BOHANNAN - HUSTON INC.

DRAINAGE REPORT FOR
COTTONWOOD MALL AND
SAD NO. 223 - PART 2

AUGUST 1994

# DRAINAGE REPORT FOR COTTONWOOD MALL AND SAD 223 - PART 2

Prepared for:

**SIMON PROPERTY GROUP, L.P.**
**MERCHANTS PLAZA**
**P.O. BOX 7033**
**INDIANAPOLIS, IN 46207**

Job No. 90316.83
and 94133.01

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# COTTONWOOD MALL

*NOTE: The following report is a re-submittal of a previously approved drainage report. This report has been prepared using the updated procedures found in recent revisions to the DPM.*

## MASTER DRAINAGE PLAN

### I. PURPOSE

The purpose of this report is to outline the drainage and management plan for a major shopping mall site comprising approximately 90 acres, referred to as Cottonwood Mall, owned and to be developed by Simon Property Group, L.P. The Drainage Ordinance, Development Process Manual (DPM), North Coors Drainage Management Plan, and the Seven Bar Ranch Sector Development Plan have been utilized to prepare this report.

### II. SITE LOCATION AND DESCRIPTION

Cottonwood Mall is bordered on the north by Seven Bar Loop Road and the Alameda West Shopping Center, on the south by Coors Bypass Road, and the east by Corrales Road (old North Coors Road). Plate 1 better identifies the project locations.

The project site is generally located on the western bank of the Rio Grande Valley within the watershed area that is drained by the Calabacillas Arroyo. Existing soils at the site are identified in the Soil Conservation Service (SCS) report entitled "Soil Survey of Bernalillo County" as those within the Bluepoint Series. The specific Bluepoint soil type shown in the report is Bluepoint Loamy Fine Sand (BCC) which is characterized as a sandy alluvium and wind-borne deposits of moderate slopes. The water and wind erosion potential of these soils is severe. The hydrologic classification of the Bluepoint soils is class "A."

## III. EXISTING CONDITIONS

The mall site is to be constructed at the southern portion of the old Alameda Airport. Existing buildings, underground storage tanks, and asphalt runways that are still in place will be removed and disposed of prior to the earthwork operations. The adjacent developments surrounding the proposed shopping center include the Alameda West Shopping Center to the north, the V.T. Autopark to the south, and the A.J. Black residential property to the east.

The V.T. Autopark is located on the south side of Coors Bypass Road, just west of Corrales Road. Infrastructure improvements (W.O. 3040) constructed as a requirement for this development included the southern 24' of the Coors Bypass Road up to the mall's west property line, sanitary sewer and water for the development, and the storm drain system that collects and discharges runoff to the Calabacillas Arroyo. The storm drain system constructed in Coors Bypass Road collects flows developed in the V.T. Autopark and a portion of the adjacent western property, Coors Bypass Road, and Eagle Ranch Road. Also, the majority of Cottonwood Mall runoff will be discharged to the downstream portion of this existing storm drain system.

The property of A.J. Black is located on the west side of Corrales Road south of Seven Bar Loop Road. The western and the southern boundaries of this property are shared with the mall site. An existing arroyo which begins on the mall site and continues easterly across the Black's property conveys collected flows into 2-24" C.M.P. storm drains, conveys flow under the road into a detention pond for ultimate discharge into the existing Middle Rio Grande Conservancy District Corrales Main Canal. Existing conditions show that a portion of the runoff developed on the mall site drains into the existing arroyo for ponding and discharges through the 24" storm drains to the Corrales Main Drain.

The perimeter street improvements that will be constructed as part of this development include the construction of the southern half of Seven Bar Loop Road, the

northern 24' of Coors Bypass Road, and drainage improvements to Corrales Road. The construction of the improvements fall under the constraints of both the Coors Corridor Plan and the Seven Bar Ranch Sector Development Plan. The public facilities associated with Cottonwood Mall will be constructed as part of the Special Assessment District (SAD) 223. SAD 223 will include other street, utility, and drainage improvements within Seven Bar Ranch, as required to serve parcels east of Coors Bypass Road. The construction of the street improvements is anticipated to be completed concurrently with the construction of the mall site.

One offsite drainage basin will discharge onto the Cottonwood Mall site; this comprises flows from the southern portion of Seven Bar Loop Road from the intersection with Cottonwood Drive to the intersection with Coors Bypass Road. Flows that develop in properties on the west and south sides of Coors Bypass Road that are not directly discharged into the Calabacillas Arroyo are conveyed either north or south in Coors Bypass Road. The southern flows will be collected and discharged through the existing storm system for release to the Calabacillas Arroyo, while the northern flows will be directed to a detention pond located on the east side of the Cibola High School site for ultimate discharge to the Cabezone Arroyo. The remaining flows that drain into Seven Bar Loop Road north of the site will be conveyed east in the roadway, then north in the proposed Cottonwood Drive to a detention pond that discharges to the Cabezone Arroyo. The Cooper Tract located north of the mall site and west of the Alameda West Shopping Center will drain toward the north for release into Ellison Drive. The information above was obtained from both the Seven Bar Drainage Management Plan (Easterling and Associates, Inc., January, 1990), and the North Coors Drainage Management Plan (Volume IV-D, AMAFCA, August, 1989).

## IV. HYDROLOGIC AND HYDRAULIC ANALYSIS

The hydrologic calculations which appear herein analyze the developed discharge for the 100-year, 24-hour storm, as identified within the recent revision to Chapter 22.2 of the Development Process Manual, 1/93 version (DPM Update). The

computerized watershed model "AHYMO" (9/93 version) was used to calculate and route flows through ponds and the storm drain system. Peak flows have been checked by the rational method as presented within the DPM Update.

The hydraulic calculations which appear herein were computed as follows. Street capacities were computed using Manning's equation with Manning's N values as identified within the DPM Update. Interior Loop Road capacities were computed with the maximum water elevation at top of curb. Inlet capacities on grade were determined in accordance with DPM charts and procedures. Inlet capacities in sump conditions were made using the orifice equation and the weir equation. Storm drain capacities and hydraulic grade line calculations are included in the report.
Stage/storage/discharge relationships were developed for each pond and outlet using the orifice and weir equations, as applicable. Parking lot detention ponds have typically been designed to reach a depth of .75' at their peak discharge. All calculations have been made in accordance with DPM procedures.

The basin boundaries, and conceptual proposed contours are shown on Plate 1 of the attached plans. The proposed storm sewer diameters, lengths, slopes, HGL information, manhole sizes and service connection information are shown on the attached plan and profile sheets (see Appendix III).

## V. DRAINAGE MANAGEMENT PLAN

The mall site was divided into three major basins (A, B, and C) which will drain to the existing storm system in Coors Bypass Road, and a fourth basin (Basin D) which will drain to Seven Bar Loop Road, as shown on the drainage plan (Plate 1). The approved drainage report for the J.T. Autopark development established the maximum flowrate of developed runoff that can be discharged into the existing storm sewer system from the mall site to be 169 cfs. The water collected in the existing storm sewer system will discharge into the Calabacillas Arroyo for ultimate release into the Rio Grande. The remaining developed runoff from Basin D will be discharged into the

south side of Seven Bar Loop Road for collection and discharge across Corrales Road into the Corrales Main Canal. This flow is governed by the North Coors Drainage Management Plan.

The three major basins (A, B, and C) are comprised of a series of contributing basins. Each contributing basin is provided a means of collecting the flow (junction boxes, inlets, or ponds) and a storm sewer lateral to convey the flow. The table given below shows the relationship between the major basins and the contributing basins as identified on Plate 1 and in the hydrologic analysis in Appendix I.

| MAJOR BASINS | CONTRIBUTING BASINS |
|---|---|
| Basin A | Basins 1-17 |
| Basin B | Basins 1a-27 |
| Basin C | Basins 1a-3e |

Basin A and Basin B were designed to collect and distribute approximately two-thirds of the developed flow generated from the shopping mall to the existing storm sewer. Basin C-2 was designed to collect the flows generated in the Reserve Parcel at the intersection of Corrales Road and Coors Bypass Road and route it to the existing storm system.

Flows from Basins C-1-A and C-3-A, through C-3-E are collected at the mall entrance at the southeast corner of the A.J. Black property and conveyed to the system which collects Basin B flows.

Basin A routes flows from the southwest corner of the site easterly along the southern half of the site to a manhole which combines the flows with those collected in Basin B. The peak flowrate developed in the Basin A as identified in the HYMO output is 44.5 cfs. Basin B routes flows from the northwest corner of the site easterly along the northern half of the site, then south along the interior loop road to the manhole

described above. The peak flow generated in Basin B at the intersecting manhole is 120.7 cfs. The water is then conveyed south to a manhole that intercepts the flows from Basins A and B. The peak flowrate to be discharged into the existing storm sewer system in Coors Bypass Road as identified in the HYMO output is 160 cfs.

Basin D is located at the northeast corner of the site. Basin D-1 flows will be collected in a small detention pond prior to discharge into Seven Bar Loop Road. Basin D-2 flows will be discharged directly into Seven Bar Loop Road. The flows will then be conveyed from Corrales Road into an existing arroyo. The North Coors Drainage Management Plan identified 106 cfs to be discharged from the mall site in the developed condition to the existing arroyo. The peak flowrate that was calculated for the 100-year, 6-hour storm which will be discharged from Basin D (developed) was 11.1 cfs. Of the 11.1 cfs, 7.7 cfs will be collected in a small detention pond at the northeast corner of the site and a peak of 7.5 cfs will be released into the southern portion of Seven Bar Loop Road. The flow will then continue south along Corrales Road into the existing arroyo (see Plate 1).

The runoff collected on the roof areas will be released by a series of gutters and pipes into the storm sewer system. The openings that will be provided to allow the runoff collected on the roof into the gutter system will be sized so that no ponding will occur on the roof areas.

It was determined through several iterations that detention ponding will be necessary in order to meet the discharge requirements at the outlet to the existing storm sewer and Seven Bar Loop Road. Size, shape, and depth of each pond will vary depending on the location and outlet conditions. The interior slopes of the ponds will be landscaped with sod and will be designed to a maximum of a 3:1 (horizontal:vertical) slope. The bottom surface of the pond will be sodded or lined with gravel in order to collect sediment and provide for erosion control. Inlets and manhole inlets will be utilized to control the discharge from the detention ponds.

Extensive landscaping will be provided on the mall site at locations not utilized for parking or buildings. Landscaped areas will include any combination of grass, trees, or shrubs. The landscaping used will provide for erosion protection of side slopes and ponds, beautification of the site, and provide an aesthetic buffer between the site and surrounding developments. The treatment provided for the individual landscaped areas will be determined by the Landscape Architect at the appropriate time.

## VI. PHASING AND EROSION CONTROL

The construction of the mall site will be completed in one phase with the surrounding Reserve Parcels to be developed as need dictates. The infrastructure improvements required for the building will be completed with the construction of the mall. A stub-out will be provided from the storm sewer system to the building areas for the roof drains.

Soil erosion and dust control are recognized as significant problems for this development. As identified in the Seven Bar Ranch Sector Development Plan, this area will be subject to the Albuquerque/Bernalillo County Air Quality Control Board regulations and ordinances regarding soil erosion and dust control during development and construction. This includes obtaining a "Top Soil Disturbance Permit" which shall outline specific dust control plans and measures for this project. It is the responsibility of the Contractor to obtain the necessary permit before mass grading operations start.

The site will be graded in two phases to allow for greater ease in mall construction and pipe installation. All lower level parking areas will be mass graded in Phase I grading. Only upper level parking areas on the far north and west sides of the site will be mass graded in Phase I grading. Mall pad areas will be excavated and tie slopes to the surrounding parking areas will also occur in Phase I. Any excess earth will be stockpiled on the perimeter (future) pad sites. Phase II grading will fill in all upper level parking areas on the east side of the site after substantial mall completion and pipe installation. Extensive erosion control and wind protection will be necessary

during the mass grading operations. These measures should include interim contour berms, snow fences, and site watering. The control berms should follow the boundary of the site to keep flows collected during grading operations on the site and to stop sediment from damaging adjacent properties. Snow fences should be placed generally in the north/south directions along the eastern boundary of the site prior to grading operations in order to contain wind-borne materials onsite. Water should be applied during all phases of the earthwork and especially at the end of the working day in order to form a crust surface. Those portions of the Reserve Parcels that are not to be developed within one year shall be treated with hay mulch crimped into north/south furrows to provide for long term dust control.

## VI. CONCLUSIONS

The Cottonwood Mall is to be constructed between Coors Bypass Road and Seven Bar Loop Road on the west side of Corrales Road. The offsite infrastructure improvements include the construction of the north portion of Coors Bypass Road, the southern half of Seven Bar Loop Road, and channelization improvements to the Corrales Road.

The site has been designed to convey developed flows to the existing storm sewer system in Coors Bypass Road. Minor flows from Wards T.B.A. will be conveyed to the Corrales Main Canal via the following route: Seven Bar Loop Road to Corrales Road to an existing arroyo to the Canal. The constraints on discharging developed runoff offsite to the existing storm system or the existing arroyo were identified in the drainage report prepared for the V.T. Autopark site and the North Coors Drainage Management Plan, respectively.

Based on the hydrologic analysis contained herein, and previous research and analysis, detention ponding will be necessary to control the discharge to the previously approved flowrates. The detention ponds will be landscaped and standpipe structures will be utilized for discharge. Roof flows will be collected by a series of gutters and

pipes for discharge into the storm sewer. The maximum peak flowrate generated onsite by this development when fully developed has been computed to be 160 cfs, which is less than the 169 cfs allowed by the V.T. Autopark Drainage Management Plan.

The project is to be graded in two phases. Extensive dust and erosion control measures will be necessary as required by the Air Quality Control Board regulations and ordinances. These measures shall include interim control berms, water protection, snow fences, and crimped hay much. It will be the Contractor's responsibility to obtain the necessary permits and provide the control measures during construction.

The construction of the mall is to be completed in one phase and the required infrastructure will be installed concurrently. The Reserve Parcels will be developed in future phases.

## APPENDICES

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## SUMMARY OF HYDROLOGIC DATA

| BASIN ID | AREA AC | AREA SQ.MI. | % LAND TREATMENT A | B | C | D | TIME TO PEAK | DISCHARGE CFS/AC | Q (R) CFS | Q(HYMO) CFS |
|---|---|---|---|---|---|---|---|---|---|---|
| A-1 | 2.990 | 0.0047 | 0.0 | 14.0 | 0.0 | 86.0 | 0.1333 | 4.04 | 12.1 | 12.0 |
| A-2 | 6.070 | 0.0095 | 0.0 | 6.0 | 0.0 | 94.0 | 0.1333 | 4.23 | 25.7 | 25.3 |
| A-3 | 7.970 | 0.0125 | 0.0 | 14.0 | 0.0 | 86.0 | 0.1333 | 4.04 | 32.2 | 31.8 |
| A-4 | 1.970 | 0.0031 | 0.0 | 4.0 | 0.0 | 96.0 | 0.1333 | 4.28 | 8.4 | 8.3 |
| A-6 | 1.710 | 0.0027 | 0.0 | 3.0 | 12.0 | 85.0 | 0.1333 | 4.12 | 7.0 | 7.0 |
| A-7 | 0.640 | 0.0010 | 0.0 | 4.0 | 0.0 | 96.0 | 0.1333 | 4.28 | 2.7 | 2.7 |
| A-8 | 3.430 | 0.0054 | 0.0 | 6.0 | 5.0 | 89.0 | 0.1333 | 4.15 | 14.3 | 14.1 |
| A-9 | 1.530 | 0.0024 | 0.0 | 3.0 | 13.0 | 84.0 | 0.1333 | 4.10 | 6.3 | 6.2 |
| A-10 | 0.230 | 0.0004 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 1.0 | 1.1 |
| A-11 | 0.730 | 0.0011 | 0.0 | 7.0 | 22.0 | 71.0 | 0.1333 | 3.88 | 2.8 | 2.7 |
| A-12 | 2.520 | 0.0039 | 0.0 | 3.0 | 6.0 | 91.0 | 0.1333 | 4.21 | 10.6 | 10.3 |
| A-13-A-1 | 0.490 | 0.0008 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 2.1 | 2.2 |
| A-13-A-2 | 0.440 | 0.0007 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 1.9 | 1.9 |
| A-13-B-1 | 0.200 | 0.0003 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 0.9 | 0.8 |
| A-13-B-2 | 0.740 | 0.0012 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 3.2 | 3.3 |
| A-13-C | 0.720 | 0.0011 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 3.1 | 3.0 |
| A-14-A | 0.740 | 0.0012 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 3.2 | 3.3 |
| A-14-B-1 | 1.230 | 0.0019 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 5.4 | 5.2 |
| A-14-B-2 | 0.510 | 0.0008 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 2.2 | 2.2 |
| A-15-A | 0.490 | 0.0008 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 2.1 | 2.1 |
| A-15-B | 0.490 | 0.0008 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 2.1 | 2.1 |
| A-16 | 0.080 | 0.0001 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 0.3 | 0.3 |
| A-17 | 2.820 | 0.0044 | 0.0 | 4.0 | 3.0 | 93.0 | 0.1333 | 4.23 | 11.9 | 11.8 |
| | 38.740 | 0.061 | | | | | | | | |
| B-1-A | 2.470 | 0.0039 | 0.0 | 4.0 | 3.0 | 93.0 | 0.1333 | 4.23 | 10.5 | 10.4 |
| B-1-B | 1.100 | 0.0017 | 0.0 | 4.0 | 3.0 | 93.0 | 0.1333 | 4.23 | 4.7 | 4.6 |
| B-1-C | 0.950 | 0.0015 | 0.0 | 4.0 | 3.0 | 93.0 | 0.1333 | 4.23 | 4.0 | 4.0 |
| B-1-D | 2.780 | 0.0043 | 0.0 | 4.0 | 3.0 | 93.0 | 0.1333 | 4.23 | 11.8 | 11.5 |
| B-2-A | 0.990 | 0.0015 | 0.0 | 31.0 | 0.0 | 69.0 | 0.1333 | 3.64 | 3.6 | 3.3 |
| B-2-B | 0.310 | 0.0005 | 0.0 | 0.0 | 100.0 | 0.0 | 0.1333 | 2.87 | 0.9 | 0.9 |
| B-3 | 2.430 | 0.0038 | 0.0 | 9.0 | 11.0 | 80.0 | 0.1333 | 3.99 | 9.7 | 9.6 |
| B-4 | 2.080 | 0.0033 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 9.1 | 9.1 |
| B-5 | 3.860 | 0.0060 | 0.0 | 5.0 | 0.0 | 95.0 | 0.1333 | 4.25 | 16.4 | 16.1 |
| B-6 | 0.370 | 0.0006 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 1.6 | 1.7 |
| B-7 | 0.500 | 0.0008 | 0.0 | 0.0 | 100.0 | 0.0 | 0.1333 | 2.87 | 1.4 | 1.5 |
| B-8-A | 1.620 | 0.0025 | 0.0 | 5.0 | 0.0 | 95.0 | 0.1333 | 4.25 | 6.9 | 6.7 |
| B-8-B | 1.200 | 0.0019 | 0.0 | 3.0 | 0.0 | 97.0 | 0.1333 | 4.30 | 5.2 | 5.2 |
| B-8-C | 2.970 | 0.0046 | 0.0 | 5.0 | 0.0 | 95.0 | 0.1333 | 4.25 | 12.6 | 12.3 |
| B-9 | 2.370 | 0.0037 | 0.0 | 1.0 | 11.0 | 88.0 | 0.1333 | 4.18 | 9.9 | 9.7 |
| B-10 | 2.100 | 0.0033 | 0.0 | 13.0 | 0.0 | 87.0 | 0.1333 | 4.07 | 8.5 | 8.5 |
| B-13 | 1.900 | 0.0030 | 0.0 | 4.0 | 5.0 | 91.0 | 0.1333 | 4.20 | 8.0 | 8.0 |
| B-14 | 2.130 | 0.0033 | 0.0 | 3.0 | 12.0 | 85.0 | 0.1333 | 4.12 | 8.8 | 8.6 |
| B-15-A | 0.935 | 0.0015 | 0.0 | 4.0 | 10.0 | 86.0 | 0.1333 | 4.13 | 3.9 | 3.8 |
| B-15-B | 0.935 | 0.0015 | 0.0 | 4.0 | 10.0 | 86.0 | 0.1333 | 4.13 | 3.9 | 3.8 |
| B-16 | 2.140 | 0.0033 | 0.0 | 3.0 | 0.0 | 97.0 | 0.1333 | 4.30 | 9.2 | 9.0 |
| B-18-A-1 | 0.490 | 0.0008 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 2.1 | 2.2 |
| B-18-A-2 | 0.460 | 0.0007 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 2.0 | 1.9 |
| B-18-B | 0.270 | 0.0004 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 1.2 | 1.1 |
| B-18-C | 0.480 | 0.0008 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 2.1 | 2.2 |
| B-19-A | 0.480 | 0.0008 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 2.1 | 2.1 |
| B-19-B | 0.790 | 0.0012 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 3.5 | 3.3 |
| B-19-C | 0.760 | 0.0012 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 3.3 | 3.1 |
| B-19-D | 0.560 | 0.0009 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 2.4 | 2.5 |
| B-20-A | 0.590 | 0.0009 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 2.6 | 2.8 |
| B-20-B | 1.080 | 0.0017 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 4.7 | 4.7 |
| B-20-C | 0.580 | 0.0009 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 2.5 | 2.5 |
| B-21-A | 0.560 | 0.0009 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 2.4 | 2.5 |
| B-21-B | 0.490 | 0.0008 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 2.1 | 2.2 |
| B-21-C | 0.505 | 0.0008 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 2.2 | 2.2 |
| B-21-D | 0.505 | 0.0008 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 2.2 | 2.2 |
| B-22 | 0.060 | 0.0001 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 0.3 | 0.3 |
| B-23 | 0.040 | 0.0001 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 0.2 | 0.3 |
| B-24 | 0.060 | 0.0001 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 0.3 | 0.3 |
| B-25 | 0.080 | 0.0001 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 0.3 | 0.3 |
| B-26 | 0.600 | 0.0009 | 0.0 | 0.0 | 100.0 | 0.0 | 0.1333 | 2.87 | 1.7 | 1.6 |
| B-27 | 0.050 | 0.0001 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 0.2 | 0.3 |
| | 45.630 | 0.0713 | | | | | | | | |
| C-1-A | 4.380 | 0.0068 | 0.0 | 30.0 | 0.0 | 70.0 | 0.1333 | 3.67 | 16.1 | 15.7 |
| C-1-B | 0.710 | 0.0011 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 3.1 | 3.0 |
| C-2 | 1.780 | 0.0028 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 7.8 | 7.9 |
| C-3-A | 0.880 | 0.0014 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 3.8 | 3.9 |
| C-3-C | 0.360 | 0.0006 | 0.0 | 7.0 | 0.0 | 93.0 | 0.1333 | 4.21 | 1.5 | 1.6 |
| C-3-D | 0.250 | 0.0004 | 0.0 | 100.0 | 0.0 | 0.0 | 0.1333 | 2.03 | 0.5 | 0.5 |
| C-3-E | 0.180 | 0.0003 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 0.8 | 0.8 |
| | 8.540 | 0.0133 | | | | | | | | |
| D-1 | 1.820 | 0.0028 | 0.0 | 12.0 | 0.0 | 88.0 | 0.1333 | 4.09 | 7.4 | --- |
| D-2 | 0.670 | 0.0010 | 0.0 | 20.0 | 0.0 | 80.0 | 0.1333 | 3.90 | 2.6 | --- |
| D-3 | 0.240 | 0.0004 | 0.0 | 0.0 | 0.0 | 100.0 | 0.1333 | 4.37 | 1.0 | --- |
| | 2.730 | 0.0043 | | | | | | | | |
| TOTAL | 95.64 | | | | | | | | | |

