	87	0.	0.	0.0	79.2	*	1	0856	537	0.	0.	0.0	79.2
1	0127	88	0.	0.	0.0	79.3	*	1	0857	538	0.	0.	0.0	79.2
1	0128	89	0.	0.	0.0	79.3	*	1	0858	539	0.	0.	0.0	79.2
1	0129	90	0.	0.	0.0	79.3	*	1	0859	540	0.	0.	0.0	79.2
1	0130	91	0.	0.	0.0	79.3	*	1	0900	541	0.	0.	0.0	79.2
1	0131	92	0.	0.	0.0	79.3	*	1	0901	542	0.	0.	0.0	79.2
1	0132	93	0.	0.	0.0	79.3	*	1	0902	543	0.	0.	0.0	79.2
1	0133	94	0.	0.	0.0	79.3	*	1	0903	544	0.	0.	0.0	79.2
1	0134	95	0.	0.	0.0	79.3	*	1	0904	545	0.	0.	0.0	79.2
1	0135	96	0.	0.	0.0	79.3	*	1	0905	546	0.	0.	0.0	79.2
1	0136	97	0.	0.	0.0	79.3	*	1	0906	547	0.	0.	0.0	79.2
1	0137	98	0.	0.	0.0	79.3	*	1	0907	548	0.	0.	0.0	79.2
1	0138	99	0.	0.	0.0	79.3	*	1	0908	549	0.	0.	0.0	79.2
1	0139	100	0.	0.	0.0	79.4	*	1	0909	550	0.	0.	0.0	79.2
1	0140	101	0.	0.	0.0	79.4	*	1	0910	551	0.	0.	0.0	79.2
1	0141	102	0.	0.	0.0	79.4	*	1	0911	552	0.	0.	0.0	79.2
1	0142	103	0.	0.	0.0	79.4	*	1	0912	553	0.	0.	0.0	79.1
1	0143	104	0.	0.	0.0	79.4	*	1	0913	554	0.	0.	0.0	79.1
1	0144	105	0.	0.	0.0	79.4	*	1	0914	555	0.	0.	0.0	79.1
1	0145	106	0.	0.	0.0	79.4	*	1	0915	556	0.	0.	0.0	79.1
1	0146	107	0.	0.	0.0	79.4	*	1	0916	557	0.	0.	0.0	79.1
1	0147	108	0.	0.	0.0	79.4	*	1	0917	558	0.	0.	0.0	79.1
1	0148	109	0.	0.	0.0	79.4	*	1	0918	559	0.	0.	0.0	79.1
1	0149	110	0.	0.	0.0	79.4	*	1	0919	560	0.	0.	0.0	79.1
1	0150	111	0.	0.	0.0	79.4	*	1	0920	561	0.	0.	0.0	79.1
1	0151	112	0.	0.	0.0	79.4	*	1	0921	562	0.	0.	0.0	79.1
1	0152	113	0.	0.	0.0	79.4	*	1	0922	563	0.	0.	0.0	79.0
1	0153	114	0.	0.	0.0	79.4	*	1	0923	564	0.	0.	0.0	79.0
1	0154	115	0.	0.	0.0	79.4	*	1	0924	565	0.	0.	0.0	79.0
1	0155	116	0.	0.	0.0	79.5	*	1	0925	566	0.	0.	0.0	79.0
1	0156	117	0.	0.	0.0	79.5	*	1	0926	567	0.	0.	0.0	78.9
1	0157	118	0.	0.	0.0	79.5	*	1	0927	568	0.	0.	0.0	78.9
1	0158	119	0.	0.	0.0	79.5	*	1	0928	569	0.	0.	0.0	78.8
1	0159	120	0.	0.	0.0	79.5	*	1	0929	570	0.	0.	0.0	78.8
1	0200	121	0.	0.	0.0	79.5	*	1	0930	571	0.	0.	0.0	78.8
1	0201	122	0.	0.	0.0	79.5	*	1	0931	572	0.	0.	0.0	78.7
1	0202	123	0.	0.	0.0	79.5	*	1	0932	573	0.	0.	0.0	78.7
1	0203	124	0.	0.	0.0	79.5	*	1	0933	574	0.	0.	0.0	78.6
1	0204	125	0.	0.	0.0	79.5	*	1	0934	575	0.	0.	0.0	78.6
1	0205	126	0.	0.	0.0	79.5	*	1	0935	576	0.	0.	0.0	78.6
1	0206	127	0.	0.	0.0	79.5	*	1	0936	577	0.	0.	0.0	78.5
1	0207	128	0.	0.	0.0	79.5	*	1	0937	578	0.	0.	0.0	78.5
1	0208	129	0.	0.	0.0	79.5	*	1	0938	579	0.	0.	0.0	78.5
1	0209	130	0.	0.	0.0	79.5	*	1	0939	580	0.	0.	0.0	78.4
1	0210	131	0.	0.	0.0	79.5	*	1	0940	581	0.	0.	0.0	78.4
1	0211	132	0.	0.	0.0	79.5	*	1	0941	582	0.	0.	0.0	78.3
1	0212	133	0.	0.	0.0	79.5	*	1	0942	583	0.	0.	0.0	78.3
1	0213	134	0.	0.	0.0	79.5	*	1	0943	584	0.	0.	0.0	78.3
1	0214	135	0.	0.	0.0	79.5	*	1	0944	585	0.	0.	0.0	78.2

1	0215	136	0.	0.	0.0	79.6	*	1	0945	586	0.	0.	0.0	78.2
1	0216	137	0.	0.	0.0	79.6	*	1	0946	587	0.	0.	0.0	78.2
1	0217	138	0.	0.	0.0	79.6	*	1	0947	588	0.	0.	0.0	78.1
1	0218	139	0.	0.	0.0	79.6	*	1	0948	589	0.	0.	0.0	78.1
1	0219	140	0.	0.	0.0	79.6	*	1	0949	590	0.	0.	0.0	78.1
1	0220	141	0.	0.	0.0	79.6	*	1	0950	591	0.	0.	0.0	78.0
1	0221	142	0.	0.	0.0	79.6	*	1	0951	592	0.	0.	0.0	78.0
1	0222	143	0.	0.	0.0	79.6	*	1	0952	593	0.	0.	0.0	78.0
1	0223	144	0.	0.	0.0	79.6	*	1	0953	594	0.	0.	0.0	77.9
1	0224	145	0.	0.	0.0	79.6	*	1	0954	595	0.	0.	0.0	77.9
1	0225	146	0.	0.	0.0	79.6	*	1	0955	596	0.	0.	0.0	77.9
1	0226	147	0.	0.	0.0	79.6	*	1	0956	597	0.	0.	0.0	77.8
1	0227	148	0.	0.	0.0	79.6	*	1	0957	598	0.	0.	0.0	77.8
1	0228	149	0.	0.	0.0	79.6	*	1	0958	599	0.	0.	0.0	77.8
1	0229	150	0.	0.	0.0	79.6	*	1	0959	600	0.	0.	0.0	77.7
1	0230	151	0.	0.	0.0	79.6	*	1	1000	601	0.	0.	0.0	77.7
1	0231	152	0.	0.	0.0	79.6	*	1	1001	602	0.	0.	0.0	77.7
1	0232	153	0.	0.	0.0	79.6	*	1	1002	603	0.	0.	0.0	77.6
1	0233	154	0.	0.	0.0	79.6	*	1	1003	604	0.	0.	0.0	77.6
1	0234	155	0.	0.	0.0	79.7	*	1	1004	605	0.	0.	0.0	77.6
1	0235	156	0.	0.	0.0	79.7	*	1	1005	606	0.	0.	0.0	77.5
1	0236	157	0.	0.	0.0	79.7	*	1	1006	607	0.	0.	0.0	77.5
1	0237	158	0.	0.	0.0	79.7	*	1	1007	608	0.	0.	0.0	77.5
1	0238	159	0.	0.	0.0	79.7	*	1	1008	609	0.	0.	0.0	77.4
1	0239	160	0.	0.	0.0	79.7	*	1	1009	610	0.	0.	0.0	77.4
1	0240	161	0.	0.	0.0	79.7	*	1	1010	611	0.	0.	0.0	77.4
1	0241	162	0.	0.	0.0	79.7	*	1	1011	612	0.	0.	0.0	77.3
1	0242	163	0.	0.	0.0	79.7	*	1	1012	613	0.	0.	0.0	77.3
1	0243	164	0.	0.	0.0	79.7	*	1	1013	614	0.	0.	0.0	77.3
1	0244	165	0.	0.	0.0	79.7	*	1	1014	615	0.	0.	0.0	77.3
1	0245	166	0.	0.	0.0	79.7	*	1	1015	616	0.	0.	0.0	77.2
1	0246	167	0.	0.	0.0	79.7	*	1	1016	617	0.	0.	0.0	77.2
1	0247	168	0.	0.	0.0	79.7	*	1	1017	618	0.	0.	0.0	77.2
1	0248	169	0.	0.	0.0	79.7	*	1	1018	619	0.	0.	0.0	77.1
1	0249	170	0.	0.	0.0	79.8	*	1	1019	620	0.	0.	0.0	77.1
1	0250	171	0.	0.	0.0	79.8	*	1	1020	621	0.	0.	0.0	77.1
1	0251	172	0.	0.	0.0	79.8	*	1	1021	622	0.	0.	0.0	77.0
1	0252	173	0.	0.	0.0	79.8	*	1	1022	623	0.	0.	0.0	77.0
1	0253	174	0.	0.	0.0	79.8	*	1	1023	624	0.	0.	0.0	77.0
1	0254	175	0.	0.	0.0	79.8	*	1	1024	625	0.	0.	0.0	77.0
1	0255	176	0.	0.	0.0	79.8	*	1	1025	626	0.	0.	0.0	76.9
1	0256	177	0.	0.	0.0	79.8	*	1	1026	627	0.	0.	0.0	76.9
1	0257	178	0.	0.	0.0	79.8	*	1	1027	628	0.	0.	0.0	76.9
1	0258	179	0.	0.	0.0	79.8	*	1	1028	629	0.	0.	0.0	76.8
1	0259	180	0.	0.	0.0	79.8	*	1	1029	630	0.	0.	0.0	76.8
1	0300	181	0.	0.	0.0	79.8	*	1	1030	631	0.	0.	0.0	76.8
1	0301	182	0.	0.	0.0	79.9	*	1	1031	632	0.	0.	0.0	76.8
1	0302	183	0.	0.	0.0	79.9	*	1	1032	633	0.	0.	0.0	76.7
1	0303	184	0.	0.	0.0	79.9	*	1	1033	634	0.	0.	0.0	76.7
1	0304	185	0.	0.	0.0	79.9	*	1	1034	635	0.	0.	0.0	76.7
1	0305	186	0.	0.	0.0	79.9	*	1	1035	636	0.	0.	0.0	76.6
1	0306	187	0.	0.	0.0	79.9	*	1	1036	637	0.	0.	0.0	76.6
1	0307	188	0.	0.	0.0	79.9	*	1	1037	638	0.	0.	0.0	76.6
1	0308	189	0.	0.	0.0	79.9	*	1	1038	639	0.	0.	0.0	76.6
1	0309	190	0.	0.	0.0	79.9	*	1	1039	640	0.	0.	0.0	76.5
1	0310	191	0.	0.	0.0	79.9	*	1	1040	641	0.	0.	0.0	76.5
1	0311	192	0.	0.	0.0	80.0	*	1	1041	642	0.	0.	0.0	76.5
1	0312	193	0.	0.	0.0	80.0	*	1	1042	643	0.	0.	0.0	76.5
1	0313	194	0.	0.	0.0	80.0	*	1	1043	644	0.	0.	0.0	76.4
1	0314	195	0.	0.	0.0	80.0	*	1	1044	645	0.	0.	0.0	76.4

1	0315	196	0.	0.	0.0	80.0	*	1	1045	646	0.	0.	0.0	76.4
1	0316	197	3.	0.	0.0	79.7	*	1	1046	647	0.	0.	0.0	76.4
1	0317	198	3.	0.	0.0	76.7	*	1	1047	648	0.	0.	0.0	76.3
1	0318	199	0.	0.	0.0	75.5	*	1	1048	649	0.	0.	0.0	76.3
1	0319	200	0.	0.	0.0	75.7	*	1	1049	650	0.	0.	0.0	76.3
1	0320	201	0.	0.	0.0	76.0	*	1	1050	651	0.	0.	0.0	76.3
1	0321	202	0.	0.	0.0	76.2	*	1	1051	652	0.	0.	0.0	76.2
1	0322	203	0.	0.	0.0	76.5	*	1	1052	653	0.	0.	0.0	76.2
1	0323	204	0.	0.	0.0	76.7	*	1	1053	654	0.	0.	0.0	76.2
1	0324	205	0.	0.	0.0	77.0	*	1	1054	655	0.	0.	0.0	76.2
1	0325	206	0.	0.	0.0	77.3	*	1	1055	656	0.	0.	0.0	76.1
1	0326	207	0.	0.	0.0	77.6	*	1	1056	657	0.	0.	0.0	76.1
1	0327	208	0.	0.	0.0	78.0	*	1	1057	658	0.	0.	0.0	76.1
1	0328	209	0.	0.	0.0	78.4	*	1	1058	659	0.	0.	0.0	76.1
1	0329	210	0.	0.	0.0	78.8	*	1	1059	660	0.	0.	0.0	76.0
1	0330	211	0.	0.	0.0	79.2	*	1	1100	661	0.	0.	0.0	76.0
1	0331	212	0.	0.	0.0	79.3	*	1	1101	662	0.	0.	0.0	76.0
1	0332	213	0.	0.	0.0	79.3	*	1	1102	663	0.	0.	0.0	76.0
1	0333	214	0.	0.	0.0	79.4	*	1	1103	664	0.	0.	0.0	75.9
1	0334	215	0.	0.	0.0	79.4	*	1	1104	665	0.	0.	0.0	75.9
1	0335	216	0.	0.	0.0	79.5	*	1	1105	666	0.	0.	0.0	75.9
1	0336	217	0.	0.	0.0	79.5	*	1	1106	667	0.	0.	0.0	75.9
1	0337	218	0.	0.	0.0	79.5	*	1	1107	668	0.	0.	0.0	75.8
1	0338	219	0.	0.	0.0	79.6	*	1	1108	669	0.	0.	0.0	75.8
1	0339	220	0.	0.	0.0	79.6	*	1	1109	670	0.	0.	0.0	75.8
1	0340	221	0.	0.	0.0	79.7	*	1	1110	671	0.	0.	0.0	75.8
1	0341	222	0.	0.	0.0	79.7	*	1	1111	672	0.	0.	0.0	75.8
1	0342	223	0.	0.	0.0	79.8	*	1	1112	673	0.	0.	0.0	75.7
1	0343	224	0.	0.	0.0	79.9	*	1	1113	674	0.	0.	0.0	75.7
1	0344	225	0.	0.	0.0	79.9	*	1	1114	675	0.	0.	0.0	75.7
1	0345	226	0.	0.	0.0	80.0	*	1	1115	676	0.	0.	0.0	75.7
1	0346	227	3.	0.	0.0	79.7	*	1	1116	677	0.	0.	0.0	75.6
1	0347	228	3.	0.	0.0	79.4	*	1	1117	678	0.	0.	0.0	75.6
1	0348	229	3.	0.	0.0	75.5	*	1	1118	679	0.	0.	0.0	75.6
1	0349	230	0.	0.	0.0	75.5	*	1	1119	680	0.	0.	0.0	75.6
1	0350	231	0.	0.	0.0	77.5	*	1	1120	681	0.	0.	0.0	75.6
1	0351	232	0.	0.	0.0	79.0	*	1	1121	682	0.	0.	0.0	75.5
1	0352	233	0.	0.	0.0	79.6	*	1	1122	683	0.	0.	0.0	75.5
1	0353	234	0.	0.	0.0	79.8	*	1	1123	684	0.	0.	0.0	75.5
1	0354	235	0.	0.	0.0	80.1	*	1	1124	685	0.	0.	0.0	75.5
1	0355	236	3.	0.	0.0	80.1	*	1	1125	686	0.	0.	0.0	75.5
1	0356	237	3.	0.	0.0	80.1	*	1	1126	687	0.	0.	0.0	75.5
1	0357	238	3.	0.	0.0	80.2	*	1	1127	688	0.	0.	0.0	75.5
1	0358	239	3.	0.	0.0	80.3	*	1	1128	689	0.	0.	0.0	75.5
1	0359	240	3.	0.	0.0	80.5	*	1	1129	690	0.	0.	0.0	75.5
1	0400	241	3.	0.	0.0	80.7	*	1	1130	691	0.	0.	0.0	75.5
1	0401	242	3.	0.	0.0	81.0	*	1	1131	692	0.	0.	0.0	75.5
1	0402	243	3.	0.	0.0	81.2	*	1	1132	693	0.	0.	0.0	75.5
1	0403	244	5.	0.	0.0	81.4	*	1	1133	694	0.	0.	0.0	75.5
1	0404	245	5.	0.	0.0	81.5	*	1	1134	695	0.	0.	0.0	75.5
1	0405	246	5.	0.	0.0	81.7	*	1	1135	696	0.	0.	0.0	75.5
1	0406	247	5.	0.	0.0	81.9	*	1	1136	697	0.	0.	0.0	75.5
1	0407	248	5.	0.	0.0	82.1	*	1	1137	698	0.	0.	0.0	75.5
1	0408	249	5.	0.	0.0	82.3	*	1	1138	699	0.	0.	0.0	75.5
1	0409	250	5.	0.	0.0	82.6	*	1	1139	700	0.	0.	0.0	75.5
1	0410	251	5.	0.	0.1	82.8	*	1	1140	701	0.	0.	0.0	75.5
1	0411	252	5.	0.	0.1	83.1	*	1	1141	702	0.	0.	0.0	75.5
1	0412	253	5.	0.	0.1	83.3	*	1	1142	703	0.	0.	0.0	75.5
1	0413	254	5.	0.	0.1	83.5	*	1	1143	704	0.	0.	0.0	75.5
1	0414	255	5.	0.	0.1	83.8	*	1	1144	705	0.	0.	0.0	75.5

1	0415	256	5.	0.	0.1	84.0	*	1	1145	706	0.	0.	0.0	75.5
1	0416	257	5.	0.	0.1	84.2	*	1	1146	707	0.	0.	0.0	75.5
1	0417	258	5.	0.	0.1	84.4	*	1	1147	708	0.	0.	0.0	75.5
1	0418	259	5.	0.	0.1	84.6	*	1	1148	709	0.	0.	0.0	75.5
1	0419	260	5.	0.	0.1	84.8	*	1	1149	710	0.	0.	0.0	75.5
1	0420	261	5.	0.	0.1	85.0	*	1	1150	711	0.	0.	0.0	75.5
1	0421	262	5.	0.	0.1	85.2	*	1	1151	712	0.	0.	0.0	75.5
1	0422	263	5.	0.	0.1	85.3	*	1	1152	713	0.	0.	0.0	75.5
1	0423	264	5.	0.	0.1	85.4	*	1	1153	714	0.	0.	0.0	75.5
1	0424	265	5.	0.	0.1	85.4	*	1	1154	715	0.	0.	0.0	75.5
1	0425	266	5.	0.	0.1	85.5	*	1	1155	716	0.	0.	0.0	75.5
1	0426	267	5.	0.	0.1	85.5	*	1	1156	717	0.	0.	0.0	75.5
1	0427	268	5.	0.	0.1	85.4	*	1	1157	718	0.	0.	0.0	75.5
1	0428	269	5.	0.	0.1	85.3	*	1	1158	719	0.	0.	0.0	75.5
1	0429	270	5.	0.	0.1	85.2	*	1	1159	720	0.	0.	0.0	75.5
1	0430	271	5.	0.	0.1	85.0	*	1	1200	721	0.	0.	0.0	75.5
1	0431	272	5.	0.	0.1	84.9	*	1	1201	722	0.	0.	0.0	75.5
1	0432	273	5.	0.	0.1	84.6	*	1	1202	723	0.	0.	0.0	75.5
1	0433	274	5.	0.	0.1	84.4	*	1	1203	724	0.	0.	0.0	75.5
1	0434	275	5.	0.	0.1	84.3	*	1	1204	725	0.	0.	0.0	75.5
1	0435	276	5.	0.	0.1	84.1	*	1	1205	726	0.	0.	0.0	75.5
1	0436	277	5.	0.	0.1	83.9	*	1	1206	727	0.	0.	0.0	75.5
1	0437	278	5.	0.	0.1	83.7	*	1	1207	728	0.	0.	0.0	75.5
1	0438	279	5.	0.	0.1	83.5	*	1	1208	729	0.	0.	0.0	75.5
1	0439	280	5.	0.	0.1	83.3	*	1	1209	730	0.	0.	0.0	75.5
1	0440	281	5.	0.	0.1	83.1	*	1	1210	731	0.	0.	0.0	75.5
1	0441	282	5.	0.	0.1	82.9	*	1	1211	732	0.	0.	0.0	75.5
1	0442	283	5.	0.	0.1	82.7	*	1	1212	733	0.	0.	0.0	75.5
1	0443	284	5.	0.	0.0	82.5	*	1	1213	734	0.	0.	0.0	75.5
1	0444	285	5.	0.	0.0	82.2	*	1	1214	735	0.	0.	0.0	75.5
1	0445	286	5.	0.	0.0	82.0	*	1	1215	736	0.	0.	0.0	75.5
1	0446	287	5.	0.	0.0	81.8	*	1	1216	737	0.	0.	0.0	75.5
1	0447	288	5.	0.	0.0	81.5	*	1	1217	738	0.	0.	0.0	75.5
1	0448	289	5.	0.	0.0	81.3	*	1	1218	739	0.	0.	0.0	75.5
1	0449	290	5.	0.	0.0	81.0	*	1	1219	740	0.	0.	0.0	75.5
1	0450	291	5.	0.	0.0	80.7	*	1	1220	741	0.	0.	0.0	75.5
1	0451	292	5.	0.	0.0	80.4	*	1	1221	742	0.	0.	0.0	75.5
1	0452	293	5.	0.	0.0	79.9	*	1	1222	743	0.	0.	0.0	75.5
1	0453	294	5.	0.	0.0	77.7	*	1	1223	744	0.	0.	0.0	75.5
1	0454	295	0.	0.	0.0	75.5	*	1	1224	745	0.	0.	0.0	75.5
1	0455	296	0.	0.	0.0	77.7	*	1	1225	746	0.	0.	0.0	75.5
1	0456	297	0.	0.	0.0	78.9	*	1	1226	747	0.	0.	0.0	75.5
1	0457	298	0.	0.	0.0	79.5	*	1	1227	748	0.	0.	0.0	75.5
1	0458	299	0.	0.	0.0	79.7	*	1	1228	749	0.	0.	0.0	75.5
1	0459	300	0.	0.	0.0	79.8	*	1	1229	750	0.	0.	0.0	75.5
1	0500	301	0.	0.	0.0	79.9	*	1	1230	751	0.	0.	0.0	75.5
1	0501	302	0.	0.	0.0	80.0	*	1	1231	752	0.	0.	0.0	75.5
1	0502	303	0.	0.	0.0	80.1	*	1	1232	753	0.	0.	0.0	75.5
1	0503	304	3.	0.	0.0	79.9	*	1	1233	754	0.	0.	0.0	75.5
1	0504	305	3.	0.	0.0	79.6	*	1	1234	755	0.	0.	0.0	75.5
1	0505	306	3.	0.	0.0	76.8	*	1	1235	756	0.	0.	0.0	75.5
1	0506	307	0.	0.	0.0	75.5	*	1	1236	757	0.	0.	0.0	75.5
1	0507	308	0.	0.	0.0	76.7	*	1	1237	758	0.	0.	0.0	75.5
1	0508	309	0.	0.	0.0	77.9	*	1	1238	759	0.	0.	0.0	75.5
1	0509	310	0.	0.	0.0	79.0	*	1	1239	760	0.	0.	0.0	75.5
1	0510	311	0.	0.	0.0	79.5	*	1	1240	761	0.	0.	0.0	75.5
1	0511	312	0.	0.	0.0	79.6	*	1	1241	762	0.	0.	0.0	75.5
1	0512	313	0.	0.	0.0	79.6	*	1	1242	763	0.	0.	0.0	75.5
1	0513	314	0.	0.	0.0	79.7	*	1	1243	764	0.	0.	0.0	75.5
1	0514	315	0.	0.	0.0	79.8	*	1	1244	765	0.	0.	0.0	75.5

1	0515	316	0.	0.	0.0	79.8	*	1	1245	766	0.	0.	0.0	75.5
1	0516	317	0.	0.	0.0	79.9	*	1	1246	767	0.	0.	0.0	75.5
1	0517	318	0.	0.	0.0	79.9	*	1	1247	768	0.	0.	0.0	75.5
1	0518	319	0.	0.	0.0	80.0	*	1	1248	769	0.	0.	0.0	75.5
1	0519	320	0.	0.	0.0	80.0	*	1	1249	770	0.	0.	0.0	75.5
1	0520	321	0.	0.	0.0	80.0	*	1	1250	771	0.	0.	0.0	75.5
1	0521	322	3.	0.	0.0	79.7	*	1	1251	772	0.	0.	0.0	75.5
1	0522	323	3.	0.	0.0	78.2	*	1	1252	773	0.	0.	0.0	75.5
1	0523	324	3.	0.	0.0	75.5	*	1	1253	774	0.	0.	0.0	75.5
1	0524	325	0.	0.	0.0	75.5	*	1	1254	775	0.	0.	0.0	75.5
1	0525	326	0.	0.	0.0	76.0	*	1	1255	776	0.	0.	0.0	75.5
1	0526	327	0.	0.	0.0	76.5	*	1	1256	777	0.	0.	0.0	75.5
1	0527	328	0.	0.	0.0	77.0	*	1	1257	778	0.	0.	0.0	75.5
1	0528	329	0.	0.	0.0	77.5	*	1	1258	779	0.	0.	0.0	75.5
1	0529	330	0.	0.	0.0	77.9	*	1	1259	780	0.	0.	0.0	75.5
1	0530	331	0.	0.	0.0	78.3	*	1	1300	781	0.	0.	0.0	75.5
1	0531	332	0.	0.	0.0	78.7	*	1	1301	782	0.	0.	0.0	75.5
1	0532	333	0.	0.	0.0	79.1	*	1	1302	783	0.	0.	0.0	75.5
1	0533	334	0.	0.	0.0	79.2	*	1	1303	784	0.	0.	0.0	75.5
1	0534	335	0.	0.	0.0	79.2	*	1	1304	785	0.	0.	0.0	75.5
1	0535	336	0.	0.	0.0	79.3	*	1	1305	786	0.	0.	0.0	75.5
1	0536	337	0.	0.	0.0	79.3	*	1	1306	787	0.	0.	0.0	75.5
1	0537	338	0.	0.	0.0	79.3	*	1	1307	788	0.	0.	0.0	75.5
1	0538	339	0.	0.	0.0	79.4	*	1	1308	789	0.	0.	0.0	75.5
1	0539	340	0.	0.	0.0	79.4	*	1	1309	790	0.	0.	0.0	75.5
1	0540	341	0.	0.	0.0	79.4	*	1	1310	791	0.	0.	0.0	75.5
1	0541	342	0.	0.	0.0	79.4	*	1	1311	792	0.	0.	0.0	75.5
1	0542	343	0.	0.	0.0	79.4	*	1	1312	793	0.	0.	0.0	75.5
1	0543	344	0.	0.	0.0	79.4	*	1	1313	794	0.	0.	0.0	75.5
1	0544	345	0.	0.	0.0	79.5	*	1	1314	795	0.	0.	0.0	75.5
1	0545	346	0.	0.	0.0	79.5	*	1	1315	796	0.	0.	0.0	75.5
1	0546	347	0.	0.	0.0	79.5	*	1	1316	797	0.	0.	0.0	75.5
1	0547	348	0.	0.	0.0	79.5	*	1	1317	798	0.	0.	0.0	75.5
1	0548	349	0.	0.	0.0	79.5	*	1	1318	799	0.	0.	0.0	75.5
1	0549	350	0.	0.	0.0	79.5	*	1	1319	800	0.	0.	0.0	75.5
1	0550	351	0.	0.	0.0	79.5	*	1	1320	801	0.	0.	0.0	75.5
1	0551	352	0.	0.	0.0	79.5	*	1	1321	802	0.	0.	0.0	75.5
1	0552	353	0.	0.	0.0	79.5	*	1	1322	803	0.	0.	0.0	75.5
1	0553	354	0.	0.	0.0	79.5	*	1	1323	804	0.	0.	0.0	75.5
1	0554	355	0.	0.	0.0	79.5	*	1	1324	805	0.	0.	0.0	75.5
1	0555	356	0.	0.	0.0	79.5	*	1	1325	806	0.	0.	0.0	75.5
1	0556	357	0.	0.	0.0	79.5	*	1	1326	807	0.	0.	0.0	75.5
1	0557	358	0.	0.	0.0	79.5	*	1	1327	808	0.	0.	0.0	75.5
1	0558	359	0.	0.	0.0	79.6	*	1	1328	809	0.	0.	0.0	75.5
1	0559	360	0.	0.	0.0	79.6	*	1	1329	810	0.	0.	0.0	75.5
1	0600	361	0.	0.	0.0	79.6	*	1	1330	811	0.	0.	0.0	75.5
1	0601	362	0.	0.	0.0	79.6	*	1	1331	812	0.	0.	0.0	75.5
1	0602	363	0.	0.	0.0	79.6	*	1	1332	813	0.	0.	0.0	75.5
1	0603	364	0.	0.	0.0	79.6	*	1	1333	814	0.	0.	0.0	75.5
1	0604	365	0.	0.	0.0	79.6	*	1	1334	815	0.	0.	0.0	75.5
1	0605	366	0.	0.	0.0	79.6	*	1	1335	816	0.	0.	0.0	75.5
1	0606	367	0.	0.	0.0	79.6	*	1	1336	817	0.	0.	0.0	75.5
1	0607	368	0.	0.	0.0	79.6	*	1	1337	818	0.	0.	0.0	75.5
1	0608	369	0.	0.	0.0	79.6	*	1	1338	819	0.	0.	0.0	75.5
1	0609	370	0.	0.	0.0	79.6	*	1	1339	820	0.	0.	0.0	75.5
1	0610	371	0.	0.	0.0	79.6	*	1	1340	821	0.	0.	0.0	75.5
1	0611	372	0.	0.	0.0	79.6	*	1	1341	822	0.	0.	0.0	75.5
1	0612	373	0.	0.	0.0	79.6	*	1	1342	823	0.	0.	0.0	75.5
1	0613	374	0.	0.	0.0	79.6	*	1	1343	824	0.	0.	0.0	75.5
1	0614	375	0.	0.	0.0	79.6	*	1	1344	825	0.	0.	0.0	75.5