[C9413301.HYDRO] HYD_OAT.WK4

# TIME TO PEAK CALCULATIONS

| Description | Variable | Unit | Basin B-4 | Basin A-2 | Basin A-3 | Basin C-1-A |
|---|---|---|---|---|---|---|
| Total Reach | L | Feet | 1400.0 | 650.0 | 1000.0 | 1000.0 |
| Overland Reach | L1 | Feet | 30.0 | 400.0 | 400.0 | 200.0 |
| Overland K | K1 | | 1 | 1 | 1 | 1 |
| Overland Slope | S1 | Percent | 1.00 | 1.00 | 1.00 | 1.00 |
| Adj. Overland Slope | S1' | Percent | 1.000 | 1.000 | 1.000 | 1.000 |
| Gully Reach | L2 | Feet | 470 | 250 | 600 | 800 |
| Gully K | K2 | | 2 | 2 | 2 | 2 |
| Gully Slope | S2 | Percent | 1.000 | 1.000 | 1.000 | 0.700 |
| Adj. Gully Slope | S2' | Percent | 1.000 | 1.000 | 1.000 | 0.700 |
| Arroyo Reach | L3 | Feet | 900.0 | 0.0 | 0.0 | 0.0 |
| Arroyo K | K3 | | 3 | 1 | 1 | 1 |
| Arroyo Slope | L3 | Percent | 2.000 | 1.000 | 1.000 | 4.000 |
| Adj. Arroyo Slope | S3' | Percent | 2.000 | 1.000 | 1.000 | 4.000 |
| Lca | Lca | Feet | 0.0 | 0.0 | 0.0 | 0.0 |
| Base Discharge | Qb | cfs | 11.0 | 25.3 | 11.0 | 10.0 |
| Ground Slope S | S | Percent | 1.643 | 1.000 | 1.000 | 0.760 |
| Adjusted Slope S' | S' | Percent | 1.643 | 1.000 | 1.000 | 0.760 |
| K | K | | 2.289 | 1.238 | 1.429 | 1.692 |
| K' | K' | | 2.289 | 1.238 | 1.429 | 1.692 |
| K" | K" | | 3.628 | 5.402 | 4.650 | 5.243 |
| K''' | K''' | | 2.487 | 3.703 | 3.187 | 3.594 |
| Kn | Kn | | 0.042 | 0.042 | 0.042 | 0.042 |
| Orig. TC | TC | Hrs. | 0.133 | 0.146 | 0.194 | 0.188 |
| K Value Used | K | | 2.289 | 1.238 | 1.429 | 1.692 |
| Adjusted TC | TC' | Hrs. | 0.122 | 0.049 | 0.087 | 0.089 |
| Time Lag | Lg | Hrs. | - | - | - | - |
| Time to Peak | TP | Hrs. | 0.133 | 0.133 | 0.133 | 0.133 |

NOTE: SINCE THESE FOUR BASINS ARE THE LARGEST, LONGEST, FLATTEST AND HAVE MINIMUM TP VALUES IT CAN BE ASSUMED THAT ALL OTHER BASINS ARE AT THE MINIMUM TP.

COTTONWOOD MALL
100-YEAR, 24-HOUR STORM
HYMO SUMMARY TABLE



| DESCRIPTION | HYDROGRAPH LABEL | FROM ID NO | TO ID NO | AREA SQ MI | DISCHARGE CFS | CURVE NO | TIME TO PEAK HR | CFS PER ACRE |
|---|---|---|---|---|---|---|---|---|
| HYDROGRAPH AT | A1 | 1 | - | 0.0047 | 12.0 | NA | 1.50 | 3.99 |
| RESERVOIR HYD | A1 | 1 | 1 | 0.0047 | 6.7 | | 1.65 | |
| ROUTED 18" | | 1 | 2 | | | | | |
| | A1 | 1 | | 0.0047 | 6.7 | | 1.65 | |
| | A1:MH14 | 2 | | 0.0047 | 6.7 | | 1.63 | |
| HYDROGRAPH AT | A13A2 | 3 | - | 0.0007 | 1.9 | NA | 1.50 | 4.31 |
| ROUTED 12" | | 3 | 4 | | | | | |
| | A13A2 | 3 | | 0.0007 | 1.9 | | 1.50 | |
| | A13A2:14 | 4 | | 0.0007 | 1.9 | | 1.50 | |
| COMBINED FLOW AT | MH14 | 2& 4 | 5 | 0.0054 | 8.1 | | 1.57 | |
| ROUTED 18" | | 5 | 6 | | | | | |
| | MH14 | 5 | | 0.0054 | 8.1 | | 1.57 | |
| | MH14:M15 | 6 | | 0.0054 | 8.0 | | 1.60 | |
| HYDROGRAPH AT | A13A1 | 7 | - | 0.0008 | 2.2 | NA | 1.50 | 4.31 |
| ROUTED 12" | | 7 | 8 | | | | | |
| | A13A1 | 7 | | 0.0008 | 2.2 | | 1.50 | |
| | A13A1:MH | 8 | | 0.0008 | 2.1 | | 1.50 | |
| HYDROGRAPH AT | A13B1 | 9 | - | 0.0003 | 0.8 | NA | 1.50 | 4.33 |
| ROUTED 12" | | 9 | 10 | | | | | |
| | A13B1 | 9 | | 0.0003 | 1.0 | | 1.50 | |
| | A13B1:MH | 10 | | 0.0003 | 1.0 | | 1.50 | |
| COMBINED FLOW AT | MH15A1 | 8&10 | 11 | 0.0011 | 2.9 | | 1.50 | |
| HYDROGRAPH AT | A13B2 | 12 | - | 0.0012 | 3.3 | NA | 1.50 | 4.30 |
| ROUTED 12" | | 12 | 13 | | | | | |
| | A13B2 | 12 | | 0.0012 | 3.3 | | 1.50 | |
| | A13B2:MH | 13 | | 0.0012 | 3.3 | | 1.50 | |
| COMBINED FLOW AT | MH15A2 | 11&13 | 14 | 0.0023 | 6.2 | | 1.50 | |
| HYDROGRAPH AT | A13C | 15 | - | 0.0011 | 3.0 | NA | 1.50 | 4.31 |
| ROUTED 12" | | 15 | 16 | | | | | |
| | A13C | 15 | | 0.0011 | 3.0 | | 1.50 | |
| | A13C2:MH | 16 | | 0.0011 | 3.0 | | 1.50 | |
| COMBINED FLOW AT | MH15ATOT | 14&16 | 17 | 0.0034 | 9.2 | | 1.50 | |
| ROUTED 15" | | 17 | 18 | | | | | |
| | MH15ATOT | 17 | | 0.0034 | 9.2 | | 1.50 | |
| | MH15B:A2 | 18 | | 0.0034 | 9.0 | | 1.50 | |
| HYDROGRAPH AT | A2 | 19 | - | 0.0095 | 25.3 | NA | 1.50 | 4.16 |
| RESERVOIR HYD | A2:POND | 19 | 19 | 0.0095 | 12.2 | | 1.70 | |
| COMBINED FLOW AT | A2:MH15B | 18&19 | 20 | 0.0129 | 19.9 | | 1.53 | |
| ROUTED 21" | | 20 | 21 | | | | | |
| | A2:MH15B | 20 | | 0.0129 | 19.9 | | 1.53 | |
| | A2:MH15 | 21 | | 0.0129 | 19.9 | | 1.53 | |
| COMBINED FLOW AT | MH15TOT | 21& 6 | 4 | 0.0183 | 27.8 | | 1.53 | |
| ROUTED 27" | | 4 | 2 | | | | | |
| | MH15TOT | 4 | | 0.0183 | 27.8 | | 1.53 | |
| | MH15:MH1 | 2 | | 0.0183 | 27.7 | | 1.57 | |
| HYDROGRAPH AT | A3 | 3 | - | 0.0125 | 31.8 | NA | 1.50 | 3.97 |
| HYDROGRAPH AT | A4 | 4 | - | 0.0031 | 8.3 | NA | 1.50 | 4.20 |

[C9413301.HYDRO]CWHYM100.MSJ/.OUT

| DESCRIPTION | HYDROGRAPH LABEL | FROM ID NO | TO ID NO | AREA SQ MI | DISCHARGE CFS | CURVE NO | TIME TO PEAK HR | CFS PER ACRE |
|---|---|---|---|---|---|---|---|---|
| COMBINED FLOW AT | POND | 2& 9 | 10 | 0.0106 | 26.4 | | 1.50 | |
| HYDROGRAPH AT | B7 | 11 | - | 0.0008 | 1.5 | NA | 1.50 | 2.86 |
| COMBINED FLOW AT | B7:PND:T | 10&11 | 12 | 0.0114 | 27.8 | | 1.50 | |
| RESERVOIR HYD | B7:PND:R | 12 | 13 | 0.0114 | 5.6 | | 2.07 | |
| ROUTED 12" | | 13 | 14 | | | | | |
| | B7:PND:R | 13 | | 0.0114 | 5.6 | | 2.07 | |
| | POND:MH3 | 14 | | 0.0114 | 5.6 | | 2.03 | |
| COMBINED FLOW AT | MH3B:TOT | 4&14 | 15 | 0.0147 | 13.7 | | 1.50 | |
| ROUTED 27" | | 15 | 16 | | | | | |
| | MH3B:TOT | 15 | | 0.0147 | 13.7 | | 1.50 | |
| | MH3B:MH4 | 16 | | 0.0147 | 13.2 | | 1.50 | |
| COMBINED FLOW AT | MH4:TOT | 16&20 | 17 | 0.0293 | 40.6 | | 1.53 | |
| ROUTED 36" | | 17 | 18 | | | | | |
| | MH4:TOT | 17 | | 0.0293 | 40.6 | | 1.53 | |
| | MH4:MH5 | 18 | | 0.0293 | 40.4 | | 1.53 | |
| HYDROGRAPH AT | B19A2 | 1 | - | 0.0004 | 1.0 | NA | 1.50 | 4.32 |
| ROUTED 12" | | 1 | 2 | | | | | |
| | B19A2 | 1 | | 0.0004 | 1.0 | | 1.50 | |
| | B19A2:5B | 2 | | 0.0004 | 1.0 | | 1.50 | |
| HYDROGRAPH AT | B19B | 3 | - | 0.0012 | 3.3 | NA | 1.50 | 4.30 |
| ROUTED 12" | | 3 | 4 | | | | | |
| | B19B | 3 | | 0.0012 | 3.3 | | 1.50 | |
| | B19B:MH5 | 4 | | 0.0012 | 3.3 | | 1.50 | |
| COMBINED FLOW AT | MH5B | 2& 4 | 5 | 0.0016 | 4.3 | | 1.50 | |
| HYDROGRAPH AT | B19D1 | 6 | - | 0.0004 | 1.1 | NA | 1.50 | 4.32 |
| ROUTED 12" | | 6 | 7 | | | | | |
| | B19D1 | 6 | | 0.0004 | 1.1 | | 1.50 | |
| | B19D:MH5 | 7 | | 0.0004 | 1.1 | | 1.50 | |
| HYDROGRAPH AT | B19C | 8 | - | 0.0011 | 3.1 | NA | 1.50 | 4.31 |
| ROUTED 12" | | 8 | 9 | | | | | |
| | B19C | 8 | | 0.0011 | 3.1 | | 1.50 | |
| | B19C:MH5 | 9 | | 0.0011 | 3.1 | | 1.50 | |
| COMBINED FLOW AT | MH5A:TOT | 7& 9 | 10 | 0.0015 | 4.2 | | 1.50 | |
| ROUTED 12" | | 10 | 11 | | | | | |
| | MH5A:TOT | 10 | | 0.0015 | 4.2 | | 1.50 | |
| | MH5A:M5B | 11 | | 0.0015 | 4.2 | | 1.50 | |
| COMBINED FLOW AT | MH5B:TOT | 5&11 | 12 | 0.0031 | 8.5 | | 1.50 | |
| ROUTED 18" | | 12 | 13 | | | | | |
| | MH5B:TOT | 12 | | 0.0031 | 8.5 | | 1.50 | |
| | MH5A:MH5 | 13 | | 0.0031 | 8.4 | | 1.50 | |
| COMBINED FLOW AT | MH5:TOT | 13&18 | 14 | 0.0324 | 48.6 | | 1.53 | |
| ROUTED 42" | | 14 | 15 | | | | | |
| | MH5:TOT | 14 | | 0.0324 | 48.6 | | 1.53 | |
| | MH5:MH5D | 15 | | 0.0324 | 48.5 | | 1.53 | |
| HYDROGRAPH AT | B19D2 | 16 | - | 0.0005 | 1.4 | NA | 1.50 | 4.32 |
| HYDROGRAPH AT | B20A2 | 17 | - | 0.0005 | 1.4 | NA | 1.50 | 4.32 |
| COMBINED FLOW AT | B19D:B20 | 16&17 | 16 | 0.0010 | 2.8 | | 1.50 | |
| ROUTED 12" | | 16 | 17 | | | | | |
| | B19D:B20 | 16 | | 0.0010 | 2.8 | | 1.50 | |

| DESCRIPTION | HYDROGRAPH LABEL | FROM ID NO | TO ID NO | AREA SQ MI | DISCHARGE CFS | CURVE NO | TIME TO PEAK HR | CFS PER ACRE |
|---|---|---|---|---|---|---|---|---|
| | B19D1:5D | 17 | | 0.0010 | 2.8 | | 1.50 | |
| COMBINED FLOW AT | MH5D:TOT | 15&17 | 18 | 0.0334 | 51.0 | | 1.53 | |
| ROUTED 42" | | 18 | 19 | | | | | |
| | MH5D:TOT | 18 | | 0.0334 | 51.0 | | 1.53 | |
| | MH5D:MH6 | 19 | | 0.0334 | 50.8 | | 1.53 | |
| HYDROGRAPH AT | B10 | 1 | - | 0.0033 | 8.5 | NA | 1.50 | 4.02 |
| ROUTED 18" | | 1 | 2 | | | | | |
| | B10 | 1 | | 0.0033 | 8.5 | | 1.50 | |
| | B10:MH6A | 2 | | 0.0033 | 8.3 | | 1.50 | |
| HYDROGRAPH AT | B9 | 7 | - | 0.0037 | 9.7 | NA | 1.50 | 4.11 |
| RESERVOIR HYD | B9 | 7 | 11 | 0.0037 | 1.9 | | 2.05 | |
| ROUTED 18" | | 11 | 12 | | | | | |
| | B9 | 11 | | 0.0037 | 1.9 | | 2.05 | |
| | B9:MH6A | 12 | | 0.0037 | 1.9 | | 2.10 | |
| COMBINED FLOW AT | MH6A:TOT | 2&12 | 13 | 0.0070 | 9.3 | | 1.50 | |
| ROUTED 21" | | 13 | 15 | | | | | |
| | MH6A:TOT | 13 | | 0.0070 | 9.3 | | 1.50 | |
| | MH6A:NLT | 15 | | 0.0070 | 9.2 | | 1.53 | |
| HYDROGRAPH AT | B13 | 1 | - | 0.0030 | 8.0 | NA | 1.50 | 4.15 |
| RESERVOIR HYD | B13 | 1 | 1 | 0.0030 | 2.4 | | 1.85 | |
| COMBINED FLOW AT | B13TOT | 1&15 | 13 | 0.0100 | 11.3 | | 1.53 | |
| ROUTED 15" | | 13 | 2 | | | | | |
| | B13TOT | 13 | | 0.0100 | 11.3 | | 1.53 | |
| | B13:MH6 | 2 | | 0.0100 | 11.1 | | 1.53 | |
| HYDROGRAPH AT | B14 | 4 | - | 0.0033 | 8.6 | NA | 1.50 | 4.06 |
| RESERVOIR HYD | B14:POND | 4 | 4 | 0.0033 | 1.1 | | 2.15 | |
| ROUTED 12" | | 4 | 5 | | | | | |
| | B14:POND | 4 | | 0.0033 | 1.1 | | 2.15 | |
| | B14:MH6 | 5 | | 0.0033 | 1.1 | | 2.13 | |
| COMBINED FLOW AT | B13:B14 | 2& 5 | 20 | 0.0133 | 12.1 | | 1.53 | |
| COMBINED FLOW AT | MH6:TOT | 20&19 | 20 | 0.0467 | 62.9 | | 1.53 | |
| ROUTED 48" | | 20 | 17 | | | | | |
| | MH6:TOT | 20 | | 0.0467 | 62.9 | | 1.53 | |
| | MH6:MH7 | 17 | | 0.0467 | 63.2 | | 1.53 | |
| HYDROGRAPH AT | B20A1 | 1 | - | 0.0005 | 1.4 | NA | 1.50 | 4.32 |
| ROUTED 12" | | 1 | 2 | | | | | |
| | B20A1 | 1 | | 0.0005 | 1.4 | | 1.50 | |
| | B20A1:7A | 2 | | 0.0005 | 1.4 | | 1.50 | |
| HYDROGRAPH AT | B23 | 3 | - | 0.0001 | 0.3 | NA | 1.50 | 4.41 |
| ROUTED 12" | | 3 | 4 | | | | | |
| | B23 | 3 | | 0.0001 | 1.0 | | 1.50 | |
| | B23:MH7A | 4 | | 0.0001 | 1.0 | | 1.50 | |
| COMBINED FLOW AT | MH7A | 2& 4 | 5 | 0.0006 | 1.7 | | 1.50 | |
| HYDROGRAPH AT | B20B | 6 | - | 0.0017 | 4.7 | NA | 1.50 | 4.30 |
| ROUTED 12" | | 6 | 7 | | | | | |
| | B20B | 6 | | 0.0017 | 4.7 | | 1.50 | |
| | B20B:MH7 | 7 | | 0.0017 | 4.7 | | 1.50 | |
| COMBINED FLOW AT | MH7A3 | 5& 7 | 8 | 0.0023 | 6.3 | | 1.50 | |
| HYDROGRAPH AT | B24 | 9 | - | 0.0001 | 0.3 | NA | 1.50 | 4.41 |

| DESCRIPTION | HYDROGRAPH LABEL | FROM ID NO | TO ID NO | AREA SQ MI | DISCHARGE CFS | CURVE NO | TIME TO PEAK HR | CFS PER ACRE |
|---|---|---|---|---|---|---|---|---|
| COMBINED FLOW AT | A3:A4 | 3& 4 | 5 | 0.0156 | 40.1 | | 1.50 | |
| ROUTED 33" | | 5 | 8 | | | | | |
| | A3:A4 | 5 | | 0.0156 | 40.1 | | 1.50 | |
| | A3:A4:RT | 8 | | 0.0156 | 40.2 | | 1.50 | |
| COMBINED FLOW AT | MH16 | 2& 8 | 9 | 0.0339 | 66.2 | | 1.50 | |
| ROUTED 42" | | 9 | 10 | | | | | |
| | MH16 | 9 | | 0.0339 | 66.2 | | 1.50 | |
| | MH16:MH1 | 10 | | 0.0339 | 65.5 | | 1.50 | |
| HYDROGRAPH AT | A10 | 11 | - | 0.0004 | 1.1 | NA | 1.50 | 4.32 |
| ROUTED 18" | | 11 | 12 | | | | | |
| | A10 | 11 | | 0.0004 | 1.1 | | 1.50 | |
| | A10:MH17 | 12 | | 0.0004 | 1.1 | | 1.50 | |
| COMBINED FLOW AT | MH17TOT | 10&12 | 13 | 0.0343 | 66.6 | | 1.50 | |
| ROUTED 42" | | 13 | 14 | | | | | |
| | MH17TOT | 13 | | 0.0343 | 66.6 | | 1.50 | |
| | MH17:A8 | 14 | | 0.0343 | 66.9 | | 1.53 | |
| HYDROGRAPH AT | A8 | 15 | - | 0.0054 | 14.1 | NA | 1.50 | 4.09 |
| RESERVOIR HYD | A8:POND | 15 | 15 | 0.0054 | 9.9 | | 1.60 | |
| ROUTED 12" | | 15 | 16 | | | | | |
| | A8:POND | 15 | | 0.0054 | 9.9 | | 1.60 | |
| | A8:IN | 16 | | 0.0054 | 9.9 | | 1.60 | |
| COMBINED FLOW AT | A8:IN | 14&16 | 17 | 0.0397 | 76.3 | | 1.53 | |
| ROUTED 42" | | 17 | 18 | | | | | |
| | A8:IN | 17 | | 0.0397 | 76.3 | | 1.53 | |
| | A8:MH18 | 18 | | 0.0397 | 76.5 | | 1.53 | |
| HYDROGRAPH AT | A14A | 1 | - | 0.0012 | 3.3 | NA | 1.50 | 4.30 |
| ROUTED 12" | | 1 | 2 | | | | | |
| | A14A | 1 | | 0.0012 | 3.3 | | 1.50 | |
| | A14A:18A | 2 | | 0.0012 | 3.3 | | 1.50 | |
| HYDROGRAPH AT | A16 | 6 | - | 0.0001 | 0.3 | NA | 1.50 | 4.41 |
| ROUTED 12" | | 6 | 7 | | | | | |
| | A16 | 6 | | 0.0001 | 1.0 | | 1.50 | |
| | A16:MH18 | 7 | | 0.0001 | 1.0 | | 1.50 | |
| COMBINED FLOW AT | A14A:A16 | 2& 7 | 8 | 0.0013 | 3.6 | | 1.50 | |
| HYDROGRAPH AT | A14B1 | 9 | - | 0.0019 | 5.2 | NA | 1.50 | 4.30 |
| ROUTED 12" | | 9 | 10 | | | | | |
| | A14B1 | 9 | | 0.0019 | 5.2 | | 1.50 | |
| | A14B1:MH | 10 | | 0.0019 | 5.2 | | 1.50 | |
| COMBINED FLOW AT | MH18C | 8&10 | 11 | 0.0032 | 8.8 | | 1.50 | |
| ROUTED 24" | | 11 | 12 | | | | | |
| | MH18C | 11 | | 0.0032 | 8.8 | | 1.50 | |
| | M18A:18B | 12 | | 0.0032 | 8.7 | | 1.50 | |
| HYDROGRAPH AT | A6 | 13 | - | 0.0027 | 7.0 | NA | 1.50 | 4.06 |
| RESERVOIR HYD | A6:POND | 13 | 13 | 0.0027 | 1.5 | | 2.05 | |
| ROUTED 12" | | 13 | 14 | | | | | |
| | A6:POND | 13 | | 0.0027 | 1.5 | | 2.05 | |
| | A6:MH18B | 14 | | 0.0027 | 1.5 | | 2.07 | |
| COMBINED FLOW AT | MH18B:TO | 12&14 | 15 | 0.0059 | 10.0 | | 1.50 | |
| ROUTED 24" | | 15 | 1 | | | | | |

| DESCRIPTION | HYDROGRAPH LABEL | FROM ID NO | TO ID NO | AREA SQ MI | DISCHARGE CFS | CURVE NO | TIME TO PEAK HR | CFS PER ACRE |
|---|---|---|---|---|---|---|---|---|
| | MH18B:TO | 15 | | 0.0059 | 10.0 | | 1.50 | |
| | M18B:18C | 1 | | 0.0059 | 9.9 | | 1.50 | |
| HYDROGRAPH AT | A14B2 | 2 | - | 0.0008 | 2.2 | NA | 1.50 | 4.31 |
| ROUTED 12" | | 2 | 3 | | | | | |
| | A14B2 | 2 | | 0.0008 | 2.2 | | 1.50 | |
| | A14B2:18 | 3 | | 0.0008 | 2.2 | | 1.50 | |
| COMBINED FLOW AT | A14B2:MH | 1& 3 | 4 | 0.0067 | 12.1 | | 1.50 | |
| HYDROGRAPH AT | A7 | 5 | - | 0.0010 | 2.7 | NA | 1.50 | 4.23 |
| RESERVOIR HYD | A7:POND | 5 | 5 | 0.0010 | 0.2 | | 2.20 | |
| ROUTED 12" | | 5 | 6 | | | | | |
| | A7:POND | 5 | | 0.0010 | 1.0 | | 1.50 | |
| | A7:MH18C | 6 | | 0.0010 | 1.0 | | 1.50 | |
| COMBINED FLOW AT | MH18C:TO | 4& 6 | 7 | 0.0077 | 12.1 | | 1.50 | |
| ROUTED 30" | | 7 | 8 | | | | | |
| | MH18C:TO | 7 | | 0.0077 | 12.1 | | 1.50 | |
| | MH18C:MH | 8 | | 0.0077 | 12.1 | | 1.53 | |
| COMBINED FLOW AT | MH18 | 8&18 | 9 | 0.0474 | 88.6 | | 1.53 | |
| HYDROGRAPH AT | A15A | 10 | - | 0.0008 | 2.1 | NA | 1.50 | 4.31 |
| ROUTED 12" | | 10 | 11 | | | | | |
| | A15A | 10 | | 0.0008 | 2.1 | | 1.50 | |
| | A15A:MH1 | 11 | | 0.0008 | 2.1 | | 1.50 | |
| COMBINED FLOW AT | MH18:TOT | 9&11 | 12 | 0.0482 | 90.5 | | 1.53 | |
| ROUTED 48" | | 12 | 13 | | | | | |
| | MH18:TOT | 12 | | 0.0482 | 90.5 | | 1.53 | |
| | MH18:MH1 | 13 | | 0.0482 | 91.1 | | 1.53 | |
| HYDROGRAPH AT | A9 | 14 | - | 0.0024 | 6.2 | NA | 1.50 | 4.05 |
| RESERVOIR HYD | A9:POND | 14 | 14 | 0.0024 | 1.4 | | 2.00 | |
| ROUTED 12" | | 14 | 15 | | | | | |
| | A9:POND | 14 | | 0.0024 | 1.4 | | 2.00 | |
| | A9:MH19 | 15 | | 0.0024 | 1.4 | | 2.00 | |
| COMBINED FLOW AT | A9:MH19 | 13&15 | 16 | 0.0506 | 92.4 | | 1.53 | |
| HYDROGRAPH AT | A15B | 17 | - | 0.0008 | 2.1 | NA | 1.50 | 4.31 |
| ROUTED 12" | | 17 | 18 | | | | | |
| | A15B | 17 | | 0.0008 | 2.1 | | 1.50 | |
| | A15B:M19 | 18 | | 0.0008 | 2.1 | | 1.50 | |
| COMBINED FLOW AT | MH19:TOT | 16&18 | 19 | 0.0513 | 94.4 | | 1.53 | |
| ROUTED 48" | | 19 | 1 | | | | | |
| | MH19:TOT | 19 | | 0.0513 | 94.4 | | 1.53 | |
| | MH19:MH2 | 1 | | 0.0513 | 95.0 | | 1.53 | |
| HYDROGRAPH AT | A11 | 2 | - | 0.0011 | 2.7 | NA | 1.50 | 3.83 |
| RESERVOIR HYD | A11:POND | 2 | 2 | 0.0011 | 0.2 | | 2.20 | |
| ROUTED 12" | | 2 | 3 | | | | | |
| | A11:POND | 2 | | 0.0011 | 1.0 | | 1.53 | |
| | A11:MH20 | 3 | | 0.0011 | 1.0 | | 1.53 | |
| COMBINED FLOW AT | MH20:TOT | 1& 3 | 4 | 0.0524 | 95.2 | | 1.53 | |
| ROUTED 48" | | 4 | 21 | | | | | |
| | MH20:TOT | 4 | | 0.0524 | 95.2 | | 1.53 | |
| | MH20:M21 | 21 | | 0.0524 | 95.1 | | 1.53 | |
| HYDROGRAPH AT | A17 | 2 | - | 0.0044 | 11.8 | NA | 1.50 | 4.18 |

| DESCRIPTION | HYDROGRAPH LABEL | FROM ID NO | TO ID NO | AREA SQ MI | DISCHARGE CFS | CURVE NO | TIME TO PEAK HR | CFS PER ACRE |
|---|---|---|---|---|---|---|---|---|
| RESERVOIR HYD | A17:POND | 2 | 2 | 0.0044 | 2.5 | | 2.05 | |
| ROUTED 18" | | 2 | 3 | | | | | |
| | A17:POND | 2 | | 0.0044 | 2.5 | | 2.05 | |
| | A17:M21D | 3 | | 0.0044 | 2.5 | | 2.07 | |
| HYDROGRAPH AT | A12 | 6 | - | 0.0039 | 10.3 | NA | 1.50 | 4.15 |
| RESERVOIR HYD | A12:POND | 6 | 7 | 0.0039 | 2.6 | | 2.00 | |
| COMBINED FLOW AT | A12:TOT | 3& 7 | 8 | 0.0083 | 5.1 | | 2.03 | |
| ROUTED 18" | | 8 | 9 | | | | | |
| | A12:TOT | 8 | | 0.0083 | 5.1 | | 2.03 | |
| | A12:MH21 | 9 | | 0.0083 | 5.1 | | 2.03 | |
| COMBINED FLOW AT | MH21 | 9&21 | 10 | 0.0607 | 99.6 | | 1.53 | |
| ROUTED 54" | | 10 | 17 | | | | | |
| | MH21 | 10 | | 0.0607 | 99.6 | | 1.53 | |
| | MH21:MH1 | 17 | | 0.0607 | 99.6 | | 1.53 | |
| HYDROGRAPH AT | B26 | 18 | - | 0.0009 | 1.6 | NA | 1.50 | 2.86 |
| COMBINED FLOW AT | POND | 17&18 | 19 | 0.0616 | 101.2 | | 1.53 | |
| RESERVOIR HYD | B26:POND | 19 | 20 | 0.0616 | 44.3 | | 2.03 | |
| ROUTED 33" | | 20 | 21 | | | | | |
| | B26:POND | 20 | | 0.0616 | 44.3 | | 2.03 | |
| | POND:MH1 | 21 | | 0.0616 | 44.3 | | 2.03 | |
| HYDROGRAPH AT | B1A | 1 | - | 0.0039 | 10.4 | NA | 1.50 | 4.17 |
| DIVIDED FLOW AT | | 1 | 1& 2 | | | | | |
| | B1A:MH4A | 1 | - | 0.0000 | 6.0 | | 1.50 | |
| | B1A:DOCK | 2 | - | 0.0000 | 4.4 | | 1.50 | |
| HYDROGRAPH AT | B1B | 3 | - | 0.0017 | 4.6 | NA | 1.50 | 4.18 |
| COMBINED FLOW AT | B1B:DOCK | 3& 2 | 3 | 0.0017 | 9.0 | | 1.50 | |
| HYDROGRAPH AT | B22 | 4 | - | 0.0001 | 0.3 | NA | 1.50 | 4.41 |
| COMBINED FLOW AT | B22:DOCK | 3& 4 | 3 | 0.0018 | 9.2 | | 1.50 | |
| RESERVOIR HYD | 367:B1C | 3 | 4 | 0.0018 | 6.2 | | 1.60 | |
| COMBINED FLOW AT | DOCK:MH4 | 4& 1 | 5 | 0.0018 | 11.6 | | 1.50 | |
| HYDROGRAPH AT | B1C | 1 | - | 0.0015 | 4.0 | NA | 1.50 | 4.19 |
| RESERVOIR HYD | B1C:POND | 1 | 2 | 0.0015 | 3.0 | | 1.60 | |
| COMBINED FLOW AT | B1C:MH4A | 2& 5 | 5 | 0.0033 | 14.3 | | 1.50 | |
| HYDROGRAPH AT | B18A2 | 1 | - | 0.0007 | 1.9 | NA | 1.50 | 4.31 |
| COMBINED FLOW AT | MH4A:TOT | 5& 1 | 5 | 0.0040 | 16.2 | | 1.50 | |
| ROUTED 12" | | 5 | 3 | | | | | |
| | MH4A:TOT | 5 | | 0.0040 | 16.2 | | 1.50 | |
| | MH4A:M4C | 3 | | 0.0040 | 15.9 | | 1.53 | |
| HYDROGRAPH AT | B18A1 | 4 | - | 0.0008 | 2.2 | NA | 1.50 | 4.31 |
| ROUTED 12" | | 4 | 5 | | | | | |
| | B18A1 | 4 | | 0.0008 | 2.2 | | 1.50 | |
| | B18A1:4B | 5 | | 0.0008 | 2.2 | | 1.50 | |
| HYDROGRAPH AT | B1D | 7 | - | 0.0043 | 11.5 | NA | 1.50 | 4.16 |
| RESERVOIR HYD | B1D:POND | 7 | 7 | 0.0043 | 3.7 | | 1.85 | |
| ROUTED 18" | | 7 | 8 | | | | | |
| | B1D:POND | 7 | | 0.0043 | 3.7 | | 1.85 | |
| | B2:MH4B | 8 | | 0.0043 | 3.7 | | 1.87 | |
| COMBINED FLOW AT | B2:MH4B | 5& 8 | 9 | 0.0051 | 5.6 | | 1.50 | |
| HYDROGRAPH AT | B18B | 10 | - | 0.0004 | 1.1 | NA | 1.50 | 4.32 |

| DESCRIPTION | HYDROGRAPH LABEL | FROM ID NO | TO ID NO | AREA SQ MI | DISCHARGE CFS | CURVE NO | TIME TO PEAK HR | CFS PER ACRE |
|---|---|---|---|---|---|---|---|---|
| ROUTED 12" | | 10 | 11 | | | | | |
| | B18B | 10 | | 0.0004 | 1.1 | | 1.50 | |
| | B18B:M4B | 11 | | 0.0004 | 1.1 | | 1.50 | |
| COMBINED FLOW AT | B18B:M4B | 9&11 | 12 | 0.0055 | 6.7 | | 1.50 | |
| HYDROGRAPH AT | B18C | 13 | - | 0.0008 | 2.2 | NA | 1.50 | 4.31 |
| ROUTED 12" | | 13 | 14 | | | | | |
| | B18C | 13 | | 0.0008 | 2.2 | | 1.50 | |
| | B18C:M4B | 14 | | 0.0008 | 2.2 | | 1.50 | |
| COMBINED FLOW AT | B18C:M4B | 12&14 | 15 | 0.0063 | 8.9 | | 1.50 | |
| ROUTED 30" | | 15 | 19 | | | | | |
| | B18C:M4B | 15 | | 0.0063 | 8.9 | | 1.50 | |
| | MH4B:M4C | 19 | | 0.0063 | 8.9 | | 1.50 | |
| COMBINED FLOW AT | MH4C:TOT | 3&19 | 1 | 0.0103 | 24.7 | | 1.53 | |
| ROUTED 36" | | 1 | 2 | | | | | |
| | MH4C:TOT | 1 | | 0.0103 | 24.7 | | 1.53 | |
| | MH4C:MH4 | 2 | | 0.0103 | 24.2 | | 1.57 | |
| HYDROGRAPH AT | B3 | 6 | - | 0.0038 | 9.6 | NA | 1.50 | 3.93 |
| RESERVOIR HYD | B3:POND | 6 | 6 | 0.0038 | 2.2 | | 2.00 | |
| ROUTED 12" | | 6 | 7 | | | | | |
| | B3:POND | 6 | | 0.0038 | 2.2 | | 2.00 | |
| | B3:MH4D | 7 | | 0.0038 | 2.2 | | 2.00 | |
| HYDROGRAPH AT | 232:B27 | 9 | - | 0.0001 | 0.3 | NA | 1.50 | 4.41 |
| ROUTED 12" | | 9 | 10 | | | | | |
| | 232:B27 | 9 | | 0.0001 | 1.0 | | 2.00 | |
| | B27:MH46 | 10 | | 0.0001 | 1.0 | | 2.00 | |
| COMBINED FLOW AT | MH4D | 7&10 | 11 | 0.0039 | 2.4 | | 1.53 | |
| HYDROGRAPH AT | B19A1 | 12 | - | 0.0004 | 1.1 | NA | 1.50 | 4.32 |
| ROUTED 12" | | 12 | 13 | | | | | |
| | B19A1 | 12 | | 0.0004 | 1.1 | | 1.50 | |
| | B19A1:MH | 13 | | 0.0004 | 1.1 | | 1.50 | |
| COMBINED FLOW AT | MH4D2 | 11&13 | 14 | 0.0043 | 3.4 | | 1.50 | |
| ROUTED 12" | | 14 | 15 | | | | | |
| | MH4D2 | 14 | | 0.0043 | 3.4 | | 1.50 | |
| | MH4D:MH4 | 15 | | 0.0043 | 3.4 | | 1.53 | |
| COMBINED FLOW AT | MH4-1 | 2&15 | 20 | 0.0146 | 27.3 | | 1.57 | |
| HYDROGRAPH AT | B2A | 6 | - | 0.0015 | 3.3 | NA | 1.50 | 3.46 |
| HYDROGRAPH AT | B2B | 1 | - | 0.0005 | 0.9 | NA | 1.50 | 2.87 |
| COMBINED FLOW AT | B2:POND | 1& 6 | 2 | 0.0020 | 4.2 | | 1.50 | |
| HYDROGRAPH AT | B4 | 3 | - | 0.0033 | 9.1 | NA | 1.50 | 4.30 |
| ROUTED 24" | | 3 | 4 | | | | | |
| | B4 | 3 | | 0.0033 | 9.1 | | 1.50 | |
| | B4:MH3B | 4 | | 0.0033 | 9.2 | | 1.50 | |
| HYDROGRAPH AT | B5 | 7 | - | 0.0060 | 16.1 | NA | 1.50 | 4.18 |
| HYDROGRAPH AT | B6 | 8 | - | 0.0006 | 1.7 | NA | 1.50 | 4.31 |
| COMBINED FLOW AT | B6:B5 | 8& 7 | 8 | 0.0066 | 17.7 | | 1.50 | |
| COMBINED FLOW AT | B2:B5:B6 | 8& 2 | 8 | 0.0086 | 22.0 | | 1.50 | |
| ROUTED 27" | | 8 | 9 | | | | | |
| | B2:B5:B6 | 8 | | 0.0086 | 22.0 | | 1.50 | |
| | B2:B5:PO | 9 | | 0.0086 | 22.1 | | 1.50 | |

# HYMO SUMMARY TABLE

| DESCRIPTION | HYDROGRAPH LABEL | FROM ID NO | TO ID NO | AREA SQ MI | DISCHARGE CFS | CURVE NO | TIME TO PEAK HR | CFS PER ACRE |
|---|---|---|---|---|---|---|---|---|
| ROUTED 12" | | 9 | 10 | | | | | |
| | B24 | 9 | | 0.0001 | 1.0 | | 1.50 | |
| | B24:MH7A | 10 | | 0.0001 | 1.0 | | 1.50 | |
| COMBINED FLOW AT | MH7A4 | 8&10 | 11 | 0.0024 | 6.6 | | 1.50 | |
| HYDROGRAPH AT | B20C | 12 | - | 0.0009 | 2.5 | NA | 1.50 | 4.31 |
| ROUTED 12" | | 12 | 13 | | | | | |
| | B20C | 12 | | 0.0009 | 2.5 | | 1.50 | |
| | B20C:M7A | 13 | | 0.0009 | 2.5 | | 1.50 | |
| COMBINED FLOW AT | MH7A:TOT | 11&13 | 14 | 0.0033 | 9.1 | | 1.50 | |
| ROUTED 21" | | 14 | 15 | | | | | |
| | MH7A:TOT | 14 | | 0.0033 | 9.1 | | 1.50 | |
| | MH7A:MH7 | 15 | | 0.0033 | 9.0 | | 1.50 | |
| COMBINED FLOW AT | MH7:TOT | 17&15 | 3 | 0.0500 | 71.9 | | 1.53 | |
| ROUTED 54" | | 3 | 4 | | | | | |
| | MH7:TOT | 3 | | 0.0500 | 71.9 | | 1.53 | |
| | MH7:B15I | 4 | | 0.0500 | 71.9 | | 1.53 | |
| HYDROGRAPH AT | B15 | 5 | - | 0.0029 | 7.5 | NA | 1.50 | 4.07 |
| RESERVOIR HYD | B15:POND | 5 | 5 | 0.0029 | 2.6 | | 1.80 | |
| ROUTED 12" | | 5 | 6 | | | | | |
| | B15:POND | 5 | | 0.0029 | 2.6 | | 1.80 | |
| | B15IN | 6 | | 0.0029 | 2.6 | | 1.80 | |
| COMBINED FLOW AT | B15OUT | 4& 6 | 7 | 0.0529 | 74.5 | | 1.53 | |
| ROUTED 54" | | 7 | 8 | | | | | |
| | B15OUT | 7 | | 0.0529 | 74.5 | | 1.53 | |
| | B15OUT:M | 8 | | 0.0529 | 74.8 | | 1.53 | |
| HYDROGRAPH AT | B16 | 9 | - | 0.0033 | 9.0 | NA | 1.50 | 4.24 |
| ROUTED 15" | | 9 | 10 | | | | | |
| | B16 | 9 | | 0.0033 | 9.0 | | 1.50 | |
| | B16:MH8 | 10 | | 0.0033 | 8.9 | | 1.50 | |
| COMBINED FLOW AT | MH8 | 8&10 | 11 | 0.0562 | 83.2 | | 1.53 | |
| ROUTED 54" | | 11 | 20 | | | | | |
| | MH8 | 11 | | 0.0562 | 83.2 | | 1.53 | |
| | MH8:MH9 | 20 | | 0.0562 | 81.9 | | 1.57 | |
| HYDROGRAPH AT | B21A | 1 | - | 0.0009 | 2.5 | NA | 1.50 | 4.31 |
| ROUTED 12" | | 1 | 2 | | | | | |
| | B21A | 1 | | 0.0009 | 2.5 | | 1.50 | |
| | B21A:MH2 | 2 | | 0.0009 | 2.5 | | 1.50 | |
| HYDROGRAPH AT | B21B | 3 | - | 0.0008 | 2.2 | NA | 1.50 | 4.31 |
| ROUTED 12" | | 3 | 4 | | | | | |
| | B21B | 3 | | 0.0008 | 2.2 | | 1.50 | |
| | B21B:M21 | 4 | | 0.0008 | 2.2 | | 1.50 | |
| COMBINED FLOW AT | MH21A2 | 2& 4 | 5 | 0.0017 | 4.7 | | 1.50 | |
| HYDROGRAPH AT | B25 | 6 | - | 0.0001 | 0.3 | NA | 1.50 | 4.41 |
| ROUTED 12" | | 6 | 7 | | | | | |
| | B25 | 6 | | 0.0001 | 1.0 | | 1.50 | |
| | B25:M21A | 7 | | 0.0001 | 1.0 | | 1.50 | |
| COMBINED FLOW AT | MH21A1 | 5& 7 | 8 | 0.0018 | 4.9 | | 1.50 | |
| HYDROGRAPH AT | B21C | 9 | - | 0.0008 | 2.2 | NA | 1.50 | 4.31 |
| ROUTED 12" | | 9 | 10 | | | | | |