1	0615	376	0.	0.	0.0	79.6	*	1	1345	826	0.	0.	0.0	75.5
1	0616	377	0.	0.	0.0	79.6	*	1	1346	827	0.	0.	0.0	75.5
1	0617	378	0.	0.	0.0	79.6	*	1	1347	828	0.	0.	0.0	75.5
1	0618	379	0.	0.	0.0	79.7	*	1	1348	829	0.	0.	0.0	75.5
1	0619	380	0.	0.	0.0	79.7	*	1	1349	830	0.	0.	0.0	75.5
1	0620	381	0.	0.	0.0	79.7	*	1	1350	831	0.	0.	0.0	75.5
1	0621	382	0.	0.	0.0	79.7	*	1	1351	832	0.	0.	0.0	75.5
1	0622	383	0.	0.	0.0	79.7	*	1	1352	833	0.	0.	0.0	75.5
1	0623	384	0.	0.	0.0	79.7	*	1	1353	834	0.	0.	0.0	75.5
1	0624	385	0.	0.	0.0	79.7	*	1	1354	835	0.	0.	0.0	75.5
1	0625	386	0.	0.	0.0	79.7	*	1	1355	836	0.	0.	0.0	75.5
1	0626	387	0.	0.	0.0	79.7	*	1	1356	837	0.	0.	0.0	75.5
1	0627	388	0.	0.	0.0	79.7	*	1	1357	838	0.	0.	0.0	75.5
1	0628	389	0.	0.	0.0	79.7	*	1	1358	839	0.	0.	0.0	75.5
1	0629	390	0.	0.	0.0	79.7	*	1	1359	840	0.	0.	0.0	75.5
1	0630	391	0.	0.	0.0	79.7	*	1	1400	841	0.	0.	0.0	75.5
1	0631	392	0.	0.	0.0	79.7	*	1	1401	842	0.	0.	0.0	75.5
1	0632	393	0.	0.	0.0	79.7	*	1	1402	843	0.	0.	0.0	75.5
1	0633	394	0.	0.	0.0	79.7	*	1	1403	844	0.	0.	0.0	75.5
1	0634	395	0.	0.	0.0	79.7	*	1	1404	845	0.	0.	0.0	75.5
1	0635	396	0.	0.	0.0	79.7	*	1	1405	846	0.	0.	0.0	75.5
1	0636	397	0.	0.	0.0	79.7	*	1	1406	847	0.	0.	0.0	75.5
1	0637	398	0.	0.	0.0	79.7	*	1	1407	848	0.	0.	0.0	75.5
1	0638	399	0.	0.	0.0	79.7	*	1	1408	849	0.	0.	0.0	75.5
1	0639	400	0.	0.	0.0	79.7	*	1	1409	850	0.	0.	0.0	75.5
1	0640	401	0.	0.	0.0	79.7	*	1	1410	851	0.	0.	0.0	75.5
1	0641	402	0.	0.	0.0	79.7	*	1	1411	852	0.	0.	0.0	75.5
1	0642	403	0.	0.	0.0	79.7	*	1	1412	853	0.	0.	0.0	75.5
1	0643	404	0.	0.	0.0	79.7	*	1	1413	854	0.	0.	0.0	75.5
1	0644	405	0.	0.	0.0	79.7	*	1	1414	855	0.	0.	0.0	75.5
1	0645	406	0.	0.	0.0	79.6	*	1	1415	856	0.	0.	0.0	75.5
1	0646	407	0.	0.	0.0	79.6	*	1	1416	857	0.	0.	0.0	75.5
1	0647	408	0.	0.	0.0	79.6	*	1	1417	858	0.	0.	0.0	75.5
1	0648	409	0.	0.	0.0	79.6	*	1	1418	859	0.	0.	0.0	75.5
1	0649	410	0.	0.	0.0	79.6	*	1	1419	860	0.	0.	0.0	75.5
1	0650	411	0.	0.	0.0	79.6	*	1	1420	861	0.	0.	0.0	75.5
1	0651	412	0.	0.	0.0	79.6	*	1	1421	862	0.	0.	0.0	75.5
1	0652	413	0.	0.	0.0	79.6	*	1	1422	863	0.	0.	0.0	75.5
1	0653	414	0.	0.	0.0	79.6	*	1	1423	864	0.	0.	0.0	75.5
1	0654	415	0.	0.	0.0	79.6	*	1	1424	865	0.	0.	0.0	75.5
1	0655	416	0.	0.	0.0	79.6	*	1	1425	866	0.	0.	0.0	75.5
1	0656	417	0.	0.	0.0	79.6	*	1	1426	867	0.	0.	0.0	75.5
1	0657	418	0.	0.	0.0	79.6	*	1	1427	868	0.	0.	0.0	75.5
1	0658	419	0.	0.	0.0	79.6	*	1	1428	869	0.	0.	0.0	75.5
1	0659	420	0.	0.	0.0	79.6	*	1	1429	870	0.	0.	0.0	75.5
1	0700	421	0.	0.	0.0	79.6	*	1	1430	871	0.	0.	0.0	75.5
1	0701	422	0.	0.	0.0	79.6	*	1	1431	872	0.	0.	0.0	75.5
1	0702	423	0.	0.	0.0	79.6	*	1	1432	873	0.	0.	0.0	75.5
1	0703	424	0.	0.	0.0	79.6	*	1	1433	874	0.	0.	0.0	75.5
1	0704	425	0.	0.	0.0	79.6	*	1	1434	875	0.	0.	0.0	75.5
1	0705	426	0.	0.	0.0	79.6	*	1	1435	876	0.	0.	0.0	75.5
1	0706	427	0.	0.	0.0	79.6	*	1	1436	877	0.	0.	0.0	75.5
1	0707	428	0.	0.	0.0	79.6	*	1	1437	878	0.	0.	0.0	75.5
1	0708	429	0.	0.	0.0	79.6	*	1	1438	879	0.	0.	0.0	75.5
1	0709	430	0.	0.	0.0	79.6	*	1	1439	880	0.	0.	0.0	75.5
1	0710	431	0.	0.	0.0	79.6	*	1	1440	881	0.	0.	0.0	75.5
1	0711	432	0.	0.	0.0	79.6	*	1	1441	882	0.	0.	0.0	75.5
1	0712	433	0.	0.	0.0	79.6	*	1	1442	883	0.	0.	0.0	75.5
1	0713	434	0.	0.	0.0	79.6	*	1	1443	884	0.	0.	0.0	75.5
1	0714	435	0.	0.	0.0	79.6	*	1	1444	885	0.	0.	0.0	75.5

1	0715	436	0.	0.	0.0	79.6	*	1	1445	886	0.	0.	0.0	75.5
1	0716	437	0.	0.	0.0	79.6	*	1	1446	887	0.	0.	0.0	75.5
1	0717	438	0.	0.	0.0	79.6	*	1	1447	888	0.	0.	0.0	75.5
1	0718	439	0.	0.	0.0	79.6	*	1	1448	889	0.	0.	0.0	75.5
1	0719	440	0.	0.	0.0	79.6	*	1	1449	890	0.	0.	0.0	75.5
1	0720	441	0.	0.	0.0	79.6	*	1	1450	891	0.	0.	0.0	75.5
1	0721	442	0.	0.	0.0	79.6	*	1	1451	892	0.	0.	0.0	75.5
1	0722	443	0.	0.	0.0	79.6	*	1	1452	893	0.	0.	0.0	75.5
1	0723	444	0.	0.	0.0	79.6	*	1	1453	894	0.	0.	0.0	75.5
1	0724	445	0.	0.	0.0	79.6	*	1	1454	895	0.	0.	0.0	75.5
1	0725	446	0.	0.	0.0	79.6	*	1	1455	896	0.	0.	0.0	75.5
1	0726	447	0.	0.	0.0	79.5	*	1	1456	897	0.	0.	0.0	75.5
1	0727	448	0.	0.	0.0	79.5	*	1	1457	898	0.	0.	0.0	75.5
1	0728	449	0.	0.	0.0	79.5	*	1	1458	899	0.	0.	0.0	75.5
1	0729	450	0.	0.	0.0	79.5	*	1	1459	900	0.	0.	0.0	75.5
							*							

****

PEAK OUTFLOW IS 0. AT TIME 4.42 HOURS

***** PUMP FLOW HYDROGRAPH *****

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	14.98-HR
5.	4.05	(CFS)	1.	0.	0.	0.
		(INCHES)	0.805	0.805	0.805	0.805
		(AC-FT)	0.	0.	0.	0.

***** OUTFLOW HYDROGRAPH *****

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	14.98-HR
0.	4.40	(CFS)	0.	0.	0.	0.
		(INCHES)	0.025	0.039	0.039	0.039
		(AC-FT)	0.	0.	0.	0.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	14.98-HR
0.	4.40	0.	0.	0.	0.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	14.98-HR
85.50	4.42	79.91	78.12	78.12	78.12

CUMULATIVE AREA = 0.01 SQ MI

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          **************
          *            *
 38 KK    *      PUMP  *
          *            *
          **************

 40 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                      IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                       IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT       0.017  TIME INTERVAL IN HOURS
```

RUNOFF SUMMARY

FLOW IN CUBIC FEET PER SECOND

TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	STAD	8.	4.15	1.	0.	0.	0.01		
PUMP FLOW TO	PUMP	5.	4.05	1.	0.	0.	0.01		
HYDROGRAPH AT	PS	0.	4.40	0.	0.	0.	0.01	85.50	4.42
HYDROGRAPH AT	PUMP	5.	4.05	1.	0.	0.	0.00		

*** NORMAL END OF HEC-1 ***

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              MAY   1991               *
*           VERSION 4.0.1E              *
*     Lahey F77L-EM/32 version 5.01     *
*       Dodson & Associates, Inc.       *
* RUN DATE  11/21/96  TIME  10:48:04    *
*****************************************
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID        MARYVALE BASEBALL PARK
  2           ID        FLOOD CONTROL FACILITIES
  3           ID        WOOD, PATEL & ASSOCIATES, INC.
  4           ID        ************************************************
  5           ID        MARYVALE BASEBALL PARK
  6           ID        MAIN FIELD PUMP STATION MODEL
  7           ID        100-YEAR 6-HOUR STORM
  8           ID        FILE:  PUMP100.DAT      DATE:  11/21/96
  9           ID        140 LF OF 6' DIAMETER STORAGE PIPE
 10           ID        JOB #: 96398
 11           ID        ***
              *DIAGRAM
 12           IT       1                    900
 13           IO       5       0
 14           IN      15
              *

 15           KK    STAD
 16           KM   RUNOFF FROM BALL FIELD # 1
 17           KM     L =  .095  Kb = .14  Adj. Slope =  10.0
 18           BA   .0096
 19           PB    3.82
 20           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 21           PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 22           PC    .962    .972    .983    .991   1.000
 23           LG    .153    .290   4.430    .304      14
 24           UC     .42     .30
 25           UA       0       5      16      30      65      77      84      90      94      97
 26           UA     100
              *

 27           KK      PS        140 LF OF 6' DIAMETER STORAGE PIPE
 28           KM        PUMP # 1 (SIMPLEX):  1150 GPM AT 29 FT TOTAL HEAD
 29           KM        PUMPS 1 & 2 (DUPLEX):  2200 GPM AT 32 FT TOTAL HEAD
 30           KO       1       2
 31           RS       1    ELEV    75.5       0
 32           SV       0   .0026   .0126   .0291   .0480   .0670   .0835   .0935   .0964  1.0964
 33           SE    75.5    79.5    80.5    81.5    82.5    83.5    84.5    85.5    90.0    91.0
 34           SQ     .01     .02     .03     .04     .05     .06     .07     .08     .09     .10
 35           WP                            PUMP
 36           WP    80.0     2.6    77.0    PUMP
 37           WP    81.0     2.3    77.0    PUMP
              *

 38           KK    PUMP
 39           KM    RETRIEVE PUMPED FLOW
 40           KO                                    21
 41           WR    PUMP
              *
 42           ZZ
```

```
                SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   15        STAD
                V
                V
   35           .------->    PUMP
   27          PS
                .
                .
   41           .           .<-------    PUMP
   38           .        PUMP

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
```

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              MAY   1991               *
*           VERSION 4.0.1E              *
*     Lahey F77L-EM/32 version 5.01     *
*       Dodson & Associates, Inc.       *
*  RUN DATE  11/21/96  TIME  10:48:04   *
*****************************************
```

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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

```
                              MARYVALE BASEBALL PARK
                              FLOOD CONTROL FACILITIES
                              WOOD, PATEL & ASSOCIATES, INC.
                              ************************************************
                              MARYVALE BASEBALL PARK
                              MAIN FIELD PUMP STATION MODEL
                              100-YEAR 6-HOUR STORM
                              FILE:  PUMP100.DAT      DATE:  11/21/96
                              140 LF OF 6' DIAMETER STORAGE PIPE
                              JOB #: 96398
                              ***

 13 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN           1  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1    0  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ         900  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      1    0  ENDING DATE
                     NDTIME        1459  ENDING TIME
                     ICENT           19  CENTURY MARK

                 COMPUTATION INTERVAL    0.02 HOURS
                      TOTAL TIME BASE   14.98 HOURS

         ENGLISH UNITS
              DRAINAGE AREA          SQUARE MILES
              PRECIPITATION DEPTH    INCHES
              LENGTH, ELEVATION      FEET
              FLOW                   CUBIC FEET PER SECOND
              STORAGE VOLUME         ACRE-FEET
              SURFACE AREA           ACRES
              TEMPERATURE            DEGREES FAHRENHEIT


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
 27 KK    *        PS  *            140 LF OF 6' DIAMETER STORAGE PIPE
```

```
*           *
**************

30 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          1  PRINT CONTROL
                    IPLOT          2  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE

             HYDROGRAPH ROUTING DATA

31 RS          STORAGE ROUTING
                    NSTPS          1  NUMBER OF SUBREACHES
                     ITYP       ELEV  TYPE OF INITIAL CONDITION
                   RSVRIC      75.50  INITIAL CONDITION
                        X       0.00 WORKING R AND D COEFFICIENT

32 SV            STORAGE        0.0       0.0       0.0       0.0       0.0       0.1       0.1       0.1       0.1       1.1

33 SE          ELEVATION      75.50     79.50     80.50     81.50     82.50     83.50     84.50     85.50     90.00     91.00

34 SQ          DISCHARGE        0.        0.        0.        0.        0.        0.        0.        0.        0.        0.

36 WP          PUMPING DATA

                 PUMP ON    PUMPING    PUMP OFF
                ELEVATION     RATE    ELEVATION

                   80.0        3.        77.0
                   81.0        2.        77.0

                   ISTAD        PUMP  PUMP FLOW HYDROGRAPH IDENTIFICATION

                                                    ***
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****

HYDROGRAPH AT STATION PS

****

DA	MON	HRMN	ORD	PUMP Q	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	PUMP Q	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	0.	0.0	75.5	*	1		0730	451	0.	0.	0.0	75.5
1		0001	2	0.	0.	0.0	75.5	*	1		0731	452	0.	0.	0.0	75.5
1		0002	3	0.	0.	0.0	75.5	*	1		0732	453	0.	0.	0.0	75.5
1		0003	4	0.	0.	0.0	75.5	*	1		0733	454	0.	0.	0.0	75.5
1		0004	5	0.	0.	0.0	75.5	*	1		0734	455	0.	0.	0.0	75.5
1		0005	6	0.	0.	0.0	75.5	*	1		0735	456	0.	0.	0.0	75.5
1		0006	7	0.	0.	0.0	75.5	*	1		0736	457	0.	0.	0.0	75.5
1		0007	8	0.	0.	0.0	75.5	*	1		0737	458	0.	0.	0.0	75.5
1		0008	9	0.	0.	0.0	75.5	*	1		0738	459	0.	0.	0.0	75.5
1		0009	10	0.	0.	0.0	75.5	*	1		0739	460	0.	0.	0.0	75.5
1		0010	11	0.	0.	0.0	75.5	*	1		0740	461	0.	0.	0.0	75.5
1		0011	12	0.	0.	0.0	75.5	*	1		0741	462	0.	0.	0.0	75.5
1		0012	13	0.	0.	0.0	75.5	*	1		0742	463	0.	0.	0.0	75.5
1		0013	14	0.	0.	0.0	75.5	*	1		0743	464	0.	0.	0.0	75.5
1		0014	15	0.	0.	0.0	75.6	*	1		0744	465	0.	0.	0.0	75.5

1	0015	16	0.	0.	0.0	75.6	*	1	0745	466	0.	0.	0.0	75.5
1	0016	17	0.	0.	0.0	75.6	*	1	0746	467	0.	0.	0.0	75.5
1	0017	18	0.	0.	0.0	75.7	*	1	0747	468	0.	0.	0.0	75.5
1	0018	19	0.	0.	0.0	75.7	*	1	0748	469	0.	0.	0.0	75.5
1	0019	20	0.	0.	0.0	75.8	*	1	0749	470	0.	0.	0.0	75.5
1	0020	21	0.	0.	0.0	75.9	*	1	0750	471	0.	0.	0.0	75.5
1	0021	22	0.	0.	0.0	75.9	*	1	0751	472	0.	0.	0.0	75.5
1	0022	23	0.	0.	0.0	76.0	*	1	0752	473	0.	0.	0.0	75.5
1	0023	24	0.	0.	0.0	76.1	*	1	0753	474	0.	0.	0.0	75.5
1	0024	25	0.	0.	0.0	76.2	*	1	0754	475	0.	0.	0.0	75.5
1	0025	26	0.	0.	0.0	76.3	*	1	0755	476	0.	0.	0.0	75.5
1	0026	27	0.	0.	0.0	76.4	*	1	0756	477	0.	0.	0.0	75.5
1	0027	28	0.	0.	0.0	76.5	*	1	0757	478	0.	0.	0.0	75.5
1	0028	29	0.	0.	0.0	76.6	*	1	0758	479	0.	0.	0.0	75.5
1	0029	30	0.	0.	0.0	76.7	*	1	0759	480	0.	0.	0.0	75.5
1	0030	31	0.	0.	0.0	76.8	*	1	0800	481	0.	0.	0.0	75.5
1	0031	32	0.	0.	0.0	76.9	*	1	0801	482	0.	0.	0.0	75.5
1	0032	33	0.	0.	0.0	77.1	*	1	0802	483	0.	0.	0.0	75.5
1	0033	34	0.	0.	0.0	77.2	*	1	0803	484	0.	0.	0.0	75.5
1	0034	35	0.	0.	0.0	77.3	*	1	0804	485	0.	0.	0.0	75.5
1	0035	36	0.	0.	0.0	77.5	*	1	0805	486	0.	0.	0.0	75.5
1	0036	37	0.	0.	0.0	77.6	*	1	0806	487	0.	0.	0.0	75.5
1	0037	38	0.	0.	0.0	77.7	*	1	0807	488	0.	0.	0.0	75.5
1	0038	39	0.	0.	0.0	77.9	*	1	0808	489	0.	0.	0.0	75.5
1	0039	40	0.	0.	0.0	78.0	*	1	0809	490	0.	0.	0.0	75.5
1	0040	41	0	0.	0.0	78.2	*	1	0810	491	0.	0.	0.0	75.5
1	0041	42	0.	0.	0.0	78.3	*	1	0811	492	0.	0.	0.0	75.5
1	0042	43	0.	0.	0.0	78.5	*	1	0812	493	0.	0.	0.0	75.5
1	0043	44	0.	0.	0.0	78.6	*	1	0813	494	0.	0.	0.0	75.5
1	0044	45	0.	0.	0.0	78.8	*	1	0814	495	0.	0.	0.0	75.5
1	0045	46	0.	0.	0.0	78.9	*	1	0815	496	0.	0.	0.0	75.5
1	0046	47	0.	0.	0.0	79.1	*	1	0816	497	0.	0.	0.0	75.5
1	0047	48	0.	0.	0.0	79.1	*	1	0817	498	0.	0.	0.0	75.5
1	0048	49	0.	0.	0.0	79.2	*	1	0818	499	0.	0.	0.0	75.5
1	0049	50	0.	0.	0.0	79.2	*	1	0819	500	0.	0.	0.0	75.5
1	0050	51	0.	0.	0.0	79.2	*	1	0820	501	0.	0.	0.0	75.5
1	0051	52	0.	0.	0.0	79.3	*	1	0821	502	0.	0.	0.0	75.5
1	0052	53	0.	0.	0.0	79.3	*	1	0822	503	0.	0.	0.0	75.5
1	0053	54	0.	0.	0.0	79.3	*	1	0823	504	0.	0.	0.0	75.5
1	0054	55	0.	0.	0.0	79.3	*	1	0824	505	0.	0.	0.0	75.5
1	0055	56	0.	0.	0.0	79.3	*	1	0825	506	0.	0.	0.0	75.5
1	0056	57	0.	0.	0.0	79.3	*	1	0826	507	0.	0.	0.0	75.5
1	0057	58	0.	0.	0.0	79.4	*	1	0827	508	0.	0.	0.0	75.5
1	0058	59	0.	0.	0.0	79.4	*	1	0828	509	0.	0.	0.0	75.5
1	0059	60	0.	0.	0.0	79.4	*	1	0829	510	0.	0.	0.0	75.5
1	0100	61	0.	0.	0.0	79.4	*	1	0830	511	0.	0.	0.0	75.5
1	0101	62	0.	0.	0.0	79.4	*	1	0831	512	0.	0.	0.0	75.5
1	0102	63	0.	0.	0.0	79.4	*	1	0832	513	0.	0.	0.0	75.5
1	0103	64	0.	0.	0.0	79.4	*	1	0833	514	0.	0.	0.0	75.5
1	0104	65	0.	0.	0.0	79.5	*	1	0834	515	0.	0.	0.0	75.5
1	0105	66	0.	0.	0.0	79.5	*	1	0835	516	0.	0.	0.0	75.5
1	0106	67	0.	0.	0.0	79.5	*	1	0836	517	0.	0.	0.0	75.5
1	0107	68	0.	0.	0.0	79.5	*	1	0837	518	0.	0.	0.0	75.5
1	0108	69	0.	0.	0.0	79.5	*	1	0838	519	0.	0.	0.0	75.5
1	0109	70	0.	0.	0.0	79.5	*	1	0839	520	0.	0.	0.0	75.5
1	0110	71	0.	0.	0.0	79.5	*	1	0840	521	0.	0.	0.0	75.5
1	0111	72	0.	0.	0.0	79.5	*	1	0841	522	0.	0.	0.0	75.5
1	0112	73	0.	0.	0.0	79.6	*	1	0842	523	0.	0.	0.0	75.5
1	0113	74	0.	0.	0.0	79.6	*	1	0843	524	0.	0.	0.0	75.5
1	0114	75	0.	0.	0.0	79.6	*	1	0844	525	0.	0.	0.0	75.5

1	0115	76	0.	0.	0.0	79.6	*	1	0845	526	0.	0.	0.0	75.5
1	0116	77	0.	0.	0.0	79.6	*	1	0846	527	0.	0.	0.0	75.5
1	0117	78	0.	0.	0.0	79.6	*	1	0847	528	0.	0.	0.0	75.5
1	0118	79	0.	0.	0.0	79.6	*	1	0848	529	0.	0.	0.0	75.5
1	0119	80	0.	0.	0.0	79.6	*	1	0849	530	0.	0.	0.0	75.5
1	0120	81	0.	0.	0.0	79.6	*	1	0850	531	0.	0.	0.0	75.5
1	0121	82	0.	0.	0.0	79.7	*	1	0851	532	0.	0.	0.0	75.5
1	0122	83	0.	0.	0.0	79.7	*	1	0852	533	0.	0.	0.0	75.5
1	0123	84	0.	0.	0.0	79.7	*	1	0853	534	0.	0.	0.0	75.5
1	0124	85	0.	0.	0.0	79.7	*	1	0854	535	0.	0.	0.0	75.5
1	0125	86	0.	0.	0.0	79.7	*	1	0855	536	0.	0.	0.0	75.5
1	0126	87	0.	0.	0.0	79.7	*	1	0856	537	0.	0.	0.0	75.5
1	0127	88	0.	0.	0.0	79.7	*	1	0857	538	0.	0.	0.0	75.5
1	0128	89	0.	0.	0.0	79.7	*	1	0858	539	0.	0.	0.0	75.5
1	0129	90	0.	0.	0.0	79.8	*	1	0859	540	0.	0.	0.0	75.5
1	0130	91	0.	0.	0.0	79.8	*	1	0900	541	0.	0.	0.0	75.5
1	0131	92	0.	0.	0.0	79.8	*	1	0901	542	0.	0.	0.0	75.5
1	0132	93	0.	0.	0.0	79.8	*	1	0902	543	0.	0.	0.0	75.5
1	0133	94	0.	0.	0.0	79.8	*	1	0903	544	0.	0.	0.0	75.5
1	0134	95	0.	0.	0.0	79.8	*	1	0904	545	0.	0.	0.0	75.5
1	0135	96	0.	0.	0.0	79.8	*	1	0905	546	0.	0.	0.0	75.5
1	0136	97	0.	0.	0.0	79.8	*	1	0906	547	0.	0.	0.0	75.5
1	0137	98	0.	0.	0.0	79.9	*	1	0907	548	0.	0.	0.0	75.5
1	0138	99	0.	0.	0.0	79.9	*	1	0908	549	0.	0.	0.0	75.5
1	0139	100	0.	0.	0.0	79.9	*	1	0909	550	0.	0.	0.0	75.5
1	0140	101	0.	0.	0.0	79.9	*	1	0910	551	0.	0.	0.0	75.5
1	0141	102	0.	0.	0.0	79.9	*	1	0911	552	0.	0.	0.0	75.5
1	0142	103	0.	0.	0.0	79.9	*	1	0912	553	0.	0.	0.0	75.5
1	0143	104	0.	0.	0.0	79.9	*	1	0913	554	0.	0.	0.0	75.5
1	0144	105	0.	0.	0.0	79.9	*	1	0914	555	0.	0.	0.0	75.5
1	0145	106	0.	0.	0.0	79.9	*	1	0915	556	0.	0.	0.0	75.5
1	0146	107	0.	0.	0.0	80.0	*	1	0916	557	0.	0.	0.0	75.5
1	0147	108	0.	0.	0.0	80.0	*	1	0917	558	0.	0.	0.0	75.5
1	0148	109	0.	0.	0.0	80.0	*	1	0918	559	0.	0.	0.0	75.5
1	0149	110	0.	0.	0.0	80.0	*	1	0919	560	0.	0.	0.0	75.5
1	0150	111	0.	0.	0.0	80.0	*	1	0920	561	0.	0.	0.0	75.5
1	0151	112	3.	0.	0.0	79.7	*	1	0921	562	0.	0.	0.0	75.5
1	0152	113	3.	0.	0.0	76.7	*	1	0922	563	0.	0.	0.0	75.5
1	0153	114	0.	0.	0.0	75.5	*	1	0923	564	0.	0.	0.0	75.5
1	0154	115	0.	0.	0.0	75.7	*	1	0924	565	0.	0.	0.0	75.5
1	0155	116	0.	0.	0.0	75.9	*	1	0925	566	0.	0.	0.0	75.5
1	0156	117	0.	0.	0.0	76.1	*	1	0926	567	0.	0.	0.0	75.5
1	0157	118	0.	0.	0.0	76.3	*	1	0927	568	0.	0.	0.0	75.5
1	0158	119	0.	0.	0.0	76.5	*	1	0928	569	0.	0.	0.0	75.5
1	0159	120	0.	0.	0.0	76.7	*	1	0929	570	0.	0.	0.0	75.5
1	0200	121	0.	0.	0.0	77.0	*	1	0930	571	0.	0.	0.0	75.5
1	0201	122	0.	0.	0.0	77.2	*	1	0931	572	0.	0.	0.0	75.5
1	0202	123	0.	0.	0.0	77.3	*	1	0932	573	0.	0.	0.0	75.5
1	0203	124	0.	0.	0.0	77.5	*	1	0933	574	0.	0.	0.0	75.5
1	0204	125	0.	0.	0.0	77.7	*	1	0934	575	0.	0.	0.0	75.5
1	0205	126	0.	0.	0.0	77.9	*	1	0935	576	0.	0.	0.0	75.5
1	0206	127	0.	0.	0.0	78.1	*	1	0936	577	0.	0.	0.0	75.5
1	0207	128	0.	0.	0.0	78.3	*	1	0937	578	0.	0.	0.0	75.5
1	0208	129	0.	0.	0.0	78.5	*	1	0938	579	0.	0.	0.0	75.5
1	0209	130	0.	0.	0.0	78.7	*	1	0939	580	0.	0.	0.0	75.5
1	0210	131	0.	0.	0.0	78.9	*	1	0940	581	0.	0.	0.0	75.5
1	0211	132	0.	0.	0.0	79.1	*	1	0941	582	0.	0.	0.0	75.5
1	0212	133	0.	0.	0.0	79.1	*	1	0942	583	0.	0.	0.0	75.5
1	0213	134	0.	0.	0.0	79.2	*	1	0943	584	0.	0.	0.0	75.5
1	0214	135	0.	0.	0.0	79.2	*	1	0944	585	0.	0.	0.0	75.5

1	0215	136	0.	0.	0.0	79.2	*	1	0945	586	0.	0.	0.0	75.5
1	0216	137	0.	0.	0.0	79.3	*	1	0946	587	0.	0.	0.0	75.5
1	0217	138	0.	0.	0.0	79.3	*	1	0947	588	0.	0.	0.0	75.5
1	0218	139	0.	0.	0.0	79.3	*	1	0948	589	0.	0.	0.0	75.5
1	0219	140	0.	0.	0.0	79.3	*	1	0949	590	0.	0.	0.0	75.5
1	0220	141	0.	0.	0.0	79.3	*	1	0950	591	0.	0.	0.0	75.5
1	0221	142	0.	0.	0.0	79.4	*	1	0951	592	0.	0.	0.0	75.5
1	0222	143	0.	0.	0.0	79.4	*	1	0952	593	0.	0.	0.0	75.5
1	0223	144	0.	0.	0.0	79.4	*	1	0953	594	0.	0.	0.0	75.5
1	0224	145	0.	0.	0.0	79.4	*	1	0954	595	0.	0.	0.0	75.5
1	0225	146	0.	0.	0.0	79.4	*	1	0955	596	0.	0.	0.0	75.5
1	0226	147	0.	0.	0.0	79.4	*	1	0956	597	0.	0.	0.0	75.5
1	0227	148	0.	0.	0.0	79.4	*	1	0957	598	0.	0.	0.0	75.5
1	0228	149	0.	0.	0.0	79.5	*	1	0958	599	0.	0.	0.0	75.5
1	0229	150	0.	0.	0.0	79.5	*	1	0959	600	0.	0.	0.0	75.5
1	0230	151	0.	0.	0.0	79.5	*	1	1000	601	0.	0.	0.0	75.5
1	0231	152	0.	0.	0.0	79.5	*	1	1001	602	0.	0.	0.0	75.5
1	0232	153	0.	0.	0.0	79.5	*	1	1002	603	0.	0.	0.0	75.5
1	0233	154	0.	0.	0.0	79.5	*	1	1003	604	0.	0.	0.0	75.5
1	0234	155	0.	0.	0.0	79.6	*	1	1004	605	0.	0.	0.0	75.5
1	0235	156	0.	0.	0.0	79.6	*	1	1005	606	0.	0.	0.0	75.5
1	0236	157	0.	0.	0.0	79.6	*	1	1006	607	0.	0.	0.0	75.5
1	0237	158	0.	0.	0.0	79.6	*	1	1007	608	0.	0.	0.0	75.5
1	0238	159	0.	0.	0.0	79.6	*	1	1008	609	0.	0.	0.0	75.5
1	0239	160	0.	0.	0.0	79.6	*	1	1009	610	0.	0.	0.0	75.5
1	0240	161	0.	0.	0.0	79.6	*	1	1010	611	0.	0.	0.0	75.5
1	0241	162	0.	0.	0.0	79.7	*	1	1011	612	0.	0.	0.0	75.5
1	0242	163	0.	0.	0.0	79.7	*	1	1012	613	0.	0.	0.0	75.5
1	0243	164	0.	0.	0.0	79.7	*	1	1013	614	0.	0.	0.0	75.5
1	0244	165	0.	0.	0.0	79.7	*	1	1014	615	0.	0.	0.0	75.5
1	0245	166	0.	0.	0.0	79.7	*	1	1015	616	0.	0.	0.0	75.5
1	0246	167	0.	0.	0.0	79.7	*	1	1016	617	0.	0.	0.0	75.5
1	0247	168	0.	0.	0.0	79.8	*	1	1017	618	0.	0.	0.0	75.5
1	0248	169	0.	0.	0.0	79.8	*	1	1018	619	0.	0.	0.0	75.5
1	0249	170	0.	0.	0.0	79.8	*	1	1019	620	0.	0.	0.0	75.5
1	0250	171	0.	0.	0.0	79.8	*	1	1020	621	0.	0.	0.0	75.5
1	0251	172	0.	0.	0.0	79.8	*	1	1021	622	0.	0.	0.0	75.5
1	0252	173	0.	0.	0.0	79.9	*	1	1022	623	0.	0.	0.0	75.5
1	0253	174	0.	0.	0.0	79.9	*	1	1023	624	0.	0.	0.0	75.5
1	0254	175	0.	0.	0.0	79.9	*	1	1024	625	0.	0.	0.0	75.5
1	0255	176	0.	0.	0.0	79.9	*	1	1025	626	0.	0.	0.0	75.5
1	0256	177	0.	0.	0.0	79.9	*	1	1026	627	0.	0.	0.0	75.5
1	0257	178	0.	0.	0.0	79.9	*	1	1027	628	0.	0.	0.0	75.5
1	0258	179	0.	0.	0.0	80.0	*	1	1028	629	0.	0.	0.0	75.5
1	0259	180	0.	0.	0.0	80.0	*	1	1029	630	0.	0.	0.0	75.5
1	0300	181	0.	0.	0.0	80.0	*	1	1030	631	0.	0.	0.0	75.5
1	0301	182	3.	0.	0.0	79.7	*	1	1031	632	0.	0.	0.0	75.5
1	0302	183	3.	0.	0.0	77.0	*	1	1032	633	0.	0.	0.0	75.5
1	0303	184	0.	0.	0.0	75.5	*	1	1033	634	0.	0.	0.0	75.5
1	0304	185	0.	0.	0.0	75.9	*	1	1034	635	0.	0.	0.0	75.5
1	0305	186	0.	0.	0.0	76.3	*	1	1035	636	0.	0.	0.0	75.5
1	0306	187	0.	0.	0.0	76.7	*	1	1036	637	0.	0.	0.0	75.5
1	0307	188	0.	0.	0.0	77.0	*	1	1037	638	0.	0.	0.0	75.5
1	0308	189	0.	0.	0.0	77.4	*	1	1038	639	0.	0.	0.0	75.5
1	0309	190	0.	0.	0.0	77.8	*	1	1039	640	0.	0.	0.0	75.5
1	0310	191	0.	0.	0.0	78.2	*	1	1040	641	0.	0.	0.0	75.5
1	0311	192	0.	0.	0.0	78.6	*	1	1041	642	0.	0.	0.0	75.5
1	0312	193	0.	0.	0.0	79.1	*	1	1042	643	0.	0.	0.0	75.5
1	0313	194	0.	0.	0.0	79.2	*	1	1043	644	0.	0.	0.0	75.5
1	0314	195	0.	0.	0.0	79.3	*	1	1044	645	0.	0.	0.0	75.5

1	0315	196	0.	0.	0.0	79.3	*	1	1045	646	0.	0.	0.0	75.5
1	0316	197	0.	0.	0.0	79.4	*	1	1046	647	0.	0.	0.0	75.5
1	0317	198	0.	0.	0.0	79.4	*	1	1047	648	0.	0.	0.0	75.5
1	0318	199	0.	0.	0.0	79.4	*	1	1048	649	0.	0.	0.0	75.5
1	0319	200	0.	0.	0.0	79.5	*	1	1049	650	0.	0.	0.0	75.5
1	0320	201	0.	0.	0.0	79.5	*	1	1050	651	0.	0.	0.0	75.5
1	0321	202	0.	0.	0.0	79.5	*	1	1051	652	0.	0.	0.0	75.5
1	0322	203	0.	0.	0.0	79.6	*	1	1052	653	0.	0.	0.0	75.5
1	0323	204	0.	0.	0.0	79.6	*	1	1053	654	0.	0.	0.0	75.5
1	0324	205	0.	0.	0.0	79.6	*	1	1054	655	0.	0.	0.0	75.5
1	0325	206	0.	0.	0.0	79.7	*	1	1055	656	0.	0.	0.0	75.5
1	0326	207	0.	0.	0.0	79.7	*	1	1056	657	0.	0.	0.0	75.5
1	0327	208	0.	0.	0.0	79.8	*	1	1057	658	0.	0.	0.0	75.5
1	0328	209	0.	0.	0.0	79.8	*	1	1058	659	0.	0.	0.0	75.5
1	0329	210	0.	0.	0.0	79.9	*	1	1059	660	0.	0.	0.0	75.5
1	0330	211	0.	0.	0.0	79.9	*	1	1100	661	0.	0.	0.0	75.5
1	0331	212	0.	0.	0.0	80.0	*	1	1101	662	0.	0.	0.0	75.5
1	0332	213	3.	0.	0.0	79.8	*	1	1102	663	0.	0.	0.0	75.5
1	0333	214	3.	0.	0.0	79.5	*	1	1103	664	0.	0.	0.0	75.5
1	0334	215	3.	0.	0.0	75.6	*	1	1104	665	0.	0.	0.0	75.5
1	0335	216	0.	0.	0.0	75.5	*	1	1105	666	0.	0.	0.0	75.5
1	0336	217	0.	0.	0.0	77.6	*	1	1106	667	0.	0.	0.0	75.5
1	0337	218	0.	0.	0.0	79.1	*	1	1107	668	0.	0.	0.0	75.5
1	0338	219	0.	0.	0.0	79.7	*	1	1108	669	0.	0.	0.0	75.5
1	0339	220	0.	0.	0.0	79.9	*	1	1109	670	0.	0.	0.0	75.5
1	0340	221	0.	0.	0.0	80.1	*	1	1110	671	0.	0.	0.0	75.5
1	0341	222	3.	0.	0.0	80.0	*	1	1111	672	0.	0.	0.0	75.5
1	0342	223	3.	0.	0.0	80.0	*	1	1112	673	0.	0.	0.0	75.5
1	0343	224	3.	0.	0.0	80.0	*	1	1113	674	0.	0.	0.0	75.5
1	0344	225	3.	0.	0.0	80.1	*	1	1114	675	0.	0.	0.0	75.5
1	0345	226	3.	0.	0.0	80.2	*	1	1115	676	0.	0.	0.0	75.5
1	0346	227	3.	0.	0.0	80.3	*	1	1116	677	0.	0.	0.0	75.5
1	0347	228	3.	0.	0.0	80.4	*	1	1117	678	0.	0.	0.0	75.5
1	0348	229	3.	0.	0.0	80.6	*	1	1118	679	0.	0.	0.0	75.5
1	0349	230	3.	0.	0.0	80.8	*	1	1119	680	0.	0.	0.0	75.5
1	0350	231	3.	0.	0.0	81.0	*	1	1120	681	0.	0.	0.0	75.5
1	0351	232	5.	0.	0.0	81.1	*	1	1121	682	0.	0.	0.0	75.5
1	0352	233	5.	0.	0.0	81.2	*	1	1122	683	0.	0.	0.0	75.5
1	0353	234	5.	0.	0.0	81.4	*	1	1123	684	0.	0.	0.0	75.5
1	0354	235	5.	0.	0.0	81.6	*	1	1124	685	0.	0.	0.0	75.5
1	0355	236	5.	0.	0.0	81.9	*	1	1125	686	0.	0.	0.0	75.5
1	0356	237	5.	0.	0.0	82.2	*	1	1126	687	0.	0.	0.0	75.5
1	0357	238	5.	0.	0.1	82.7	*	1	1127	688	0.	0.	0.0	75.5
1	0358	239	5.	0.	0.1	83.2	*	1	1128	689	0.	0.	0.0	75.5
1	0359	240	5.	0.	0.1	83.8	*	1	1129	690	0.	0.	0.0	75.5
1	0400	241	5.	0.	0.1	84.7	*	1	1130	691	0.	0.	0.0	75.5
1	0401	242	5.	0.	0.1	90.0	*	1	1131	692	0.	0.	0.0	75.5
1	0402	243	5.	0.	0.1	90.0	*	1	1132	693	0.	0.	0.0	75.5
1	0403	244	5.	0.	0.1	90.0	*	1	1133	694	0.	0.	0.0	75.5
1	0404	245	5.	0.	0.2	90.1	*	1	1134	695	0.	0.	0.0	75.5
1	0405	246	5.	0.	0.2	90.1	*	1	1135	696	0.	0.	0.0	75.5
1	0406	247	5.	0.	0.2	90.1	*	1	1136	697	0.	0.	0.0	75.5
1	0407	248	5.	0.	0.2	90.1	*	1	1137	698	0.	0.	0.0	75.5
1	0408	249	5.	0.	0.2	90.1	*	1	1138	699	0.	0.	0.0	75.5
1	0409	250	5.	0.	0.3	90.2	*	1	1139	700	0.	0.	0.0	75.5
1	0410	251	5.	0.	0.3	90.2	*	1	1140	701	0.	0.	0.0	75.5
1	0411	252	5.	0.	0.3	90.2	*	1	1141	702	0.	0.	0.0	75.5
1	0412	253	5.	0.	0.3	90.2	*	1	1142	703	0.	0.	0.0	75.5
1	0413	254	5.	0.	0.3	90.2	*	1	1143	704	0.	0.	0.0	75.5
1	0414	255	5.	0.	0.4	90.3	*	1	1144	705	0.	0.	0.0	75.5

1	0415	256	5.	0.	0.4	90.3	*	1	1145	706	0.	0.	0.0	75.5
1	0416	257	5.	0.	0.4	90.3	*	1	1146	707	0.	0.	0.0	75.5
1	0417	258	5.	0.	0.4	90.3	*	1	1147	708	0.	0.	0.0	75.5
1	0418	259	5.	0.	0.4	90.3	*	1	1148	709	0.	0.	0.0	75.5
1	0419	260	5.	0.	0.5	90.4	*	1	1149	710	0.	0.	0.0	75.5
1	0420	261	5.	0.	0.5	90.4	*	1	1150	711	0.	0.	0.0	75.5
1	0421	262	5.	0.	0.5	90.4	*	1	1151	712	0.	0.	0.0	75.5
1	0422	263	5.	0.	0.5	90.4	*	1	1152	713	0.	0.	0.0	75.5
1	0423	264	5.	0.	0.5	90.4	*	1	1153	714	0.	0.	0.0	75.5
1	0424	265	5.	0.	0.5	90.4	*	1	1154	715	0.	0.	0.0	75.5
1	0425	266	5.	0.	0.5	90.4	*	1	1155	716	0.	0.	0.0	75.5
1	0426	267	5.	0.	0.5	90.5	*	1	1156	717	0.	0.	0.0	75.5
1	0427	268	5.	0.	0.6	90.5	*	1	1157	718	0.	0.	0.0	75.5
1	0428	269	5.	0.	0.6	90.5	*	1	1158	719	0.	0.	0.0	75.5
1	0429	270	5.	0.	0.6	90.5	*	1	1159	720	0.	0.	0.0	75.5
1	0430	271	5.	0.	0.6	90.5	*	1	1200	721	0.	0.	0.0	75.5
1	0431	272	5.	0.	0.6	90.5	*	1	1201	722	0.	0.	0.0	75.5
1	0432	273	5.	0.	0.6	90.5	*	1	1202	723	0.	0.	0.0	75.5
1	0433	274	5.	0.	0.6	90.5	*	1	1203	724	0.	0.	0.0	75.5
1	0434	275	5.	0.	0.6	90.5	*	1	1204	725	0.	0.	0.0	75.5
1	0435	276	5.	0.	0.6	90.5	*	1	1205	726	0.	0.	0.0	75.5
1	0436	277	5.	0.	0.6	90.5	*	1	1206	727	0.	0.	0.0	75.5
1	0437	278	5.	0.	0.6	90.5	*	1	1207	728	0.	0.	0.0	75.5
1	0438	279	5.	0.	0.6	90.5	*	1	1208	729	0.	0.	0.0	75.5
1	0439	280	5.	0.	0.6	90.5	*	1	1209	730	0.	0.	0.0	75.5
1	0440	281	5.	0.	0.6	90.5	*	1	1210	731	0.	0.	0.0	75.5
1	0441	282	5.	0.	0.6	90.5	*	1	1211	732	0.	0.	0.0	75.5
1	0442	283	5.	0.	0.6	90.5	*	1	1212	733	0.	0.	0.0	75.5
1	0443	284	5.	0.	0.6	90.5	*	1	1213	734	0.	0.	0.0	75.5
1	0444	285	5.	0.	0.6	90.5	*	1	1214	735	0.	0.	0.0	75.5
1	0445	286	5.	0.	0.6	90.5	*	1	1215	736	0.	0.	0.0	75.5
1	0446	287	5.	0.	0.6	90.5	*	1	1216	737	0.	0.	0.0	75.5
1	0447	288	5.	0.	0.6	90.5	*	1	1217	738	0.	0.	0.0	75.5
1	0448	289	5.	0.	0.6	90.5	*	1	1218	739	0.	0.	0.0	75.5
1	0449	290	5.	0.	0.6	90.5	*	1	1219	740	0.	0.	0.0	75.5
1	0450	291	5.	0.	0.6	90.5	*	1	1220	741	0.	0.	0.0	75.5
1	0451	292	5.	0.	0.6	90.5	*	1	1221	742	0.	0.	0.0	75.5
1	0452	293	5.	0.	0.6	90.5	*	1	1222	743	0.	0.	0.0	75.5
1	0453	294	5.	0.	0.6	90.5	*	1	1223	744	0.	0.	0.0	75.5
1	0454	295	5.	0.	0.6	90.5	*	1	1224	745	0.	0.	0.0	75.5
1	0455	296	5.	0.	0.6	90.5	*	1	1225	746	0.	0.	0.0	75.5
1	0456	297	5.	0.	0.6	90.5	*	1	1226	747	0.	0.	0.0	75.5
1	0457	298	5.	0.	0.6	90.5	*	1	1227	748	0.	0.	0.0	75.5
1	0458	299	5.	0.	0.6	90.5	*	1	1228	749	0.	0.	0.0	75.5
1	0459	300	5.	0.	0.6	90.5	*	1	1229	750	0.	0.	0.0	75.5
1	0500	301	5.	0.	0.6	90.5	*	1	1230	751	0.	0.	0.0	75.5
1	0501	302	5.	0.	0.6	90.5	*	1	1231	752	0.	0.	0.0	75.5
1	0502	303	5.	0.	0.6	90.5	*	1	1232	753	0.	0.	0.0	75.5
1	0503	304	5.	0.	0.6	90.5	*	1	1233	754	0.	0.	0.0	75.5
1	0504	305	5.	0.	0.6	90.5	*	1	1234	755	0.	0.	0.0	75.5
1	0505	306	5.	0.	0.6	90.5	*	1	1235	756	0.	0.	0.0	75.5
1	0506	307	5.	0.	0.6	90.5	*	1	1236	757	0.	0.	0.0	75.5
1	0507	308	5.	0.	0.6	90.5	*	1	1237	758	0.	0.	0.0	75.5
1	0508	309	5.	0.	0.6	90.5	*	1	1238	759	0.	0.	0.0	75.5
1	0509	310	5.	0.	0.5	90.5	*	1	1239	760	0.	0.	0.0	75.5
1	0510	311	5.	0.	0.5	90.4	*	1	1240	761	0.	0.	0.0	75.5
1	0511	312	5.	0.	0.5	90.4	*	1	1241	762	0.	0.	0.0	75.5
1	0512	313	5.	0.	0.5	90.4	*	1	1242	763	0.	0.	0.0	75.5
1	0513	314	5.	0.	0.5	90.4	*	1	1243	764	0.	0.	0.0	75.5
1	0514	315	5.	0.	0.5	90.4	*	1	1244	765	0.	0.	0.0	75.5

1	0515	316	5.	0.	0.5	90.4	*	1	1245	766	0.	0.	0.0	75.5
1	0516	317	5.	0.	0.5	90.4	*	1	1246	767	0.	0.	0.0	75.5
1	0517	318	5.	0.	0.5	90.4	*	1	1247	768	0.	0.	0.0	75.5
1	0518	319	5.	0.	0.5	90.4	*	1	1248	769	0.	0.	0.0	75.5
1	0519	320	5.	0.	0.5	90.4	*	1	1249	770	0.	0.	0.0	75.5
1	0520	321	5.	0.	0.5	90.4	*	1	1250	771	0.	0.	0.0	75.5
1	0521	322	5.	0.	0.5	90.4	*	1	1251	772	0.	0.	0.0	75.5
1	0522	323	5.	0.	0.5	90.4	*	1	1252	773	0.	0.	0.0	75.5
1	0523	324	5.	0.	0.5	90.4	*	1	1253	774	0.	0.	0.0	75.5
1	0524	325	5.	0.	0.5	90.4	*	1	1254	775	0.	0.	0.0	75.5
1	0525	326	5.	0.	0.5	90.4	*	1	1255	776	0.	0.	0.0	75.5
1	0526	327	5.	0.	0.5	90.4	*	1	1256	777	0.	0.	0.0	75.5
1	0527	328	5.	0.	0.4	90.4	*	1	1257	778	0.	0.	0.0	75.5
1	0528	329	5.	0.	0.4	90.3	*	1	1258	779	0.	0.	0.0	75.5
1	0529	330	5.	0.	0.4	90.3	*	1	1259	780	0.	0.	0.0	75.5
1	0530	331	5.	0.	0.4	90.3	*	1	1300	781	0.	0.	0.0	75.5
1	0531	332	5.	0.	0.4	90.3	*	1	1301	782	0.	0.	0.0	75.5
1	0532	333	5.	0.	0.4	90.3	*	1	1302	783	0.	0.	0.0	75.5
1	0533	334	5.	0.	0.4	90.3	*	1	1303	784	0.	0.	0.0	75.5
1	0534	335	5.	0.	0.4	90.3	*	1	1304	785	0.	0.	0.0	75.5
1	0535	336	5.	0.	0.4	90.3	*	1	1305	786	0.	0.	0.0	75.5
1	0536	337	5.	0.	0.4	90.3	*	1	1306	787	0.	0.	0.0	75.5
1	0537	338	5.	0.	0.4	90.3	*	1	1307	788	0.	0.	0.0	75.5
1	0538	339	5.	0.	0.4	90.3	*	1	1308	789	0.	0.	0.0	75.5
1	0539	340	5.	0.	0.4	90.3	*	1	1309	790	0.	0.	0.0	75.5
1	0540	341	5.	0.	0.4	90.3	*	1	1310	791	0.	0.	0.0	75.5
1	0541	342	5.	0.	0.4	90.3	*	1	1311	792	0.	0.	0.0	75.5
1	0542	343	5.	0.	0.4	90.3	*	1	1312	793	0.	0.	0.0	75.5
1	0543	344	5.	0.	0.3	90.2	*	1	1313	794	0.	0.	0.0	75.5
1	0544	345	5.	0.	0.3	90.2	*	1	1314	795	0.	0.	0.0	75.5
1	0545	346	5.	0.	0.3	90.2	*	1	1315	796	0.	0.	0.0	75.5
1	0546	347	5.	0.	0.3	90.2	*	1	1316	797	0.	0.	0.0	75.5
1	0547	348	5.	0.	0.3	90.2	*	1	1317	798	0.	0.	0.0	75.5
1	0548	349	5.	0.	0.3	90.2	*	1	1318	799	0.	0.	0.0	75.5
1	0549	350	5.	0.	0.3	90.2	*	1	1319	800	0.	0.	0.0	75.5
1	0550	351	5.	0.	0.3	90.2	*	1	1320	801	0.	0.	0.0	75.5
1	0551	352	5.	0.	0.3	90.2	*	1	1321	802	0.	0.	0.0	75.5
1	0552	353	5.	0.	0.3	90.2	*	1	1322	803	0.	0.	0.0	75.5
1	0553	354	5.	0.	0.3	90.2	*	1	1323	804	0.	0.	0.0	75.5
1	0554	355	5.	0.	0.3	90.2	*	1	1324	805	0.	0.	0.0	75.5
1	0555	356	5.	0.	0.3	90.2	*	1	1325	806	0.	0.	0.0	75.5
1	0556	357	5.	0.	0.3	90.2	*	1	1326	807	0.	0.	0.0	75.5
1	0557	358	5.	0.	0.3	90.2	*	1	1327	808	0.	0.	0.0	75.5
1	0558	359	5.	0.	0.2	90.1	*	1	1328	809	0.	0.	0.0	75.5
1	0559	360	5.	0.	0.2	90.1	*	1	1329	810	0.	0.	0.0	75.5
1	0600	361	5.	0.	0.2	90.1	*	1	1330	811	0.	0.	0.0	75.5
1	0601	362	5.	0.	0.2	90.1	*	1	1331	812	0.	0.	0.0	75.5
1	0602	363	5.	0.	0.2	90.1	*	1	1332	813	0.	0.	0.0	75.5
1	0603	364	5.	0.	0.2	90.1	*	1	1333	814	0.	0.	0.0	75.5
1	0604	365	5.	0.	0.2	90.1	*	1	1334	815	0.	0.	0.0	75.5
1	0605	366	5.	0.	0.2	90.1	*	1	1335	816	0.	0.	0.0	75.5
1	0606	367	5.	0.	0.2	90.1	*	1	1336	817	0.	0.	0.0	75.5
1	0607	368	5.	0.	0.2	90.1	*	1	1337	818	0.	0.	0.0	75.5
1	0608	369	5.	0.	0.2	90.1	*	1	1338	819	0.	0.	0.0	75.5
1	0609	370	5.	0.	0.2	90.1	*	1	1339	820	0.	0.	0.0	75.5
1	0610	371	5.	0.	0.2	90.1	*	1	1340	821	0.	0.	0.0	75.5
1	0611	372	5.	0.	0.2	90.1	*	1	1341	822	0.	0.	0.0	75.5
1	0612	373	5.	0.	0.2	90.1	*	1	1342	823	0.	0.	0.0	75.5
1	0613	374	5.	0.	0.1	90.0	*	1	1343	824	0.	0.	0.0	75.5
1	0614	375	5.	0.	0.1	90.0	*	1	1344	825	0.	0.	0.0	75.5

1	0615	376	5.	0.	0.1	90.0	*	1	1345	826	0.	0.	0.0	75.5
1	0616	377	5.	0.	0.1	90.0	*	1	1346	827	0.	0.	0.0	75.5
1	0617	378	5.	0.	0.1	90.0	*	1	1347	828	0.	0.	0.0	75.5
1	0618	379	5.	0.	0.1	90.0	*	1	1348	829	0.	0.	0.0	75.5
1	0619	380	5.	0.	0.1	90.0	*	1	1349	830	0.	0.	0.0	75.5
1	0620	381	5.	0.	0.1	90.0	*	1	1350	831	0.	0.	0.0	75.5
1	0621	382	5.	0.	0.1	85.2	*	1	1351	832	0.	0.	0.0	75.5
1	0622	383	5.	0.	0.1	84.6	*	1	1352	833	0.	0.	0.0	75.5
1	0623	384	5.	0.	0.1	84.2	*	1	1353	834	0.	0.	0.0	75.5
1	0624	385	5.	0.	0.1	83.7	*	1	1354	835	0.	0.	0.0	75.5
1	0625	386	5.	0.	0.1	83.3	*	1	1355	836	0.	0.	0.0	75.5
1	0626	387	5.	0.	0.1	82.9	*	1	1356	837	0.	0.	0.0	75.5
1	0627	388	5.	0.	0.0	82.6	*	1	1357	838	0.	0.	0.0	75.5
1	0628	389	5.	0.	0.0	82.2	*	1	1358	839	0.	0.	0.0	75.5
1	0629	390	5.	0.	0.0	81.9	*	1	1359	840	0.	0.	0.0	75.5
1	0630	391	5.	0.	0.0	81.5	*	1	1400	841	0.	0.	0.0	75.5
1	0631	392	5.	0.	0.0	81.1	*	1	1401	842	0.	0.	0.0	75.5
1	0632	393	5.	0.	0.0	80.7	*	1	1402	843	0.	0.	0.0	75.5
1	0633	394	5.	0.	0.0	80.2	*	1	1403	844	0.	0.	0.0	75.5
1	0634	395	5.	0.	0.0	79.6	*	1	1404	845	0.	0.	0.0	75.5
1	0635	396	0.	0.	0.0	75.5	*	1	1405	846	0.	0.	0.0	75.5
1	0636	397	0.	0.	0.0	75.6	*	1	1406	847	0.	0.	0.0	75.5
1	0637	398	0.	0.	0.0	75.6	*	1	1407	848	0.	0.	0.0	75.5
1	0638	399	0.	0.	0.0	75.6	*	1	1408	849	0.	0.	0.0	75.5
1	0639	400	0.	0.	0.0	75.7	*	1	1409	850	0.	0.	0.0	75.5
1	0640	401	0.	0.	0.0	75.7	*	1	1410	851	0.	0.	0.0	75.5
1	0641	402	0.	0.	0.0	75.7	*	1	1411	852	0.	0.	0.0	75.5
1	0642	403	0.	0.	0.0	75.7	*	1	1412	853	0.	0.	0.0	75.5
1	0643	404	0.	0.	0.0	75.8	*	1	1413	854	0.	0.	0.0	75.5
1	0644	405	0.	0.	0.0	75.8	*	1	1414	855	0.	0.	0.0	75.5
1	0645	406	0.	0.	0.0	75.8	*	1	1415	856	0.	0.	0.0	75.5
1	0646	407	0.	0.	0.0	75.8	*	1	1416	857	0.	0.	0.0	75.5
1	0647	408	0.	0.	0.0	75.8	*	1	1417	858	0.	0.	0.0	75.5
1	0648	409	0.	0.	0.0	75.8	*	1	1418	859	0.	0.	0.0	75.5
1	0649	410	0.	0.	0.0	75.8	*	1	1419	860	0.	0.	0.0	75.5
1	0650	411	0.	0.	0.0	75.8	*	1	1420	861	0.	0.	0.0	75.5
1	0651	412	0.	0.	0.0	75.8	*	1	1421	862	0.	0.	0.0	75.5
1	0652	413	0.	0.	0.0	75.8	*	1	1422	863	0.	0.	0.0	75.5
1	0653	414	0.	0.	0.0	75.8	*	1	1423	864	0.	0.	0.0	75.5
1	0654	415	0.	0.	0.0	75.8	*	1	1424	865	0.	0.	0.0	75.5
1	0655	416	0.	0.	0.0	75.8	*	1	1425	866	0.	0.	0.0	75.5
1	0656	417	0.	0.	0.0	75.8	*	1	1426	867	0.	0.	0.0	75.5
1	0657	418	0.	0.	0.0	75.8	*	1	1427	868	0.	0.	0.0	75.5
1	0658	419	0.	0.	0.0	75.8	*	1	1428	869	0.	0.	0.0	75.5
1	0659	420	0.	0.	0.0	75.8	*	1	1429	870	0.	0.	0.0	75.5
1	0700	421	0.	0.	0.0	75.8	*	1	1430	871	0.	0.	0.0	75.5
1	0701	422	0.	0.	0.0	75.8	*	1	1431	872	0.	0.	0.0	75.5
1	0702	423	0.	0.	0.0	75.8	*	1	1432	873	0.	0.	0.0	75.5
1	0703	424	0.	0.	0.0	75.8	*	1	1433	874	0.	0.	0.0	75.5
1	0704	425	0.	0.	0.0	75.8	*	1	1434	875	0.	0	0.0	75.5
1	0705	426	0.	0.	0.0	75.8	*	1	1435	876	0.	0.	0.0	75.5
1	0706	427	0.	0.	0.0	75.7	*	1	1436	877	0.	0.	0.0	75.5
1	0707	428	0.	0.	0.0	75.7	*	1	1437	878	0.	0.	0.0	75.5
1	0708	429	0.	0.	0.0	75.7	*	1	1438	879	0.	0.	0.0	75.5
1	0709	430	0.	0.	0.0	75.7	*	1	1439	880	0.	0.	0.0	75.5
1	0710	431	0.	0.	0.0	75.7	*	1	1440	881	0.	0.	0.0	75.5
1	0711	432	0.	0.	0.0	75.7	*	1	1441	882	0.	0.	0.0	75.5
1	0712	433	0.	0.	0.0	75.7	*	1	1442	883	0.	0.	0.0	75.5
1	0713	434	0.	0.	0.0	75.6	*	1	1443	884	0.	0.	0.0	75.5
1	0714	435	0.	0.	0.0	75.6	*	1	1444	885	0.	0.	0.0	75.5

1	0715	436	0.	0.	0.0	75.6	*	1	1445	886	0.	0.	0.0	75.5
1	0716	437	0.	0.	0.0	75.6	*	1	1446	887	0.	0.	0.0	75.5
1	0717	438	0.	0.	0.0	75.6	*	1	1447	888	0.	0.	0.0	75.5
1	0718	439	0.	0.	0.0	75.6	*	1	1448	889	0.	0.	0.0	75.5
1	0719	440	0.	0.	0.0	75.5	*	1	1449	890	0.	0.	0.0	75.5
1	0720	441	0.	0.	0.0	75.5	*	1	1450	891	0.	0.	0.0	75.5
1	0721	442	0.	0.	0.0	75.5	*	1	1451	892	0.	0.	0.0	75.5
1	0722	443	0.	0.	0.0	75.5	*	1	1452	893	0.	0.	0.0	75.5
1	0723	444	0.	0.	0.0	75.5	*	1	1453	894	0.	0.	0.0	75.5
1	0724	445	0.	0.	0.0	75.5	*	1	1454	895	0.	0.	0.0	75.5
1	0725	446	0.	0.	0.0	75.5	*	1	1455	896	0.	0.	0.0	75.5
1	0726	447	0.	0.	0.0	75.5	*	1	1456	897	0.	0.	0.0	75.5
1	0727	448	0.	0.	0.0	75.5	*	1	1457	898	0.	0.	0.0	75.5
1	0728	449	0.	0.	0.0	75.5	*	1	1458	899	0.	0.	0.0	75.5
1	0729	450	0.	0.	0.0	75.5	*	1	1459	900	0.	0.	0.0	75.5
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PEAK OUTFLOW IS 0. AT TIME 4.73 HOURS

***** PUMP FLOW HYDROGRAPH *****

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	14.98-HR
5.	3.85	(CFS)	2.	1.	1.	1.
		(INCHES)	2.281	2.281	2.281	2.281
		(AC-FT)	1.	1.	1.	1.

***** OUTFLOW HYDROGRAPH *****

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	14.98-HR
0.	4.43	(CFS)	0.	0.	0.	0.
		(INCHES)	0.049	0.051	0.051	0.051
		(AC-FT)	0.	0.	0.	0.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	14.98-HR
1.	4.72	0.	0.	0.	0.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	14.98-HR
90.53	4.73	83.70	78.82	78.82	78.82

CUMULATIVE AREA = 0.01 SQ MI

*** ***

```
          **************
          *            *
 38 KK    *      PUMP  *
          *            *
          **************

 40 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         900  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       0.017  TIME INTERVAL IN HOURS
```

RUNOFF SUMMARY

FLOW IN CUBIC FEET PER SECOND

TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	STAD	21.	4.15	2.	1.	1.	0.01		
PUMP FLOW TO	PUMP	5.	3.85	2.	1.	1.	0.01		
HYDROGRAPH AT	PS	0.	4.43	0.	0.	0.	0.01	90.53	4.73
HYDROGRAPH AT	PUMP	5.	3.85	2.	1.	1.	0.00		

*** NORMAL END OF HEC-1 ***

LINE "F"

PARKING LOT DRAINAGE

In order to determine the capacity of the proposed storm drain (Line "F") for parking lot drainage, a rational method analysis was performed for drainage areas contributing to Line "F" and to the existing storm drain in Whitton Avenue (Line "E"). Based on the results of the analysis (Table 4 on the following pages) and the normal depth capacity of the existing downstream line (Line "E"), the capacity of Line "F" is approximately the 1-year event. A simplified culvert analysis for 1-year flows in Line "F" is attached.

The pump system for Field #1 is designed for the 10-year flow which will discharge into the existing 24-inch storm drain (Line "E") detailed analysis to support the pumping parameters are explained in Appendix II, "Hydraulics". When additional onsite runoff is contributing to the existing 24-inch storm drain, the system may become surcharged. If the hydraulic grade line were to ultimately rise above the inlet elevation of the proposed catch basin in Whitton Lane on Line "F", this flow will outfall and continue overland in Whitton Lane and would be directed to the south detention storage basin via overland pavement drainage.