| DESCRIPTION | HYDROGRAPH LABEL | FROM ID NO | TO ID NO | AREA SQ MI | DISCHARGE CFS | CURVE NO | TIME TO PEAK HR | CFS PER ACRE |
|---|---|---|---|---|---|---|---|---|
| | B21C | 9 | | 0.0008 | 2.2 | | 1.50 | |
| | B21C1:21 | 10 | | 0.0008 | 2.2 | | 1.50 | |
| COMBINED FLOW AT | MH21A | 8&10 | 11 | 0.0026 | 7.1 | | 1.50 | |
| ROUTED 15" | | 11 | 15 | | | | | |
| | MH21A | 11 | | 0.0026 | 7.1 | | 1.50 | |
| | M21A:21B | 15 | | 0.0026 | 7.1 | | 1.50 | |
| HYDROGRAPH AT | B21D | 16 | - | 0.0008 | 2.2 | NA | 1.50 | 4.31 |
| ROUTED 12" | | 16 | 17 | | | | | |
| | B21D | 16 | | 0.0008 | 2.2 | | 1.50 | |
| | B21D:21B | 17 | | 0.0008 | 2.2 | | 1.50 | |
| COMBINED FLOW AT | MH21B:TO | 15&17 | 18 | 0.0034 | 9.3 | | 1.50 | |
| ROUTED 15" | | 18 | 19 | | | | | |
| | MH21B:TO | 18 | | 0.0034 | 9.3 | | 1.50 | |
| | MH21B:M9 | 19 | | 0.0034 | 9.2 | | 1.50 | |
| COMBINED FLOW AT | MH9 | 19&20 | 20 | 0.0596 | 89.6 | | 1.57 | |
| HYDROGRAPH AT | C1A | 2 | - | 0.0068 | 15.7 | NA | 1.50 | 3.61 |
| HYDROGRAPH AT | C1B | 4 | - | 0.0011 | 3.0 | NA | 1.50 | 4.31 |
| COMBINED FLOW AT | C1A:C1B | 2& 4 | 1 | 0.0079 | 18.7 | | 1.50 | |
| RESERVOIR HYD | BDPOND | 1 | 1 | 0.0079 | 13.3 | | 1.60 | |
| ROUTED 24" | | 1 | 2 | | | | | |
| | BDPOND | 1 | | 0.0079 | 13.3 | | 1.60 | |
| | MH9A1 | 2 | | 0.0079 | 13.3 | | 1.60 | |
| HYDROGRAPH AT | C3A | 3 | - | 0.0014 | 3.9 | NA | 1.50 | 4.30 |
| COMBINED FLOW AT | MH9A3 | 2& 3 | 4 | 0.0093 | 16.9 | | 1.50 | |
| ROUTED 24" | | 4 | 5 | | | | | |
| | MH9A3 | 4 | | 0.0093 | 16.9 | | 1.50 | |
| | MH9A1 | 5 | | 0.0093 | 16.9 | | 1.50 | |
| HYDROGRAPH AT | C3E | 6 | - | 0.0003 | 0.8 | NA | 1.50 | 4.33 |
| ROUTED 18" | | 6 | 7 | | | | | |
| | C3E | 6 | | 0.0003 | 1.0 | | 1.50 | |
| | C3E:MH9A | 7 | | 0.0003 | 1.0 | | 1.50 | |
| COMBINED FLOW AT | MH9A1 | 5& 7 | 8 | 0.0096 | 17.8 | | 1.50 | |
| HYDROGRAPH AT | C3C | 9 | - | 0.0006 | 1.6 | NA | 1.50 | 4.17 |
| HYDROGRAPH AT | C3D | 10 | - | 0.0004 | 0.5 | NA | 1.50 | 2.04 |
| COMBINED FLOW AT | C3C:C3D | 9&10 | 11 | 0.0010 | 2.1 | | 1.50 | |
| ROUTED 18" | | 11 | 12 | | | | | |
| | C3C:C3D | 11 | | 0.0010 | 2.1 | | 1.50 | |
| | C3C:MH9A | 12 | | 0.0010 | 2.1 | | 1.50 | |
| COMBINED FLOW AT | MH9A:TOT | 8&12 | 13 | 0.0106 | 19.9 | | 1.50 | |
| ROUTED 36" | | 13 | 14 | | | | | |
| | MH9A:TOT | 13 | | 0.0106 | 19.9 | | 1.50 | |
| | MH9A:M9B | 14 | | 0.0106 | 19.8 | | 1.50 | |
| ROUTED 36" | | 14 | 15 | | | | | |
| | MH9A:M9B | 14 | | 0.0106 | 19.8 | | 1.50 | |
| | MH9B:MH9 | 15 | | 0.0106 | 20.0 | | 1.50 | |
| COMBINED FLOW AT | MH9:TOT | 15&20 | 1 | 0.0702 | 108.5 | | 1.53 | |
| ROUTED 60" | | 1 | 2 | | | | | |
| | MH9:TOT | 1 | | 0.0702 | 108.5 | | 1.53 | |
| | MH9:MH10 | 2 | | 0.0702 | 107.4 | | 1.53 | |

| DESCRIPTION | HYDROGRAPH LABEL | FROM ID NO | TO ID NO | AREA SQ MI | DISCHARGE CFS | CURVE NO | TIME TO PEAK HR | CFS PER ACRE |
|---|---|---|---|---|---|---|---|---|
| HYDROGRAPH AT | B8A | 3 | - | 0.0025 | 6.7 | NA | 1.50 | 4.20 |
| HYDROGRAPH AT | B8B | 4 | - | 0.0019 | 5.2 | NA | 1.50 | 4.25 |
| COMBINED FLOW AT | B8A:B8B | 3& 4 | 4 | 0.0044 | 11.9 | | 1.50 | |
| RESERVOIR HYD | B8:POND | 4 | 6 | 0.0044 | 6.8 | | 1.65 | |
| COMBINED FLOW AT | MH10 | 2& 6 | 7 | 0.0746 | 114.1 | | 1.53 | |
| ROUTED 60" | | 7 | 8 | | | | | |
| | MH10 | 7 | | 0.0746 | 114.1 | | 1.53 | |
| | MH10:M11 | 8 | | 0.0746 | 114.1 | | 1.57 | |
| HYDROGRAPH AT | B8C | 9 | - | 0.0046 | 12.3 | NA | 1.50 | 4.17 |
| RESERVOIR HYD | B8C | 9 | 10 | 0.0046 | 6.0 | | 1.70 | |
| ROUTED 12" | | 10 | 11 | | | | | |
| | B8C | 10 | | 0.0046 | 6.0 | | 1.70 | |
| | B8C:MH11 | 11 | | 0.0046 | 6.0 | | 1.70 | |
| COMBINED FLOW AT | MH11:TOT | 8&11 | 12 | 0.0792 | 120.0 | | 1.57 | |
| ROUTED 60" | | 12 | 13 | | | | | |
| | MH11:TOT | 12 | | 0.0792 | 120.0 | | 1.57 | |
| | MH11:M12 | 13 | | 0.0792 | 121.1 | | 1.57 | |
| COMBINED FLOW AT | MH12:TOT | 13&21 | 14 | 0.1408 | 159.2 | | 1.57 | |
| ROUTED 84" | | 14 | 15 | | | | | |
| | MH12:TOT | 14 | | 0.1408 | 159.2 | | 1.57 | |
| | 357:E1 | 15 | | 0.1408 | 159.8 | | 1.57 | |
| HYDROGRAPH AT | 385:E1 | 16 | - | 0.0004 | 1.0 | NA | 1.50 | 4.33 |
| ROUTED 18" | | 16 | 17 | | | | | |
| | 385:E1 | 16 | | 0.0004 | 1.0 | | 1.57 | |
| | 386:E1OU | 17 | | 0.0004 | 1.0 | | 1.57 | |
| COMBINED FLOW AT | 387:E1OU | 15&17 | 18 | 0.1412 | 160.6 | | 1.57 | |
| ROUTED 84" | | 18 | 19 | | | | | |
| | 387:E1OU | 18 | | 0.1412 | 160.6 | | 1.57 | |
| | 388:E1:E | 19 | | 0.1412 | 161.4 | | 1.57 | |
| HYDROGRAPH AT | 389:E2 | 20 | - | 0.0008 | 2.2 | NA | 1.50 | 4.31 |
| ROUTED 18" | | 20 | 21 | | | | | |
| | 389:E2 | 20 | | 0.0008 | 2.2 | | 1.50 | |
| | 390:E1OU | 21 | | 0.0008 | 2.2 | | 1.50 | |
| COMBINED FLOW AT | 391:E1IN | 19&21 | 1 | 0.1420 | 163.2 | | 1.57 | |
| ROUTED 84" | | 1 | 2 | | | | | |
| | 391:E1IN | 1 | | 0.1420 | 163.2 | | 1.57 | |
| | 392:E2:E | 2 | | 0.1420 | 163.8 | | 1.57 | |
| HYDROGRAPH AT | 393:E3 | 3 | - | 0.0003 | 0.8 | NA | 1.50 | 4.34 |
| ROUTED 18" | | 3 | 4 | | | | | |
| | 393:E3 | 3 | | 0.0003 | 1.0 | | 1.57 | |
| | 394:E3OU | 4 | | 0.0003 | 1.0 | | 1.57 | |
| COMBINED FLOW AT | 395:E3IN | 2& 4 | 5 | 0.1423 | 164.5 | | 1.57 | |
| ROUTED 84" | | 5 | 20 | | | | | |
| | 395:E3IN | 5 | | 0.1423 | 164.5 | | 1.57 | |
| | 396:E3:E | 20 | | 0.1423 | 163.1 | | 1.60 | |
| HYDROGRAPH AT | 397:C2 | 1 | - | 0.0028 | 7.7 | NA | 1.50 | 4.30 |
| ROUTED 18" | | 1 | 2 | | | | | |
| | 397:C2 | 1 | | 0.0028 | 7.7 | | 1.50 | |
| | 398 | 2 | | 0.0028 | 7.7 | | 1.50 | |

| DESCRIPTION | HYDROGRAPH LABEL | FROM ID NO | TO ID NO | AREA SQ MI | DISCHARGE CFS | CURVE NO | TIME TO PEAK HR | CFS PER ACRE |
|---|---|---|---|---|---|---|---|---|
| HYDROGRAPH AT | 399:C1C | 3 | - | 0.0010 | 2.5 | NA | 1.50 | 3.78 |
| COMBINED FLOW AT | 400 | 2& 3 | 4 | 0.0038 | 10.2 | | 1.50 | |
| ROUTED 24" | | 4 | 5 | | | | | |
| | 400 | 4 | | 0.0038 | 10.2 | | 1.50 | |
| | 401R:P6I | 5 | | 0.0038 | 9.9 | | 1.50 | |
| COMBINED FLOW AT | 404:E4IN | 5&20 | 8 | 0.1461 | 171.5 | | 1.57 | |
| ROUTED 84" | | 8 | 9 | | | | | |
| | 404:E4IN | 8 | | 0.1461 | 171.5 | | 1.57 | |
| | 405:E4:E | 9 | | 0.1461 | 172.4 | | 1.57 | |
| HYDROGRAPH AT | 406:E5 | 10 | - | 0.0003 | 0.7 | NA | 1.50 | 4.34 |
| ROUTED 18" | | 10 | 11 | | | | | |
| | 406:E5 | 10 | | 0.0003 | 1.0 | | 1.57 | |
| | 407:E5OU | 11 | | 0.0003 | 1.0 | | 1.57 | |
| COMBINED FLOW AT | 408:E5IN | 9&11 | 12 | 0.1463 | 173.0 | | 1.57 | |
| ROUTED 84" | | 12 | 18 | | | | | |
| | 408:E5IN | 12 | | 0.1463 | 173.0 | | 1.57 | |
| | 409:E5:M | 18 | | 0.1463 | 173.8 | | 1.60 | |
| HYDROGRAPH AT | 410:N2A1 | 2 | - | 0.0223 | 48.4 | NA | 1.50 | 3.38 |
| RESERVOIR HYD | 411:N2A1 | 2 | 3 | 0.0223 | 6.6 | | 2.10 | |
| ROUTED 30" | | 3 | 4 | | | | | |
| | 411:N2A1 | 3 | | 0.0223 | 6.6 | | 2.10 | |
| | 412 | 4 | | 0.0223 | 6.6 | | 2.13 | |
| HYDROGRAPH AT | 413:BP1W | 2 | - | 0.0010 | 2.7 | NA | 1.50 | 4.31 |
| DIVIDED FLOW AT | | 2 | 2& 8 | | | | | |
| | BP1WP | 2 | - | 0.0000 | 2.2 | | 1.45 | |
| | BP1WS | 8 | - | 0.0000 | 0.4 | | 1.00 | |
| ROUTED 18" | | 2 | 3 | | | | | |
| | BP1WP | 2 | | 0.0000 | 2.2 | | 1.55 | |
| | 414 | 3 | | 0.0000 | 2.2 | | 1.50 | |
| HYDROGRAPH AT | 405:BP1E | 5 | - | 0.0008 | 2.3 | NA | 1.50 | 4.31 |
| ROUTED 18" | | 5 | 6 | | | | | |
| | 405:BP1E | 5 | | 0.0008 | 2.3 | | 1.50 | |
| | 405 | 6 | | 0.0008 | 2.3 | | 1.50 | |
| COMBINED FLOW AT | 417:MH15 | 3& 6 | 7 | 0.0008 | 4.5 | | 1.50 | |
| ROUTED 24" | | 7 | 2 | | | | | |
| | 417:MH15 | 7 | | 0.0008 | 4.5 | | 1.50 | |
| | 418:MH24 | 2 | | 0.0008 | 4.5 | | 1.50 | |
| COMBINED FLOW AT | 419:MH24 | 4& 2 | 3 | 0.0232 | 8.6 | | 1.63 | |
| ROUTED 30" | | 3 | 2 | | | | | |
| | 419:MH24 | 3 | | 0.0232 | 8.6 | | 1.63 | |
| | 420 | 2 | | 0.0232 | 8.6 | | 1.63 | |
| ROUTED | | 8 | 8 | | | | | |
| | BP1WS | 8 | | 0.0000 | 1.0 | | 1.00 | |
| | BP1WS | 8 | | 0.0000 | 1.0 | | 1.63 | |
| HYDROGRAPH AT | 426:BP2W | 3 | - | 0.0006 | 1.5 | NA | 1.50 | 4.32 |
| COMBINED FLOW AT | 419:BP2W | 3& 8 | 5 | 0.0006 | 1.5 | | 1.50 | |
| ROUTED 24" | | 3 | 4 | | | | | |
| | 426:BP2W | 3 | | 0.0006 | 1.5 | | 1.00 | |
| | 427 | 4 | | 0.0006 | 1.5 | | 2.23 | |

| DESCRIPTION | HYDROGRAPH LABEL | FROM ID NO | TO ID NO | AREA SQ MI | DISCHARGE CFS | CURVE NO | TIME TO PEAK HR | CFS PER ACRE |
|---|---|---|---|---|---|---|---|---|
| COMBINED FLOW AT | 419:MH24 | 4& 2 | 5 | 0.0237 | 8.6 | | 1.63 | |
| ROUTED 36" | | 5 | 2 | | | | | |
| | 419:MH24 | 5 | | 0.0237 | 8.6 | | 1.63 | |
| | 420 | 2 | | 0.0237 | 8.6 | | 1.63 | |
| HYDROGRAPH AT | 421:N1B2 | 3 | - | 0.0116 | 28.6 | NA | 1.50 | 3.84 |
| RESERVOIR HYD | 422:N1B2 | 3 | 4 | 0.0116 | 13.9 | | 2.20 | |
| ROUTED 18" | | 4 | 3 | | | | | |
| | 422:N1B2 | 4 | | 0.0116 | 13.9 | | 2.20 | |
| | 423 | 3 | | 0.0116 | 13.5 | | 1.60 | |
| COMBINED FLOW AT | 424:MH25 | 2& 3 | 4 | 0.0354 | 22.0 | | 1.60 | |
| ROUTED 36" | | 4 | 2 | | | | | |
| | 424:MH25 | 4 | | 0.0354 | 22.0 | | 1.60 | |
| | 425 | 2 | | 0.0354 | 21.9 | | 2.23 | |
| HYDROGRAPH AT | 428:BP2E | 3 | - | 0.0010 | 2.9 | NA | 1.50 | 4.31 |
| ROUTED 24" | | 3 | 4 | | | | | |
| | 428:BP2E | 3 | | 0.0010 | 2.9 | | 1.50 | |
| | 429 | 4 | | 0.0010 | 2.9 | | 1.50 | |
| COMBINED FLOW AT | 431:MH26 | 2& 4 | 5 | 0.0364 | 23.8 | | 1.60 | |
| HYDROGRAPH AT | 428:BP-M | 6 | - | 0.0011 | 0.6 | NA | 1.80 | 0.81 |
| COMBINED FLOW AT | 431:MH26 | 5& 6 | 7 | 0.0375 | 24.2 | | 1.60 | |
| ROUTED 36" | | 7 | 2 | | | | | |
| | 431:MH26 | 7 | | 0.0375 | 24.2 | | 1.60 | |
| | 432 | 2 | | 0.0375 | 24.0 | | 1.60 | |
| HYDROGRAPH AT | 433:BP3E | 3 | - | 0.0005 | 1.5 | NA | 1.50 | 4.32 |
| ROUTED 24" | | 3 | 4 | | | | | |
| | 433:BP3E | 3 | | 0.0005 | 1.5 | | 1.50 | |
| | 434:MH27 | 4 | | 0.0005 | 1.5 | | 1.50 | |
| COMBINED FLOW AT | 435 | 2& 4 | 5 | 0.0381 | 25.1 | | 1.60 | |
| ROUTED 36" | | 5 | 6 | | | | | |
| | 435 | 5 | | 0.0381 | 25.1 | | 1.60 | |
| | 434:MH27 | 6 | | 0.0381 | 25.0 | | 1.60 | |
| HYDROGRAPH AT | 436:ER | 2 | - | 0.0029 | 6.6 | NA | 1.50 | 3.57 |
| HYDROGRAPH AT | 437:BP3W | 3 | - | 0.0015 | 4.2 | NA | 1.50 | 4.30 |
| COMBINED FLOW AT | 438 | 2& 3 | 4 | 0.0044 | 10.8 | | 1.50 | |
| HYDROGRAPH AT | 441:PB | 5 | - | 0.0064 | 16.6 | NA | 1.50 | 4.05 |
| RESERVOIR HYD | 442:PB:P | 5 | 1 | 0.0064 | 7.6 | | 1.60 | |
| ROUTED 12" | | 1 | 2 | | | | | |
| | 442:PB:P | 1 | | 0.0064 | 7.6 | | 1.60 | |
| | 443 | 2 | | 0.0064 | 7.5 | | 1.60 | |
| COMBINED FLOW AT | 438 | 2& 4 | 3 | 0.0108 | 14.9 | | 1.60 | |
| ROUTED 24" | | 3 | 2 | | | | | |
| | 438 | 3 | | 0.0108 | 14.9 | | 1.60 | |
| | 439:MH27 | 2 | | 0.0108 | 15.0 | | 1.53 | |
| COMBINED FLOW AT | 440 | 6& 2 | 3 | 0.0489 | 40.0 | | 1.60 | |
| HYDROGRAPH AT | 446:BP3E | 4 | - | 0.0003 | 0.7 | NA | 1.50 | 4.34 |
| ROUTED 24" | | 4 | 5 | | | | | |
| | 446:BP3E | 4 | | 0.0003 | 1.0 | | 1.60 | |
| | 447 | 5 | | 0.0003 | 1.0 | | 1.53 | |
| COMBINED FLOW AT | 448:MH27 | 3& 5 | 6 | 0.0491 | 40.5 | | 1.60 | |

| DESCRIPTION | HYDROGRAPH LABEL | FROM ID NO | TO ID NO | AREA SQ MI | DISCHARGE CFS | CURVE NO | TIME TO PEAK HR | CFS PER ACRE |
|---|---|---|---|---|---|---|---|---|
| ROUTED 42" | | 6 | 3 | | | | | |
| | 448:MH27 | 6 | | 0.0491 | 40.5 | | 1.60 | |
| | 445 | 3 | | 0.0491 | 40.2 | | 1.60 | |
| HYDROGRAPH AT | 446:BP4E | 4 | - | 0.0005 | 1.3 | NA | 1.50 | 4.32 |
| ROUTED 24" | | 4 | 5 | | | | | |
| | 446:BP4E | 4 | | 0.0005 | 1.3 | | 1.50 | |
| | 447 | 5 | | 0.0005 | 1.3 | | 1.50 | |
| COMBINED FLOW AT | 448:MH28 | 3& 5 | 6 | 0.0496 | 41.1 | | 1.60 | |
| ROUTED 42" | | 6 | 2 | | | | | |
| | 448:MH28 | 6 | | 0.0496 | 41.1 | | 1.60 | |
| | 449 | 2 | | 0.0496 | 40.9 | | 1.60 | |
| HYDROGRAPH AT | 450:N1A2 | 3 | - | 0.0071 | 17.5 | NA | 1.50 | 3.84 |
| RESERVOIR HYD | 451:N1A2 | 3 | 4 | 0.0071 | 7.9 | | 2.25 | |
| ROUTED 18" | | 4 | 5 | | | | | |
| | 451:N1A2 | 4 | | 0.0071 | 7.9 | | 2.25 | |
| | 452:MH29 | 5 | | 0.0071 | 7.4 | | 2.27 | |
| COMBINED FLOW AT | 453:MH29 | 2& 5 | 3 | 0.0567 | 47.9 | | 1.60 | |
| ROUTED 42" | | 3 | 4 | | | | | |
| | 453:MH29 | 3 | | 0.0567 | 47.9 | | 1.60 | |
| | 454 | 4 | | 0.0567 | 47.7 | | 1.60 | |
| HYDROGRAPH AT | 455:BP4W | 2 | - | 0.0012 | 3.3 | NA | 1.50 | 4.30 |
| HYDROGRAPH AT | 456:RM | 3 | - | 0.0030 | 7.9 | NA | 1.50 | 4.17 |
| RESERVOIR HYD | 457:RM:P | 3 | 5 | 0.0030 | 3.4 | | 2.35 | |
| ROUTED 18" | | 5 | 6 | | | | | |
| | 457:RM:P | 5 | | 0.0030 | 3.4 | | 2.35 | |
| | 458 | 6 | | 0.0030 | 3.4 | | 2.37 | |
| COMBINED FLOW AT | 459 | 2& 6 | 5 | 0.0041 | 6.5 | | 1.50 | |
| ROUTED 18" | | 5 | 3 | | | | | |
| | 459 | 5 | | 0.0041 | 6.5 | | 1.50 | |
| | 460 | 3 | | 0.0041 | 6.5 | | 1.50 | |
| COMBINED FLOW AT | 461:MH30 | 4& 3 | 2 | 0.0609 | 52.2 | | 1.60 | |
| HYDROGRAPH AT | 437:BP5E | 3 | - | 0.0009 | 2.5 | NA | 1.50 | 4.31 |
| COMBINED FLOW AT | 438 | 2& 3 | 4 | 0.0618 | 53.8 | | 1.60 | |
| ROUTED 42" | | 4 | 1 | | | | | |
| | 438 | 4 | | 0.0618 | 53.8 | | 1.60 | |
| | 462 | 1 | | 0.0618 | 53.4 | | 1.60 | |
| HYDROGRAPH AT | 469:RC2 | 2 | - | 0.0064 | 16.7 | NA | 1.50 | 4.07 |
| DIVIDED FLOW AT | | 2 | 2& 6 | | | | | |
| | RC_CB | 2 | - | 0.0000 | 10.3 | | 1.40 | |
| | RC2_RCS | 6 | - | 0.0000 | 6.4 | | 1.00 | |
| ROUTED 18" | | 2 | 3 | | | | | |
| | RC_CB | 2 | | 0.0000 | 10.3 | | 1.60 | |
| | 470 | 3 | | 0.0000 | 10.5 | | 1.43 | |
| HYDROGRAPH AT | 466:BP5W | 4 | - | 0.0015 | 4.1 | NA | 1.50 | 4.30 |
| DIVIDED FLOW AT | | 4 | 5&49 | | | | | |
| | BP5WR | 5 | - | 0.0015 | 2.7 | | 0.97 | |
| | BP5WS | 49 | - | 0.0000 | 1.5 | | 0.00 | |
| COMBINED FLOW AT | 471 | 3& 5 | 2 | 0.0015 | 13.2 | | 1.43 | |
| ROUTED 18" | | 2 | 3 | | | | | |