Table 4

Rational Method Worksheet

W/P Job No. 93986.02

On Site Storm Drain Maryvale Baseball Park

12/16/96

Description:	Calculation of Peak Flows Using the Rational Method
Reference:	Major Street Storm Drain Design Manual, City of Phoenix
Date:	12/16/96

Known Values:

Lot travel time: 0 min
Design storm: 2 yrs

Calculated Values:

Tc = lot travel time + street travel time
= lot travel time + drainage length / avg velocity / 60
Q = CiA

Concentration Point	*Drainage Area, A (Ac)*	*Runoff Coefficient, C*	*Drainage Length (ft)*	*Avg. Slope ('/FT)*	*Avg. Velocity (fps)*	*Time of Conc., Tc (min)*	*1 Year Intensity, (in/hr)*	*Flow, Q 1 Year (cfs)*	*10 Year Intensity, i (in/hr)*	*Flow, Q 10 Year (cfs)*
	4.25	0.2								
	0.94	0.95								
Total @ CP 1	**5.19**	**0.34**	480	0.01	2.96	2.7	1.65	**2.88**	3.85	**6.7**
	2.89	0.95								
Total @ CP 1a	**2.89**	**0.95**	580	0.01	2.96	3.3	1.65	**4.53**	3.85	**10.6**
	1.35	0.95								
Total @ CP 2	**1.35**	**0.95**	200	0.004	2.10	1.6	1.65	**2.12**	3.85	**4.9**
	1.25	0.95								
Total @ CP 3	**1.25**	**0.95**	220	0.006	2.44	1.5	1.65	**1.96**	3.85	**4.6**
	0.9	0.95								
Total @ CP 4	**0.9**	**0.95**	160	0.01	2.96	0.9	1.65	**1.41**	3.85	**3.3**
	1.35	0.95								
	13.24	0.2								
Total @ CP 5	**14.59**	**0.27**	1350	0.004	2.10	10.7	1.6	**6.29**	3.85	**15.1**
	0.45	0.95								
Total @ CP 6	**0.45**	**0.95**	300	0.002	1.62	3.1	1.65	**0.71**	3.85	**1.6**

Note:
1. Use 10 min intensity, if Tc is less than 10 min.
2. See Figure 1 for Drainage area delineation.
3. Existing Storm Drain Line "E" Capacity: 24" pipe, S=0.004 '/ft, n=0.013, Q=14.3 cfs
4. Total 1 Year flow for CP 1-4, Q = 13 cfs

q:\mvalebbp\onsitrat.wq1

PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

December 16, 1996
Maryvale Baseball Park
Line "F"
18" Storm Drain into Exist 24" Storm Drain

==========

PROGRAM INPUT DATA:

DESCRIPTION	VALUE
Culvert Diameter (feet).....	1.50
FHWA Chart Number (1,2 or 3).....	1
Scale Number on Chart (Type of Culvert Entrance).....	2
Manning's Roughness Coefficient (n-value).....	0.0130
Entrance Loss Coefficient of Culvert Opening.....	0.50
Culvert Length (feet).....	113.0
Culvert Slope (feet per foot).....	0.0030

==========

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Headwater (ft) Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
5.5	1.40	1.36	1.59	1.17	0.90	1.40	3.20

==========

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PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

December 16, 1996
Maryvale Baseball Park
Line "F"
24" Pipe

==========

PROGRAM INPUT DATA:

DESCRIPTION	VALUE
Culvert Diameter (feet)	1.50
FHWA Chart Number (1,2 or 3)	1
Scale Number on Chart (Type of Culvert Entrance)	2
Manning's Roughness Coefficient (n-value)	0.0130
Entrance Loss Coefficient of Culvert Opening	0.50
Culvert Length (feet)	321.0
Culvert Slope (feet per foot)	0.0030

==========

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Headwater (ft) Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
4.1	1.59	1.12	1.24	0.94	0.78	1.50	2.32

==========

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PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

December 16, 1996
Maryvale Baseball Park
Line "F"
24" Pipe

==========

PROGRAM INPUT DATA:

DESCRIPTION	VALUE
Culvert Diameter (feet).....	1.50
FHWA Chart Number (1,2 or 3).....	1
Scale Number on Chart (Type of Culvert Entrance).....	2
Manning's Roughness Coefficient (n-value).....	0.0130
Entrance Loss Coefficient of Culvert Opening.....	0.50
Culvert Length (feet).....	394.0
Culvert Slope (feet per foot).....	0.0030

==========

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Headwater (ft) Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
2.1	1.24	0.76	0.25	0.62	0.55	0.62	3.02

==========

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III. HYDRAULICS
Offsite Flood Control Components Preliminarily Analyzed with this Project

51st Avenue Storm Drain, Line D

Interception & Conveyance Estimates
Figure 6: Existing Storm Drain/Catch Basin Locations
Table 5: Existing Catch Basin Inlet Calculations
Details for Existing Catch Basins Type B, C, D & E

Site "B" - Crittenden Lane Storm Drain, Lines X & Y

Table 6: Option Analysis Summary Sheet
Table 7: Estimated Storm Drain Costs
Table 8: Crittenden Lane Storm Drain, Lines X & Y
Table 9: Rational Method Worksheet
Table 10: Crittenden Lane Street Capacity Computations
Table 11: Preliminary Catch Basin Design
HEC-2: Crittenden Lane

Site "C" - Whitton Avenue Channel

HEC-RAS: Whitton Avenue Channel
Hydrograph: Whitton Avenue Channel (10-Year)
55th Avenue Storm Drain

LINE "D"

MARYVALE BASEBALL PARK

Interception and Conveyance Estimates for 51st Avenue Storm Drain (Line "D")

51st Avenue North of Indian School Road

There are 21 catch basins in 51st Avenue and 12 catch basins in the Campbell Avenue lateral which contribute to the 51st Avenue storm drain north of Indian School Road.

Based on the type of catch basin, the capacity of each basin was estimated (see attached calculations). The combined capacity of all catch basins north of Indian School Road is estimated at 84 cfs. Checking the capacity of the storm drain north of Indian School Road (42" pipe at 0.0036 ft/ft) assuming COP storm drain design criteria (HGL below crown) the pipe capacity is 65 cfs. This indicates a surcharge in the hydraulic grade line within the storm drain system.

In Indian School Road east of 51st Avenue there are 35 catch basins. Again, based on the capacity of the basins, the combined capacity of all catch basins east of 51st Avenue is estimated at 112 cfs. Checking the capacity of the storm drain in Indian School Road (42" pipe with a HGL slope of 0.0058 ft/ft) the pipe capacity is 83 cfs. This indicates a surcharge in the hydraulic grade line within the storm drain system. This also suggests a potential overtopping at Indian School Road should the HGL rise above the gutter line.

Based on the controlling pipe conveyance, these estimates project a storm drain capacity at 51st Avenue and Indian School Road of 167 cfs. There are 5 catch basins in 51st between Indian School and the new storm drain. The capacity of these basins is estimated at 8.5 cfs. There are 3 catch basins in Whitton Avenue which contribute to this storm drain system. The capacity of these basins is estimated at 25 cfs. Checking the capacity of the storm drain in Whitton Avenue (24" pipe at 0.02 ft/ft) with HGL below crown the pipe capacity is 34 cfs. Based on these estimates, the total flow at the proposed storm drain diversion is 219 cfs.

The capacity of the new 72" storm drain (Line "C") diversion to the storage basin is 212 cfs. Even though the existing catch basins provide inlet capacity slightly in excess of the storm drain full flow capacity, Wood/Patel is proposing two additional catch basins (each with 37 ft of curb opening) in 51st Avenue just south of Mitchell Drive. These catch basins will provide an additional 19 cfs. interception capacity. These basins will be located adjacent to the site in areas which will be disturbed due to offsite improvements required for site development.

Conclusion:

Total probable catch basin capacity:

1.	51st Avenue north of Indian School	84 cfs
2.	Indian School east of 51st Avenue	83 cfs
3.	51st Avenue north of Mitchell Drive	8.5 cfs
4.	Whitton Avenue west of 51st Avenue	25 cfs
5.	New catch basins in 51st Avenue, south of Mitchell Drive	19 cfs
		219

WOOD/PATEL

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS

PROJECT Maryvale Baseball Park

PROJECT NO. 96398.02 SHEET NO. 1 OF 2

CALCULATED BY JGT DATE 10/15/96 CHECKED BY _____ DAT _____

51st Ave North of Indian School Road

Campbell Ave Lateral (12 C.B)

12	TYPE 'D' On Grade	Q = 2.76 cfs/basin	33.1 cfs

51st Ave (21 CB)

10	TYPE M1, L=0'	2.4 cfs/basin	24.0 cfs
2	TYPE M1, L=6'	6.3 cfs/basin	12.6 cfs
2	TYPE H	1.4 cfs/basin	2.8 cfs
1	TYPE E	1.4 cfs/basin	1.4 cfs
1	TYPE B	1.7 cfs/basin	1.7 cfs
1	TYPE D	2.8 cfs/basin	2.8 cfs
4	UNK (ASSUME TYPE E) ON Grade	1.4 cfs/basin	5.6 cfs
			51 cfs

51+33 = 84 cfs

Indian School Road east of 51st Ave (35 C.B)

6	TYPE B SUMP	7.5 cfs/basin	45.0 cfs
9	TYPE C	2.8 cfs/basin	25.2 cfs
2	TYPE D SUMP	8.4 cfs/basin	16.8 cfs
10	TYPE E	0.97 cfs/basin	9.7 cfs
8	UNK (ASSUME ½ C & ½ E)	1.9 cfs/basin	15.2 cfs
			112 cfs

84+112 = 196 cfs

51st Ave South to the New Storm Drain (5 CB)

1	TYPE C	2.8 cfs/basin	2.9 cfs
1	TYPE D	2.8 cfs/basin	2.8 cfs
3	UNK (ASSUME TYPE E) on Grade	0.97 cfs/basin	2.9 cfs
			8.5 cfs

196 + 8.5 = 205 cfs

WOOD/PATEL

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS

PROJECT Maryvale Baseball Park

PROJECT NO. _____ SHEET NO. 2 OF 2

CALCULATED BY _____ DATE _____ CHECKED BY _____ DAT _____

Whitton Ave (3 CB)

1	M2, L=6' (SUMP)	15cfs/basin	15 cfs
2	M2, L=3' (SUMP)	10cfs/basin	10 cfs
			25cfs

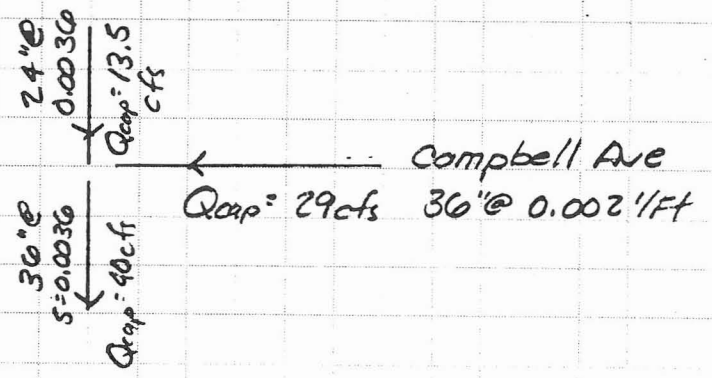
205+25= 230cfs

New catch basins at diversion

2	P1569, M-2, L=M'	9.3 cfs/basin	19 cfs

230+19 = 249 cfs

Check of storm drain capacities north of Indian school Road



Campbell Ave Q est = 33.1 ≈ Qcap 29cfs

51st Ave North of Campbell

2	TYPE N	1.4 cfs	2.8
4	TYPE M1 L=0	2.4cfs	9.6
1	TYPE E	1.4cfs	1.4

Qest: 13.8cfs ≈ Qcap 13.5

Combined: Qest (33.1+13.8) = 46.9cfs ≈ Qcap 40cfs

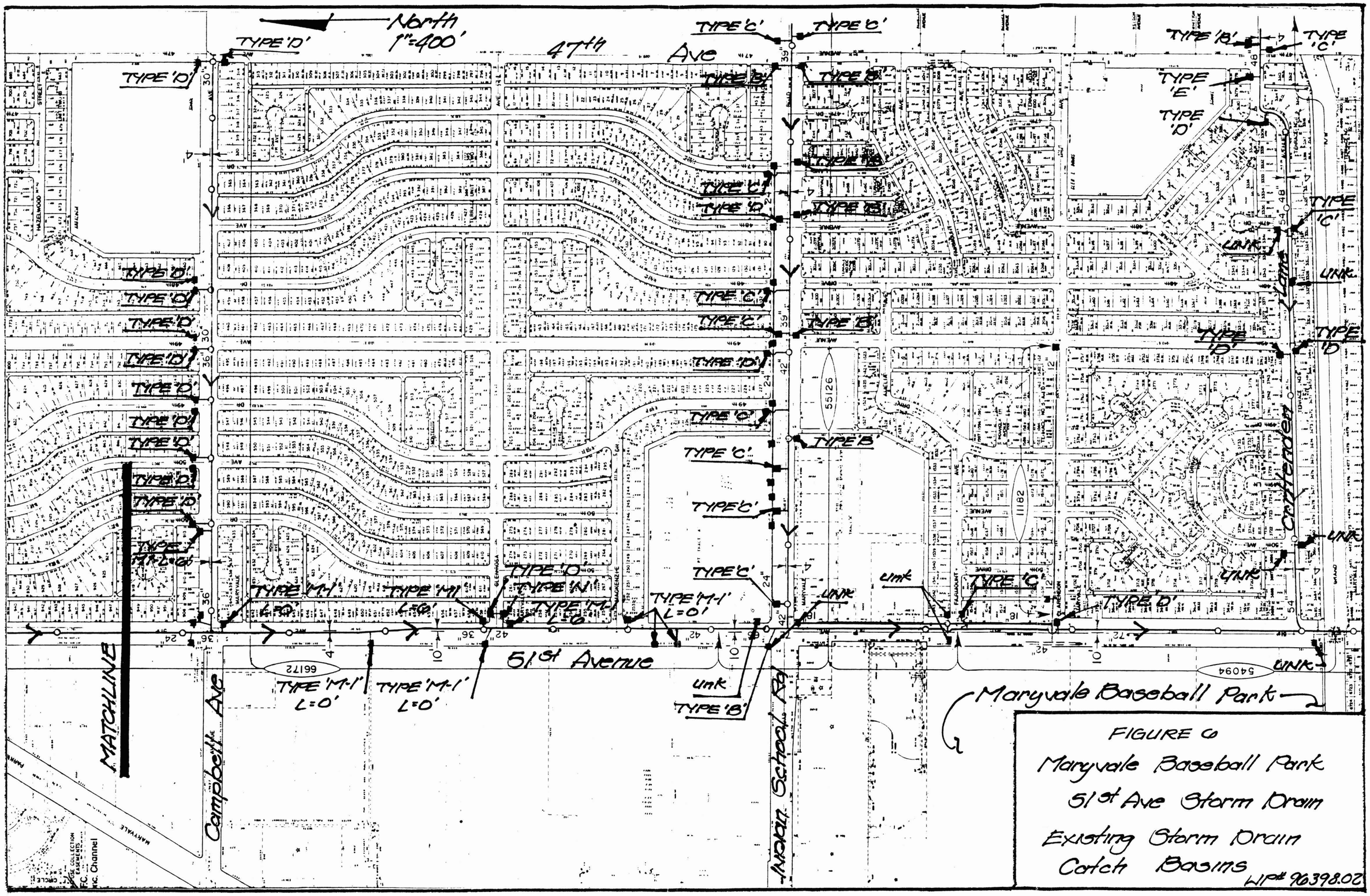


FIGURE 6
Maryvale Baseball Park
51st Ave Storm Drain
Existing Storm Drain
Catch Basins
WP# 96398.02

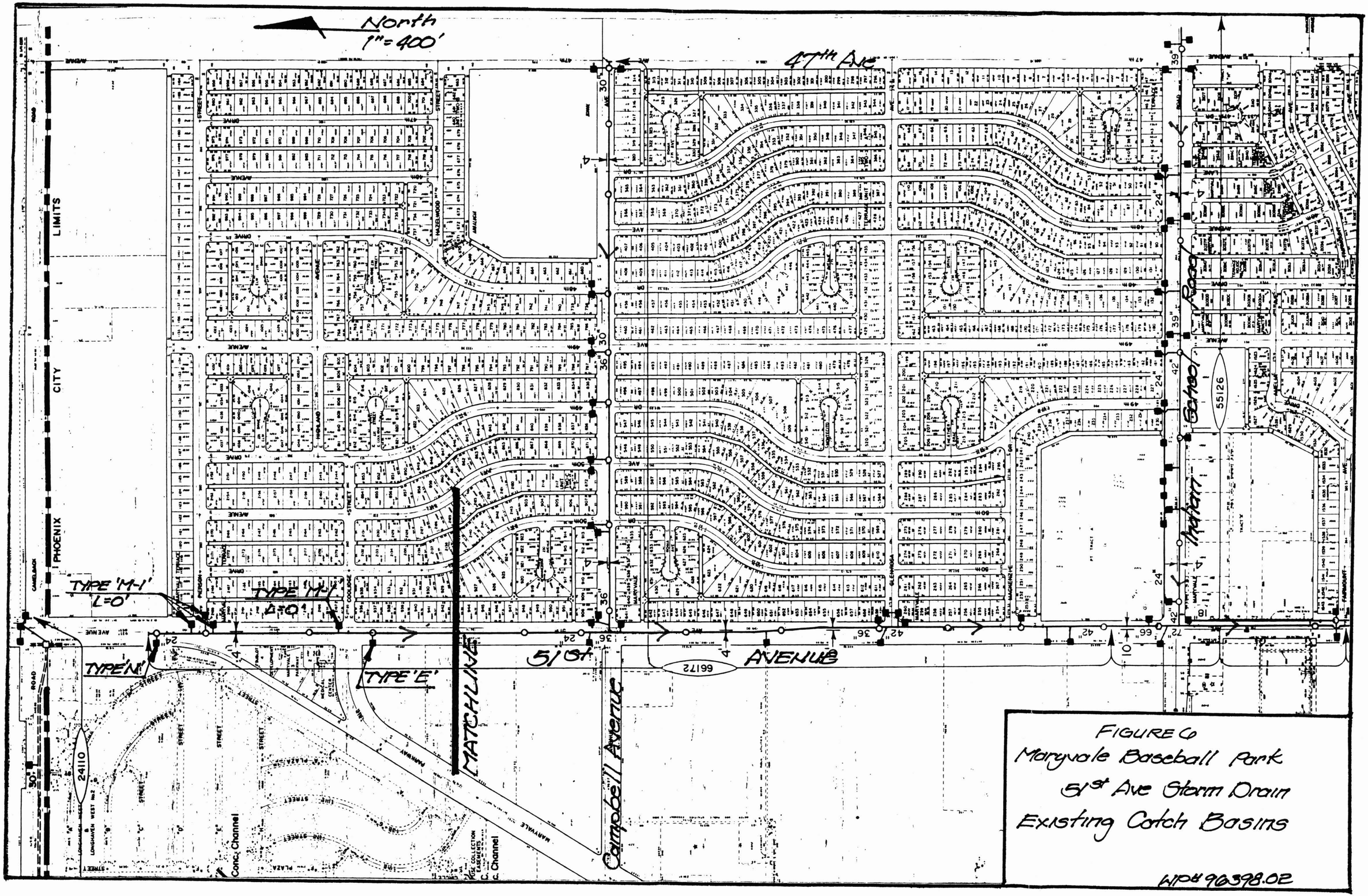


FIGURE 6
Maryvale Baseball Park
51st Ave Storm Drain
Existing Catch Basins

WP# 96398.02

Wood/Patel & Associates

Table 5

Maryvale Baseball Park

Capacity of existing catch basins
contributing to the 51st Ave Storm Drain.

Job No. 93986.02
12/12/96

Catch Basin Type	Basin Location	Slope ft/ft	Capacity (cfs)
Type B	In Sump	N/A	7.5
Type B	On Grade	0.002	1.7
Type C	On Grade	0.002	2.8
Type D	In Sump	N/A	8.4
Type D	On Grade	0.002	2.8
Type E	On Grade	0.002	1.4
Type N	On Grade	0.002	1.4
Type M-1, L=0'	On Grade	0.002	2.4
Type M-1, L=6'	On Grade	0.002	6.3
Type M-2, L=3'	In Sump	N/A	10.0
Type M-2, L=6'	In Sump	N/A	15.0
Type M-2, L=17'	In Sump	N/A	9.3

Note: Capacity calculations based on 4" depression at inlet.
Depth of flow used in calcs is assumed at top of curb.

q:\mvalebbp\critexcb.wq2

ARIZONA DEPARTMENT OF TRANSPORTATION
DRAINAGE DESIGN SECTION

10-14-1996

PROJECT NAME-_____ TRACS NO.- _____
HIGHWAY NAME-_____ DESIGNER - _____
LOCATION -_____ CHECKER - _____PAGE_____
Ver 3.40: December 1995

CURB OPENING INLET -- ON GRADE

GUTTER FLOW HYDRAULICS
GUTTER DESCRIPTION

Roadway Grade-% Per cent--G	=	0.200
Roadway Cross-Slope-Ft./Ft.--Sx	=	0.020
Shoulder Width-Ft.--	=	10.000
Shoulder Slope-Ft./Ft.--Ss	=	0.020
Gutter Width-Ft.--W	=	1.420
Gutter Slope-Ft./Ft.--Sw	=	0.057
Gutter Depression-Inches--	=	0.971
Manning's 'N	=	0.016
Flow-CFS--Q	=	2.760
SPREAD-Ft.--T	=	14.040
Average Velocity-V-fps	=	1.374
FLOW in Gutter-CFS--Q	=	0.768
% Flow in Gutter-CFS	=	27.840
Velocity of Flow in Gutter-fps	=	1.847
Depth at Curb Line-Inches--d	=	4.000

CURB OPENING--ADOT STD. C-15.20

Flow-CFS--Q	=	2.760
Gutter Velocity at INLET-fps	=	2.307
GUTTER FLOW at INLET-CFS--Q	=	1.282
Depth at INLET Curb Line-Inches--d	=	6.680
Local Gutter Depression-Inches	=	3.000
Length of opening: TOTAL Intercept--Ft.	=	7.636
Capture Ratio -- CURB OPENING	=	0.800

LENGTH	Efficiency	Q(Captured)	Q(By-Pass)
3.083	0.606	1.672	1.088
6.583	0.972	2.682	0.078
9.583	1.000	2.760	0.000
13.583	1.000	2.760	0.000
20.583	1.000	2.760	0.000

ARIZONA DEPARTMENT OF TRANSPORTATION
DRAINAGE DESIGN SECTION

10-09-1996

PROJECT NAME-_____ TRACS NO.- _____
HIGHWAY NAME-_____ DESIGNER - _____
LOCATION -_____ CHECKER - _____PAGE_____
Ver 3.40: December 1995

CURB OPENING INLET--IN SUMP

GUTTER FLOW HYDRAULICS

GUTTER DESCRIPTION

Roadway Cross-Slope-Ft./Ft.--Sx	=	0.020
Shoulder Width-Ft.--	=	10.000
Shoulder Slope-Ft./Ft.--Ss	=	0.020
Gutter Width-Ft.--W	=	1.420
Gutter Slope-Ft./Ft.--Sw	=	0.056
Gutter Depression-Inches--	=	0.954
Capture Ratio -- CURB OPENING	=	0.800
Depth at INLET Curb Line-Inches--d	=	4.000
Local Gutter Depression-Inches	=	3.000
SPREAD-Ft.--T	=	14.111

LENGTH	Q(weir)	Q(orifice)	Q(INLET)
3.083	4.623	4.607	4.607
6.583	7.492	9.838	7.492
9.583	9.951	14.321	9.951
13.583	13.230	20.298	13.230
20.583	18.969	30.759	18.969

*** Q(INLET) is Lesser of WEIR or ORIFICE flow.! ***

ARIZONA DEPARTMENT OF TRANSPORTATION
DRAINAGE DESIGN SECTION

10-14-1996

PROJECT NAME-_____ TRACS NO.- _____
HIGHWAY NAME-_____ DESIGNER - _____
LOCATION -_____ CHECKER - _____PAGE_____
Ver 3.40: December 1995

CURB OPENING INLET -- ON GRADE

GUTTER FLOW HYDRAULICS
GUTTER DESCRIPTION

Roadway Grade-% Per cent--G	=	0.200
Roadway Cross-Slope-Ft./Ft.--Sx	=	0.020
Shoulder Width-Ft.--	=	10.000
Shoulder Slope-Ft./Ft.--Ss	=	0.020
Gutter Width-Ft.--W	=	1.420
Gutter Slope-Ft./Ft.--Sw	=	0.057
Gutter Depression-Inches--	=	0.971
Manning's 'N	=	0.016
Flow-CFS--Q	=	2.760
SPREAD-Ft.--T	=	14.040
Average Velocity-V-fps	=	1.374
FLOW in Gutter-CFS--Q	=	0.768
% Flow in Gutter-CFS	=	27.840
Velocity of Flow in Gutter-fps	=	1.847
Depth at Curb Line-Inches--d	=	4.000

CURB OPENING--ADOT STD. C-15.20

Flow-CFS--Q	=	2.760
Gutter Velocity at INLET-fps	=	2.307
GUTTER FLOW at INLET-CFS--Q	=	1.282
Depth at INLET Curb Line-Inches--d	=	6.680
Local Gutter Depression-Inches	=	3.000
Length of opening: TOTAL Intercept--Ft.	=	7.636
Capture Ratio -- CURB OPENING	=	0.800

LENGTH	Efficiency	Q(Captured)	Q(By-Pass)
3.083	0.606	1.672	1.088
6.583	0.972	2.682	0.078
9.583	1.000	2.760	0.000
13.583	1.000	2.760	0.000
20.583	1.000	2.760	0.000

ARIZONA DEPARTMENT OF TRANSPORTATION
DRAINAGE DESIGN SECTION

10-14-1996

PROJECT NAME-_____ TRACS NO.- _____
HIGHWAY NAME-_____ DESIGNER - _____
LOCATION -_____ CHECKER - _____PAGE_____
Ver 3.40: December 1995

CURB OPENING W/ GRATE--ON GRADE

GUTTER FLOW HYDRAULICS
GUTTER DESCRIPTION

Roadway Grade-% Per cent--G	=	0.200
Roadway Cross-Slope-Ft./Ft.--Sx	=	0.020
Shoulder Width-Ft.--	=	10.000
Shoulder Slope-Ft./Ft.--Ss	=	0.020
Gutter Width-Ft.--W	=	1.420
Gutter Slope-Ft./Ft.--Sw	=	0.057
Gutter Depression-Inches--	=	0.971
Manning's 'N	=	0.016
Flow-CFS--Q	=	2.760
SPREAD-Ft.--T	=	14.040
Average Velocity-V-fps	=	1.374
FLOW in Gutter-CFS--Q	=	0.768
% Flow in Gutter-CFS	=	27.840
Velocity of Flow in Gutter-fps	=	1.847
Depth at Curb Line-Inches--d	=	4.000

CURB OPENING--ADOT STD. C-15.40
GRATE TYPE: ADOT STD.--C15.91

Grate Length--Ft.	=	3.354
Grate Width---Ft.	=	2.000
Grate Area--Sq. Ft.	=	5.171
Splash-Over Velocity--FPS	=	5.016
Depth at INLET Curb Line-Inches--d	=	6.680
Local Gutter Depression-Inches	=	3.000
Length of opening: TOTAL Intercept--Ft.	=	7.636
Capture Ratio -- GRATE	=	0.250
Capture Ratio -- CURB OPENING	=	0.800

CURB OPENING:

LENGTH	Efficiency	Q(C.O.)	Q(GRATE)	Q(INT.)	Q(By-Pass)	% CAPT.
3.500	0.668	1.844	0.762	2.606	0.153	94.44
6.500	0.968	2.670	0.089	2.760	0.000	100.00
10.500	1.000	2.760	0.000	2.760	0.000	100.00
17.500	1.000	2.760	0.000	2.760	0.000	100.00

ARIZONA DEPARTMENT OF TRANSPORTATION
DRAINAGE DESIGN SECTION

10-09-1996

PROJECT NAME-_____ TRACS NO.- _____
HIGHWAY NAME-_____ DESIGNER - _____
LOCATION -_____ CHECKER - _____PAGE_____
Ver 3.40: December 1995

CURB OPENING W/ GRATE--IN SUMP

GUTTER FLOW HYDRAULICS

GUTTER DESCRIPTION

Roadway Cross-Slope-Ft./Ft.--Sx	=	0.020
Shoulder Width-Ft.--	=	10.000
Shoulder Slope-Ft./Ft.--Ss	=	0.020
Gutter Width-Ft.--W	=	1.420
Gutter Slope-Ft./Ft.--Sw	=	0.056
Gutter Depression-Inches--	=	0.954

GRATE TYPE: NON-STD. GRATE

Grate Length--Ft.	=	3.000
Grate Width---Ft.	=	2.000
Grate Area--Sq. Ft.	=	6.000
Effective Perimeter--Ft.	=	7.000
Capture Ratio -- CURB OPENING	=	0.800
Capture Ratio -- CURB OPENING	=	0.800
Local Gutter Depression-Inches	=	3.000
Depth at Curb Line-Inches--d	=	4.000
SPREAD-Ft.--T	=	14.111

	---- CURB OPENING ----		------ GRATE ------		
LENGTH	Q(weir)	Q(orifice)	Q(weir)	Q(orifice)	Q(INLET)
3.083	4.623	4.607	0.858	5.090	5.466
6.583	7.492	9.838	0.858	5.090	8.350
9.583	9.951	14.321	0.858	5.090	10.810
13.583	13.230	20.298	0.858	5.090	14.089
20.583	18.969	30.759	0.858	5.090	19.827

*** Q(INLET) is SUM of WEIR FLOW in Curb Opening and Grate ***

TYPE E & N ON GRADE

ARIZONA DEPARTMENT OF TRANSPORTATION
DRAINAGE DESIGN SECTION

10-09-1996

PROJECT NAME-_____ TRACS NO.- _____
HIGHWAY NAME-_____ DESIGNER - _____
LOCATION -_____ CHECKER - _____ PAGE_____
Ver 3.40: December 1995

GRATE INLET DESIGN -- ON GRADE

GUTTER FLOW HYDRAULICS
GUTTER DESCRIPTION

Roadway Grade-% Per cent--G	=	0.200
Roadway Cross-Slope-Ft./Ft.--Sx	=	0.020
Shoulder Width-Ft.--	=	10.000
Shoulder Slope-Ft./Ft.--Ss	=	0.020
Gutter Width-Ft.--W	=	1.420
Gutter Slope-Ft./Ft.--Sw	=	0.056
Gutter Depression-Inches--	=	0.954
Manning's 'N	=	0.016
Flow-CFS--Q	=	2.793
SPREAD-Ft.--T	=	14.111
Average Velocity-V-fps	=	1.377
FLOW in Gutter-CFS--Q	=	0.771
% Flow in Gutter-CFS	=	27.618
Velocity of Flow in Gutter-fps	=	1.850
Depth at Curb Line-Inches--d	=	4.000

GRATE TYPE: ADOT STD.--C15.91

Grate Length--Ft.	=	3.420
Grate Width---Ft.	=	1.290
Grate Area--Sq. Ft.	=	4.410
Capture Ratio -- GRATE	=	0.250
Effective Perimeter--Ft.	=	6.000
Splash-Over Velocity--FPS	=	5.016
Local Gutter Depression-Inches	=	3.000
Flow-CFS--Q	=	2.793
GUTTER FLOW at INLET-CFS--Q	=	1.286
Gutter Velocity at INLET-fps	=	2.310
Depth at INLET Curb Line-Inches--d	=	6.682
Frontal Flow Intercepted by GRATE--CFS	=	1.235
Lateral Flow Intercepted by GRATE--CFS	=	0.128
TOTAL Flow Intercepted by GRATE--CFS	=	1.363
% FLOW Intercepted	=	48.796
By-pass Flow--CFS	=	1.430

TYPE E IN IN SUMP

ARIZONA DEPARTMENT OF TRANSPORTATION
DRAINAGE DESIGN SECTION

10-09-1996

PROJECT NAME-_____ TRACS NO.- _____
HIGHWAY NAME-_____ DESIGNER - _____
LOCATION -_____ CHECKER - _____ PAGE_____
Ver 3.40: December 1995

GRATE INLET--IN SUMP

GUTTER FLOW HYDRAULICS

GUTTER DESCRIPTION

Roadway Cross-Slope-Ft./Ft.--Sx	=	0.020
Shoulder Width-Ft.--	=	10.000
Shoulder Slope-Ft./Ft.--Ss	=	0.020
Gutter Width-Ft.--W	=	1.420
Gutter Slope-Ft./Ft.--Sw	=	0.056
Gutter Depression-Inches--	=	0.954

GRATE TYPE: ADOT STD.--C15.91

Grate Length--Ft.	=	3.420
Grate Width---Ft.	=	1.290
Grate Area--Sq. Ft.	=	4.400
Effective Perimeter--Ft.	=	4.140
Capture Ratio -- GRATE	=	0.250
Local Gutter Depression-Inches	=	3.000
Depth at INLET Curb Line-Inches--d	=	4.000
Depth at C.G. of Grate Flow--In.	=	5.411
SPREAD-Ft.--T	=	14.111
FLOW INTERCEPTED--WEIR FLOW--CFS	=	0.974
FLOW INTERCEPTED--ORIFICE FLOW--CFS	=	3.954

Q(INLET)= 0.974 cfs is Based on WEIR flow

TYPE M P-1569 on GRADE

ARIZONA DEPARTMENT OF TRANSPORTATION
DRAINAGE DESIGN SECTION

10-09-1996

PROJECT NAME-_____ TRACS NO.- _____
HIGHWAY NAME-_____ DESIGNER - _____
LOCATION -_____ CHECKER - _____PAGE_____
Ver 3.40: December 1995

CURB OPENING INLET -- ON GRADE

GUTTER FLOW HYDRAULICS
GUTTER DESCRIPTION

Roadway Grade-% Per cent--G	=	0.200
Roadway Cross-Slope-Ft./Ft.--Sx	=	0.020
Shoulder Width-Ft.--	=	10.000
Shoulder Slope-Ft./Ft.--Ss	=	0.020
Gutter Width-Ft.--W	=	1.420
Gutter Slope-Ft./Ft.--Sw	=	0.056
Gutter Depression-Inches--	=	0.954
Manning's 'N	=	0.016
Flow-CFS--Q	=	9.395
SPREAD-Ft.--T	=	22.444
Average Velocity-V-fps	=	1.852
FLOW in Gutter-CFS--Q	=	1.628
% Flow in Gutter-CFS	=	17.332
Velocity of Flow in Gutter-fps	=	2.492
Depth at Curb Line-Inches--d	=	6.000

CURB OPENING--ADOT STD. C-15.20

Flow-CFS--Q	=	9.395
Gutter Velocity at INLET-fps	=	2.774
GUTTER FLOW at INLET-CFS--Q	=	2.102
Depth at INLET Curb Line-Inches--d	=	7.882
Local Gutter Depression-Inches	=	2.000
Length of opening: TOTAL Intercept--Ft.	=	20.444
Capture Ratio -- CURB OPENING	=	0.800

P-1569	LENGTH	Efficiency	Q(Captured)	Q(By-Pass)
M	3.083	0.255	2.395	7.000
M1, L3'	6.583	0.503	4.727	4.668
M1, L6'	9.583	0.680	6.386	3.009
M1, L10'	13.583	0.860	8.079	1.316
M1, L17'	20.583	1.000	9.395	0.000

P1569 M-1, L-17'

TYPE 'M' P1569 in SUMP

ARIZONA DEPARTMENT OF TRANSPORTATION
DRAINAGE DESIGN SECTION

10-09-1996

PROJECT NAME-_____ TRACS NO.- _____
HIGHWAY NAME-_____ DESIGNER - _____
LOCATION -_____ CHECKER - _____PAGE_____
Ver 3.40: December 1995

CURB OPENING INLET--IN SUMP

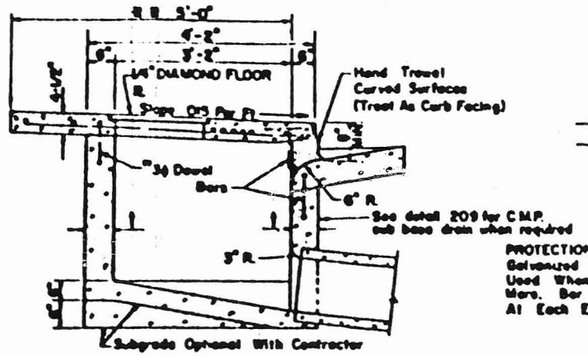
GUTTER FLOW HYDRAULICS

GUTTER DESCRIPTION

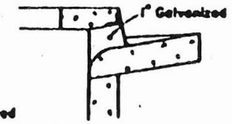
Roadway Cross-Slope-Ft./Ft.--Sx	=	0.020
Shoulder Width-Ft.--	=	10.000
Shoulder Slope-Ft./Ft.--Ss	=	0.020
Gutter Width-Ft.--W	=	1.420
Gutter Slope-Ft./Ft.--Sw	=	0.056
Gutter Depression-Inches--	=	0.954
Capture Ratio -- CURB OPENING	=	0.800
Depth at INLET Curb Line-Inches--d	=	6.000
Local Gutter Depression-Inches	=	2.000
SPREAD-Ft.--T	=	22.444

P-1569	LENGTH	Q(weir)	Q(orifice)	Q(INLET)
M	3.083	5.648	4.736	4.736
M1, L3'	6.583	9.153	10.112	9.153
M1, L6'	9.583	12.158	14.720	12.158
M1, L10'	13.583	16.164	20.865	16.164
M1, L17'	20.583	23.175	31.617	23.175

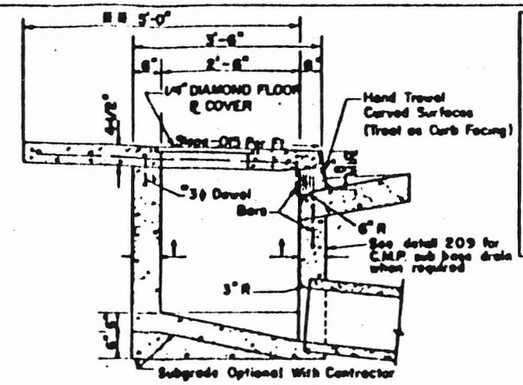
*** Q(INLET) is Lesser of WEIR or ORIFICE flow.! ***



SECTION "B-B"



PROTECTION BAR: Horizontal Plate Round Galvanized Steel Protection Bar Shall Be Used When Curb Face Is 11 Inches Or More. Bar Shall Be Embedded 5 Inches At Each End.



SECTION "F-F"

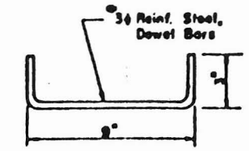
NOTES

V = 3'-6" unless otherwise specified
I = 6" for type 'A'
I = 6" for type 'B' if V = 4' or less
I = 8" for type 'B' if V = 4' to 8'
I = 10" for type 'B' if V = 8' to 10' (if V exceeds 10' special design required)

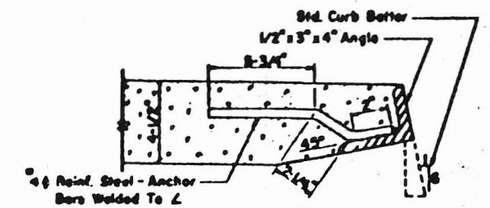
Connection Pipes may be placed in any position around the walls provided the position is consistent with the plan.

Outlet Pipe shall be to final shape & length before concrete is poured.

Floor of basin shall be troweled to a hard smooth surface and shall slope from all directions to outlet

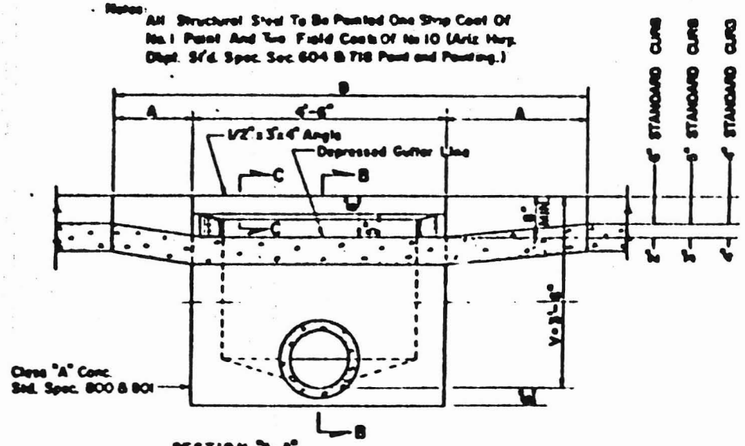


DOWEL BAR DETAIL



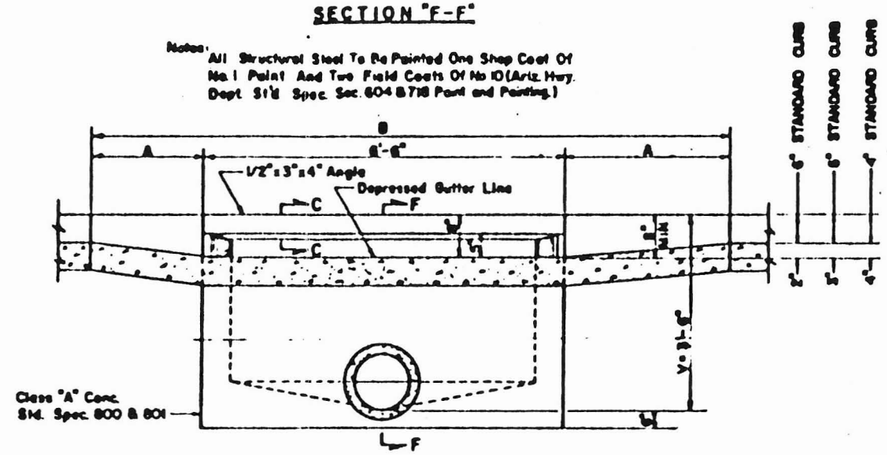
SECTION "C-C"

Notes: All Structural Steel To Be Painted One Shop Coat Of No. 1 Paint And Two Field Coats Of No. 10 (Ariz. Hwy. Dept. Std. Spec. Sec. 604 & 718 Paint and Painting.)

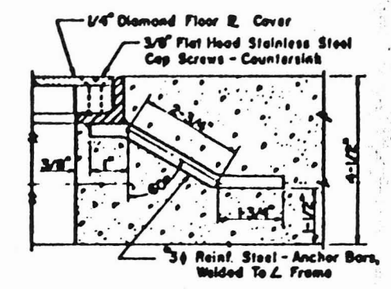


SECTION "A-A"

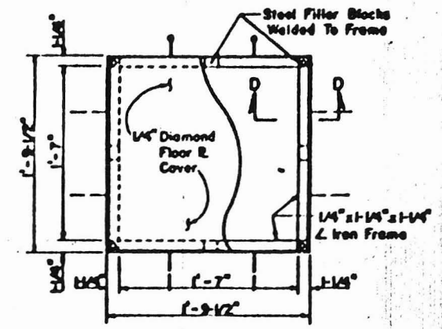
Notes: All Structural Steel To Be Painted One Shop Coat Of No. 1 Paint And Two Field Coats Of No. 10 (Ariz. Hwy. Dept. Std. Spec. Sec. 604 & 718 Paint and Painting.)



SECTION "E-E"

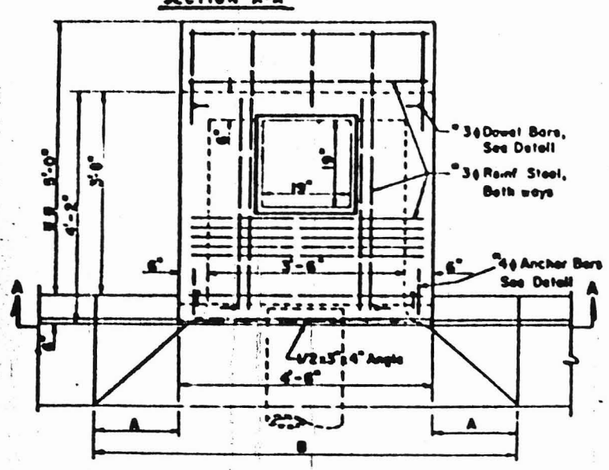


SECTION "D-D"



PLAN VIEW

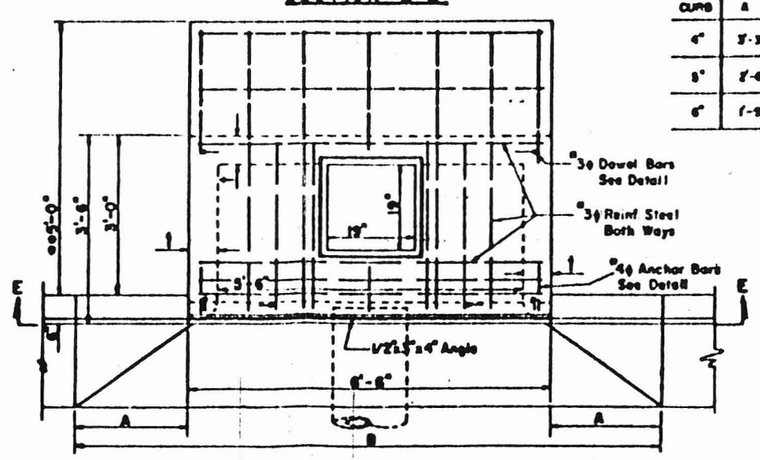
CURB	A	B
6"	3'-3"	11'-0"
5"	2'-6"	9'-6"
4"	1'-9"	8'-0"



** To Be 4'-0" In Locations Where 4' S/W Is Constructed

PLAN VIEW

CURB	A	B
6"	3'-3"	13'-0"
5"	2'-6"	11'-6"
4"	1'-9"	10'-0"



** To Be 4'-0" In Locations Where 4' S/W Is Constructed

PLAN VIEW

DETAILS & SECTIONS COMMON TO ALL CURB OPENING CATCH BASIN

TYPE 'B'

STANDARD DETAIL "216"
CITY OF PHOENIX
ENGINEERING DEPARTMENT
CATCH BASIN TYPE 'A' & TYPE 'B'

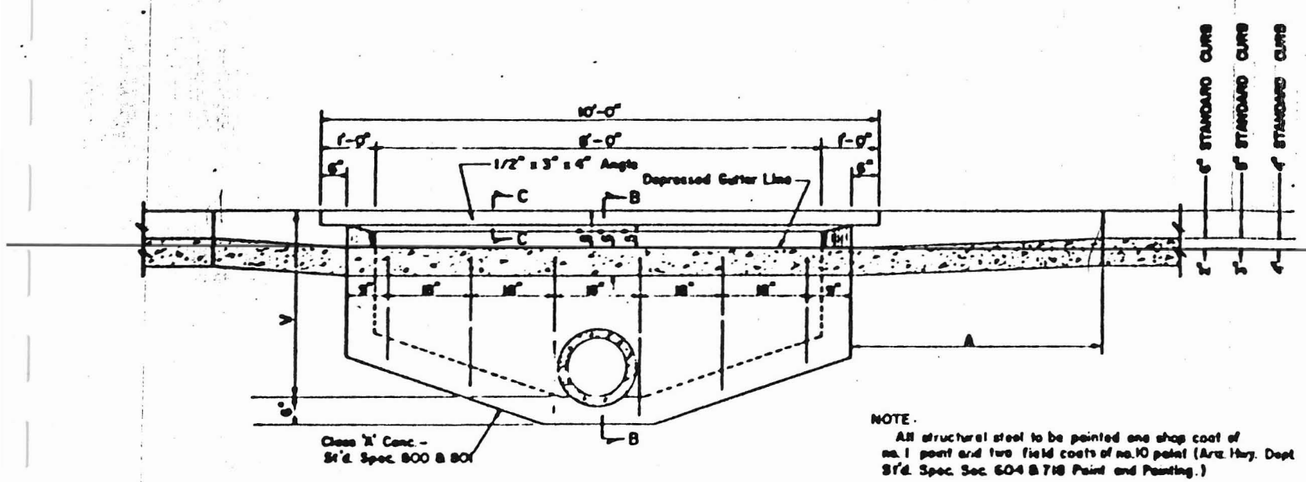
APPROVED C. C. Fitzhugh, CITY ENGINEER — Oct. 1, 1968, DATE

EV. 3-72
W. 10-1-68

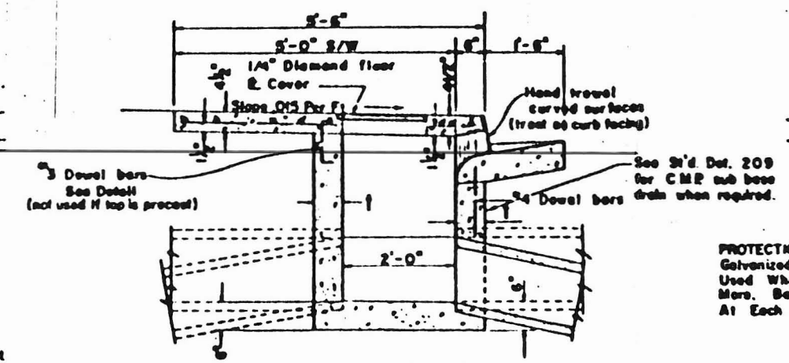
3'-6" CURB OPENING CATCH BASIN
TYPE "A"

5'-6" CURB OPENING CATCH BASIN
TYPE "B"

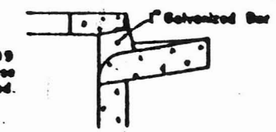
TYPE 'B'



SECTION "A-A"



SECTION "B-B"



PROTECTION BAR: Horizontal Plain Round Galvanized Steel Protection Bar Shall Be Used When Curb Face Is 11 Inches Or More. Bar Shall Be Embeded 3 Inches At Each End.

NOTE:

All structural steel to be painted one shop coat of no. 1 paint and two field coats of no.10 paint (Ariz. Hwy. Dept St'd. Spec. Sec. 604 & 718 Paint and Painting.)

The entire Catch Basin Cover may be poured in place or Precast.

Connection Pipes may be placed in any position around the walls provided the position is consistent with the plan

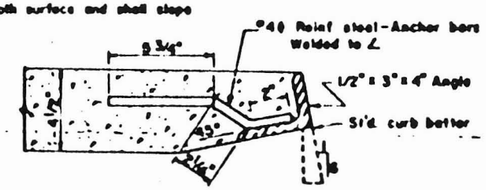
Outlet Pipe shall be trimmed to final shape and length before concrete is poured.

Floor of basin shall be trowelled to a hard, smooth surface and shall slope from all directions to outlet.

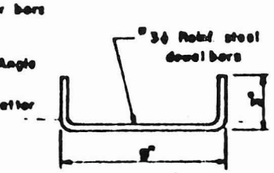
CURB	A	B
4"	3'-3"	13'-6"
8"	2'-6"	14'-0"
6"	1'-8"	12'-6"

DIMENSIONS

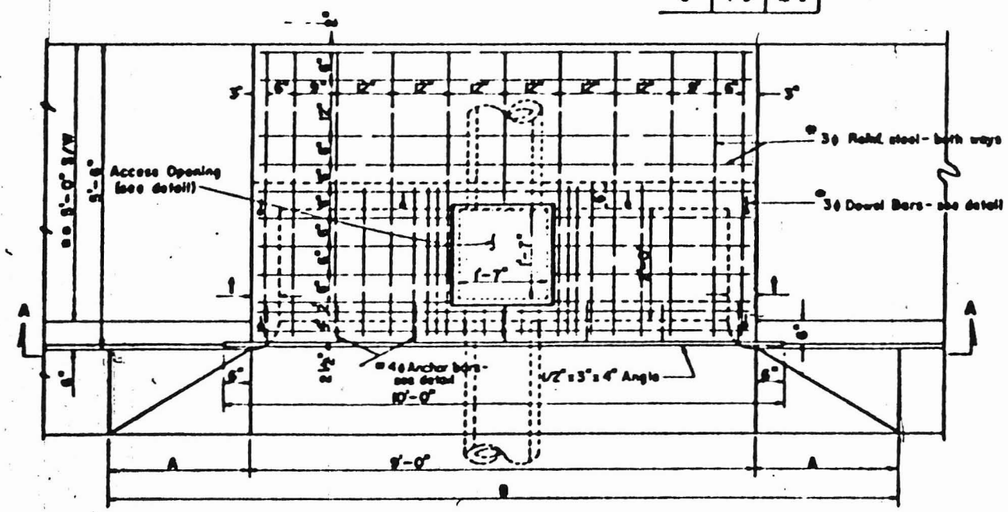
t = 6" if V = 4' or less
t = 8" if V is between 4' and 8'
t = 10" if V is 8' or more (if V exceeds 10' special design required)
V = 4' unless otherwise noted.



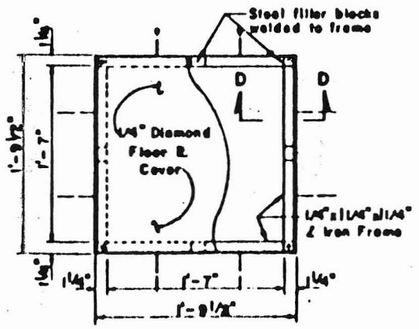
SECTION "C-C"



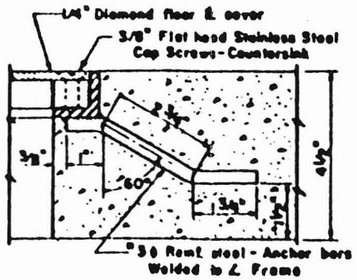
DOWEL BARS FOR COVER



PLAN VIEW



PLAN VIEW



SECTION "D-D"

ACCESS OPENING DETAIL

TYPE 'C'

8' CURB OPENING CATCH BASIN DETAILS

TYPE "C"

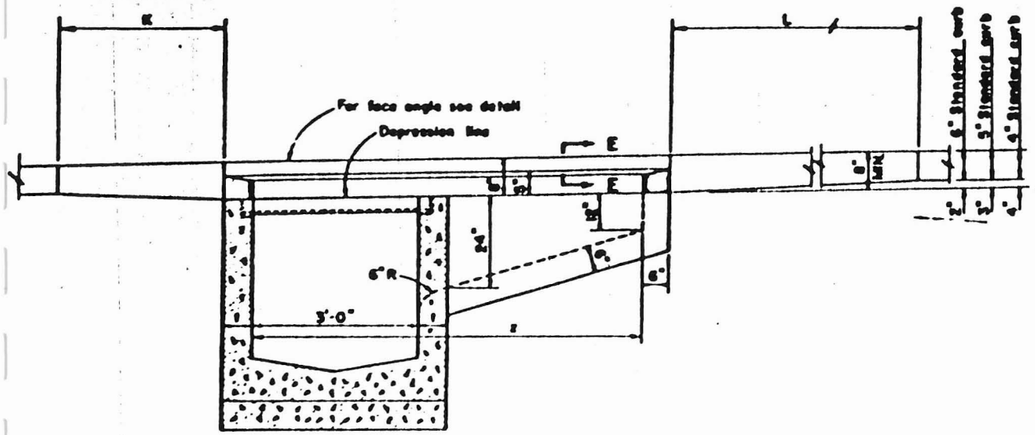
STANDARD DETAIL 217
CITY OF PHOENIX
ENGINEERING DEPARTMENT
CATCH BASIN TYPE 'C'

APPROVED R. C. Gatt Kirk — CITY ENGINEER — Oct 1, 1968 DATE

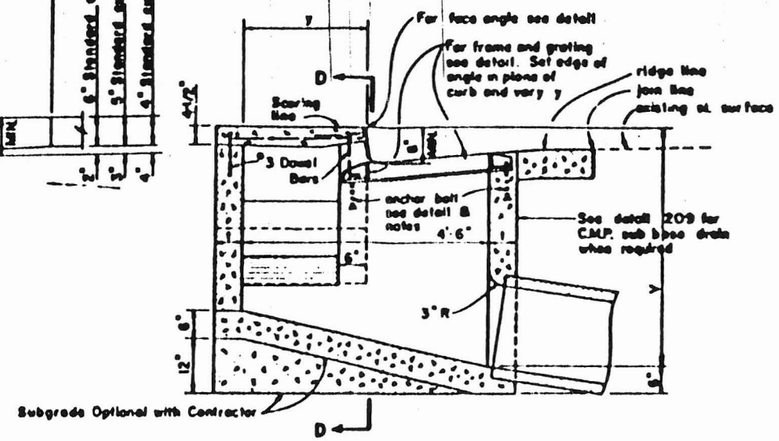
REV. 3-72
REW. 10-1-68

4/4/73

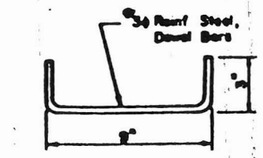
TYPE 'C'



SECTION D-D

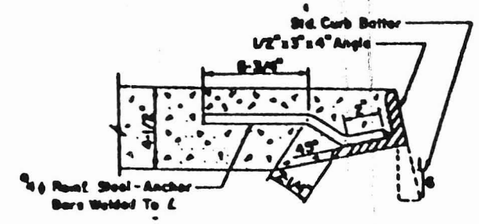


SECTION C-C



DOWEL BAR DETAIL

PROTECTION BAR: Horizontal plain round galvanized steel protection bar shall be used when curb face is 11" or more. Bar shall be embedded 5" at each end.



SECTION E-E

GENERAL NOTES

All Structural Steel to be galvanized or painted one shop coat of no 1 paint and two field coats of no 10 paint (Ariz Hwy Dept Std Spec. Sec 604 & 718 Paint and Painting)

Connection Pipes may be placed in any position around the walls provided the position is consistent with the plan.

Outlet Pipe shall be trimmed to final shape and length before concrete is poured.

Floor of basin shall be troweled to a hard, smooth surface and shall slope from all directions to outlet.

Reinforcing Steel clearance shall be 1" from bottom of slab.

Dimensions
- y = variable (approximately 8'-3")
- t = 8" if v is 5' or less
- t = 8" if v is greater than 5' (if v exceeds 10' special design required)
- v = 4'-0" unless otherwise specified
- z (for catch basin) = 7' unless otherwise specified on plan

NOTES FOR LOCAL DEPRESSION

(local depression is to be constructed only when specified on plan)

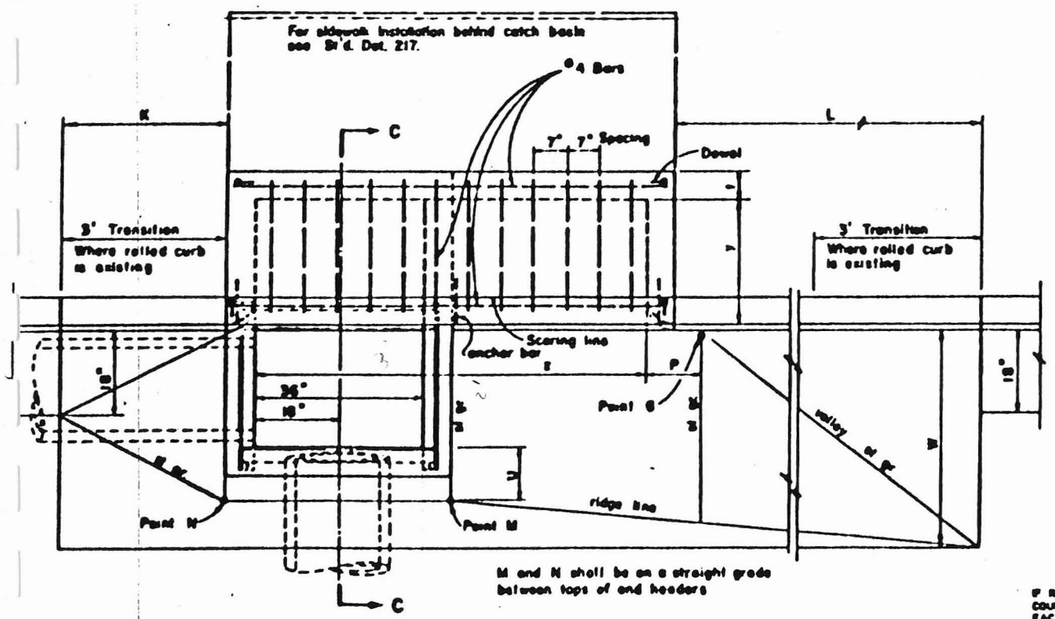
Concrete in local depression shall be not less than 8".

Curb Faces at catch basin opening and point G shall be that of the existing curb face plus 4" or as otherwise shown

Dimensions for local depression
- K = 3' unless otherwise specified
- L = 6' unless otherwise specified
- P = 12" unless otherwise specified
- U = 12" unless otherwise specified
- W = (width of local depression) + 4' unless otherwise specified

Elevations at the outer corners of local depression shown on the plans are for the finished surface

TYPE 'D'

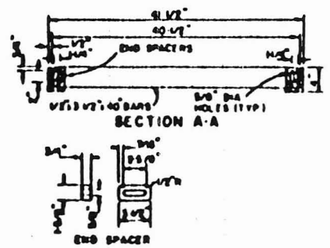


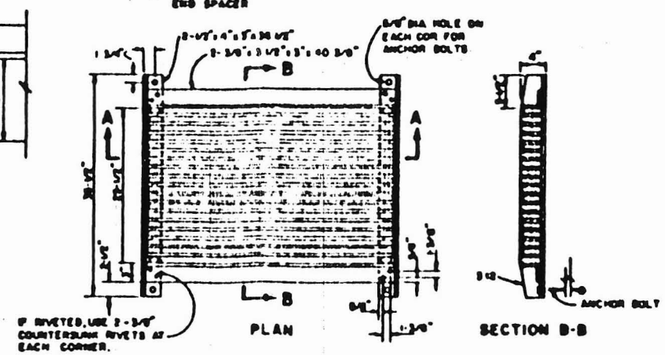
PLAN

7' CURB OPENING CATCH BASIN WITH LOCAL DEPRESSION TYPE "D"

NOTES FOR FRAME & GRATE

1. Frame may be riveted or welded. Frame & grating shall be tested for accuracy of fit & shall be marked in sets before delivery.
2. Bolt holes shall be 5/8" dia unless otherwise specified.
3. Anchor bolts shall be 1/2" dia x 8" with head and nut.
4. Tie rods shall be 1/2" dia x 25-3/8" threaded 3/4" on both ends. Use one, 1/2" dia nut each end.
5. All parts shall be of structural grade steel, except spacers, which shall be either cast iron or steel.



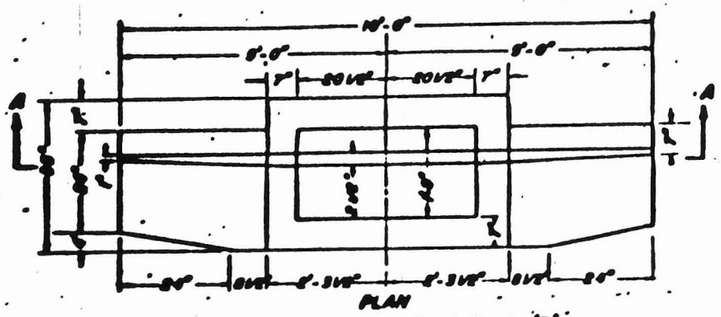


FRAME AND GRATE DETAIL

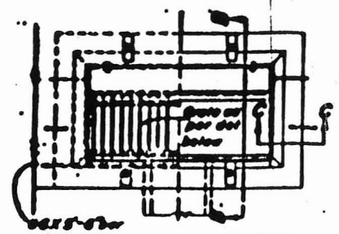
STANDARD DETAIL 218
CITY OF PHOENIX
ENGINEERING DEPARTMENT
CATCH BASIN TYPE 'D'

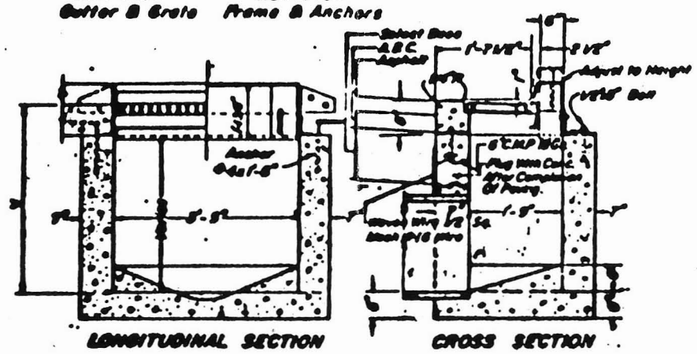
APPROVED R C Fatzinger Oct 1, 1968
CITY ENGINEER DATE

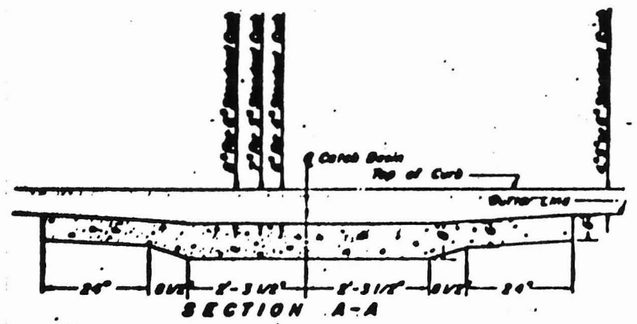
REV. 3-72
W. 10-1-68

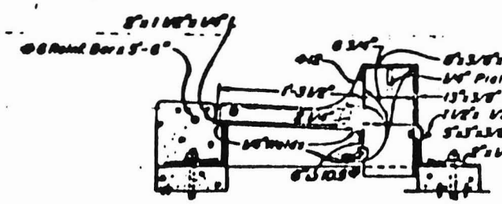


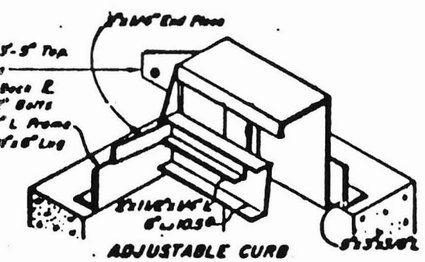
Curb & Gutter Detail – Catch Basin "E"



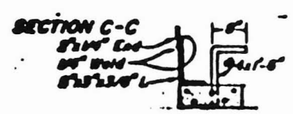


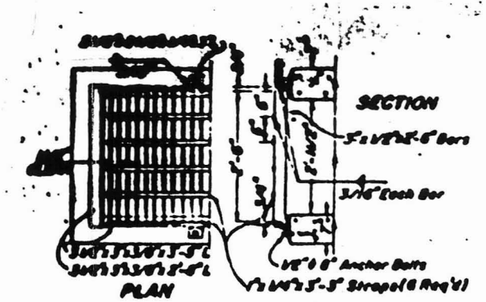


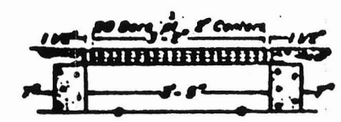




Showing relation of angles, Channel end end piece.



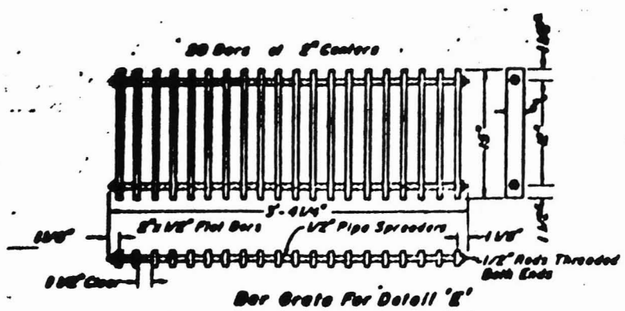


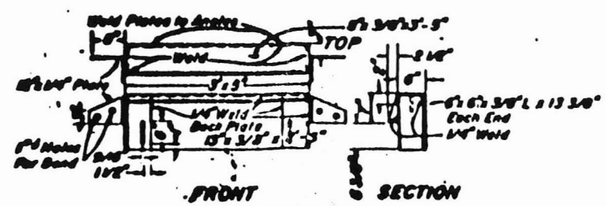


Welded frame and bar grate outlet use without curb. Bottom of concrete box is as shown for DETAIL "E"

TYPE "F"

CONCRETE CATCH BASIN





Detail of Adjustable Curb

GENERAL NOTES

Adjustable curb, frame, & grating units shall be structural steel ASTM A-7, painted one shop coat of No. 1 paint and two field coats of No.10 paint. (Ariz. Hwy. Dept. Std. Spec. Sec. 604 & 710 Paint and Painting.)