| DESCRIPTION | HYDROGRAPH LABEL | FROM ID NO | TO ID NO | AREA SQ MI | DISCHARGE CFS | CURVE NO | TIME TO PEAK HR | CFS PER ACRE |
|---|---|---|---|---|---|---|---|---|
| | 471 | 2 | | 0.0015 | 13.2 | | 1.43 | |
| | 472 | 3 | | 0.0015 | 13.3 | | 1.43 | |
| COMBINED FLOW AT | 473:MH32 | 1& 3 | 2 | 0.0633 | 66.4 | | 1.60 | |
| ROUTED 42" | | 2 | 3 | | | | | |
| | 473:MH32 | 2 | | 0.0633 | 66.4 | | 1.60 | |
| | 474:MH23 | 3 | | 0.0633 | 66.4 | | 1.60 | |
| COMBINED FLOW AT | 475:MH23 | 18& 3 | 4 | 0.2096 | 240.2 | | 1.60 | |
| ROUTED 84" | | 4 | 2 | | | | | |
| | 475:MH23 | 4 | | 0.2096 | 240.2 | | 1.60 | |
| | 476 | 2 | | 0.2096 | 240.4 | | 1.60 | |
| HYDROGRAPH AT | 477:RC3 | 3 | - | 0.0058 | 15.6 | NA | 1.50 | 4.21 |
| COMBINED FLOW AT | 478 | 6& 3 | 4 | 0.0058 | 22.0 | | 1.50 | |
| COMBINED FLOW AT | 478 | 2& 4 | 5 | 0.2154 | 252.5 | | 1.57 | |
| ROUTED 84" | | 5 | 2 | | | | | |
| | 478 | 5 | | 0.2154 | 252.5 | | 1.57 | |
| | 479:MH33 | 2 | | 0.2154 | 253.8 | | 1.57 | |
| ROUTED 84" | | 2 | 3 | | | | | |
| | 479:MH33 | 2 | | 0.2154 | 253.8 | | 1.57 | |
| | 480:MH34 | 3 | | 0.2154 | 255.2 | | 1.57 | |
| ROUTED 84" | | 3 | 2 | | | | | |
| | 480:MH34 | 3 | | 0.2154 | 255.2 | | 1.57 | |
| | 481:CALO | 2 | | 0.2154 | 255.6 | | 1.60 | |
| HYDROGRAPH AT | 700:BP-M | 1 | - | 0.0005 | 0.7 | NA | 1.50 | 2.03 |
| ROUTED 18" | | 1 | 2 | | | | | |
| | 700:BP-M | 1 | | 0.0005 | 1.0 | | 1.57 | |
| | 701 | 2 | | 0.0005 | 1.0 | | 1.60 | |
| ROUTED | | 49 | 3 | | | | | |
| | BP5WS | 49 | | 0.0000 | 1.5 | | 1.50 | |
| | BP6WS | 3 | | 0.0000 | 1.0 | | 1.53 | |
| HYDROGRAPH AT | 702:BP6W | 4 | - | 0.0006 | 1.7 | NA | 1.50 | 4.31 |
| COMBINED FLOW AT | 703 | 3& 4 | 5 | 0.0006 | 2.6 | | 1.53 | |
| COMBINED FLOW AT | 704 | 2& 5 | 6 | 0.0012 | 3.3 | | 1.53 | |

| DESCRIPTION | HYDROGRAPH LABEL | FROM ID NO | TO ID NO | AREA SQ MI | DISCHARGE CFS | CURVE NO | TIME TO PEAK HR | CFS PER ACRE |
|---|---|---|---|---|---|---|---|---|
| HYDROGRAPH AT | A1 | 1 | - | 0.0047 | 12.0 | NA | 1.50 | 3.99 |
| HYDROGRAPH AT | A13A2 | 3 | - | 0.0007 | 1.9 | NA | 1.50 | 4.31 |
| HYDROGRAPH AT | A13A1 | 7 | - | 0.0008 | 2.2 | NA | 1.50 | 4.31 |
| HYDROGRAPH AT | A13B1 | 9 | - | 0.0003 | 0.8 | NA | 1.50 | 4.33 |
| HYDROGRAPH AT | A13B2 | 12 | - | 0.0012 | 3.3 | NA | 1.50 | 4.30 |
| HYDROGRAPH AT | A13C | 15 | - | 0.0011 | 3.0 | NA | 1.50 | 4.31 |
| HYDROGRAPH AT | A2 | 19 | - | 0.0095 | 25.3 | NA | 1.50 | 4.16 |
| HYDROGRAPH AT | A3 | 3 | - | 0.0125 | 31.8 | NA | 1.50 | 3.97 |
| HYDROGRAPH AT | A4 | 4 | - | 0.0031 | 8.3 | NA | 1.50 | 4.20 |
| HYDROGRAPH AT | A10 | 11 | - | 0.0004 | 1.1 | NA | 1.50 | 4.32 |
| HYDROGRAPH AT | A8 | 15 | - | 0.0054 | 14.1 | NA | 1.50 | 4.09 |
| HYDROGRAPH AT | A14A | 1 | - | 0.0012 | 3.3 | NA | 1.50 | 4.30 |
| HYDROGRAPH AT | A16 | 6 | - | 0.0001 | 0.3 | NA | 1.50 | 4.41 |
| HYDROGRAPH AT | A14B1 | 9 | - | 0.0019 | 5.2 | NA | 1.50 | 4.30 |
| HYDROGRAPH AT | A6 | 13 | - | 0.0027 | 7.0 | NA | 1.50 | 4.06 |
| HYDROGRAPH AT | A14B2 | 2 | - | 0.0008 | 2.2 | NA | 1.50 | 4.31 |
| HYDROGRAPH AT | A7 | 5 | - | 0.0010 | 2.7 | NA | 1.50 | 4.23 |
| HYDROGRAPH AT | A15A | 10 | - | 0.0008 | 2.1 | NA | 1.50 | 4.31 |
| HYDROGRAPH AT | A9 | 14 | - | 0.0024 | 6.2 | NA | 1.50 | 4.05 |
| HYDROGRAPH AT | A15B | 17 | - | 0.0008 | 2.1 | NA | 1.50 | 4.31 |
| HYDROGRAPH AT | A11 | 2 | - | 0.0011 | 2.7 | NA | 1.50 | 3.83 |
| HYDROGRAPH AT | A17 | 2 | - | 0.0044 | 11.8 | NA | 1.50 | 4.18 |
| HYDROGRAPH AT | A12 | 6 | - | 0.0039 | 10.3 | NA | 1.50 | 4.15 |
| HYDROGRAPH AT | B26 | 18 | - | 0.0009 | 1.6 | NA | 1.50 | 2.86 |
| HYDROGRAPH AT | B1A | 1 | - | 0.0039 | 10.4 | NA | 1.50 | 4.17 |
| HYDROGRAPH AT | B1B | 3 | - | 0.0017 | 4.6 | NA | 1.50 | 4.18 |
| HYDROGRAPH AT | B22 | 4 | - | 0.0001 | 0.3 | NA | 1.50 | 4.41 |
| HYDROGRAPH AT | B1C | 1 | - | 0.0015 | 4.0 | NA | 1.50 | 4.19 |
| HYDROGRAPH AT | B18A2 | 1 | - | 0.0007 | 1.9 | NA | 1.50 | 4.31 |
| HYDROGRAPH AT | B18A1 | 4 | - | 0.0008 | 2.2 | NA | 1.50 | 4.31 |
| HYDROGRAPH AT | B1D | 7 | - | 0.0043 | 11.5 | NA | 1.50 | 4.16 |
| HYDROGRAPH AT | B18B | 10 | - | 0.0004 | 1.1 | NA | 1.50 | 4.32 |
| HYDROGRAPH AT | B18C | 13 | - | 0.0008 | 2.2 | NA | 1.50 | 4.31 |
| HYDROGRAPH AT | B3 | 6 | - | 0.0038 | 9.6 | NA | 1.50 | 3.93 |
| HYDROGRAPH AT | 232:B27 | 9 | - | 0.0001 | 0.3 | NA | 1.50 | 4.41 |
| HYDROGRAPH AT | B19A1 | 12 | - | 0.0004 | 1.1 | NA | 1.50 | 4.32 |
| HYDROGRAPH AT | B2A | 6 | - | 0.0015 | 3.3 | NA | 1.50 | 3.46 |
| HYDROGRAPH AT | B2B | 1 | - | 0.0005 | 0.9 | NA | 1.50 | 2.87 |
| HYDROGRAPH AT | B4 | 3 | - | 0.0033 | 9.1 | NA | 1.50 | 4.30 |
| HYDROGRAPH AT | B5 | 7 | - | 0.0060 | 16.1 | NA | 1.50 | 4.18 |
| HYDROGRAPH AT | B6 | 8 | - | 0.0006 | 1.7 | NA | 1.50 | 4.31 |
| HYDROGRAPH AT | B7 | 11 | - | 0.0008 | 1.5 | NA | 1.50 | 2.86 |
| HYDROGRAPH AT | B19A2 | 1 | - | 0.0004 | 1.0 | NA | 1.50 | 4.32 |
| HYDROGRAPH AT | B19B | 3 | - | 0.0012 | 3.3 | NA | 1.50 | 4.30 |
| HYDROGRAPH AT | B19D1 | 6 | - | 0.0004 | 1.1 | NA | 1.50 | 4.32 |
| HYDROGRAPH AT | B19C | 8 | - | 0.0011 | 3.1 | NA | 1.50 | 4.31 |
| HYDROGRAPH AT | B19D2 | 16 | - | 0.0005 | 1.4 | NA | 1.50 | 4.32 |

| DESCRIPTION | HYDROGRAPH LABEL | FROM ID NO | TO ID NO | AREA SQ MI | DISCHARGE CFS | CURVE NO | TIME TO PEAK HR | CFS PER ACRE |
|---|---|---|---|---|---|---|---|---|
| HYDROGRAPH AT | B20A2 | 17 | - | 0.0005 | 1.4 | NA | 1.50 | 4.32 |
| HYDROGRAPH AT | B10 | 1 | - | 0.0033 | 8.5 | NA | 1.50 | 4.02 |
| HYDROGRAPH AT | B9 | 7 | - | 0.0037 | 9.7 | NA | 1.50 | 4.11 |
| HYDROGRAPH AT | B13 | 1 | - | 0.0030 | 8.0 | NA | 1.50 | 4.15 |
| HYDROGRAPH AT | B14 | 4 | - | 0.0033 | 8.6 | NA | 1.50 | 4.06 |
| HYDROGRAPH AT | B20A1 | 1 | - | 0.0005 | 1.4 | NA | 1.50 | 4.32 |
| HYDROGRAPH AT | B23 | 3 | - | 0.0001 | 0.3 | NA | 1.50 | 4.41 |
| HYDROGRAPH AT | B20B | 6 | - | 0.0017 | 4.7 | NA | 1.50 | 4.30 |
| HYDROGRAPH AT | B24 | 9 | - | 0.0001 | 0.3 | NA | 1.50 | 4.41 |
| HYDROGRAPH AT | B20C | 12 | - | 0.0009 | 2.5 | NA | 1.50 | 4.31 |
| HYDROGRAPH AT | B15 | 5 | - | 0.0029 | 7.5 | NA | 1.50 | 4.07 |
| HYDROGRAPH AT | B16 | 9 | - | 0.0033 | 9.0 | NA | 1.50 | 4.24 |
| HYDROGRAPH AT | B21A | 1 | - | 0.0009 | 2.5 | NA | 1.50 | 4.31 |
| HYDROGRAPH AT | B21B | 3 | - | 0.0008 | 2.2 | NA | 1.50 | 4.31 |
| HYDROGRAPH AT | B25 | 6 | - | 0.0001 | 0.3 | NA | 1.50 | 4.41 |
| HYDROGRAPH AT | B21C | 9 | - | 0.0008 | 2.2 | NA | 1.50 | 4.31 |
| HYDROGRAPH AT | B21D | 16 | - | 0.0008 | 2.2 | NA | 1.50 | 4.31 |
| HYDROGRAPH AT | C1A | 2 | - | 0.0068 | 15.7 | NA | 1.50 | 3.61 |
| HYDROGRAPH AT | C1B | 4 | - | 0.0011 | 3.0 | NA | 1.50 | 4.31 |
| HYDROGRAPH AT | C3A | 3 | - | 0.0014 | 3.9 | NA | 1.50 | 4.30 |
| HYDROGRAPH AT | C3E | 6 | - | 0.0003 | 0.8 | NA | 1.50 | 4.33 |
| HYDROGRAPH AT | C3C | 9 | - | 0.0006 | 1.6 | NA | 1.50 | 4.17 |
| HYDROGRAPH AT | C3D | 10 | - | 0.0004 | 0.5 | NA | 1.50 | 2.04 |
| HYDROGRAPH AT | B8A | 3 | - | 0.0025 | 6.7 | NA | 1.50 | 4.20 |
| HYDROGRAPH AT | B8B | 4 | - | 0.0019 | 5.2 | NA | 1.50 | 4.25 |
| HYDROGRAPH AT | B8C | 9 | - | 0.0046 | 12.3 | NA | 1.50 | 4.17 |
| HYDROGRAPH AT | 385:E1 | 16 | - | 0.0004 | 1.0 | NA | 1.50 | 4.33 |
| HYDROGRAPH AT | 389:E2 | 20 | - | 0.0008 | 2.2 | NA | 1.50 | 4.31 |
| HYDROGRAPH AT | 393:E3 | 3 | - | 0.0003 | 0.8 | NA | 1.50 | 4.34 |
| HYDROGRAPH AT | 406:E5 | 10 | - | 0.0003 | 0.7 | NA | 1.50 | 4.34 |
| HYDROGRAPH AT | 410:N2A1 | 2 | - | 0.0223 | 48.4 | NA | 1.50 | 3.38 |
| HYDROGRAPH AT | 413:BP1W | 2 | - | 0.0010 | 2.7 | NA | 1.50 | 4.31 |
| HYDROGRAPH AT | 405:BP1E | 5 | - | 0.0008 | 2.3 | NA | 1.50 | 4.31 |
| HYDROGRAPH AT | 426:BP2W | 3 | - | 0.0006 | 1.5 | NA | 1.50 | 4.32 |
| HYDROGRAPH AT | 421:N1B2 | 3 | - | 0.0116 | 28.6 | NA | 1.50 | 3.84 |
| HYDROGRAPH AT | 428:BP2E | 3 | - | 0.0010 | 2.9 | NA | 1.50 | 4.31 |
| HYDROGRAPH AT | 428:BP-M | 6 | - | 0.0011 | 0.6 | NA | 1.80 | 0.81 |
| HYDROGRAPH AT | 433:BP3E | 3 | - | 0.0005 | 1.5 | NA | 1.50 | 4.32 |
| HYDROGRAPH AT | 437:BP3W | 3 | - | 0.0015 | 4.2 | NA | 1.50 | 4.30 |
| HYDROGRAPH AT | 441:PB | 5 | - | 0.0064 | 16.6 | NA | 1.50 | 4.05 |
| HYDROGRAPH AT | 446:BP3E | 4 | - | 0.0003 | 0.7 | NA | 1.50 | 4.34 |
| HYDROGRAPH AT | 446:BP4E | 4 | - | 0.0005 | 1.3 | NA | 1.50 | 4.32 |
| HYDROGRAPH AT | 450:N1A2 | 3 | - | 0.0071 | 17.5 | NA | 1.50 | 3.84 |
| HYDROGRAPH AT | 455:BP4W | 2 | - | 0.0012 | 3.3 | NA | 1.50 | 4.30 |
| HYDROGRAPH AT | 456:RM | 3 | - | 0.0030 | 7.9 | NA | 1.50 | 4.17 |
| HYDROGRAPH AT | 437:BP5E | 3 | - | 0.0009 | 2.5 | NA | 1.50 | 4.31 |
| HYDROGRAPH AT | 469:RC2 | 2 | - | 0.0064 | 16.7 | NA | 1.50 | 4.07 |
| HYDROGRAPH AT | 466:BP5W | 4 | - | 0.0015 | 4.1 | NA | 1.50 | 4.30 |
| HYDROGRAPH AT | 477:RC3 | 3 | - | 0.0058 | 15.6 | NA | 1.50 | 4.21 |

HYMO SUMMARY TABLE

| DESCRIPTION | HYDROGRAPH LABEL | FROM ID NO | TO ID NO | AREA SQ MI | DISCHARGE CFS | CURVE NO | TIME TO PEAK HR | CFS PER ACRE |
|---|---|---|---|---|---|---|---|---|
| HYDROGRAPH AT | 700:BP-M | 1 | - | 0.0005 | 0.7 | NA | 1.50 | 2.03 |
| HYDROGRAPH AT | 702:BP6W | 4 | - | 0.0006 | 1.7 | NA | 1.50 | 4.31 |

# APPENDIX II: HYDRAULIC COMPUTATIONS

CAPACITIES OF INLETS ON GRADE . . . . . A2-1
POND ANALYSIS . . . . . A2-7
HGL COMPUTATIONS . . . . . A2-41

## SUMMARY OF INLET GRATE CAPACITIES ON GRADE

| INLET/ TYPE | LOCATION | AVERAGE SLOPE | WIDTH F-F/ROW | Q 100 (CFS) | NORMAL DEPTH | Q GRATE (CFS) |
|---|---|---|---|---|---|---|
| DBL "A" | BASIN A-3 | 0.90% | 36'/N.A. | 8.8 | 0.45 | 5.5 |
| DBL "A" | BASIN A-3 | 2.00% | 36'/N.A. | 35.3 | 0.62 | 13.0 |
| DBL "C" | BASIN A-3 | 2.00% | 36'/N.A. | 22.3 | 0.53 | 10.5 |
| "A" | BASIN A-3 | 2.00% | 36'/N.A. | 15.7 | 0.47 | 7.2 |
| "C" | BASIN A-3 | 2.00% | 36'/N.A. | 8.5 | 0.39 | 5.0 |
| "A" | BASIN B-1-A/B | 5.00% | 28'/N.A. | 10.5 | 0.36 | 6.4 |
| "A" | BASIN B-16 | 4.00% | 36'/N.A. | 9.2 | 0.36 | 5.6 |
| "C" | BASIN B-16 | 1.00% | 36'/N.A. | 3.6 | 0.34 | 2.5 |

NOTE: THE ONLY INLETS SHOWN ARE ON GRADE.
SEE THE SECTION ON PONDS FOR INLETS IN SUMP.