All concrete to be class "A".

Place only color or lean dry wall. Bottom of box to be sloped to outlet pipe from all directions and troweled to a hard smooth surface.

CMP Drains to be installed in all inlets built with paving projects.

See Project Plans for inlet details and depth of paving.

"V"-5'-0" unless otherwise specified.

TYPE "E"

CONCRETE CATCH BASIN

REV. 3-73
REV. 3-72
REV. 10-1-68

STANDARD DETAIL 219
CITY OF PHOENIX
ENGINEERING DEPARTMENT
CATCH BASIN TYPE 'E' & TYPE 'F'

APPROVED [signature] Oct. 1968

TYPE 'E', 'F' Grate

SITE "B"

CRITTENDEN LANE

MARYVALE BASEBALL PARK
Cumulative Flows from Rational Method Worksheet
Crittenden Lane, 51st Avenue to 45th Avenue

Crittenden Lane

In order to analyze the existing Crittenden Lane storm drain and recommend improvements to the system, Wood/Patel attempted to quantify the flows contributing to the system using the rational method (Figure 5) . Several option analyses were then performed incorporating different storm drain configurations and areas of coverage. A description of these options based on the approximate storm event (flood frequency) capacity of each option and the associated cost is included in this section. The FCDMC will base their decision on which option to pursue for future design based on these conclusions.

Option 1: Utilize the existing system capacity with an additional parallel storm drain from 50th Avenue to 51st Avenue.

The existing system from 45th Avenue to 47th Avenue will carry approximately the 1 year event. From 47th Avenue to 49th Avenue the capacity is approximately the 2-year event. From 49th Avenue to the proposed storm drain at 50th Avenue the capacity falls between the 1 and 2 year event. From 50th Avenue to 51st Avenue the combined capacity of the storm drains will increase to the 5-year event for the local area.

Option 2: Utilize the existing system capacity with an additional parallel storm drain from 50th Avenue to 49th Avenue.

The upstream system from 45th Avenue to 49th Avenue remains essentially the same as in Option 1. The combined capacity of the storm drain systems from 49th Avenue to 51st Avenue will increase to approximately the 5-year event.

Option 3: Utilize the existing system capacity with an additional parallel storm drain along the entire alignment.

The combined capacity of the storm drain systems will increase to approximately the 5-year event. The new system alignment analyzed was based on a design which could be constructed in phases from Option 1 thru to Option 3.

Table 6

Maryvale Baseball Park

W/P Job No. 96398.02

Option Analysis Summary Sheet

Crittenden Lane, 51st Ave to 45th Ave

12/12/96

Cumulative Flows from Rational Method

Option 1:

Concentration Point	Capacity of Existing Storm Drains	Capacity of Proposed Storm Drains	Capacity of Combined Storm Drains	1 Year Cumulative Flow (cfs)	2 Year Cumulative Flow (cfs)	5 Year Cumulative Flow (cfs)	10 Year Cumulative Flow (cfs)
1	115	110	225	110	154	212	247
2	115	0	115	96	134	185	215
3	115	0	115	88	122	168	196
4	115	0	115	80	111	154	179
5	115	0	115	67	92	128	148
6	75	0	75	61	83	116	134
7	75	0	75	51	68	94	109
8	30	0	30	30	39	54	62

Option 2:

Concentration Point	Capacity of Existing Storm Drains	Capacity of Proposed Storm Drains	Capacity of Combined Storm Drains	1 Year Cumulative Flow (cfs)	2 Year Cumulative Flow (cfs)	5 Year Cumulative Flow (cfs)	10 Year Cumulative Flow (cfs)
1	115	110	225	110	154	212	247
2	115	70	185	96	134	185	215
3	115	70	185	88	122	168	196
4	115	0	115	80	111	154	179
5	115	0	115	67	92	128	148
6	75	0	75	61	83	116	134
7	75	0	75	51	68	94	109
8	30	0	30	30	39	54	62

Option 3:

Concentration Point	Capacity of Existing Storm Drains	Capacity of Proposed Storm Drains	Capacity of Combined Storm Drains	1 Year Cumulative Flow (cfs)	2 Year Cumulative Flow (cfs)	5 Year Cumulative Flow (cfs)	10 Year Cumulative Flow (cfs)
1	115	110	225	110	154	212	247
2	115	70	185	96	134	185	215
3	115	70	185	88	122	168	196
4	115	40	155	80	111	154	179
5	115	40	155	67	92	128	148
6	75	35	110	61	83	116	134
7	75	20	95	51	68	94	109
8	30	20	50	30	39	54	62

- Indicates system capacity at each concentration point.

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Wood/Patel & Associates

Table 7

W/P Job No. 96398.02

Maryvale Baseball Park

Crittenden Lane Estimated Storm Drain Costs

12/12/96
11:12 AM

Option No.	Approximate Event Capacity of System	Storm Drain Pipe	Manholes (a)		Catch Basins (b)		Sub-Total Cost	Total Including Contingencies (c)
			No.	($2000/ea)	No.	($2000/ea)		
1	1 & 2 year event	$50,000	3	$6,000	4	$8,000	$64,000	$87,680
2	2 & 5 year event	$142,000	5	$10,000	8	$16,000	$168,000	$230,160
3	5 year event	$427,000	13	$26,000	19	$38,000	$491,000	$672,670

Note: (a) The number of additional manholes and catch basins required has been estimated.
(b) Manholes are based on city spacing requirements. Catch basins are based on estimated locations of concentrated flows.
(c) Contingency factor of 37% includes: 7% engineering, 5% Administration, and 25% construction.

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51st Avenue to I-10

CRITTENDEN LANE, EXISTING PIPE SYSTEM WITH IMPROVED OUTFALL IN TO 72" PIPE W/P RECOMMENDED FLOWS

TABLE 8
Crittenden Lane Storm Drain

12/12/96

Manning's "n"= 0.012

11:18 AM

STORM SEWER LINE STATION LOCATION	PIPE #	STATION	PIPE DIA (in)	REACH LENGTH (ft)	SLOPE OF REACH (ft/ft)	INVERT ELEV (ft)	DESIGN Q (cfs)	FULL PIPE DISCHARG (cfs)	VELOCITY (fps)	KJ	VELOCITY HEAD (ft)	HEAD LOSSES FRICTION Hf (ft)	HEAD LOSSES JUNCTION LOSS (ft)	SLOPE OF ENERGY GRADE (ft/ft)	PREL GRADE LINE ELEV ENERGY	PREL GRADE LINE ELEV HYDRAULIC	CHECK D+INV +.2vel hd	(a)	(b)	CONTROL HGL	CONTROL EGL	NATURAL GROUND ELEVATION	CHECK NAT GRND VS. EGL (c)	DEPTH TO INVERT
@ 51st Av/I-1																								
		716				1050.7									1057.65	1057.65				1057.65	***1057.65***	***1072.00***	ok	21.3
	1		84	666	0.0017																			
McDowell Rd		1382				1051.8	495	286.33	12.86	0.15	2.57	3.39	0.39	0.0095	1064.00	1061.43	1059.30	2.1	ok	1061.43	***1064.00***	***1073.00***	ok	21.2
	2		78	696	0.0043																			
		2078				1054.8	428	372.27	12.90	0.15	2.58	3.94	0.37	0.0062	1068.32	1065.74	1061.80	3.9	ok	1065.74	***1068.32***	***1074.50***	ok	19.7
	3		78	662	0.0044																			
		2740				1057.7	419	375.92	12.63	0.15	2.48	3.59	0.35	0.0058	1072.15	1069.67	1064.68	5.0	ok	1069.67	***1072.15***	***1077.00***	ok	19.3
	4		78	120	0.0035																			
Grade Break		2860				1058.1	404	336.01	12.17	0.15	2.30	0.60	0.33	0.0063	1072.91	1070.61	1065.06	5.5	ok	1070.61	***1072.91***	***1077.50***	ok	19.4
	5		78	544	0.0042																			
		3404				1060.4	395	366.89	11.90	0.15	2.20	2.62	0.32	0.0052	1075.75	1073.55	1067.31	6.2	ok	1073.55	***1075.75***	***1079.00***	ok	18.6
	6		78	656	0.0041																			
		4060				1063.0	387	362.35	11.66	0.15	2.11	3.03	0.00	0.0045	1078.69	1076.58	1069.96	6.6	ok	1076.58	***1078.69***	***1081.00***	ok	18.0
	7		78	663	0.0040																			
		4723				1065.7	387	358.40	11.66	0.15	2.11	3.07	0.30	0.0051	1082.06	1079.95	1072.60	7.3	ok	1079.95	***1082.06***	***1083.00***	ok	17.3
	8		78	661	0.0041																			
		5384				1068.4	378	362.32	11.39	0.15	2.01	2.92	0.28	0.0047	1085.16	1083.14	1075.27	7.9	ok	1083.14	***1085.16***	***1086.00***	ok	17.6
	9		78	158	0.0034																			
Grade Break		5542				1068.9	364	332.04	10.97	0.15	1.87	0.65	0.25	0.0047	1085.91	1084.04	1075.78	8.3	ok	1084.04	***1085.91***	***1086.50***	pb	17.6
	10		78	502	0.0046																			
		6044				1071.2	342	385.28	10.31	0.15	1.65	1.81	0.00	0.0032	1087.50	1085.85	1078.05	7.8	ok	1085.85	***1087.50***	***1088.50***	ok	17.3
	11		78	657	0.0043																			
Thomas Rd		6701				1074.1	342	374.08	10.31	0.15	1.65	2.37	0.17	0.0039	1090.05	1088.40	1080.90	7.5	ok	1088.40	***1090.05***	***1091.50***	ok	17.4
	12		72	276	0.0039																			
		6977				1075.1	244	285.67	8.63	0.15	1.16	0.78	0.14	0.0015	1090.47	1089.32	1081.37	7.9	ok	1089.32	***1090.47***	***1092.50***	ok	17.4
	13		72	506	0.0041																			
		7483				1077.2	221	292.74	7.82	0.15	0.95	1.17	0.12	0.0021	1091.56	1090.61	1083.39	7.2	ok	1090.61	***1091.56***	***1094.00***	ok	16.8
	14		72	662	0.0041																			
		8145				1079.9	205	293.55	7.25	0.15	0.82	1.32	0.00	0.0018	1092.74	1091.92	1086.07	5.8	ok	1091.92	***1092.74***	***1096.50***	ok	16.6
	15		72	601	0.0035																			
		8746				1082.0	205	269.91	7.25	0.15	0.82	1.19	0.00	0.0020	1093.93	1093.12	1088.15	5.0	ok	1093.12	***1093.93***	***1098.50***	ok	16.5
	16		72	659	0.0028																			
Grade Break		9405				1083.8	205	242.43	7.25	0.15	0.82	1.31	0.12	0.0022	1095.36	1094.54	1089.99	4.5	ok	1094.54	***1095.36***	***1102.50***	ok	18.7
	17		72	250	0.0080																			
Crittenden Ln		9655				1085.8	199	410.36	7.04	0.15	0.77	0.47	0.00	0.0017	1095.78	1095.01	1091.98	3.0	ok	1095.01	***1095.78***	***1105.00***	ok	19.2
Line X																								
@ 51st & Critt		0				1086.5									1095.78	1095.01				1095.01	***1095.01***	***1104.00***	ok	17.5
	1		54	416	0.0048																			
Along Critt		416				1088.5	115	147.71	7.23	0.15	0.81	1.21	0.00	0.0030	1097.03	1096.22	1093.16	3.1	ok	1096.22	***1097.03***	***1103.00***	ok	14.5
	2		54	661	0.0024																			
		1077				1090.1	115	104.81	7.23	0.15	0.81	1.92	0.00	0.0029	1098.95	1098.13	1094.76	3.4	ok	1098.13	***1098.95***	***1104.40***	ok	14.3
	3		54	853	0.0026																			
		1930				1092.3	115	108.19	7.23	0.15	0.81	2.47	0.08	0.0030	1101.50	1100.69	1096.96	3.7	ok	1100.69	***1101.50***	***1103.50***	ok	11.2
	4		48	346	0.0023																			
		2276				1093.1	75	74.83	5.97	0.15	0.55	0.80	0.00	0.0016	1102.04	1101.49	1097.21	4.3	ok	1101.49	***1102.04***	***1104.00***	ok	10.9
	5		48	551	0.0022																			
		2827				1094.3	75	72.62	5.97	0.15	0.55	1.27	0.02	0.0024	1103.34	1102.78	1098.41	4.4	ok	1102.78	***1103.34***	***1104.60***	ok	10.3
	6		42	1014	0.0017																			
		3841				1096.0	30	44.63	3.12	0.15	0.15	0.76	0.00	0.0004	1103.70	1103.55	1099.53	4.0	ok	1103.55	***1103.70***	***1104.80***	ok	8.8
	7		42	255	0.0016																			
		4096				1096.4	30	43.17	3.12	0.15	0.15	0.19	0.00	0.0008	1103.89	1103.74	1099.93	3.8	ok	1103.74	***1103.89***	***1104.08***	pb	7.7

CRITTENDEN LANE, NEW PIPE TO SUPPLEMENT CONVEYANCE

from 51st Ave to 45th Ave

TABLE 8

(Continued)

Line Y

12-Dec-96

Manning's "n"= 0.012

11:18 AM

STORM SEWER LINE STATION LOCATION	PIPE #	STATION	PIPE DIA (in)	REACH LENGTH (ft)	SLOPE OF REACH (ft/ft)	INVERT ELEV (ft)	DESIGN Q (cfs)	FULL PIPE DISCHARG (cfs)	VELOCITY (fps)	KJ	VELOCITY HEAD (ft)	HEAD LOSSES FRICTION Hf (ft)	HEAD LOSSES JUNCTION LOSS (ft)	SLOPE OF ENERGY GRADE (ft/ft)	PREL GRADE LINE ELEV ENERGY	PREL GRADE LINE ELEV HYDRAULIC	CHECK D+INV +.2vel hd	(a)	(b)	CONTROL HGL	CONTROL EGL	NATURAL GROUND ELEVATION	CHECK NAT GRND VS. EGL (c)	DEPTH TO INVERT
@ 51st Ave 72																								
		0				1086.00									1095.78	1095.01				1095.01	***1095.01***	***1104.00***	ok	18.0
	a		48	350	0.00256																			
to 50th Ave		350				1086.90	110	78.73	8.75	0.15	1.19	1.74	0.07	0.0064	1098.01	1096.82	1091.13	5.7	ok	1096.82	***1098.01***	***1102.33***	ok	15.4
	b		48	100	0.00256																			
		450				1087.15	70	78.73	5.57	0.15	0.48	0.20	0.00	-0.0051	1097.51	1097.02	1091.25	5.8	ok	1097.02	***1097.51***	***1102.75***	ok	15.6
	c		48	500	0.00256																			
		950				1088.43	70	78.73	5.57	0.15	0.48	1.01	0.00	0.0020	1098.51	1098.03	1092.53	5.5	ok	1098.03	***1098.51***	***1103.65***	ok	15.2
	d		42	350	0.00256																			
to 49th Ave		1300				1089.33	70	55.15	7.28	0.15	0.82	1.43	0.08	0.0053	1100.37	1099.55	1092.99	6.6	ok	1099.55	***1100.37***	***1103.75***	ok	14.4
	e		42	630	0.00256																			
		1930				1090.94	40	55.15	4.16	0.15	0.27	0.84	0.00	0.0005	1100.66	1100.39	1094.49	5.9	ok	1100.39	***1100.66***	***1103.30***	ok	12.4
	f		42	346	0.00256																			
		2276				1091.83	40	55.15	4.16	0.15	0.27	0.46	0.06	0.0015	1101.18	1100.91	1095.38	5.5	ok	1100.91	***1101.18***	***1103.40***	ok	11.6
	g		42	551	0.00256																			
		2827				1093.24	35	55.14	3.64	0.15	0.21	0.56	0.06	0.0010	1101.74	1101.53	1096.78	4.8	ok	1101.53	***1101.74***	***1103.91***	ok	10.7
	h		36	1014	0.00256																			
		3841				1095.83	20	36.56	2.83	0.15	0.12	0.77	0.00	0.0007	1102.43	1102.31	1098.86	3.4	ok	1102.31	***1102.43***	***1104.10***	ok	8.3
	I		30	255	0.00256																			
		4096				1096.49	20	22.47	4.07	0.15	0.26	0.51	0.00	0.0025	1103.08	1102.82	1099.04	3.8	ok	1102.82	***1103.08***	***1103.90***	ok	7.4

(c) If natural ground is less than 0.75 feet above EGL, "pb" statement appears here.
Minor losses are ignored in computation.

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Table 9

Maryvale Baseball Park

W/P Job # 96398.02

Rational Method Worksheet for Crittenden Lane

12/12/96

Description: Calculation of Peak Flows Using the Rational Method for Crittenden Lane between 51st Ave ans 43rd Ave.

Reference: City of Phoenix Storm Drain Design Manual

Known Values:

Lot travel time: 10 min

Design storm: 1, 2, 5 & 10 Year

Calculated Values:

Tc = lot travel time + street travel time (min)

= lot travel time + drainage length / avg velocity / 60 sec

Q = CiA

Conc. Point	Drainage Area, A (Acres)	Runoff Coefficient, C	Drainage Length (ft)	Avg. Slope (%)	Avg. Velocity (fps)	Time of Conc., Tc (min)	1 Year Intensity (in/hr)	1 Year Flow, Q (cfs)	Cumulative Flow (cfs)	2 Year Intensity (in/hr)	2 Year Flow, Q (cfs)	Cumulative Flow (cfs)	5 Year Intensity (in/hr)	5 Year Flow, Q (cfs)	Cumulative Flow (cfs)	10 Year Intensity (in/hr)	10 Year Flow, Q (cfs)	Cumulative Flow (cfs)
1	30.67	0.45	2200	0.3	2.0	28	1.00	14	110	1.45	20	154	2.00	28	212	2.33	32	247
2	18.97	0.45	2250	0.3	2.0	29	0.97	8	96	1.40	12	134	1.90	16	185	2.28	19	215
3	16.14	0.45	2200	0.3	2.0	28	1.00	7	88	1.45	11	122	2.00	15	168	2.33	17	196
4	30.62	0.45	2600	0.5	2.3	29	0.97	13	80	1.40	19	111	1.90	26	154	2.28	31	179
5	10.70	0.45	550	0.1	1.0	19	1.22	6	67	1.80	9	92	2.50	12	128	2.90	14	148
6	23.60	0.45	2220	0.4	2.1	28	1.00	11	61	1.45	15	83	2.00	21	116	2.33	25	134
7	44.65	0.45	2150	0.3	2.0	28	1.00	20	51	1.45	29	68	2.00	40	94	2.33	47	109
8	57.39	0.45	2250	0.5	2.3	26	1.18	30	30	1.50	39	39	2.10	54	54	2.40	62	62
							Total	*110*			*154*			*212*			*247*	

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Table 10

Street Capacity Computations

W/P # 96398

Maryvale Baseball Stadium - City of Phoenix

12/12/96

Description: Calculation of Street Flow Conveyance Capacity - Crittenden Lane

References: Federal Highway Administration, Hydraulic Engineering Circular No. 12, "Drainage of Highway Pavements", March 1984

Known Values:

Depth of Flow =	0.33	ft
Cross Slope =	0.02	ft/ft
Street Width (F/C to F/C) =	32	ft
Manning's "n" Value=	0.016	

Calculated Values:

Referenced Equations:

Q = 0.56 * (Sx^1.67) * (S^0.5) * (T^2.67) / n for flow below crown (FHWA Procedure)

Q = 1.486 * A * (R^0.67) * (S^0.5) / n for flow above crown (Manning's equation)

where
Q = flow rate, cfs
Sx = cross slope, ft/ft
S = longitudinal slope, ft/ft
T = width of flow, ft
A = conveyance area, sq ft
R = hydraulic radius, ft

Longitudinal Slope ft/ft	*Conveyance Area sq ft*	*Velocity fps*	*Hydraulic Capacity cfs*	*1/2 Street Hydraulic Capacity, cfs*
0.0000	5.44	0.00	0	0
0.0005	5.44	0.62	3	2
0.0010	5.44	0.88	5	2
0.0015	5.44	1.08	6	3
0.0020	5.44	1.25	7	3
0.0025	5.44	1.40	8	4
0.0030	5.44	1.53	8	4
0.0035	5.44	1.65	9	4
0.0040	5.44	1.77	10	5

WOOD, PATEL & ASSOCIATES, INC., 8/93

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Wood/Patel & Associates

Table 11

Maryvale Baseball Park

Preliminary Catch Basin Design

Crittenden Lane, 51st Ave to 45th Ave

W/P Job No. 96398.02

12/12/96

11:28 AM

Option 3:

Catch Basins Contributing to Existing Storm Drain						Catch Basins Contributing to Proposed Storm Drain					Combined Storm Drains		
Concentration Point (CP)	CB Type	CB Capacity	CB Capacity @ CP	Total CB Cumulative Capacity @ CP	Capacity of Existing Storm Drain	CB Type	CB Capacity	CB Capacity @ CP	Total Cumulative Capacity @ CP	Capacity of Proposed Storm Drain	Capacity of Combined CB	Capacity of Combined Storm Drains	5 Year Cumulative Flow (cfs)
1	M (S)	4.7	9.4	114	115	M (P)	4.7	40.7	109.5	110	223.5	225	212
	M (S)	4.7	-	-	-	M1,L6 (P)	6.4	-	-	-	-	-	-
	-	-	-	-	-	M1,L6 (P)	6.4	-	-	-	-	-	-
	-	-	-	-	-	M1,L17 (S)(P)	23.2	-	-	-	-	-	-
2	-	-	0	104.6	115	M1,L17 (P)	9.3	9.3	68.8	70	173.4	185	185
3	D (S)	5.5	11	104.6	115	M1,L10 (S) (P)	16.2	16.2	59.5	70	164.1	185	168
	D (S)	5.5	-	-	-	-	-	-	-	-	-	-	-
4	-	-	0	93.6	115	M1,L3 (S)(P)	9.2	9.2	43.3	40	136.9	155	154
5	C (S)	12.1	16.8	93.6	115	-	-	-	-	40	93.6	155	128
	M (S)	4.7	-	-	-	-	-	-	-	-	-	-	-
6	E	1.4	4.2	76.8	75	M1,L10 (P)	8	14.4	34.1	35	110.9	110	116
	D	2.8	-	-	-	M1,L6 (P)	6.4	-	-	-	-	-	-
7	B	1.7	40.6	72.6	75	-	-	-	19.7	20	92.3	95	94
	C	1.7	-	-	-	-	-	-	-	-	-	-	-
	M1,L17 (P)	9.3	-	-	-	-	-	-	-	-	-	-	-
	M1,L17 (P)	9.3	-	-	-	-	-	-	-	-	-	-	-
	M1,L17 (P)	9.3	-	-	-	-	-	-	-	-	-	-	-
	M1,L17 (P)	9.3	-	-	-	-	-	-	-	-	-	-	-
8	M	2.4	32	32	30	M (P)	9.3	19.7	19.7	20	51.7	50	54
	M	2.4	-	-	-	M1,L10 (P)	8	-	-	-	-	-	-
	M	2.4	-	-	-	M1,L17 (P)	2.4	-	-	-	-	-	-
	M1,L3 (S)(P)	9.2	-	-	-	-	-	-	-	-	-	-	-
	M1,L3 (S)(P)	9.2	-	-	-	-	-	-	-	-	-	-	-
	M1,L6 (P)	6.4	-	-	-	-	-	-	-	-	-	-	-

Notes:

- For Catch Basin inlet capacity estimates, see 51st Ave Storm Drian (Line "D")

[ ] - Indicates system capacity at each concentration point.

(S) - Indicates Catch Basin in Sump

(P) - Indicates Proposed Catch Basin

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SITE "B"

CRITTENDEN LANE

HEC-2 Description

To understand a "big picture" of conveyance condition along the north side of Grand Canal, a backwater analysis using computer program HEC-2 was performed. The HEC-2 was not in the original Scope of Work however, its use was warranted to assure the effectiveness of flood conveyance along Crittenden Lane.

Although preliminary, the HEC-2 exercise proved very beneficial in an overall assessment of flooding potential and effective conveyance in the study area. Due to the limited scope for this task, several assumptions were made to simplify the hydraulic modelling technique. The following paragraphs describe the modeling approach used for this study.

In order to determine the approximate overland and street flow capacity along Crittenden Lane north of the Grand Canal, a HEC-2 model was developed for this area. Cross sections were taken at 400 ft. intervals from the existing topography and the data which resulted was augmented by more recent field survey data collected by Wood/Patel. This field survey established the top of bank elevations on each side of the canal and was used to determine the elevation at which the canal bank would be overtopped by the overland flow.

Upon examination of the cross section information, it was discovered that 51st Avenue is significantly higher than the ground elevations upstream (east) and downstream (west). Thus 51st Avenue acts as a "dam" and significantly decreases the westerly overland flow which can be conveyed through this area. The HEC-2 model was started approximately 600 feet downstream of 51st Avenue and the starting water surface elevation was determined by the slope-area method.

Since the roads which parallel the Grand Canal are not continuous along the canal's length, the main channel conveyance area was defined as an artificial 100 ft. wide swath adjacent to the canal bank. This is intended to account for flows in the roadway as well as any flows which are conveyed in the open space which parallels the Grand Canal for most of it's length. A composite manning's "n" value of 0.020 was used for this main channel conveyance area (probably a conservatively low estimate). The overbank manning's "n" value used was 0.150 to account for the large amount of flow blocked out by buildings, fences, etc. It was assumed that this overbank area will convey some flows but that they will not be continuous (flows will constantly be diverted around obstructions) and will probably not be significant.

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*****************************************
*  HEC-2 WATER SURFACE PROFILES          *
                                         *
   Version   4.6.2;  May 1991            *
*                                        *
   RUN DATE    08JUL96    TIME   13:30:01 *
*****************************************
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*****************************************
*  U.S. ARMY CORPS OF ENGINEERS          *
*  HYDROLOGIC ENGINEERING CENTER         *
*  609 SECOND STREET, SUITE D            *
*  DAVIS, CALIFORNIA 95616-4687          *
*          (916) 756-1104                *
*****************************************
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX             XXXXXXX
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THIS RUN EXECUTED 08JUL96 13:30:01

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************************************
 HEC-2 WATER SURFACE PROFILES

 ersion   4.6.2;  May 1991
************************************

T1   MARYVALE ADMS (AREA DRAINAGE MASTER STUDY)
T2   MARCH 28, 1994 2'CI TOPO BASE MAP
     59TH AVENUE TO GRAND AVENUE

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

     0         2         0         0      0.0022       0        0.0       100

    NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     -1        0        -1         0         0         0         0       -6.0        0         0


J2  VARIABLE CODES FOR SUMMARY PRINTOUT

     38        42         1        43        26        51         4         8        10        53
     24        68       150

J3  LPRNT    NUMSEC                 ********REQUESTED SECTION NUMBERS********

    -10       -10

      .150      .150      .020       .1        .3
     5000        65     458.60    509.88     400       400       400
X3                                 458.60
    1099.2    449.77   1100.60    451.54   1101.45    452.04   1104.06    457.45   1104.73    458.60
    1104.5    473.63   1104.55    488.77   1104.92    490.11   1105.37    493.48   1103.96    498.16
GR  1105.7    504.19   1105.36    509.88   1105.01    512.31   1105.01    518.26   1105.19    551.91
    1105.3    575.54   1105.25    600.55   1105.14    606.47   1105.15    619.54   1105.42    636.69
    1104.9    655.08   1104.77    669.07   1104.80    674.60   1104.55    687.90   1104.39    694.68
GR  1104.4    698.67   1104.37    719.87   1104.45    734.78   1104.25    748.44   1104.49    751.18
GR  1105.1    754.70   1104.45    759.49   1104.63    762.12   1105.14    763.96   1104.51    767.04
    1105.5    772.71   1105.16    775.68   1105.42    782.43   1105.16    786.15   1105.29    788.67
    1104.6    794.79   1105.93    800.67   1104.99    805.39   1105.45    810.65   1105.98    812.96
GR  1105.4    814.25   1105.45    816.39   1106.69    820.30   1105.45    823.78   1105.22    825.84
    1106.3    829.13   1105.45    832.16   1105.14    836.05   1106.29    840.53   1105.40    843.81
    1105.2    846.28   1106.25    850.56   1105.08    856.03   1105.45    857.18   1106.14    861.87
GR  1105.0    867.38   1105.76    871.71   1105.02    874.48   1106.42    889.53   1106.74    892.55

     5400        60     473.97    524.00     400       400       400
X3                                 473.97
GR  1105.0    473.97   1104.34    474.93   1103.52    475.03   1103.98    476.18   1103.55    485.21
    1103.9    492.85   1103.90    524.00   1104.15    568.48   1104.02    616.49   1103.55    639.36
    1104.0    679.25   1104.29    689.64   1103.67    697.81   1103.56    709.31   1103.42    712.11
GR  1103.3    718.29   1103.83    752.70   1104.21    763.47   1104.75    771.61   1105.26    776.53
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GR	1104.6	782.42	1105.48	787.12	1104.77	795.28	1105.40	797.53	1105.11	800.36
GR	1105.7	804.23	1104.92	810.21	1105.79	812.86	1105.91	813.88	1105.17	818.97
	1104.8	820.00	1105.94	825.30	1104.88	832.05	1105.83	835.65	1105.88	841.15
GR	1105.3	844.64	1104.87	848.71	1106.48	854.42	1104.86	860.38	1106.48	882.83
GR	1106.1	887.60	1105.65	888.40	1106.21	908.42	1105.71	927.84	1106.23	929.23
	1106.3	932.99	1105.45	945.12	1105.45	948.39	1106.15	960.31	1105.65	961.11
	1106.3	1003.22	1106.81	1004.02	1106.45	1006.41	1105.32	1016.83	1106.45	1027.40
GR	1106.9	1032.27	1106.55	1053.71	1105.42	1082.57	1104.46	1115.37	1104.55	1120.25
	5600	50	640.17	742.87	200	200	200.00			
X3				478.49						
GR	1104.8	450.80	1104.76	454.77	1104.89	460.29	1105.87	473.85	1105.85	478.49
	1104.5	490.94	1104.33	494.98	1104.09	495.54	1103.29	505.74	1103.47	511.97
	1103.8	516.47	1104.46	533.87	1104.72	559.14	1104.58	587.03	1104.64	591.68
GR	1104.5	596.70	1104.04	597.53	1104.45	610.54	1104.64	619.22	1104.31	640.17
	1104.3	645.33	1104.16	656.21	1104.33	702.73	1104.26	718.51	1104.32	731.67
	1104.5	742.87	1104.45	764.77	1104.64	798.09	1104.72	860.10	1104.76	873.46
GR	1104.7	893.07	1105.29	919.96	1105.43	980.11	1105.48	1025.54	1105.48	1038.59
	1105.5	1073.19	1105.57	1098.75	1105.85	1153.56	1105.82	1176.68	1106.01	1216.78
	1106.1	1241.43	1106.20	1276.83	1106.23	1320.09	1106.06	1328.43	1105.82	1343.44
GR	1106.1	1379.11	1106.30	1425.32	1106.46	1448.80	1106.77	1454.18	1106.96	1500.00
	5800	50	471.57	518.41	200	200	200			
				471.57						
GR	1104.9	456.07	1106.34	471.57	1105.45	473.39	1104.13	478.12	1103.74	480.75
	1104.0	485.84	1104.19	486.58	1104.40	518.41	1104.30	523.34	1104.33	540.75
	1104.2	568.99	1103.68	597.80	1103.18	598.60	1103.45	605.97	1103.45	630.15
GR	1103.2	635.86	1103.66	636.64	1105.17	695.16	1106.52	746.94	1104.00	755.97
GR	1104.5	801.57	1104.45	881.28	1104.22	895.99	1104.24	905.38	1104.23	938.93
	1104.2	944.68	1105.28	984.98	1105.45	999.66	1105.45	1003.85	1104.00	1004.77
GR	1104.9	1014.04	1105.03	1016.24	1105.10	1026.36	1105.45	1050.53	1105.45	1184.26
GR	1106.0	1225.15	1105.99	1228.90	1105.86	1259.39	1105.04	1283.26	1104.90	1285.57
	1105.6	1295.27	1105.99	1304.10	1106.45	1323.47	1106.45	1366.69	1105.94	1410.56
	1105.9	1413.37	1106.55	1438.41	1107.05	1462.14	1107.45	1478.87	1107.45	1500.00
	6200	46	470.49	523.55	400	400	400			
				470.49						
GR	1104.9	457.64	1106.45	470.49	1106.33	475.16	1104.80	477.12	1104.03	479.42
GR	1104.5	480.22	1104.19	487.01	1104.41	523.55	1103.62	594.40	1103.49	598.29
	1103.0	599.01	1103.45	604.85	1103.70	633.82	1103.75	636.61	1104.26	637.41
	1105.5	659.69	1105.45	713.43	1105.38	723.82	1105.25	772.67	1105.30	792.61
GR	1105.1	797.23	1105.33	801.10	1105.45	828.64	1105.45	918.48	1104.27	926.82
	1105.5	928.01	1105.24	939.93	1106.29	971.54	1106.42	986.50	1106.35	999.10
	1106.1	1030.62	1105.98	1047.54	1105.50	1048.58	1105.51	1078.85	1106.01	1079.65
GR	1106.5	1105.93	1106.45	1178.01	1107.40	1251.19	1107.45	1277.26	1105.97	1295.89
	1106.0	1297.23	1107.33	1308.66	1107.49	1310.71	1107.45	1361.40	1107.47	1468.62
	1107.8	1500.00								
	6600	56	472.23	524.09	400	400	400			
				472.23						
	1106.3	475.32	1105.45	477.88	1104.03	479.82	1104.91	524.09	1105.45	559.88
GR	1105.5	583.74	1104.91	598.61	1104.44	600.24	1104.43	637.35	1104.94	638.40
	1105.5	649.16	1105.45	654.73	1107.30	747.47	1105.35	755.13	1105.51	842.24
	1105.5	850.39	1105.02	851.64	1105.45	857.45	1105.45	904.63	1105.11	910.25

GR	1105.6	911.06	1105.70	915.15	1105.41	943.37	1105.34	955.26	1105.27	983.63
GR	1106.5	994.78	1106.23	998.78	1106.45	1029.11	1106.39	1035.22	1106.33	1064.03
	1106.1	1070.02	1105.66	1071.02	1105.66	1073.30	1105.90	1084.01	1105.70	1106.35
GR	1105.6	1109.91	1105.60	1119.02	1105.78	1139.22	1105.78	1151.04	1105.74	1161.41
GR	1105.8	1178.63	1105.79	1196.66	1106.30	1197.84	1106.45	1201.48	1106.29	1290.92
	1106.5	1304.55	1106.28	1324.73	1107.06	1333.25	1106.56	1334.34	1106.54	1355.78
	1107.1	1368.44	1107.12	1396.92	1106.79	1414.66	1107.29	1415.59	1107.45	1418.59
GR	1107.2	1500.00								
	7000	54	459.83	502.17	400	400	400			
X3				459.83						
GR	1108.1	454.05	1104.24	455.74	1103.82	456.62	1105.45	459.35	1106.45	459.83
	1106.3	474.88	1105.45	477.47	1104.18	480.40	1104.09	483.22	1104.41	493.44
	1104.5	502.17	1104.45	582.62	1104.35	599.29	1103.86	601.13	1103.90	610.56
GR	1104.1	636.94	1104.43	638.99	1104.45	650.37	1104.85	675.95	1106.43	739.50
	1106.4	747.10	1106.51	752.44	1106.36	760.99	1106.56	771.65	1106.74	788.80
	1106.7	791.26	1105.96	803.26	1105.86	818.96	1106.62	836.73	1106.70	845.87
GR	1106.2	858.64	1105.45	871.61	1105.45	875.66	1106.08	889.63	1106.75	926.11
GR	1106.5	949.18	1106.45	956.53	1106.69	974.44	1106.70	1003.71	1106.45	1014.26
	1106.5	1173.90	1106.57	1212.01	1106.79	1261.59	1107.13	1288.03	1107.27	1293.24
GR	1107.3	1301.07	1107.31	1334.26	1107.45	1336.83	1107.45	1413.01	1107.63	1424.37
GR	1108.1	1444.70	1108.12	1453.91	1108.11	1485.00	1108.04	1500.00		
	7400	73	462.39	501.03	400	400	400			
X3				462.39						
	1108.1	456.06	1105.41	456.61	1103.45	456.73	1104.45	458.15	1106.45	462.39
	1106.3	473.46	1106.29	476.62	1105.45	477.36	1104.19	480.08	1104.27	484.09
GR	1104.1	501.03	1103.64	540.58	1103.41	565.97	1103.24	592.05	1103.15	599.57
GR	1102.7	601.76	1102.97	609.23	1103.45	623.22	1103.43	642.12	1103.88	645.19
	1103.8	653.77	1104.04	662.09	1104.21	704.60	1104.19	720.95	1104.36	749.94
GR	1106.0	759.19	1105.20	764.34	1104.43	771.96	1104.42	790.16	1104.40	799.54
GR	1104.5	811.42	1104.61	817.77	1104.16	821.37	1103.94	824.48	1103.88	828.75
	1104.0	834.97	1104.45	843.92	1104.83	870.71	1105.45	906.50	1105.45	972.86
	1105.9	995.92	1105.67	1009.89	1105.40	1014.69	1105.45	1025.50	1104.89	1043.76
GR	1104.6	1048.99	1105.87	1063.19	1106.17	1080.52	1106.13	1107.25	1106.01	1132.97
GR	1105.9	1140.20	1106.05	1152.21	1105.51	1169.29	1105.47	1178.79	1105.88	1213.33
	1106.1	1217.07	1106.21	1233.89	1106.13	1240.62	1106.16	1257.41	1106.38	1276.67
GR	1106.5	1301.04	1106.42	1313.21	1106.52	1341.52	1106.69	1352.18	1107.20	1387.98
GR	1107.5	1400.87	1107.45	1407.29	1107.65	1418.63	1107.97	1440.28	1108.09	1451.09
	1108.1	1459.40	1108.29	1478.64	1108.27	1500.00				
X1	7800	42	461.33	515.00	400	400	400			
				461.33						
	1107.4	461.33	1106.34	471.68	1106.45	476.47	1105.26	478.65	1104.32	479.53
GR	1104.2	492.00	1104.45	515.00	1104.45	567.99	1103.88	600.28	1103.48	602.39
GR	1103.9	638.39	1104.14	640.03	1104.45	653.96	1104.52	724.43	1104.63	750.97
	1104.6	761.62	1104.66	777.97	1104.48	790.86	1104.48	797.06	1104.66	825.14
GR	1104.5	828.15	1104.49	846.09	1104.57	867.85	1104.69	870.49	1104.82	888.39
GR	1105.2	920.15	1105.45	940.35	1105.45	971.91	1106.90	987.50	1106.92	988.99
	1109.0	1024.03	1105.37	1038.14	1105.68	1046.58	1106.45	1056.10	1106.14	1062.80
	1106.2	1130.11	1107.08	1204.68	1107.45	1233.49	1107.45	1339.42	1107.79	1422.35
GR	1108.0	1469.21	1108.18	1500.00						

Y	8200	33	472.25	523.58	400	400	400			
				472.25						
G	1106.5	472.25	1106.33	510.30	1106.13	523.58	1105.82	562.48	1106.20	567.70
GR	1105.7	591.75	1105.45	601.74	1104.98	644.40	1104.91	659.48	1104.47	661.86
	1104.6	679.92	1104.70	688.05	1104.77	699.20	1105.21	701.43	1105.45	727.87
	1105.5	767.53	1108.34	815.25	1109.04	817.92	1107.41	824.32	1107.22	825.44
GR	1106.1	828.78	1106.45	830.60	1106.45	837.32	1106.70	856.76	1107.08	894.95
	1107.3	929.62	1107.25	932.94	1107.45	1149.20	1107.45	1247.43	1107.65	1275.45
	1107.9	1366.01	1107.96	1392.88	1108.25	1497.72				

THIS RUN EXECUTED 08JUL96 13:30:03

****
HEC-2 WATER SURFACE PROFILES

ersion 4.6.2; May 1991
****

E- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

AVENUE TO GRAND AVENUE

SUMMARY PRINTOUT

SECNO	ELMIN	CWSEL	Q	VCH	DIFWSX	TOPWID	DEPTH	HV	SSTA	RBEL	FRCH
5000.000	1099.20	1105.25	100.00	2.52	.00	277.93	6.05	.07	458.60	1105.36	.61
* 5400.000	1103.30	1105.39	100.00	.77	.14	395.80	2.09	.01	473.97	1103.90	.11
5600.000	1103.29	1105.40	100.00	.67	.01	485.75	2.11	.01	482.61	1104.50	.11
5800.000	1103.18	1105.42	100.00	.84	.02	541.67	2.24	.00	473.51	1104.40	.14
6200.000	1103.00	1105.47	100.00	1.14	.05	429.83	2.47	.01	476.27	1104.41	.19
6600.000	1104.03	1105.57	100.00	1.68	.10	398.84	1.54	.04	477.51	1104.91	.28
7000.000	1103.82	1105.74	100.00	1.48	.16	250.27	1.92	.02	476.60	1104.50	.23
7400.000	1102.70	1105.79	100.00	.69	.06	616.16	3.09	.00	477.06	1104.10	.10
7800.000	1103.48	1105.81	100.00	.78	.02	510.01	2.33	.00	477.64	1104.45	.11
* 8200.000	1104.47	1105.90	100.00	.00	.09	203.15	1.43	.01	552.51	1106.13	.00

H AVENUE TO GRAND AVENUE

MARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	5000.000	.00	.00	.00	1099.20	100.00	1105.25	.00	1105.31	21.71	2.52	121.59	21.46
	5400.000	400.00	.00	.00	1103.30	100.00	1105.39	.00	1105.39	.64	.77	485.82	124.83
	5600.000	200.00	.00	.00	1103.29	100.00	1105.40	.00	1105.41	.69	.67	405.84	120.47
	5800.000	200.00	.00	.00	1103.18	100.00	1105.42	.00	1105.43	1.08	.84	544.65	96.15
	6200.000	400.00	.00	.00	1103.00	100.00	1105.47	.00	1105.48	1.99	1.14	277.25	70.82
*	6600.000	400.00	.00	.00	1104.03	100.00	1105.57	.00	1105.61	4.66	1.68	156.02	46.35
	7000.000	400.00	.00	.00	1103.82	100.00	1105.74	.00	1105.75	2.79	1.48	287.67	59.83
*	7400.000	400.00	.00	.00	1102.70	100.00	1105.79	.00	1105.79	.50	.69	781.12	140.77
	7800.000	400.00	.00	.00	1103.48	100.00	1105.81	.00	1105.82	.67	.78	631.18	122.36
	8200.000	400.00	.00	.00	1104.47	100.00	1105.90	.00	1105.91	70.41	.00	134.15	11.92

...ENUE TO GRAND AVENUE

1 ARY PRINTOUT TABLE 150

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
5000.000	100.00	1105.25	.00	.00	.00	277.93	.00
5400.000	100.00	1105.39	.00	.14	.00	395.80	400.00
5600.000	100.00	1105.40	.00	.01	.00	485.75	200.00
5800.000	100.00	1105.42	.00	.02	.00	541.67	200.00
6200.000	100.00	1105.47	.00	.05	.00	429.83	400.00
6600.000	100.00	1105.57	.00	.10	.00	398.84	400.00
7000.000	100.00	1105.74	.00	.16	.00	250.27	400.00
7400.000	100.00	1105.79	.00	.06	.00	616.16	400.00
7800.000	100.00	1105.81	.00	.02	.00	510.01	400.00
8200.000	100.00	1105.90	.00	.09	.00	203.15	400.00

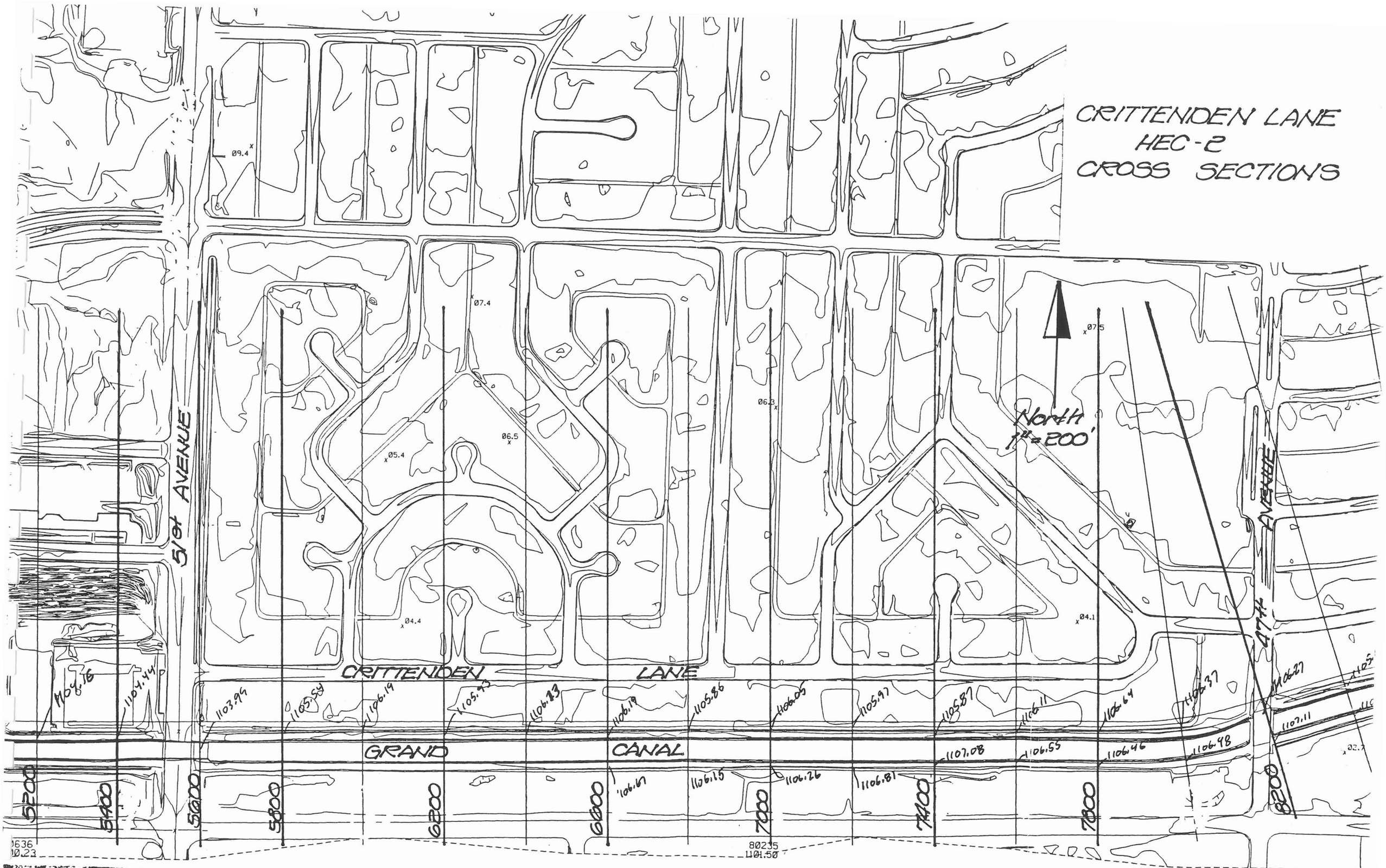
JMMARY OF ERRORS AND SPECIAL NOTES

RNING SECNO= 5400.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 6600.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

RNING SECNO= 7400.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 8200.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE


CRITTENDEN LANE
HEC-2
CROSS SECTIONS
North
1" = 200'
51st AVENUE
47th AVENUE
CRITTENDEN LANE
GRAND CANAL
09.4
07.4
06.5
05.4
04.4
06.3
07.5
04.1
1104.16
1104.44
1103.94
1105.54
1106.19
1105.93
1106.33
1106.19
1105.86
1106.05
1105.97
1105.87
1106.11
1106.64
1106.37
1106.27
1107.11
1107.08
1106.55
1106.46
1106.48
1106.17
1106.15
1106.26
1106.81
5200
5400
5600
5800
6200
6600
7000
7400
7800
8200
80235
1101.50

SITE "C"

WHITTON AVENUE CHANNEL

HEC-RAS Description

For purposes of HEC-RAS analysis, Whitton Avenue Channel stationing was started at the west property line of this site as station 0 + 00. Stationing increases upstream at 25 foot intervals to station 23 + 07 at 57th Avenue. Flows used in this analysis were the two year flow of approximately 110 cfs at the southwest corner of the site. The flow was estimated at 60 cfs from the proposed lateral in 55th Avenue and 80 cfs upstream of 55th Avenue. The 2-year flow at the southwest corner of the site (approximately 110 cfs) is less than the combined 2-year flows used in the analysis (140 cfs). It was decided to upsize the channel west of 57th Avenue to provide extra runoff conveyance where flood relief is most needed. See Preliminary Design Plans sheet 4 of 5 in the Appendix.

HEC-RAS Plan: Whitton Reach: Reach 1 7/10/96

River Sta.	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
2307	80.00	1096.00	1099.17		1099.32	0.000308	3.02	26.50	14.70	0.40
2282.24*	80.00	1095.97	1099.17		1099.31	0.000297	2.98	26.86	14.79	0.39
2257.48*	80.00	1095.93	1099.16		1099.30	0.000282	2.92	27.40	14.94	0.38
2232.72*	80.00	1095.90	1099.16		1099.29	0.000272	2.88	27.77	15.04	0.37
2207.96*	80.00	1095.87	1099.15		1099.28	0.000262	2.84	28.15	15.14	0.37
2183.20*	80.00	1095.84	1099.15		1099.27	0.000253	2.80	28.53	15.24	0.36
2158.44*	80.00	1095.80	1099.15		1099.26	0.000240	2.75	29.10	15.39	0.35
2133.68*	80.00	1095.77	1099.14		1099.26	0.000232	2.71	29.50	15.49	0.35
2108.93*	80.00	1095.74	1099.14		1099.25	0.000223	2.68	29.90	15.59	0.34
2084.17*	80.00	1095.70	1099.14		1099.24	0.000212	2.62	30.49	15.75	0.33
2059.41*	80.00	1095.67	1099.13		1099.24	0.000205	2.59	30.90	15.85	0.33
2034.65*	80.00	1095.64	1099.13		1099.23	0.000197	2.55	31.32	15.95	0.32
2009.89*	80.00	1095.60	1099.13		1099.22	0.000187	2.51	31.93	16.11	0.31
1985.13*	80.00	1095.57	1099.12		1099.22	0.000181	2.47	32.36	16.21	0.31
1960.37*	80.00	1095.54	1099.12		1099.21	0.000175	2.44	32.79	16.32	0.30
1935.62*	80.00	1095.51	1099.12		1099.21	0.000168	2.41	33.23	16.43	0.30
1910.86*	80.00	1095.47	1099.12		1099.20	0.000160	2.36	33.86	16.58	0.29
1886.10*	80.00	1095.44	1099.11		1099.20	0.000155	2.33	34.32	16.69	0.29
1861.34*	80.00	1095.41	1099.11		1099.19	0.000149	2.30	34.77	16.80	0.28
1836.58*	80.00	1095.37	1099.11		1099.19	0.000142	2.26	35.42	16.95	0.28
1811.82*	80.00	1095.34	1099.11		1099.18	0.000137	2.23	35.89	17.06	0.27
1787.06*	80.00	1095.31	1099.10		1099.18	0.000133	2.20	36.36	17.17	0.27
1762.31*	80.00	1095.28	1099.10		1099.17	0.000128	2.17	36.84	17.28	0.26
1737.55*	80.00	1095.24	1099.10		1099.17	0.000122	2.13	37.51	17.44	0.26
1712.79*	80.00	1095.21	1099.10		1099.17	0.000118	2.11	38.00	17.55	0.25
1688.03*	80.00	1095.18	1099.10		1099.16	0.000114	2.08	38.50	17.66	0.25
1663.27*	80.00	1095.14	1099.09		1099.16	0.000109	2.04	39.19	17.82	0.24
1638.51*	80.00	1095.11	1099.09		1099.16	0.000105	2.02	39.69	17.93	0.24
1613.75*	80.00	1095.08	1099.09		1099.15	0.000101	1.99	40.20	18.00	0.23
1589.*	80.00	1095.05	1099.09		1099.15	0.000097	1.97	40.71	18.00	0.23
1564.24*	80.00	1095.01	1099.09		1099.15	0.000093	1.93	41.41	18.00	0.22
1539.48*	80.00	1094.98	1099.09		1099.14	0.000089	1.91	41.92	18.00	0.22
1514.72*	80.00	1094.95	1099.09		1099.14	0.000086	1.89	42.44	18.00	0.22
1489.96*	80.00	1094.91	1099.08		1099.14	0.000082	1.85	43.14	18.00	0.21

HEC-RAS Plan: Whitton Reach: Reach 1 7/10/96 (continued)

River Sta.	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1465.20*	80.00	1094.88	1099.08		1099.14	0.000079	1.83	43.66	18.00	0.21
1440.44*	80.00	1094.85	1099.08		1099.13	0.000076	1.81	44.17	18.00	0.20
1415.68*	80.00	1094.81	1099.08		1099.13	0.000073	1.78	44.88	18.00	0.20
1390.93*	80.00	1094.78	1099.08		1099.13	0.000070	1.76	45.40	18.00	0.20
1366.17*	80.00	1094.75	1099.08		1099.13	0.000068	1.74	45.92	18.00	0.19
1341.41*	80.00	1094.72	1099.08		1099.12	0.000065	1.72	46.44	18.00	0.19
1316.65*	80.00	1094.68	1099.08		1099.12	0.000063	1.70	47.15	18.00	0.18
1291.89*	80.00	1094.65	1099.08		1099.12	0.000061	1.68	47.67	18.00	0.18
1267.13*	80.00	1094.62	1099.07		1099.12	0.000059	1.66	48.19	18.00	0.18
1242.37*	80.00	1094.58	1099.07		1099.12	0.000056	1.64	48.90	18.00	0.17
1217.62*	80.00	1094.55	1099.07		1099.11	0.000054	1.62	49.42	18.00	0.17
1192.86*	80.00	1094.52	1099.07		1099.11	0.000053	1.60	49.94	18.00	0.17
1168.10*	80.00	1094.49	1099.07		1099.11	0.000051	1.59	50.47	18.00	0.17
1143.34*	80.00	1094.45	1099.07		1099.11	0.000049	1.56	51.18	18.00	0.16
1118.58*	80.00	1094.42	1099.07		1099.11	0.000048	1.55	51.70	18.00	0.16
1093.82*	80.00	1094.39	1099.07		1099.11	0.000046	1.53	52.23	18.00	0.16
1069.06*	80.00	1094.35	1099.07		1099.10	0.000044	1.51	52.94	18.00	0.16
1044.31*	80.00	1094.32	1099.07		1099.10	0.000043	1.50	53.47	18.00	0.15
1019.55*	80.00	1094.29	1099.07		1099.10	0.000042	1.48	53.99	18.00	0.15
994.793*	80.00	1094.25	1099.07		1099.10	0.000040	1.46	54.71	18.00	0.15
970.034*	80.00	1094.22	1099.07		1099.10	0.000039	1.45	55.24	18.00	0.15
945.275*	80.00	1094.19	1099.07		1099.10	0.000038	1.43	55.76	18.00	0.14
920.517*	80.00	1094.16	1099.06		1099.10	0.000037	1.42	56.29	18.00	0.14
895.758*	80.00	1094.12	1099.06		1099.10	0.000036	1.40	57.00	18.00	0.14
871	80.00	1094.09	1099.06	1096.16	1099.09	0.000035	1.40	56.96	17.87	0.31
836	Culvert									
801	110.00	1093.99	1098.06		1098.17	0.000181	2.69	40.83	17.80	0.31
776.727*	110.00	1093.96	1098.06		1098.17	0.000171	2.63	41.76	18.00	0.30
752.454*	110.00	1093.93	1098.05		1098.16	0.000165	2.60	42.24	18.00	0.30
728.181*	110.00	1093.90	1098.05		1098.15	0.000159	2.57	42.73	18.00	0.29
703.909*	110.00	1093.87	1098.05		1098.15	0.000154	2.54	43.22	18.00	0.29
679.636*	110.00	1093.84	1098.05		1098.14	0.000149	2.52	43.72	18.00	0.28
655.363*	110.00	1093.81	1098.04		1098.14	0.000144	2.49	44.21	18.00	0.28
631.090*	110.00	1093.78	1098.04		1098.14	0.000139	2.46	44.71	18.00	0.28

HEC-RAS Plan: Whitton Reach: Reach 1 7/10/96 (continued)

River Sta.	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
606.818*	110.00	1093.75	1098.04		1098.13	0.000134	2.43	45.21	18.00	0.27
582.545*	110.00	1093.72	1098.04		1098.13	0.000130	2.41	45.71	18.00	0.27
558.272*	110.00	1093.69	1098.04		1098.12	0.000126	2.38	46.21	18.00	0.26
534.*	110.00	1093.66	1098.03		1098.12	0.000122	2.35	46.71	18.00	0.26
509.727*	110.00	1093.63	1098.03		1098.11	0.000118	2.33	47.21	18.00	0.25
485.454*	110.00	1093.60	1098.03		1098.11	0.000114	2.31	47.72	18.00	0.25
461.181*	110.00	1093.57	1098.03		1098.11	0.000111	2.28	48.23	18.00	0.25
436.909*	110.00	1093.54	1098.03		1098.10	0.000107	2.26	48.73	18.00	0.24
412.636*	110.00	1093.51	1098.02		1098.10	0.000104	2.23	49.24	18.00	0.24
388.363*	110.00	1093.48	1098.02		1098.10	0.000101	2.21	49.75	18.00	0.23
364.090*	110.00	1093.45	1098.02		1098.09	0.000098	2.19	50.26	18.00	0.23
339.818*	110.00	1093.42	1098.02		1098.09	0.000095	2.17	50.77	18.00	0.23
315.545*	110.00	1093.39	1098.02		1098.09	0.000092	2.15	51.28	18.00	0.22
291.272*	110.00	1093.36	1098.02		1098.09	0.000089	2.12	51.79	18.00	0.22
267.*	110.00	1093.33	1098.01		1098.08	0.000087	2.10	52.31	18.00	0.22
242.727*	110.00	1093.30	1098.01		1098.08	0.000084	2.08	52.82	18.00	0.21
218.454*	110.00	1093.27	1098.01		1098.08	0.000082	2.06	53.34	18.00	0.21
194.181*	110.00	1093.24	1098.01		1098.07	0.000080	2.04	53.85	18.00	0.21
169.909*	110.00	1093.21	1098.01		1098.07	0.000077	2.02	54.37	18.00	0.21
145.636*	110.00	1093.18	1098.01		1098.07	0.000075	2.00	54.88	18.00	0.20
121.363*	110.00	1093.15	1098.01		1098.07	0.000073	1.99	55.40	18.00	0.20
97.0909*	110.00	1093.12	1098.00		1098.06	0.000071	1.97	55.92	18.00	0.20
72.8181*	110.00	1093.09	1098.00		1098.06	0.000069	1.95	56.44	18.00	0.19
48.5454*	110.00	1093.06	1098.00		1098.06	0.000067	1.93	56.96	18.00	0.19
24.2727*	110.00	1093.03	1098.00		1098.06	0.000066	1.91	57.48	18.00	0.19
0	110.00	1093.00	1098.00	1095.40	1098.06	0.000064	1.90	58.00	18.00	0.19

7/10/96

10-year
2

INTERPOLATED HYDROGRAPH AT CHD (inflow from Whitton Ave channel to basin.)

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	27.	1		1230	151	0.	1		1845	226	0.
1		0005	2	0.	1		0620	77	26.	1		1235	152	0.	1		1850	227	0.
1		0010	3	0.	1		0625	78	24.	1		1240	153	0.	1		1855	228	0.
1		0015	4	0.	1		0630	79	22.	1		1245	154	0.	1		1900	229	0.
1		0020	5	0.	1		0635	80	21.	1		1250	155	0.	1		1905	230	0.
1		0025	6	1.	1		0640	81	19.	1		1255	156	0.	1		1910	231	0.
1		0030	7	1.	1		0645	82	17.	1		1300	157	0.	1		1915	232	0.
1		0035	8	1.	1		0650	83	16.	1		1305	158	0.	1		1920	233	0.
1		0040	9	2.	1		0655	84	15.	1		1310	159	0.	1		1925	234	0.
1		0045	10	2.	1		0700	85	13.	1		1315	160	0.	1		1930	235	0.
1		0050	11	3.	1		0705	86	12.	1		1320	161	0.	1		1935	236	0.
1		0055	12	3.	1		0710	87	11.	1		1325	162	0.	1		1940	237	0.
1		0100	13	3.	1		0715	88	10.	1		1330	163	0.	1		1945	238	0.
1		0105	14	4.	1		0720	89	9.	1		1335	164	0.	1		1950	239	0.
1		0110	15	4.	1		0725	90	8.	1		1340	165	0.	1		1955	240	0.
1		0115	16	4.	1		0730	91	7.	1		1345	166	0.	1		2000	241	0.
1		0120	17	5.	1		0735	92	7.	1		1350	167	0.	1		2005	242	0.
1		0125	18	5.	1		0740	93	6.	1		1355	168	0.	1		2010	243	0.
1		0130	19	5.	1		0745	94	5.	1		1400	169	0.	1		2015	244	0.
1		0135	20	5.	1		0750	95	5.	1		1405	170	0.	1		2020	245	0.
1		0140	21	6.	1		0755	96	4.	1		1410	171	0.	1		2025	246	0.
1		0145	22	6.	1		0800	97	4.	1		1415	172	0.	1		2030	247	0.
1		0150	23	6.	1		0805	98	3.	1		1420	173	0.	1		2035	248	0.
1		0155	24	6.	1		0810	99	3.	1		1425	174	0.	1		2040	249	0.
1		0200	25	6.	1		0815	100	3.	1		1430	175	0.	1		2045	250	0.
1		0205	26	6.	1		0820	101	2.	1		1435	176	0.	1		2050	251	0.
1		0210	27	6.	1		0825	102	2.	1		1440	177	0.	1		2055	252	0.
1		0215	28	6.	1		0830	103	2.	1		1445	178	0.	1		2100	253	0.
1		0220	29	7.	1		0835	104	1.	1		1450	179	0.	1		2105	254	0.
1		0225	30	7.	1		0840	105	1.	1		1455	180	0.	1		2110	255	0.
1		0230	31	7.	1		0845	106	1.	1		1500	181	0.	1		2115	256	0.
1		0235	32	7.	1		0850	107	1.	1		1505	182	0.	1		2120	257	0.
1		0240	33	7.	1		0855	108	1.	1		1510	183	0.	1		2125	258	0.
1		0245	34	8.	1		0900	109	1.	1		1515	184	0.	1		2130	259	0.
1		0250	35	8.	1		0905	110	1.	1		1520	185	0.	1		2135	260	0.
1		0255	36	8.	1		0910	111	0.	1		1525	186	0.	1		2140	261	0.
1		0300	37	8.	1		0915	112	0.	1		1530	187	0.	1		2145	262	0.
1		0305	38	9.	1		0920	113	0.	1		1535	188	0.	1		2150	263	0.
1		0310	39	9.	1		0925	114	0.	1		1540	189	0.	1		2155	264	0.
1		0315	40	10.	1		0930	115	0.	1		1545	190	0.	1		2200	265	0.
1		0320	41	11.	1		0935	116	0.	1		1550	191	0.	1		2205	266	0.
1		0325	42	12.	1		0940	117	0.	1		1555	192	0.	1		2210	267	0.
1		0330	43	14.	1		0945	118	0.	1		1600	193	0.	1		2215	268	0.
1		0335	44	17.	1		0950	119	0.	1		1605	194	0.	1		2220	269	0.
1		0340	45	23.	1		0955	120	0.	1		1610	195	0.	1		2225	270	0.
1		0345	46	31.	1		1000	121	0.	1		1615	196	0.	1		2230	271	0.
1		0350	47	46.	1		1005	122	0.	1		1620	197	0.	1		2235	272	0.
1		0355	48	71.	1		1010	123	0.	1		1625	198	0.	1		2240	273	0.
1		0400	49	108.	1		1015	124	0.	1		1630	199	0.	1		2245	274	0.
1		0405	50	108.	1		1020	125	0.	1		1635	200	0.	1		2250	275	0.
1		0410	51	108.	1		1025	126	0.	1		1640	201	0.	1		2255	276	0.
1		0415	52	108.	1		1030	127	0.	1		1645	202	0.	1		2300	277	0.
1		0420	53	108.	1		1035	128	0.	1		1650	203	0.	1		2305	278	0.
1		0425	54	108.	1		1040	129	0.	1		1655	204	0.	1		2310	279	0.