BASIN A-3A: STD CURB -- 2% CROSS SLOPE

MANNING'S N = .0170 SLOPE = .0090

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|---|---|---|---|---|---|---|---|---|
| 1 | -10.00 | 0.87 | 3 | 0.00 | 0.00 | 5 | 40.00 | 0.89 |
| 2 | 0.00 | 0.67 | 4 | 2.00 | 0.13 | | | |

| WSEL (FT) | DEPTH INC | FLOW AREA (SQ FT) | FLOW RATE (CFS) | WETTED PER (FT) | FLOW VEL (FPS) | TOP WID |
|---|---|---|---|---|---|---|
| 0.05 | 0.05 | 0.0 | 0.0 | 0.8 | 0.7 | 0.77 |
| 0.10 | 0.10 | 0.1 | 0.1 | 1.6 | 1.1 | 1.54 |
| 0.15 | 0.15 | 0.2 | 0.2 | 3.2 | 1.2 | 3.00 |
| 0.20 | 0.20 | 0.4 | 0.5 | 5.7 | 1.4 | 5.50 |
| 0.25 | 0.25 | 0.7 | 1.2 | 8.3 | 1.6 | 8.00 |
| 0.30 | 0.30 | 1.2 | 2.3 | 10.8 | 1.9 | 10.50 |
| 0.35 | 0.35 | 1.8 | 3.9 | 13.4 | 2.2 | 13.00 |
| 0.40 | 0.40 | 2.5 | 6.0 | 15.9 | 2.4 | 15.50 |
| 0.45 | 0.45 | 3.3 | 8.8 | 18.5 | 2.6 | 18.00 |
| 0.50 | 0.50 | 4.3 | 12.3 | 21.0 | 2.9 | 20.50 |
| 0.55 | 0.55 | 5.4 | 16.7 | 23.6 | 3.1 | 23.00 |
| 0.60 | 0.60 | 6.6 | 21.8 | 26.1 | 3.3 | 25.50 |
| 0.65 | 0.65 | 7.9 | 27.9 | 28.7 | 3.5 | 28.00 |
| 0.70 | 0.70 | 9.4 | 34.0 | 32.7 | 3.6 | 32.00 |
| 0.75 | 0.75 | 11.1 | 40.9 | 37.8 | 3.7 | 37.00 |
| 0.80 | 0.80 | 13.1 | 49.4 | 42.8 | 3.8 | 42.00 |
| 0.85 | 0.85 | 15.3 | 59.6 | 47.9 | 3.9 | 47.00 |
| 0.87 | 0.87 | 16.3 | 64.1 | 49.9 | 3.9 | 49.00 |

Q = 8.8 cfs

$D_N = .45'$

$Q_{Grate} = 5.5\,cfs$ (Type DBL "A")

$Q_{Removed} = 5.5\,cfs$

$Q_{Remaining} = 3.3\,cfs$

$Q_{Remaining\ @\ Eagle\ Ranch\ Road\ Enterance} = \overset{32.4}{Q_{A-3}} + \overset{8.4}{Q_{A-4}} - 5.5\,cfs$

$= 35.3\,cfs$

BASIN A-3: STD CURB -- 2% CROSS SLOPE

MANNING'S N = .0170 SLOPE = .0200

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|---|---|---|---|---|---|---|---|---|
| 1 | -10.00 | 0.87 | 3 | 0.00 | 0.00 | 5 | 40.00 | 0.89 |
| 2 | 0.00 | 0.67 | 4 | 2.00 | 0.13 | | | |

| WSEL (FT) | DEPTH INC | FLOW AREA (SQ FT) | FLOW RATE (CFS) | WETTED PER (FT) | FLOW VEL (FPS) | TOP WID |
|---|---|---|---|---|---|---|
| 0.05 | 0.05 | 0.0 | 0.0 | 0.8 | 1.0 | 0.77 |
| 0.10 | 0.10 | 0.1 | 0.1 | 1.6 | 1.6 | 1.54 |
| 0.15 | 0.15 | 0.2 | 0.3 | 3.2 | 1.8 | 3.00 |
| 0.20 | 0.20 | 0.4 | 0.8 | 5.7 | 2.1 | 5.50 |
| 0.25 | 0.25 | 0.7 | 1.8 | 8.3 | 2.5 | 8.00 |
| 0.30 | 0.30 | 1.2 | 3.4 | 10.8 | 2.8 | 10.50 |
| 0.35 | 0.35 | 1.8 | 5.7 | 13.4 | 3.2 | 13.00 |
| 0.40 | 0.40 | 2.5 | 9.0 | 15.9 | 3.6 | 15.50 |
| 0.45 | 0.45 | 3.3 | 13.1 | 18.5 | 3.9 | 18.00 |
| 0.50 | 0.50 | 4.3 | 18.4 | 21.0 | 4.3 | 20.50 |
| 0.55 | 0.55 | 5.4 | 24.8 | 23.6 | 4.6 | 23.00 |
| 0.60 | 0.60 | 6.6 | 32.6 | 26.1 | 4.9 | 25.50 |
| 0.65 | 0.65 | 7.9 | 41.6 | 28.7 | 5.2 | 28.00 |
| 0.70 | 0.70 | 9.4 | 50.7 | 32.7 | 5.4 | 32.00 |
| 0.75 | 0.75 | 11.1 | 61.0 | 37.8 | 5.5 | 37.00 |
| 0.80 | 0.80 | 13.1 | 73.7 | 42.8 | 5.6 | 42.00 |
| 0.85 | 0.85 | 15.3 | 88.8 | 47.9 | 5.8 | 47.00 |
| 0.87 | 0.87 | 16.3 | 95.6 | 49.9 | 5.9 | 49.00 |

Q=35.3 cfs

$D_N = .62'$

$Q = 13.0$ cfs (Type DBL "A")

$E = 1.01'$

$Q_{Remaining} = 22.3$ cfs

$D_N = .53'$

$Q = 10.5$ cfs (Type DBL "C")

$Q_{Remaining} = 11.8$ cfs

$Q_{@MH17} = 11.8\text{cfs} + \overset{1.0}{Q_{A-10}} + \overset{\frac{1}{5}14.3}{\frac{1}{5}Q_{A-8}}$
$= 15.7$ cfs

$Q_{Remaining} = 8.5$ cfs

$D_N = .47'$

$Q = 7.2$ cfs (Type "A")

$Q_{Remaining} = 3.5$ cfs

$D_N = .39'$

$Q = 5.0$ cfs (Type "C")

BASIN B-1-A/B: STD CURB -- 2% CROSS SLOPE

MANNING'S N = .0170 SLOPE = .0500

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|---|---|---|---|---|---|---|---|---|
| 1 | -10.00 | 0.87 | 3 | 0.00 | 0.00 | 5 | 40.00 | 0.89 |
| 2 | 0.00 | 0.67 | 4 | 2.00 | 0.13 | | | |

| WSEL (FT) | DEPTH INC | FLOW AREA (SQ FT) | FLOW RATE (CFS) | WETTED PER (FT) | FLOW VEL (FPS) | TOP WID |
|---|---|---|---|---|---|---|
| 0.05 | 0.05 | 0.0 | 0.0 | 0.8 | 1.6 | 0.77 |
| 0.10 | 0.10 | 0.1 | 0.2 | 1.6 | 2.5 | 1.54 |
| 0.15 | 0.15 | 0.2 | 0.5 | 3.2 | 2.9 | 3.00 |
| 0.20 | 0.20 | 0.4 | 1.3 | 5.7 | 3.3 | 5.50 |
| 0.25 | 0.25 | 0.7 | 2.8 | 8.3 | 3.9 | 8.00 |
| 0.30 | 0.30 | 1.2 | 5.4 | 10.8 | 4.5 | 10.50 |
| 0.35 | 0.35 | 1.8 | 9.1 | 13.4 | 5.1 | 13.00 |
| 0.40 | 0.40 | 2.5 | 14.2 | 15.9 | 5.7 | 15.50 |
| 0.45 | 0.45 | 3.3 | 20.8 | 18.5 | 6.2 | 18.00 |
| 0.50 | 0.50 | 4.3 | 29.1 | 21.0 | 6.8 | 20.50 |
| 0.55 | 0.55 | 5.4 | 39.3 | 23.6 | 7.3 | 23.00 |
| 0.60 | 0.60 | 6.6 | 51.5 | 26.1 | 7.8 | 25.50 |
| 0.65 | 0.65 | 7.9 | 65.8 | 28.7 | 8.3 | 28.00 |
| 0.70 | 0.70 | 9.4 | 80.2 | 32.7 | 8.5 | 32.00 |
| 0.75 | 0.75 | 11.1 | 96.5 | 37.8 | 8.7 | 37.00 |
| 0.80 | 0.80 | 13.1 | 116.5 | 42.8 | 8.9 | 42.00 |
| 0.85 | 0.85 | 15.3 | 140.4 | 47.9 | 9.2 | 47.00 |
| 0.87 | 0.87 | 16.3 | 151.1 | 49.9 | 9.3 | 49.00 |

$Q = 10.5$ cfs

$D_N = .36'$

$Q_{Grate} = 6.4$ cfs (Type "A")

$Q_{Remaining} = 4.1$ cfs

BASIN B-16: STD CURB -- 2% CROSS SLOPE

MANNING'S N = .0170 SLOPE = .0400

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|---|---|---|---|---|---|---|---|---|
| 1 | -10.00 | 0.87 | 3 | 0.00 | 0.00 | 5 | 40.00 | 0.89 |
| 2 | 0.00 | 0.67 | 4 | 2.00 | 0.13 | | | |

| WSEL (FT) | DEPTH INC | FLOW AREA (SQ FT) | FLOW RATE (CFS) | WETTED PER (FT) | FLOW VEL (FPS) | TOP WID |
|---|---|---|---|---|---|---|
| 0.05 | 0.05 | 0.0 | 0.0 | 0.8 | 1.4 | 0.77 |
| 0.10 | 0.10 | 0.1 | 0.2 | 1.6 | 2.3 | 1.54 |
| 0.15 | 0.15 | 0.2 | 0.5 | 3.2 | 2.6 | 3.00 |
| 0.20 | 0.20 | 0.4 | 1.2 | 5.7 | 2.9 | 5.50 |
| 0.25 | 0.25 | 0.7 | 2.5 | 8.3 | 3.5 | 8.00 |
| 0.30 | 0.30 | 1.2 | 4.8 | 10.8 | 4.0 | 10.50 |
| 0.35 | 0.35 | 1.8 | 8.1 | 13.4 | 4.6 | 13.00 |
| 0.40 | 0.40 | 2.5 | 12.7 | 15.9 | 5.1 | 15.50 |
| 0.45 | 0.45 | 3.3 | 18.6 | 18.5 | 5.6 | 18.00 |
| 0.50 | 0.50 | 4.3 | 26.0 | 21.0 | 6.1 | 20.50 |
| 0.55 | 0.55 | 5.4 | 35.1 | 23.6 | 6.5 | 23.00 |
| 0.60 | 0.60 | 6.6 | 46.0 | 26.1 | 7.0 | 25.50 |
| 0.65 | 0.65 | 7.9 | 58.9 | 28.7 | 7.4 | 28.00 |
| 0.70 | 0.70 | 9.4 | 71.8 | 32.7 | 7.6 | 32.00 |
| 0.75 | 0.75 | 11.1 | 86.3 | 37.8 | 7.7 | 37.00 |
| 0.80 | 0.80 | 13.1 | 104.2 | 42.8 | 7.9 | 42.00 |
| 0.85 | 0.85 | 15.3 | 125.6 | 47.9 | 8.2 | 47.00 |
| 0.87 | 0.87 | 16.3 | 135.2 | 49.9 | 8.3 | 49.00 |

Q=9.2 cfs

$D_N = .36'$

$Q_{Grate} = 5.6$ cfs (Type "A")

$Q_{Remaining} = 3.6$ cfs

BASIN B-16: STD CURB -- 2% CROSS SLOPE

MANNING'S N = .0170 SLOPE = .0100

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|---|---|---|---|---|---|---|---|---|
| 1 | -10.00 | 0.87 | 3 | 0.00 | 0.00 | 5 | 40.00 | 0.89 |
| 2 | 0.00 | 0.67 | 4 | 2.00 | 0.13 | | | |

| WSEL (FT) | DEPTH INC | FLOW AREA (SQ FT) | FLOW RATE (CFS) | WETTED PER (FT) | FLOW VEL (FPS) | TOP WID |
|---|---|---|---|---|---|---|
| 0.05 | 0.05 | 0.0 | 0.0 | 0.8 | 0.7 | 0.77 |
| 0.10 | 0.10 | 0.1 | 0.1 | 1.6 | 1.1 | 1.54 |
| 0.15 | 0.15 | 0.2 | 0.2 | 3.2 | 1.3 | 3.00 |
| 0.20 | 0.20 | 0.4 | 0.6 | 5.7 | 1.5 | 5.50 |
| 0.25 | 0.25 | 0.7 | 1.3 | 8.3 | 1.7 | 8.00 |
| 0.30 | 0.30 | 1.2 | 2.4 | 10.8 | 2.0 | 10.50 |
| 0.35 | 0.35 | 1.8 | 4.1 | 13.4 | 2.3 | 13.00 |
| 0.40 | 0.40 | 2.5 | 6.3 | 15.9 | 2.5 | 15.50 |
| 0.45 | 0.45 | 3.3 | 9.3 | 18.5 | 2.8 | 18.00 |
| 0.50 | 0.50 | 4.3 | 13.0 | 21.0 | 3.0 | 20.50 |
| 0.55 | 0.55 | 5.4 | 17.6 | 23.6 | 3.3 | 23.00 |
| 0.60 | 0.60 | 6.6 | 23.0 | 26.1 | 3.5 | 25.50 |
| 0.65 | 0.65 | 7.9 | 29.4 | 28.7 | 3.7 | 28.00 |
| 0.70 | 0.70 | 9.4 | 35.9 | 32.7 | 3.8 | 32.00 |
| 0.75 | 0.75 | 11.1 | 43.2 | 37.8 | 3.9 | 37.00 |
| 0.80 | 0.80 | 13.1 | 52.1 | 42.8 | 4.0 | 42.00 |
| 0.85 | 0.85 | 15.3 | 62.8 | 47.9 | 4.1 | 47.00 |
| 0.87 | 0.87 | 16.3 | 67.6 | 49.9 | 4.1 | 49.00 |

Q=3.6 cfs

$D_N = .34'$

$Q_{Grate} = 2.5$ cfs (Type "C")

$Q_{Remaining}$ (flows to Basin D-1) = 1.1 cfs

## POND ANALYSIS

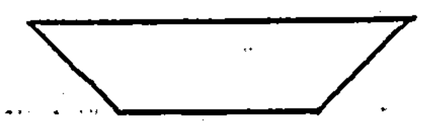

VOLUMES . . . . . A2-8
METHOD OF ANALYSIS . . . . . A2-9
POND A-1 . . . . . A2-12
POND A-2 . . . . . A2-13
POND A-6 . . . . . A2-14
POND A-7 . . . . . A2-15
POND A-8 . . . . . A2-16
POND A-9 . . . . . A2-17
POND A-11 . . . . . A2-18
POND A-12 . . . . . A2-19
POND A-17 . . . . . A2-20
POND B-1-C . . . . . A2-21
POND B-1-D . . . . . A2-22
POND B-3 . . . . . A2-23
POND B-7 . . . . . A2-24
POND B-8-A/B-8-B . . . . . A2-25
POND B-8-C . . . . . A2-26
POND B-9 . . . . . A2-27
POND B-13 . . . . . A2-28
POND B-14 . . . . . A2-29
POND B-15 . . . . . A2-30
POND B-22 . . . . . A2-31
POND B-26 . . . . . A2-32
POND D-1 . . . . . A2-38

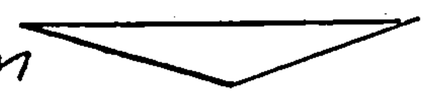
# POND ANALYSIS – VOLUMES

## POND CHARACTERISTICS

| POND # | DESCRIPTION | TOP AREA | BOTTOM AREA | DEPTH | VOL ft³ | VOL Ac-ft |
|---|---|---|---|---|---|---|
| B-26 | OUTLOT C-4 | 15,350 | 3,372 | 8' | 74,880 | 1.719 |
| B-6 | COTTONWOOD DR. W. | 4,550 | 775 | 5' | 13,312 | 0.306 |
| B-7 | COTTONWOOD DR. E. | 10,425 | 800 | 5' | 28,062 | 0.644 |
| B-9 | 7-BAR LOOP RD. | 4,975 | 375 | 5' | 13,375 | 0.307 |
| BD-1 | CORRALES RD BAR DITCH | 6,000 | 0 | 2' | 6,000 | 0.138 |
| PL | PARKING LOT (TYP OF 12) | 22,500 | 0 | 0.75' | ~~9,440~~ | ~~0.194~~ .129 ✱ |
| D-1 * | BASIN-D-WARD TIBA | 2,556 | 0 | 2' | 2,556 | 0.059 |

* POND D-1 IS FOR AN OFF-SITE BASIN (D)

✱ For Ponds with section  $V = \frac{1}{2}(A_{Top} + A_{Bottom}) \times D$

✱ For Ponds with section  $V = \frac{1}{3}(A_{Top} + A_{Bottom}) \times D$
(Parking Lot Ponds)

✱ Each pond's characteristics are calculated and summarized on the following pages.

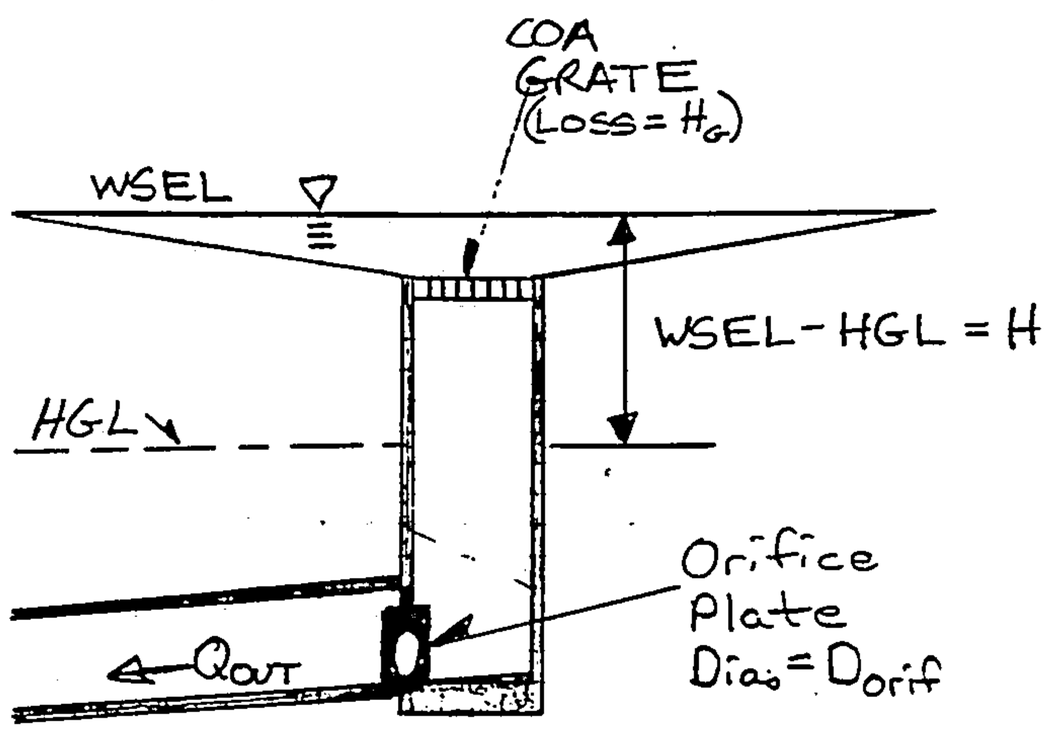
BOHANNAN-HUSTON INC.

PROJECT NAME Cottonwood Mall SHEET ____ OF A2-8

PROJECT NO. 9013505 BY D.F. DATE 3/20/92

SUBJECT Drainage - Ponds ✱ Revised ~~CH'D~~ by MSJ DATE 7/94

Method Used to Determine Stage-Discharge Relationships of a pond with a modified Type "D" Inlet




For Full Pipe Flow:

$$Head = WSEL - HGL - H_G$$

For Normal Depth Flow:

$$Head = WSEL - \left(Inv + \tfrac{1}{2} D_{orif}\right) - H_G$$

$H_G$ = Loss = Head Required to Push Flow (Q) thru Std Grate w/ 35% Clogging

$$Q_{ORIF} = .6\left(A_{ORIF}\right)\sqrt{64.4\,(Head)}$$

Note: This is an iterative solution.

$$Q_{OUT} = \begin{cases} Q_{Grate} & \text{when } Q_{Grate} < Q_{ORIF} \\ Q_{ORIF} & \text{when } Q_{ORIF} < Q_{GRATE} \end{cases}$$

| HEAD LOSS | AT | FLOW |
|---|---|---|
| 0.00 | | 0.00 |
| 0.01 | | 1.28 |
| 0.02 | | 1.81 |
| 0.03 | | 2.22 |
| 0.04 | | 2.57 |
| 0.05 | | 2.87 |
| 0.06 | | 3.14 |
| 0.07 | | 3.39 |
| 0.08 | | 3.63 |
| 0.09 | | 3.85 |
| 0.10 | | 4.06 |
| 0.11 | | 4.25 |
| 0.12 | | 4.44 |
| 0.13 | | 4.62 |
| 0.14 | | 4.80 |
| 0.15 | | 4.97 |
| 0.16 | | 5.13 |
| 0.17 | | 5.29 |
| 0.18 | | 5.44 |
| 0.19 | | 5.59 |
| 0.20 | | 5.74 |
| 0.21 | | 5.88 |
| 0.22 | | 6.02 |
| 0.23 | | 6.15 |
| 0.24 | | 6.28 |
| 0.25 | | 6.41 |
| 0.26 | | 6.54 |
| 0.27 | | 6.66 |
| 0.28 | | 6.79 |
| 0.29 | | 6.91 |
| 0.30 | | 7.03 |
| 0.31 | | 7.14 |
| 0.32 | | 7.26 |
| 0.33 | | 7.37 |
| 0.34 | | 7.48 |
| 0.35 | | 7.59 |
| 0.36 | | 7.70 |
| 0.37 | | 7.80 |
| 0.38 | | 7.91 |
| 0.39 | | 8.01 |
| 0.40 | | 8.11 |
| 0.41 | | 8.21 |
| 0.42 | | 8.31 |
| 0.43 | | 8.41 |
| 0.44 | | 8.51 |
| 0.45 | | 8.60 |
| 0.46 | | 8.70 |
| 0.47 | | 8.79 |
| 0.48 | | 8.89 |
| 0.49 | | 8.98 |
| 0.50 | | 9.07 |

BOHANNAN-HUSTON INC.

PROJECT NAME Cotton Wood Mall SHEET _____ OF A2-9

PROJECT NO. 90316.83 BY MSJ DATE 7/94

SUBJECT _____ CH'D _____ DATE _____

## Grate Capacity of COA STD Grate (Type "D" Inlet)

Weir Equation

$Q = .65(2.68)\left(\frac{18.5'' + 31.9''}{12''/'}\right)(2)\,H^{1.5}$

$Q = 14.63\,H^{1.5}$

Orifice Equation

$Q = .65(.6)(4.10SF)\sqrt{64.4(H)}$

$Q = 1.6\sqrt{64.4(H)}$

| H | Q | |
|---|---|---|
| .25 | 1.83 | weir |
| .50 | 5.20 | weir |
| .75 | 9.50 | weir |
| 1.00 | 12.84 | orifice |
| 2.00 | 18.16 | orifice |
| 3.00 | 22.24 | orifice |

## Capacity of Neenah R-2668 Type C Vented Lid

Open Area = 0.9SF

Open Perimeter $= \pi D = \pi\left(\frac{22\frac{1}{4}''}{12''/'}\right)\frac{1}{2} = 2.91'$

(consider only ½ Perimeter is open)

Weir Equation

$Q = .65(2.68)(2.91')\,H^{1.5}$

$Q = 5.07\,H^{1.5}$

Orifice Equation

$Q = .65(.6)(.95F)\sqrt{64.4(H)}$

$Q = .351\sqrt{64.4(H)}$

| H | Q | |
|---|---|---|
| .25 | .63 | weir |
| .50 | 1.79 | weir |
| .75 | 2.44 | orifice |
| 1.00 | 2.82 | orifice |

BOHANNAN-HUSTON INC.

PROJECT NAME Cottonwood Mall SHEET ____ OF A2-10

PROJECT NO. 90316.83 BY MSJ DATE 7/04

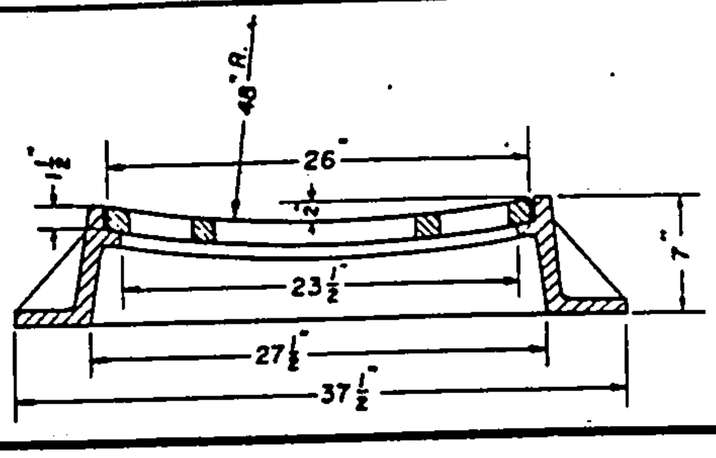
SUBJECT ____ CH'D ____ DATE ____

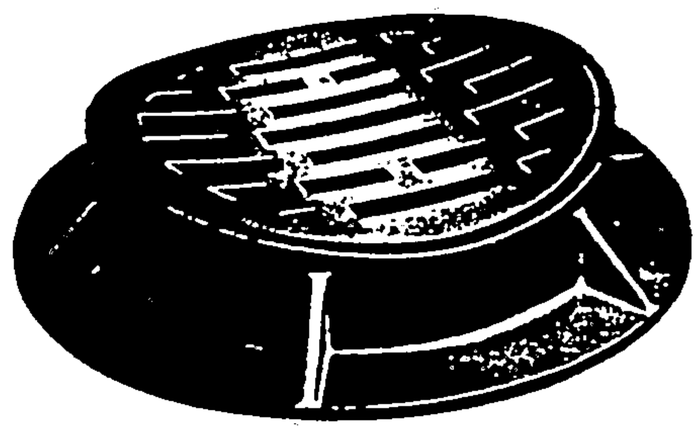
NEENAH FOUNDRY COMPANY

## R-2600 Catch Basin Frame and Concave Grate

Heavy Duty

Total Weight 365 Pounds



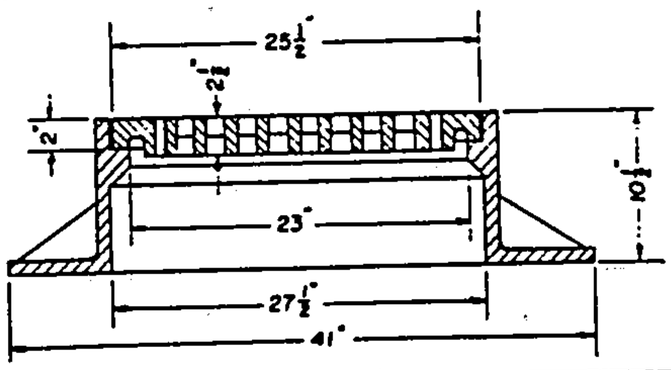



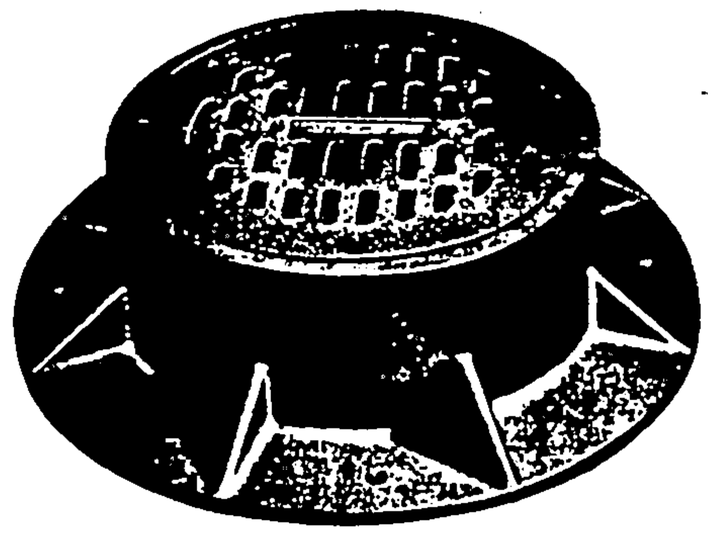
## R-2650 Catch Basin Frame and Grate

Heavy Duty

Total Weight 600 Pounds

Furnished with machined horizontal bearing surfaces.



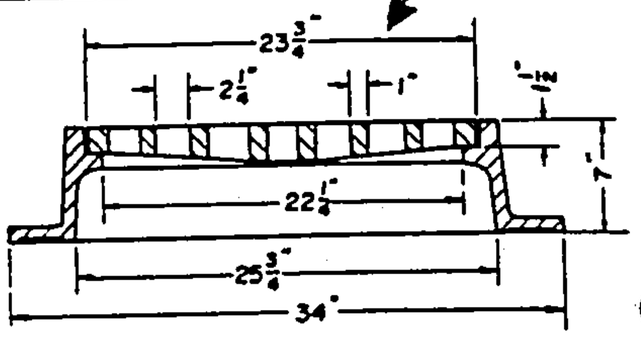
## R-2668 Catch Basin Frame and Type C Grate

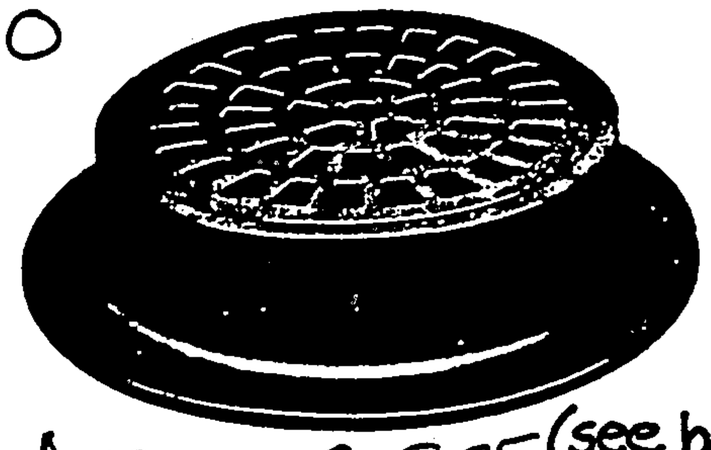
Closest match to COA STD DWG 2110

Heavy Duty

Total Weight 290 Pounds

Furnished with machined horizontal bearing surfaces.



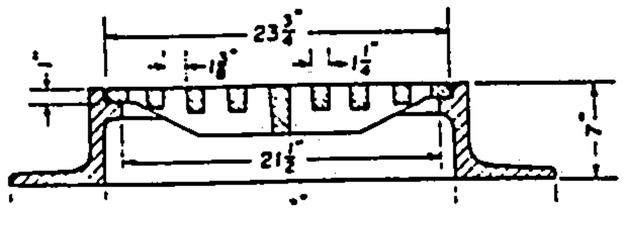
Open Area = 0.9SF (see below)

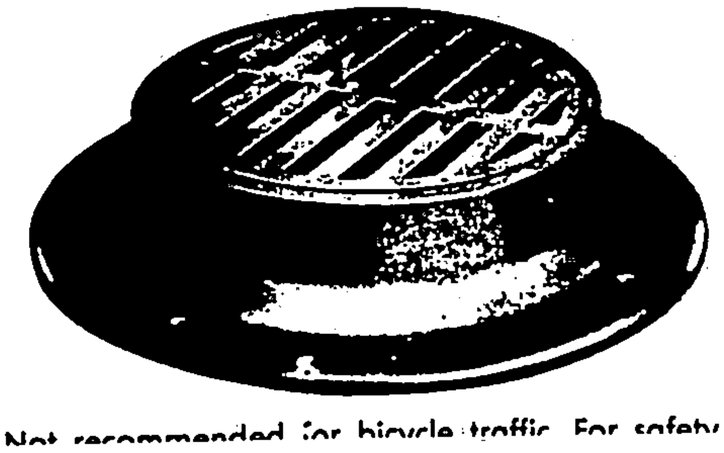
## R-2680 Catch Basin Frame and Grate

Heavy Duty

Total Weight 450 Pounds

Furnished with machined horizontal



Not recommended for bicycle traffic. For safety

| | | |
|---|---|---|
| 2050 | F | 0.7 |
| 2060 | A | 1.1 |
| 2060 | B | 1.2 |
| 2060 | C | 1.3 |
| R-2390 | B | 1.2 |
| R-2390 | C | 1.5 |
| R-2392 | C | 1.4 |
| R-2392 | G | 1.4 |
| R-2475 | A | 1.0 |
| R-2481 | A | 0.9 |
| R-2484 | D | 1.0 |
| R-2494 | G | 0.8 |
| R-2496 | E | 0.6 |
| R-2595 | D | 1.2 |
| R-2600 | K | 1.1 |
| R-2650 | G | 1.1 |
| R-2668 | C | 0.9 |
| R-2680 | G | 1.1 |

Type K indicates "Special" grate style and is not among standard types as illustrated.

NEENAH FOUNDRY COMPANY

AZ-11

POND A-1

MAX WSEL= 61.25 HGL in= 57.62
GRT ELEV= 60.25 DELT WSEL= 0.25

LENGTH = 150
WIDTH = 150
@ DEPTH = 0.75

| ORIFICE DIAMETER | 0.6*A orif | H | - H grate | =HEAD | Q orif (MAX) | OUTFLOW | STORAGE | ELEVATION |
|---|---|---|---|---|---|---|---|---|
| 12.75 | 0.532 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.00 |
| 12.75 | 0.532 | 2.88 | 0.00 | 2.88 | 7.24 | 1.83 | 0.005 | 0.25 |
| 12.75 | 0.532 | 3.13 | 0.00 | 3.13 | 7.55 | 5.20 | 0.038 | 0.50 |
| 12.75 | 0.532 | 3.38 | 0.34 | 3.04 | 7.44 | 7.44 | 0.129 | 0.75 |
| 12.75 | 0.532 | 3.63 | 0.36 | 3.27 | 7.72 | 7.72 | 0.306 | 1.00 |

HYDROGRAPH NUMBER A1

RUNOFF VOLUME = 0.547 ACRE-FT
PEAK DISCHARGE RATE = 12.0 CFS
PEAK OCCURRED AT 1.50 HRS.

```
** ROUTE FLOW THROUGH PARKING LOT POND TYPE "D" INLET
** 12.75" ORIFICE CONTROLS AT ELEV 100.75 Q=7.44 NOT Q=9.50(GRATE)
ROUTE RESERVOIR      ID=1   HYD=A1      INFLOW ID=1  CODE=00
                     OUTFLOW(cfs)    STORAGE(ac-ft)   ELEV(ft)
                          0.00            0.000        100.00
                          1.83            0.005        100.25
                          5.20            0.038        100.50
                          7.44            0.129        100.75
                          7.72            0.306        101.00
```

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

| TIME (HRS) | INFLOW DISCHARGE (CFS) | WATER ELEV (FT) | WATER VOLUME (A-F) | TOTAL OUTFLOW (CFS) |
|---|---|---|---|---|
| 0.0 | 0.0 | 100.0 | 0.0 | |

PEAK DISCHARGE = 6.73 CFS.
MAXIMUM WATER ELEVATION = 100.7 FT.
MAXIMUM RESERVOIR STORAGE = 0.10 ACRE-FT.
PRINT HYD ID=1 CODE=0

HYDROGRAPH NUMBER A1

RUNOFF VOLUME = 0.412 ACRE-FT
PEAK DISCHARGE RATE = 6.7 CFS
PEAK OCCURRED AT 1.65 HRS.

| POND | A-2 | | MAX WSEL= | 59.25 | HGL in= | 54.80 | | LENGTH = | 150 |
|---|---|---|---|---|---|---|---|---|---|
| | | | GRT ELEV= | 58.25 | DELT WSEL= | 0.25 | | WIDTH = | 150 |
| | | | | | | | | @ DEPTH = | 0.75 |

| ORIFICE DIAMETER | 0.6*A orif | H | - H grate | =HEAD | Q orif (MAX) | OUTFLOW | STORAGE | ELEVATION |
|---|---|---|---|---|---|---|---|---|
| 18 | 1.060 | 0.00 | 0.00 | .0.00 | 0.00 | 0.00 | 0.000 | 0.00 |
| 18 | 1.060 | 3.70 | 0.00 | 3.70 | 16.37 | 1.83 | 0.005 | 0.25 |
| 18 | 1.060 | 3.95 | 0.00 | 3.95 | 16.91 | 5.20 | 0.038 | 0.50 |
| 18 | 1.060 | 4.20 | 0.00 | 4.20 | 17.44 | 9.50 | 0.129 | 0.75 |
| 18 | 1.060 | 4.45 | 0.00 | 4.45 | 17.95 | 12.83 | 0.306 | 1.00 |

HYDROGRAPH NUMBER A2

RUNOFF VOLUME = 1.174 ACRE-FT
PEAK DISCHARGE RATE = 25.3 CFS
PEAK OCCURRED AT 1.50 HRS.

```
** ROUTE FLOW THROUGH PARKING LOT POND TYPE "D" INLET
** NO ORIFICE
ROUTE RESERVOIR      ID=19   HYD=A2:POND     INFLOW ID=19  CODE=00
                     OUTFLOW(cfs)   STORAGE(ac-ft)   ELEV(ft)
                          0.00            0.000        100.00
                          1.83            0.005        100.25
                          5.20            0.038        100.50
                          9.50            0.129        100.75
                         12.84            0.306        101.00
```

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

| TIME (HRS) | INFLOW DISCHARGE (CFS) | WATER ELEV (FT) | WATER VOLUME (A-F) | TOTAL OUTFLOW (CFS) |
|---|---|---|---|---|
| 0.0 | 0.0 | 100.0 | 0.0 | |

```
PEAK DISCHARGE =      12.17 CFS.
MAXIMUM WATER ELEVATION =  100.9 FT.
MAXIMUM RESERVOIR STORAGE =     0.27 ACRE-FT.
    PRINT HYD              ID=19   CODE=0
```

HYDROGRAPH NUMBER A2:POND

RUNOFF VOLUME = 0.897 ACRE-FT
PEAK DISCHARGE RATE = 12.2 CFS
PEAK OCCURRED AT 1.70 HRS.

| POND | A-6 | | MAX WSEL= | 45.25 | HGL in= | 43.95 | | LENGTH = | 170 |
|---|---|---|---|---|---|---|---|---|---|
| | | | GRT ELEV= | 44.25 | DELT WSEL= | 0.25 | | WIDTH = | 100 |
| | | | | | | | | @ DEPTH = | 0.75 |

| ORIFICE DIAMETER | 0.6*A orif | H | - H grate | =HEAD | Q orif (MAX) | OUTFLOW | STORAGE | ELEVATION |
|---|---|---|---|---|---|---|---|---|
| 7.25 | 0.172 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.00 |
| 7.25 | 0.172 | 0.55 | 0.01 | 0.54 | 1.01 | 1.01 | 0.004 | 0.25 |
| 7.25 | 0.172 | 0.80 | 0.01 | 0.79 | 1.23 | 1.23 | 0.029 | 0.50 |
| 7.25 | 0.172 | 1.05 | 0.01 | 1.04 | 1.41 | 1.41 | 0.098 | 0.75 |
| 7.25 | 0.172 | 1.30 | 0.01 | 1.29 | 1.57 | 1.57 | 0.231 | 1.00 |

```
                    HYDROGRAPH NUMBER          A6

        RUNOFF VOLUME =        0.316 ACRE-FT
        PEAK DISCHARGE RATE =          7.0 CFS
        PEAK OCCURRED AT  1.50 HRS.


**
** ROUTE FLOW THROUGH PARKING LOT POND 3' DEEP INLET
** 7.25" ORIFICE
ROUTE RESERVOIR:      ID=13   HYD=A6:POND     INFLOW ID=13  CODE=00
                      OUTFLOW(cfs)   STORAGE(ac-ft)   ELEV(ft)
                           0.00            0.000        100.00
                           1.01            0.004        100.25
                           1.23            0.029        100.50
                           1.41            0.098        100.75
                           1.57            0.231        101.00


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

                 INFLOW      WATER      WATER      TOTAL
   TIME        DISCHARGE    ELEV       VOLUME     OUTFLOW
   (HRS)        (CFS)       (FT)       (A-F)      (CFS)

    0.0          0.0       100.0        0.0
PEAK DISCHARGE =       1.46 CFS.
MAXIMUM WATER ELEVATION =  100.8 FT.
MAXIMUM RESERVOIR STORAGE =     0.14 ACRE-FT.
    PRINT HYD              ID=13   CODE=0

                    HYDROGRAPH NUMBER     A6:POND


        RUNOFF VOLUME =        0.250 ACRE-FT
        PEAK DISCHARGE RATE =          1.5 CFS
        PEAK OCCURRED AT  2.05 HRS.
```

| POND | A-7 | | MAX WSEL= | 45.25 | HGL in= | 43.90 | | LENGTH = | 100 |
|---|---|---|---|---|---|---|---|---|---|
| | | | GRT ELEV= | 44.25 | DELT WSEL= | 0.25 | | WIDTH = | 100 |
| | | | | | | | | @ DEPTH = | 0.75 |

| ORIFICE DIAMETER | 0.6*A orif | H | - H grate | =HEAD | Q orif (MAX) | OUTFLOW | STORAGE | ELEVATION |
|---|---|---|---|---|---|---|---|---|
| 2.75 | 0.025 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.00 |
| 2.75 | 0.025 | 0.60 | 0.00 | 0.60 | 0.15 | 0.15 | 0.002 | 0.25 |
| 2.75 | 0.025 | 0.85 | 0.00 | 0.85 | 0.18 | 0.18 | 0.017 | 0.50 |
| 2.75 | 0.025 | 1.10 | 0.00 | 1.10 | 0.21 | 0.21 | 0.057 | 0.75 |
| 2.75 | 0.025 | 1.35 | 0.00 | 1.35 | 0.23 | 0.23 | 0.136 | 1.00 |

```
                    HYDROGRAPH NUMBER          A7

      RUNOFF VOLUME =       0.126 ACRE-FT
      PEAK DISCHARGE RATE =         2.7 CFS
      PEAK OCCURRED AT  1.50 HRS.


**
** ROUTE FLOW THROUGH PARKING LOT POND 3' DEEP INLET
** 2.75" ORIFICE
ROUTE RESERVOIR     ID=5   HYD=A7:POND     INFLOW ID=5  CODE=00
                      OUTFLOW(cfs)    STORAGE(ac-ft)    ELEV(ft)
                           0.00            0.000         100.00
                           0.15            0.002         100.25
                           0.18            0.017         100.50
                           0.21            0.057         100.75
                           0.23            0.136         101.00


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


          INFLOW      WATER      WATER      TOTAL
  TIME  DISCHARGE     ELEV      VOLUME     OUTFLOW
  (HRS)   (CFS)       (FT)      (A-F)      (CFS)

   0.0      0.0      100.0       0.0
PEAK DISCHARGE =       0.21 CFS.
MAXIMUM WATER ELEVATION =  100.8 FT.
MAXIMUM RESERVOIR STORAGE =     0.08 ACRE-FT.
   PRINT HYD              ID=5   CODE=0

                    HYDROGRAPH NUMBER     A7:POND


      RUNOFF VOLUME =       0.017 ACRE-FT
      PEAK DISCHARGE RATE =         1.0 CFS
      PEAK OCCURRED AT  1.50 HRS.
```

POND A-8

MAX WSEL= 44.25 HGL in= 42.58
GRT ELEV= 43.25 DELT WSEL= 0.25

LENGTH = 130
WIDTH = 100
@ DEPTH = 0.75

| ORIFICE DIAMETER | 0.6*A orif | H | - H grate | =HEAD | Q orif (MAX) | OUTFLOW | STORAGE | ELEVATION |
|---|---|---|---|---|---|---|---|---|
| 18 | 1.060 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.00 |
| 18 | 1.060 | 0.92 | 0.00 | 0.92 | 8.16 | 1.83 | 0.003 | 0.25 |
| 18 | 1.060 | 1.17 | 0.00 | 1.17 | 9.20 | 5.20 | 0.022 | 0.50 |
| 18 | 1.060 | 1.42 | 0.00 | 1.42 | 10.14 | 9.50 | 0.075 | 0.75 |
| 18 | 1.060 | 1.67 | 0.00 | 1.67 | 11.00 | 11.00 | 0.177 | 1.00 |

```
                    HYDROGRAPH NUMBER          A8

     RUNOFF VOLUME =       0.646 ACRE-FT
     PEAK DISCHARGE RATE =        14.1 CFS
     PEAK OCCURRED AT  1.50 HRS.


** ROUTE FLOW THROUGH PARKING LOT POND TYPE "D" INLET
** NO ORIFICE
ROUTE RESERVOIR      ID=15   HYD=A8:POND     INFLOW ID=15  CODE=00
                     OUTFLOW(cfs)   STORAGE(ac-ft)   ELEV(ft)
                          0.00            0.000        100.00
                          1.83            0.003        100.25
                          5.20            0.022        100.50
                          9.50            0.075        100.75
                         12.84            0.177        101.00


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


                INFLOW      WATER      WATER      TOTAL
   TIME       DISCHARGE    ELEV       VOLUME     OUTFLOW
   (HRS)       (CFS)       (FT)       (A-F)      (CFS)


    0.0          0.0      100.0        0.0
PEAK DISCHARGE =       9.87 CFS.
MAXIMUM WATER ELEVATION =  100.8 FT.
MAXIMUM RESERVOIR STORAGE =     0.09 ACRE-FT.
    PRINT HYD              ID=15   CODE=0

                    HYDROGRAPH NUMBER     A8:POND


     RUNOFF VOLUME =       0.485 ACRE-FT
     PEAK DISCHARGE RATE =         9.9 CFS
     PEAK OCCURRED AT  1.60 HRS.
```

| POND | A-9 | | MAX WSEL= | 44.25 | HGL in= | 41.46 | | LENGTH = | 150 |
|---|---|---|---|---|---|---|---|---|---|
| | | | GRT ELEV= | 43.25 | DELT WSEL= | 0.25 | | WIDTH = | 100 |
| | | | | | | | | @ DEPTH = | 0.75 |

| ORIFICE DIAMETER | 0.6*A orif | H | - H grate | =HEAD | Q orif (MAX) | OUTFLOW | STORAGE | ELEVATION |
|---|---|---|---|---|---|---|---|---|
| 5.75 | 0.108 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.00 |
| 5.75 | 0.108 | 2.04 | 0.01 | 2.03 | 1.24 | 1.24 | 0.003 | 0.25 |
| 5.75 | 0.108 | 2.29 | 0.01 | 2.28 | 1.31 | 1.31 | 0.026 | 0.50 |
| 5.75 | 0.108 | 2.54 | 0.01 | 2.53 | 1.38 | 1.38 | 0.086 | 0.75 |
| 5.75 | 0.108 | 2.79 | 0.01 | 2.78 | 1.45 | 1.45 | 0.204 | 1.00 |

HYDROGRAPH NUMBER A9

RUNOFF VOLUME = 0.279 ACRE-FT
PEAK DISCHARGE RATE = 6.2 CFS
PEAK OCCURRED AT 1.50 HRS.

```
** ROUTE FLOW THROUGH PARKING LOT POND 3' DEEP INLET
** 5.75" ORIFICE
ROUTE RESERVOIR      ID=14   HYD=A9:POND      INFLOW ID=14  CODE=00
                     OUTFLOW(cfs)   STORAGE(ac-ft)   ELEV(ft)
                          0.00            0.000       100.00
                          1.24            0.003       100.25
                          1.31            0.026       100.50
                          1.38            0.086       100.75
                          1.45            0.204       101.00
```

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

| TIME (HRS) | INFLOW DISCHARGE (CFS) | WATER ELEV (FT) | WATER VOLUME (A-F) | TOTAL OUTFLOW (CFS) |
|---|---|---|---|---|
| 0.0 | 0.0 | 100.0 | 0.0 | |

PEAK DISCHARGE = 1.39 CFS.
MAXIMUM WATER ELEVATION = 100.8 FT.
MAXIMUM RESERVOIR STORAGE = 0.11 ACRE-FT.
PRINT HYD ID=14 CODE=0

HYDROGRAPH NUMBER A9:POND

RUNOFF VOLUME = 0.221 ACRE-FT
PEAK DISCHARGE RATE = 1.4 CFS
PEAK OCCURRED AT 2.00 HRS.