1	0430	55	108.	*	1	1045	130	0.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	108.	*	1	1050	131	0.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	108.	*	1	1055	132	0.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	108.	*	1	1100	133	0.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	108.	*	1	1105	134	0.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	108.	*	1	1110	135	0.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	108.	*	1	1115	136	0.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	108.	*	1	1120	137	0.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	99.	*	1	1125	138	0.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	89.	*	1	1130	139	0.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	81.	*	1	1135	140	0.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	73.	*	1	1140	141	0.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	66.	*	1	1145	142	0.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	59.	*	1	1150	143	0.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	53.	*	1	1155	144	0.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	48.	*	1	1200	145	0.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	43.	*	1	1205	146	0.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	39.	*	1	1210	147	0.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	35.	*	1	1215	148	0.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	32.	*	1	1220	149	0.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	29.	*	1	1225	150	0.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
108.	4.00		40.	10.	10.	10.
		(INCHES)	0.878	0.907	0.907	0.907
		(AC-FT)	20.	21.	21.	21.

CUMULATIVE AREA = 0.43 SQ MI

SITE "C"

55TH AVENUE STORM DRAIN

MARYVALE BASEBALL PARK

55th Avenue Storm Drain at Whitton Avenue Channel

Whitton Avenue Channel has been analyzed with a 48" culvert crossing at 55th Avenue. A storm drain is proposed in 55th Avenue to carry flows from the sump area at 55th Avenue at Whitton Avenue. This storm drain preliminary design was analyzed for the 2-year flow in 55th Avenue from the HEC-2 model and the tailwater for the analysis was taken from the HEC-RAS, 2-year analysis for Whitton Avenue Channel.

NOTES\96398.O14

Catch Basins in Sump

ARIZONA DEPARTMENT OF TRANSPORTATION
DRAINAGE DESIGN SECTION

10-16-1996

PROJECT NAME-_____ TRACS NO.- _____
HIGHWAY NAME-_____ DESIGNER - _____
LOCATION -_____ CHECKER - _____ PAGE_____
Ver 3.40: December 1995

CURB OPENING INLET--IN SUMP

GUTTER FLOW HYDRAULICS

GUTTER DESCRIPTION

Roadway Cross-Slope-Ft./Ft.--Sx	=	0.020
Shoulder Width-Ft.--	=	10.000
Shoulder Slope-Ft./Ft.--Ss	=	0.020
Gutter Width-Ft.--W	=	1.420
Gutter Slope-Ft./Ft.--Sw	=	0.057
Gutter Depression-Inches--	=	0.971
Capture Ratio -- CURB OPENING	=	0.800
Depth at INLET Curb Line-Inches--d	=	6.000
Local Gutter Depression-Inches	=	3.000
SPREAD-Ft.--T	=	22.373

LENGTH	Q(weir)	Q(orifice)	Q(INLET)
3.083	6.739	5.695	5.695
6.583	10.922	12.159	10.922
9.583	14.508	17.700	14.508
13.583	19.288	25.089	19.288
20.583	27.654	38.018	27.654

P-1509

*** Q(INLET) is Lesser of WEIR or ORIFICE flow.! ***

M-1, L=17'
(In Sump)

Catch Basins on Grade

ARIZONA DEPARTMENT OF TRANSPORTATION
DRAINAGE DESIGN SECTION

10-16-1996

PROJECT NAME-_____ TRACS NO.- _____
HIGHWAY NAME-_____ DESIGNER - _____
LOCATION -_____ CHECKER - _____ PAGE_____
Ver 3.40: December 1995

CURB OPENING INLET -- ON GRADE

GUTTER FLOW HYDRAULICS
GUTTER DESCRIPTION

Roadway Grade-% Per cent--G	=	0.330
Roadway Cross-Slope-Ft./Ft.--Sx	=	0.020
Shoulder Width-Ft.--	=	10.000
Shoulder Slope-Ft./Ft.--Ss	=	0.020
Gutter Width-Ft.--W	=	1.420
Gutter Slope-Ft./Ft.--Sw	=	0.056
Gutter Depression-Inches--	=	0.954
Manning's 'N	=	0.016
Flow-CFS--Q	=	12.068
SPREAD-Ft.--T	=	22.444
Average Velocity-V-fps	=	2.379
FLOW in Gutter-CFS--Q	=	2.092
% Flow in Gutter-CFS	=	17.332
Velocity of Flow in Gutter-fps	=	3.201
Depth at Curb Line-Inches--d	=	6.000

CURB OPENING--ADOT STD. C-15.20

Flow-CFS--Q	=	12.068
Gutter Velocity at INLET-fps	=	3.743
GUTTER FLOW at INLET-CFS--Q	=	3.029
Depth at INLET Curb Line-Inches--d	=	8.816
Local Gutter Depression-Inches	=	3.000
Length of opening: TOTAL Intercept--Ft.	=	22.061
Capture Ratio -- CURB OPENING	=	0.800

LENGTH	Efficiency	Q(Captured)	Q(By-Pass)
3.083	0.237	2.864	9.204
6.583	0.472	5.691	6.377
9.583	0.641	7.741	4.327
13.583	0.821	9.910	2.158
20.583	0.992	11.975	0.093

P-1569

M-1, L=17'
(ON Grade)

Whitton Ave Channel

PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

October 14, 1996
Maryvale Baseball Park
55th Ave Storm Drain at Whitton Ave Channel
42" Storm Drain

==========

PROGRAM INPUT DATA:

DESCRIPTION	VALUE
Culvert Diameter (feet)	3.50
FHWA Chart Number (1,2 or 3)	1
Scale Number on Chart (Type of Culvert Entrance)	1
Manning's Roughness Coefficient (n-value)	0.0130
Entrance Loss Coefficient of Culvert Opening	0.50
Culvert Length (feet)	180.0
Culvert Slope (feet per foot)	0.0080

==========

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Headwater (ft) Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
61.0	4.23	3.96	4.38	2.12	2.45	3.50	6.34

==========

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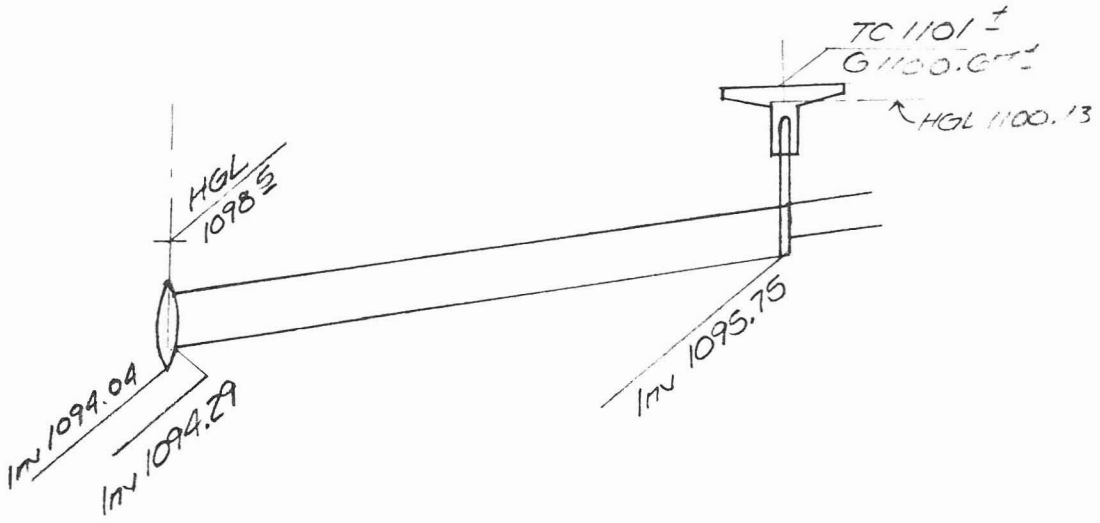

Whitton Ave Channel

PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

October 14, 1996
Maryvale Baseball Park
55th Ave Storm Drain at Whitton Ave Channel
36" Storm Drain

==========

PROGRAM INPUT DATA:

DESCRIPTION	VALUE
Culvert Diameter (feet).....	3.00
FHWA Chart Number (1,2 or 3).....	1
Scale Number on Chart (Type of Culvert Entrance).....	1
Manning's Roughness Coefficient (n-value).....	0.0130
Entrance Loss Coefficient of Culvert Opening.....	0.50
Culvert Length (feet).....	120.0
Culvert Slope (feet per foot).....	0.0080

==========

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Headwater (ft) Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
24.0	3.88	2.32	3.34	1.32	1.58	3.00	3.40

==========

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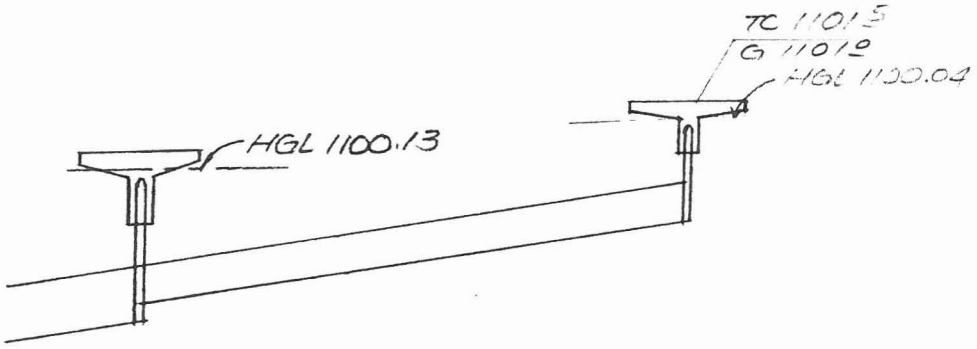


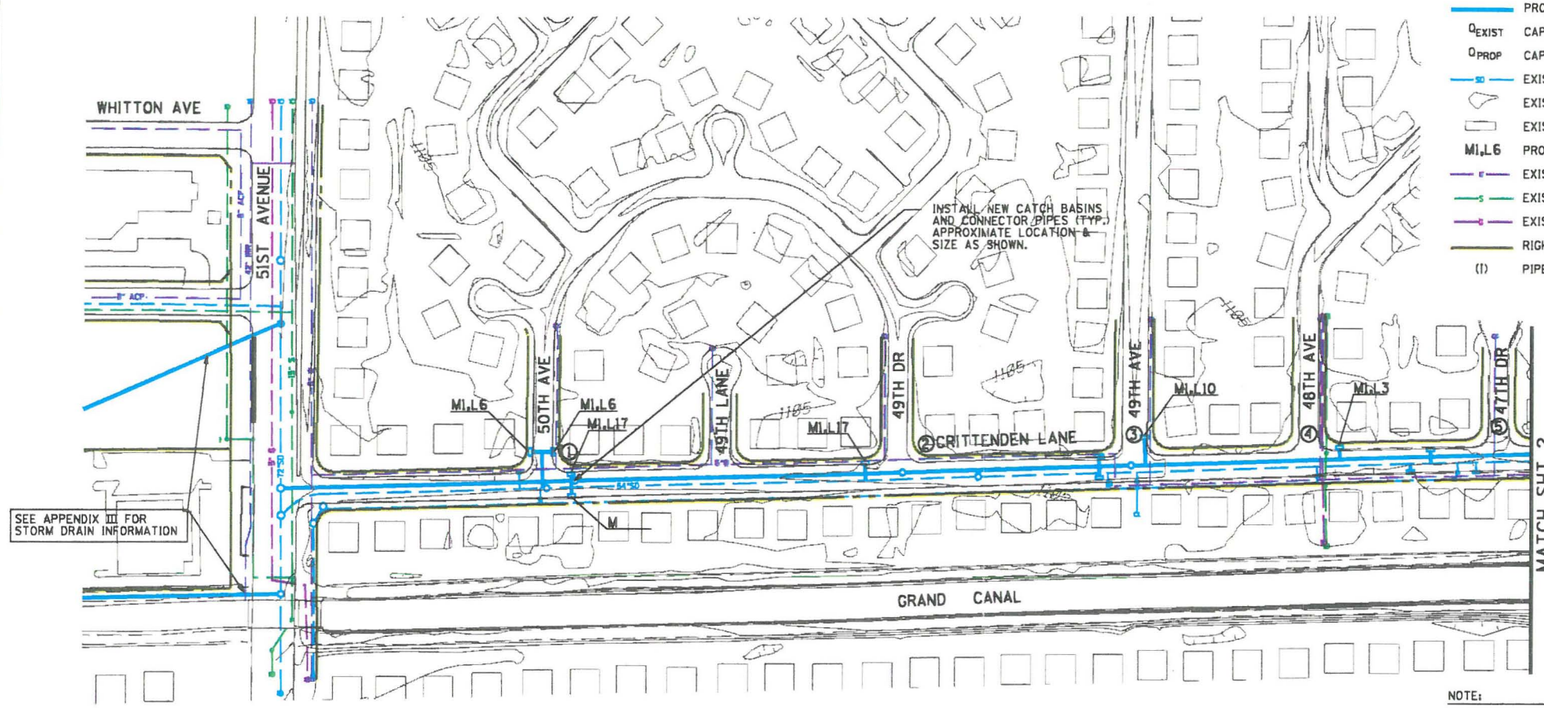
IV. DESIGN PLANS

ONSITE

Design Plans (under separate cover)

OFFSITE

Preliminary Design Plans:
Sheet 1 and 2 Crittenden Lane
Sheet 3 Whitton Avenue Channel



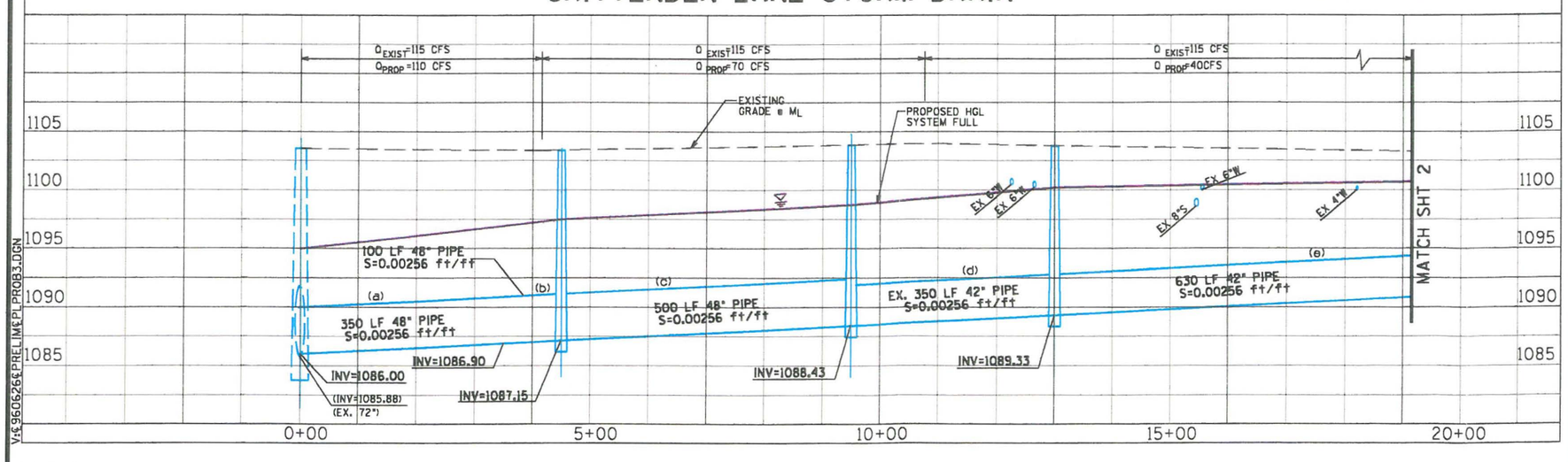
LEGEND

- PROPOSED STORM DRAIN
- Q_{EXIST} CAPACITY OF EXIST. STORM DRAIN
- Q_{PROP} CAPACITY OF PROP. STORM DRAIN
- EXISTING STORM DRAIN
- EXISTING TOPOGRAPHY
- EXISTING BUILDINGS
- M1.L6 PROPOSED CATCH BASIN TYPE
- EXISTING WATER LINE
- EXISTING SEWER LINE
- EXISTING GAS LINE
- RIGHT-OF-WAY
- (1) PIPE NUMBER

NOTE:

SEE APPENDIX III FOR STORM DRAIN CAPACITY CALCULATION RECORDS

CRITTENDEN LANE STORM DRAIN



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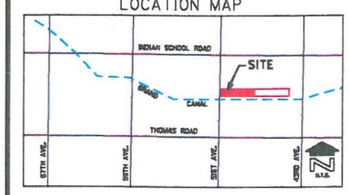
MARYVALE
BASEBALL STADIUM

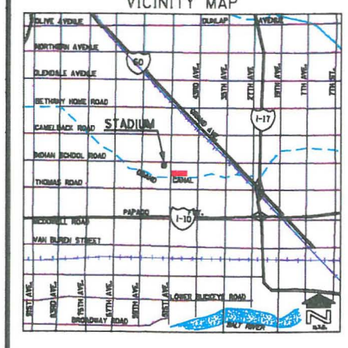
PRELIMINARY DESIGN

Registered Professional Engineer (Civil)
CERTIFICATE NO. 10512
ASHOK C. PATEL
Date Signed
ARIZONA, U.S.A.

LOCATION MAP



VICINITY MAP



100 0' 100 200
SCALE IN FEET
CONTOUR INTERVAL = 1' FEET

WOOD, PATEL & ASSOCIATES, INC.
1550 EAST MISSOURI, SUITE 203
PHOENIX, ARIZONA (602)234-1344

	BY	DATE
DESIGN	JGT	7/96
DESIGN CHK.	ACP	7/96
PLANS	RDR	7/96
PLANS CHK.	ACP	7/96

SUBMITTED BY: DATE:

CITY OF PHOENIX
MARICOPA COUNTY, AZ.

RECOMMENDED BY: DATE
APPROVED BY: DATE

SHEET 1 OF 3

JOB NO. 96398.00

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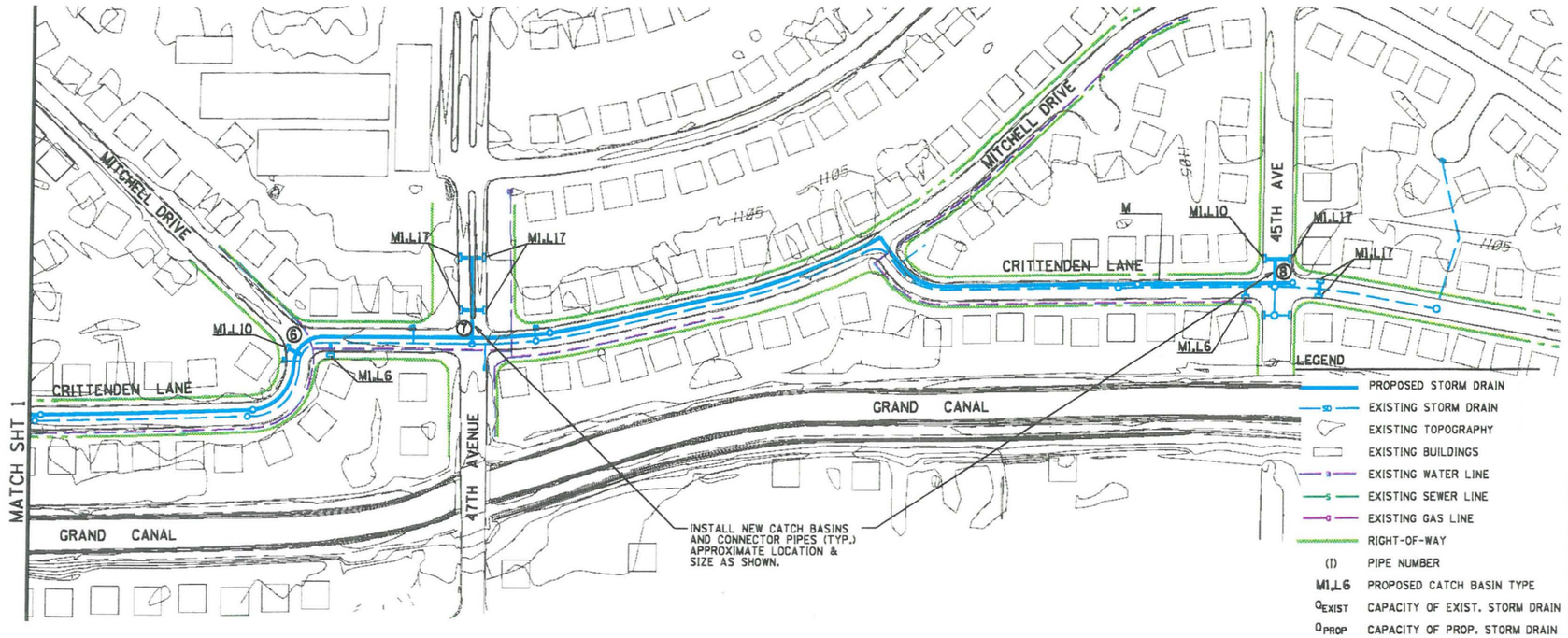
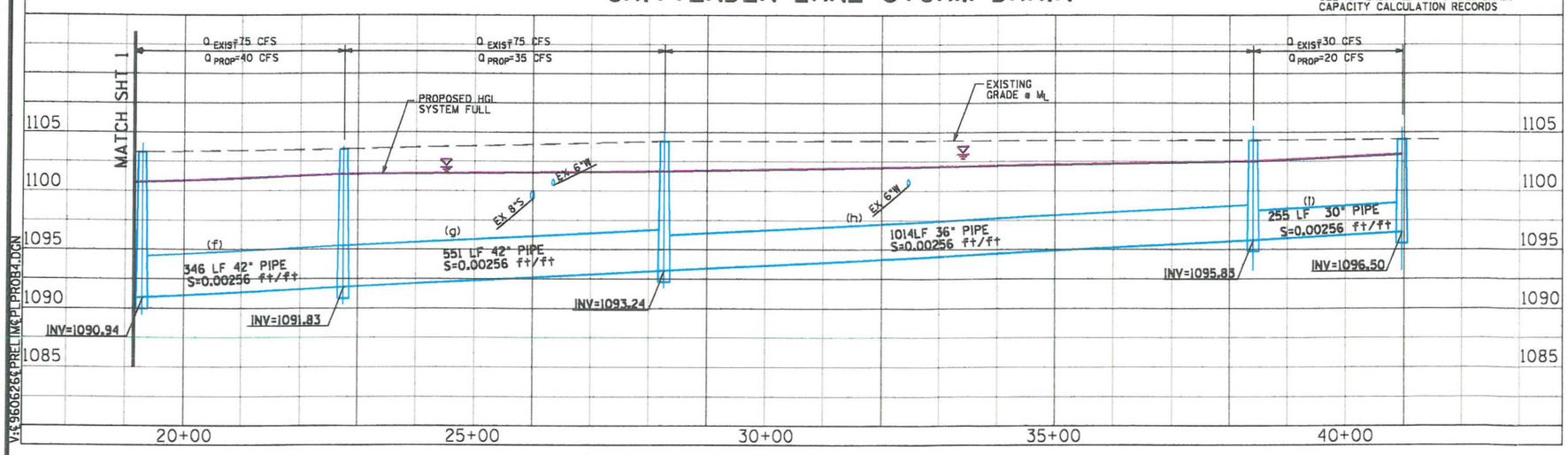


LEGEND

- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- EXISTING TOPOGRAPHY
- EXISTING BUILDINGS
- EXISTING WATER LINE
- EXISTING SEWER LINE
- EXISTING GAS LINE
- RIGHT-OF-WAY
- (1) PIPE NUMBER
- M1.L6 PROPOSED CATCH BASIN TYPE
- Q_{EXIST} CAPACITY OF EXIST. STORM DRAIN
- Q_{PROP} CAPACITY OF PROP. STORM DRAIN

NOTE:
SEE APPENDIX III FOR STORM DRAIN CAPACITY CALCULATION RECORDS

CRITTENDEN LANE STORM DRAIN



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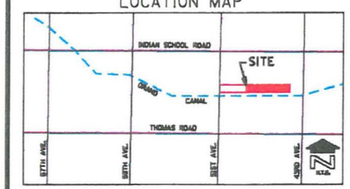
MARYVALE
BASEBALL STADIUM

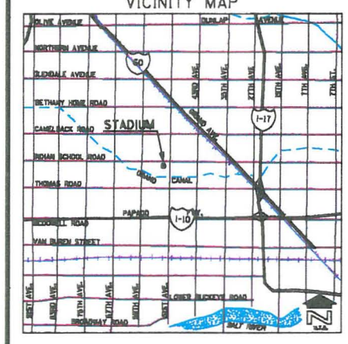
PRELIMINARY DESIGN

Registered Professional Engineer (Civil)
CERTIFICATE NO. 10512
ASHOK C. PATEL
Date Signed 12/4/96
ARIZONA, U.S.A.

LOCATION MAP



VICINITY MAP



100 0' 100 200
SCALE IN FEET
CONTOUR INTERVAL = 1' FEET

WOOD, PATEL & ASSOCIATES, INC.
1550 EAST MISSOURI, SUITE 203
PHOENIX, ARIZONA (602)234-1344

	BY	DATE
DESIGN	JGT	7/96
DESIGN CHK.	ACP	7/96
PLANS	RDR	7/96
PLANS CHK.	ACP	7/96
SUBMITTED BY:		DATE:

CITY OF PHOENIX
MARICOPA COUNTY, AZ.

RECOMMENDED BY: DATE
APPROVED BY: DATE

SHEET 2 OF 3

JOB NO. 96398.00

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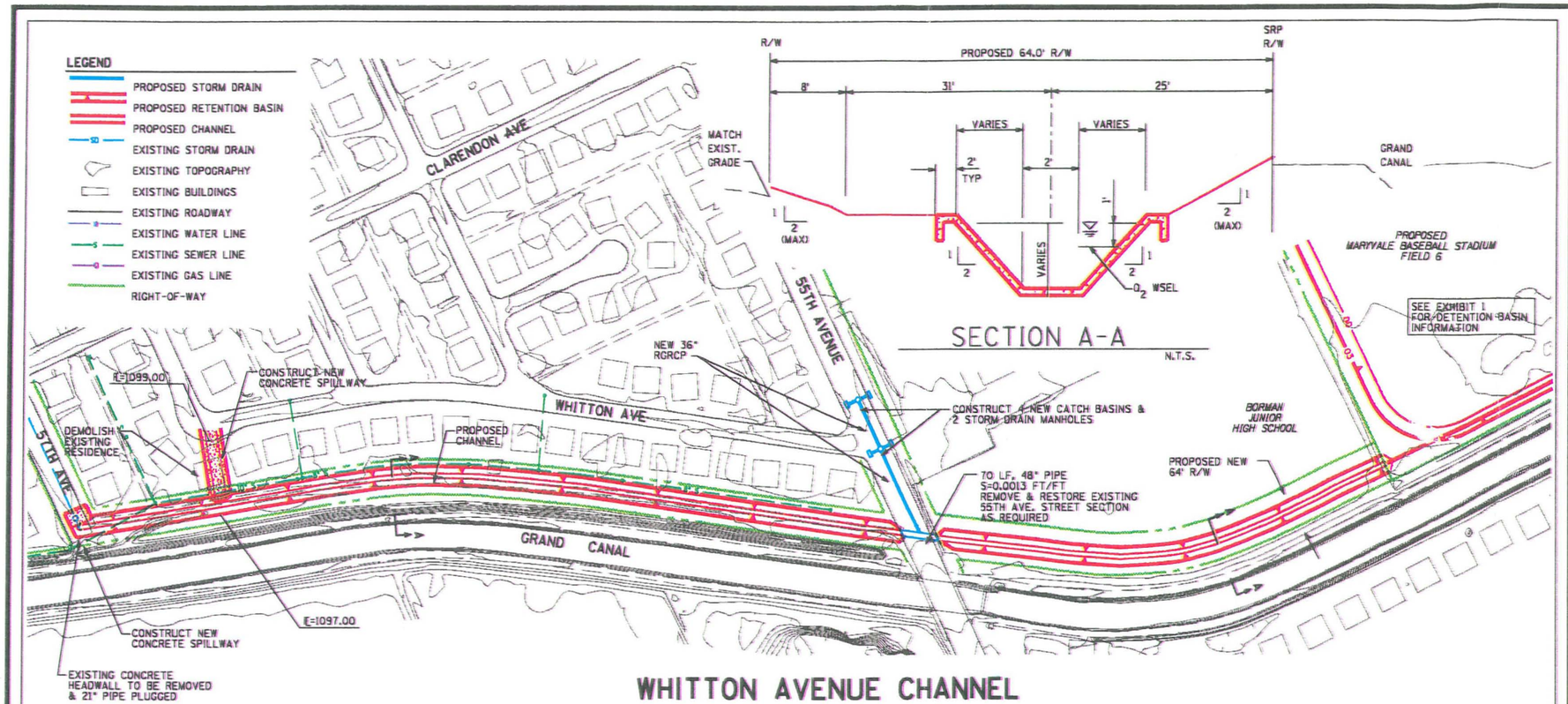
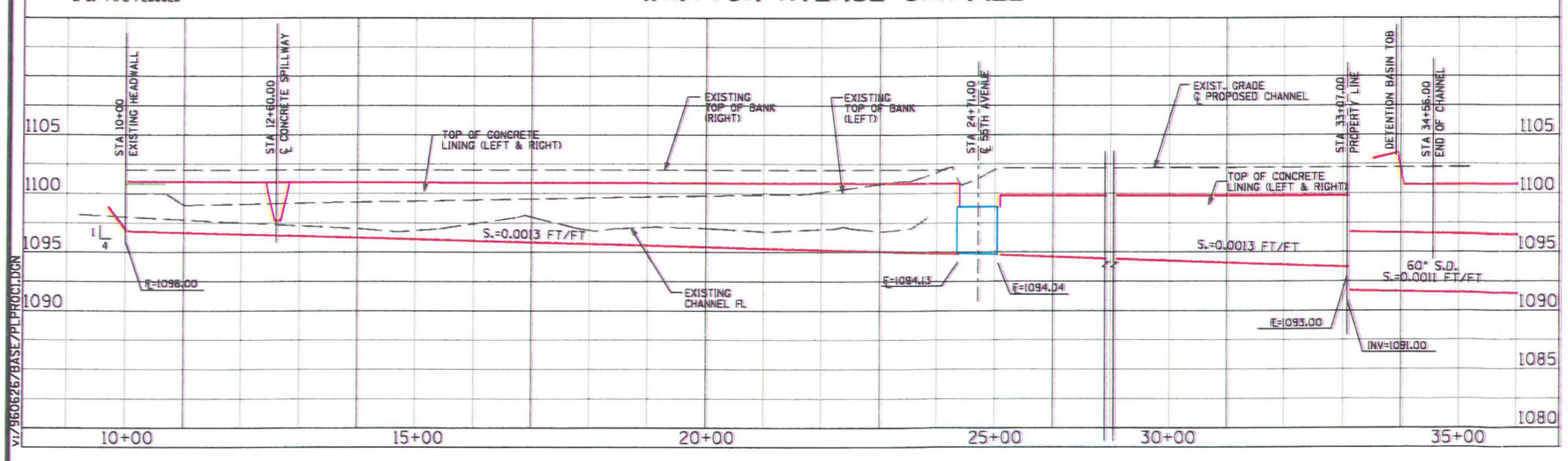


SECTION A-A

N.T.S.



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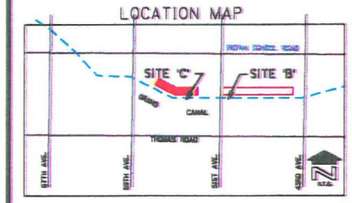
MARYVALE BASEBALL STADIUM

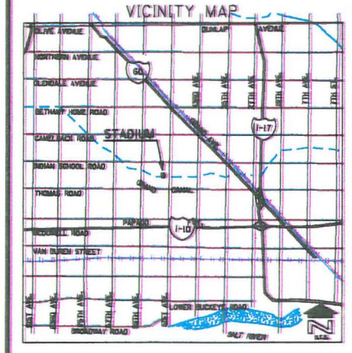
PRELIMINARY DESIGN

Registered Professional Engineer (Civil) CERTIFICATE NO. 10512 ASHOK C. PATEL Date Signed 7/1/96 ARIZONA, U.S.A.

LOCATION MAP



VICINITY MAP



100 0' 100 200
SCALE IN FEET
CONTOUR INTERVAL = 1' FEET

WOOD, PATEL & ASSOCIATES, INC.
1550 EAST MISSOURI, SUITE 203
PHOENIX, ARIZONA (602)234-1344

	BY:	DATE:
DESIGN:	JGT	7/96
DESIGN CHK.	ACP	7/96
PLANS:	RDR	7/96
PLANS CHK.	ACP	7/96
SUBMITTED BY:		DATE:

CITY OF PHOENIX
MARICOPA COUNTY, AZ.

RECOMMENDED BY: DATE:
APPROVED BY: DATE:

SHEET 5 OF 5

JOB NO. 96398.00

v:\960626\base\plproc1.dgn