POND A-11

MAX WSEL= 44.25 HGL in= 40.79
GRT ELEV= 43.25 DELT WSEL= 0.25

LENGTH = 130
WIDTH = 100
@ DEPTH = 0.75

| ORIFICE DIAMETER | 0.6*A orif | H | - H grate | =HEAD | Q orif (MAX) | OUTFLOW | STORAGE | ELEVATION |
|---|---|---|---|---|---|---|---|---|
| 2.125 | 0.015 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.00 |
| 2.125 | 0.015 | 2.71 | 0.00 | 2.71 | 0.20 | 0.20 | 0.003 | 0.25 |
| 2.125 | 0.015 | 2.96 | 0.00 | 2.96 | 0.20 | 0.20 | 0.022 | 0.50 |
| 2.125 | 0.015 | 3.21 | 0.00 | 3.21 | 0.21 | 0.21 | 0.075 | 0.75 |
| 2.125 | 0.015 | 3.46 | 0.00 | 3.46 | 0.22 | 0.22 | 0.177 | 1.00 |

HYDROGRAPH NUMBER A11

RUNOFF VOLUME = 0.117 ACRE-FT
PEAK DISCHARGE RATE = 2.7 CFS
PEAK OCCURRED AT 1.50 HRS.

```
**
** ROUTE FLOW THROUGH PARKING LOT POND 3' DEEP INLET
** 2.125" ORIFICE
ROUTE RESERVOIR      ID=2   HYD=A11:POND     INFLOW ID=2  CODE=00
                     OUTFLOW(cfs)   STORAGE(ac-ft)   ELEV(ft)
                          0.00            0.000        100.00
                          0.20            0.003        100.25
                          0.20            0.022        100.50
                          0.21            0.075        100.75
                          0.22            0.177        101.00
```

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

| TIME (HRS) | INFLOW DISCHARGE (CFS) | WATER ELEV (FT) | WATER VOLUME (A-F) | TOTAL OUTFLOW (CFS) |
|---|---|---|---|---|
| 0.0 | 0.0 | 100.0 | 0.0 | |

PEAK DISCHARGE = 0.21 CFS.
MAXIMUM WATER ELEVATION = 100.7 FT.
MAXIMUM RESERVOIR STORAGE = 0.07 ACRE-FT.
PRINT HYD ID=2 CODE=0

HYDROGRAPH NUMBER A11:POND

RUNOFF VOLUME = 0.017 ACRE-FT
PEAK DISCHARGE RATE = 1.0 CFS
PEAK OCCURRED AT 1.50 HRS.

| POND | A-12 | | MAX WSEL= | 43.25 | HGL in= | 41.97 | | LENGTH = | 150 |
|---|---|---|---|---|---|---|---|---|---|
| | | | GRT ELEV= | 42.25 | DELT WSEL= | 0.25 | | WIDTH = | 150 |
| | | | | | | | | @ DEPTH = | 0.75 |

| ORIFICE DIAMETER | 0.6*A orif | H | - H grate | =HEAD | Q orif (MAX) | OUTFLOW | STORAGE | ELEVATION |
|---|---|---|---|---|---|---|---|---|
| 18 | 1.060 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.00 |
| 18 | 1.060 | 0.53 | 0.00 | 0.53 | 6.19 | 0.63 | 0.005 | 0.25 |
| 18 | 1.060 | 0.78 | 0.00 | 0.78 | 7.51 | 1.79 | 0.038 | 0.50 |
| 18 | 1.060 | 1.03 | 0.00 | 1.03 | 8.64 | 2.45 | 0.129 | 0.75 |
| 18 | 1.060 | 1.28 | 0.00 | 1.28 | 9.63 | 2.82 | 0.306 | 1.00 |

OUTFLOW CONTROLLED BY VENTED LID

```
                    HYDROGRAPH NUMBER        A12

          RUNOFF VOLUME =       0.475 ACRE-FT
          PEAK DISCHARGE RATE =        10.3 CFS
          PEAK OCCURRED AT  1.50 HRS.

**
** ROUTE FLOW THROUGH PARKING LOT POND VENTED LID INLET (H=1.0'MAX)
** 8.75" ORIFICE 0.0 3.62 3.76 3.89 SUPERCEEDED
ROUTE RESERVOIR      ID=7   HYD=A12:POND      INFLOW ID=6  CODE=00
                     OUTFLOW(cfs)    STORAGE(ac-ft)    ELEV(ft)
                          0.00            0.000        100.00
                          0.63            0.005        100.25
                          1.79            0.038        100.50
                          2.45            0.129        100.75
                          2.82            0.306        101.00

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

                INFLOW      WATER      WATER      TOTAL
   TIME       DISCHARGE    ELEV       VOLUME     OUTFLOW
   (HRS)        (CFS)      (FT)       (A-F)      (CFS)

    0.0          0.0      100.0        0.0
PEAK DISCHARGE =       2.58 CFS.
MAXIMUM WATER ELEVATION =  100.8 FT.
MAXIMUM RESERVOIR STORAGE =     0.19 ACRE-FT.
    PRINT HYD              ID=7   CODE=0

                    HYDROGRAPH NUMBER    A12:POND

          RUNOFF VOLUME =       0.361 ACRE-FT
          PEAK DISCHARGE RATE =         2.6 CFS
          PEAK OCCURRED AT  2.00 HRS.
```

| POND | A-17 | | MAX WSEL= | 43.25 | HGL in= | 42.35 | | LENGTH = | 150 |
|---|---|---|---|---|---|---|---|---|---|
| | | | GRT ELEV= | 42.25 | DELT WSEL= | 0.25 | | WIDTH = | 150 |
| | | | | | | | | @ DEPTH = | 0.75 |

| ORIFICE DIAMETER | 0.6*A orif | H | - H grate | =HEAD | Q orif (MAX) | OUTFLOW | STORAGE | ELEVATION |
|---|---|---|---|---|---|---|---|---|
| 18 | 1.060 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.00 |
| 18 | 1.060 | 0.15 | 0.00 | 0.15 | 3.30 | 0.63 | 0.005 | 0.25 |
| 18 | 1.060 | 0.40 | 0.00 | 0.40 | 5.38 | 1.79 | 0.038 | 0.50 |
| 18 | 1.060 | 0.65 | 0.00 | 0.65 | 6.86 | 2.28 | 0.129 | 0.75 |
| 18 | 1.060 | 0.90 | 0.00 | 0.90 | 8.07 | 2.68 | 0.306 | 1.00 |

OUTFLOW CONTROLLED BY VENTED LID

```
                    HYDROGRAPH NUMBER          A17

RUNOFF VOLUME =        0.544 ACRE-FT
PEAK DISCHARGE RATE =          11.8 CFS
PEAK OCCURRED AT  1.50 HRS.

**
** ROUTE FLOW THROUGH PARKING LOT POND VENTED LID INLET (H=0.9'MAX)
** 9.75" ORIFICE 0.0 4.50 4.67 4.83 5.00 SUPERCEEDED
ROUTE RESERVOIR      ID=2   HYD=A17:POND      INFLOW ID=2  CODE=00
                     OUTFLOW(cfs)    STORAGE(ac-ft)    ELEV(ft)
                          0.00             0.000        100.00
                          0.63             0.005        100.25
                          1.79             0.038        100.50
                          2.27             0.129        100.75
                          2.67             0.308        101.00

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

                 INFLOW      WATER      WATER      TOTAL
  TIME         DISCHARGE    ELEV       VOLUME     OUTFLOW
  (HRS)          (CFS)      (FT)       (A-F)      (CFS)

    0.0          0.0      100.0        0.0
PEAK DISCHARGE =       2.51 CFS.
MAXIMUM WATER ELEVATION =  100.9 FT.
MAXIMUM RESERVOIR STORAGE =     0.24 ACRE-FT.
    PRINT HYD              ID=2   CODE=0

                    HYDROGRAPH NUMBER    A17:POND

RUNOFF VOLUME =        0.418 ACRE-FT
PEAK DISCHARGE RATE =           2.5 CFS
PEAK OCCURRED AT  2.05 HRS.
```

| POND | B-1-C | | MAX WSEL= | 45.25 | HGL in= | 42.71 | | LENGTH = | 180 |
|---|---|---|---|---|---|---|---|---|---|
| | | | GRT ELEV= | 44.25 | DELT WSEL= | 0.25 | | WIDTH = | 50 |
| | | | | | | | | @ DEPTH = | 0.75 |

| ORIFICE DIAMETER | 0.6*A orif | H | - H grate | =HEAD | Q orif (MAX) | OUTFLOW | STORAGE | ELEVATION |
|---|---|---|---|---|---|---|---|---|
| 9 | 0.265 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.00 |
| 9 | 0.265 | 1.79 | 0.00 | 1.79 | 2.85 | 1.83 | 0.002 | 0.25 |
| 9 | 0.265 | 2.04 | 0.05 | 1.99 | 3.00 | 3.00 | 0.015 | 0.50 |
| 9 | 0.265 | 2.29 | 0.06 | 2.23 | 3.18 | 3.18 | 0.052 | 0.75 |
| 9 | 0.265 | 2.54 | 0.07 | 2.47 | 3.34 | 3.34 | 0.122 | 1.00 |

```
                    HYDROGRAPH NUMBER        B1C

     RUNOFF VOLUME =       0.186 ACRE-FT
     PEAK DISCHARGE RATE =         4.0 CFS
     PEAK OCCURRED AT  1.50 HRS.


**
** ROUTE FLOW THROUGH PARKING LOT POND
** 9" ORIFICE
ROUTE RESERVOIR     ID=2   HYD=B1C:POND     INFLOW ID=1  CODE=00
                    OUTFLOW(cfs)    STORAGE(ac-ft)    ELEV(ft)
                         0.00            0.000          100.00
                         1.83            0.002          100.25
                         2.99            0.015          100.50
                         3.18            0.052          100.75
                         3.35            0.122          101.00


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


                INFLOW      WATER      WATER      TOTAL
   TIME        DISCHARGE    ELEV      VOLUME     OUTFLOW
   (HRS)        (CFS)       (FT)      (A-F)      (CFS)

    0.0          0.0       100.0       0.0
PEAK DISCHARGE =       3.00 CFS.
MAXIMUM WATER ELEVATION =  100.5 FT.
MAXIMUM RESERVOIR STORAGE =    0.02 ACRE-FT.
    PRINT HYD            ID=2   CODE=0

                    HYDROGRAPH NUMBER   B1C:POND


     RUNOFF VOLUME =       0.126 ACRE-FT
     PEAK DISCHARGE RATE =         3.0 CFS
     PEAK OCCURRED AT  1.60 HRS.
```

POND B-1-D

MAX WSEL= 45.25 HGL in= 43.03
GRT ELEV= 44.25 DELT WSEL= 0.25

LENGTH = 150
WIDTH = 150
@ DEPTH = 0.75

| ORIFICE DIAMETER | 0.6*A orif | H | - H grate | =HEAD | Q orif (MAX) | OUTFLOW | STORAGE | ELEVATION |
|---|---|---|---|---|---|---|---|---|
| 10 | 0.327 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.00 |
| 10 | 0.327 | 1.47 | 0.06 | 1.41 | 3.12 | 1.83 | 0.005 | 0.25 |
| 10 | 0.327 | 1.72 | 0.07 | 1.65 | 3.37 | 3.37 | 0.038 | 0.50 |
| 10 | 0.327 | 1.97 | 0.08 | 1.89 | 3.61 | 3.61 | 0.129 | 0.75 |
| 10 | 0.327 | 2.22 | 0.09 | 2.13 | 3.83 | 3.83 | 0.306 | 1.00 |

```
                    HYDROGRAPH NUMBER        B1D

      RUNOFF VOLUME =       0.529 ACRE-FT
      PEAK DISCHARGE RATE =        11.5 CFS
      PEAK OCCURRED AT  1.50 HRS.

**
** ROUTE FLOW THROUGH PARKING LOT POND TYPE "D" INLET
** 10" ORIFICE
ROUTE RESERVOIR -    ID=7   HYD=B1D:POND     INFLOW ID=7  CODE=00
                     OUTFLOW(cfs)   STORAGE(ac-ft)   ELEV(ft)
                          0.00            0.000        100.00
                          1.83            0.005        100.25
                          3.36            0.038        100.50
                          3.61            0.129        100.75
                          3.84            0.306        101.00

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

                INFLOW      WATER      WATER      TOTAL
  TIME        DISCHARGE    ELEV      VOLUME     OUTFLOW
  (HRS)         (CFS)      (FT)       (A-F)      (CFS)

    0.0          0.0      100.0        0.0
PEAK DISCHARGE =       3.65 CFS.
MAXIMUM WATER ELEVATION =  100.8 FT.
MAXIMUM RESERVOIR STORAGE =     0.16 ACRE-FT.
    PRINT HYD              ID=7   CODE=0

                    HYDROGRAPH NUMBER   B1D:POND

      RUNOFF VOLUME =       0.409 ACRE-FT
      PEAK DISCHARGE RATE =         3.7 CFS
      PEAK OCCURRED AT  1.85 HRS.
```

| POND | B-3 | | MAX WSEL= | 45.25 | HGL in= | 42.63 | | LENGTH = | 200 |
|---|---|---|---|---|---|---|---|---|---|
| | | | GRT ELEV= | 44.25 | DELT WSEL= | 0.25 | | WIDTH = | 100 |
| | | | | | | | | @ DEPTH = | 0.75 |

| ORIFICE DIAMETER | 0.6*A orif | H | - H grate | =HEAD | Q orif (MAX) | OUTFLOW | STORAGE | ELEVATION |
|---|---|---|---|---|---|---|---|---|
| 7.25 | 0.172 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.00 |
| 7.25 | 0.172 | 1.87 | 0.02 | 1.85 | 1.88 | 1.83 | 0.004 | 0.25 |
| 7.25 | 0.172 | 2.12 | 0.02 | 2.10 | 2.00 | 2.00 | 0.034 | 0.50 |
| 7.25 | 0.172 | 2.37 | 0.03 | 2.34 | 2.11 | 2.11 | 0.115 | 0.75 |
| 7.25 | 0.172 | 2.62 | 0.03 | 2.59 | 2.22 | 2.22 | 0.272 | 1.00 |

```
                    HYDROGRAPH NUMBER          B3

        RUNOFF VOLUME =       0.427 ACRE-FT
        PEAK DISCHARGE RATE =         9.6 CFS
        PEAK OCCURRED AT  1.50 HRS.


**
** ROUTE FLOW THROUGH PARKING LOT POND 3' DEEP INLET
** 7.25" ORIFICE
ROUTE RESERVOIR      ID=6   HYD=B3:POND      INFLOW ID=6  CODE=00
                     OUTFLOW(cfs)    STORAGE(ac-ft)    ELEV(ft)
                          0.00            0.000         100.00
                          1.83            0.004         100.25
                          2.00            0.034         100.50
                          2.12            0.115         100.75
                          2.23            0.272         101.00


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


          INFLOW      WATER      WATER      TOTAL
TIME      DISCHARGE   ELEV       VOLUME     OUTFLOW
(HRS)     (CFS)       (FT)       (A-F)      (CFS)


   0.0        0.0      100.0       0.0
PEAK DISCHARGE =       2.16 CFS.
MAXIMUM WATER ELEVATION =  100.8 FT.
MAXIMUM RESERVOIR STORAGE =     0.17 ACRE-FT.
   PRINT HYD              ID=6   CODE=0

                    HYDROGRAPH NUMBER     B3:POND


        RUNOFF VOLUME =       0.339 ACRE-FT
        PEAK DISCHARGE RATE =         2.2 CFS
        PEAK OCCURRED AT  2.00 HRS.
```

POND B-7

MAX WSEL= 47.00 HGL in= 42.53
GRT ELEV= 42.00 DELT WSEL= 1.00

LENGTH = ----
WIDTH = ----
@ DEPTH = 5

| ORIFICE DIAMETER | 0.6*A orif | H | - H grate | =HEAD | Q orif (MAX) | OUTFLOW | STORAGE | ELEVATION |
|---|---|---|---|---|---|---|---|---|
| 10.25 | 0.344 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.00 |
| 10.25 | 0.344 | 0.47 | 0.02 | 0.45 | 1.85 | 1.85 | 0.028 | 1.00 |
| 10.25 | 0.344 | 1.47 | 0.07 | 1.40 | 3.26 | 3.26 | 0.090 | 2.00 |
| 10.25 | 0.344 | 2.47 | 0.11 | 2.36 | 4.24 | 4.24 | 0.200 | 3.00 |
| 10.25 | 0.344 | 3.47 | 0.15 | 3.32 | 5.03 | 5.03 | 0.374 | 4.00 |
| 10.25 | 0.344 | 4.47 | 0.20 | 4:27 | 5.70 | 5.70 | 0.628 * | 5.00 |

* HAND ENTERED: DETERMINED IN PREVIOUS REPORT

HYDROGRAPH NUMBER B7:PND:T

RUNOFF VOLUME = 0.992 ACRE-FT
PEAK DISCHARGE RATE = 27.8 CFS
PEAK OCCURRED AT 1.50 HRS.

```
**
** ROUTE FLOW THROUGH POND B7
** 10.25" ORIFICE
ROUTE RESERVOIR      ID=13   HYD=B7:PND:R   INFLOW ID=12  CODE=00
                     OUTFLOW(cfs)   STORAGE(ac-ft)   ELEV(ft)
                          0.00            0.0          100.0
                          1.85            0.028        101.02
                          3.26            0.090        102.02
                          4.24            0.200        103.02
                          5.03            0.374        104.02
                          5.70            0.628        105.0
```

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

| TIME (HRS) | INFLOW DISCHARGE (CFS) | WATER ELEV (FT) | WATER VOLUME (A-F) | TOTAL OUTFLOW (CFS) |
|---|---|---|---|---|
| 0.0 | 0.0 | 100.0 | 0.0 | |

PEAK DISCHARGE = 5.56 CFS.
MAXIMUM WATER ELEVATION = 104.8 FT.
MAXIMUM RESERVOIR STORAGE = 0.58 ACRE-FT.
PRINT HYD ID=13 CODE=0

HYDROGRAPH NUMBER B7:PND:R

RUNOFF VOLUME = 0.955 ACRE-FT
PEAK DISCHARGE RATE = 5.6 CFS
PEAK OCCURRED AT 2.07 HRS.

POND B-8A/B-8-B

MAX WSEL= 46.25 HGL in= 41.00
GRT ELEV= 45.25 DELT WSEL= 0.25

LENGTH = 150
WIDTH = 150
@ DEPTH = 0.75

| ORIFICE DIAMETER | 0.6*A orif | H | - H grate | =HEAD | Q orif (MAX) | OUTFLOW | STORAGE | ELEVATION |
|---|---|---|---|---|---|---|---|---|
| 11 | 0.396 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.00 |
| 11 | 0.396 | 4.50 | 0.27 | 4.23 | 6.54 | 1.83 | 0.005 | 0.25 |
| 11 | 0.396 | 4.75 | 0.28 | 4.47 | 6.72 | 5.20 | 0.038 | 0.50 |
| 11 | 0.396 | 5.00 | 0.29 | 4.71 | 6.90 | 6.90 | 0.129 | 0.75 |
| 11 | 0.396 | 5.25 | 0.30 | 4.95 | 7.07 | 7.07 | 0.306 | 1.00 |

```
                    HYDROGRAPH NUMBER     B8A:B8B

     RUNOFF VOLUME =       0.554 ACRE-FT
     PEAK DISCHARGE RATE =        11.9 CFS
     PEAK OCCURRED AT  1.50 HRS.

**
** ROUTE FLOW THROUGH PARKING LOT POND 3' DEEP INLET
** 11" ORIFICE
ROUTE RESERVOIR      ID=6   HYD=B8:POND   INFLOW ID=4  CODE=00
                     OUTFLOW(cfs)    STORAGE(ac-ft)    ELEV(ft)
                          0.00             0.000        100.00
                          1.83             0.005        100.25
                          6.72             0.038        100.50
                          6.90             0.129        100.75
                          7.07             0.306        101.00

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

                 INFLOW      WATER      WATER      TOTAL
   TIME        DISCHARGE    ELEV       VOLUME     OUTFLOW
   (HRS)        (CFS)       (FT)       (A-F)      (CFS)

    0.0          0.0       100.0        0.0
PEAK DISCHARGE =       6.81 CFS.
MAXIMUM WATER ELEVATION =  100.6 FT.
MAXIMUM RESERVOIR STORAGE =     0.08 ACRE-FT.
    PRINT HYD            ID=6   CODE=0

                    HYDROGRAPH NUMBER     B8:POND

     RUNOFF VOLUME =       0.411 ACRE-FT
     PEAK DISCHARGE RATE =         6.8 CFS
     PEAK OCCURRED AT  1.65 HRS.
```

POND B-8-C

MAX WSEL= 43.25 HGL in= 40.01
GRT ELEV= 42.25 DELT WSEL= 0.25

LENGTH = 150
WIDTH = 150
@ DEPTH = 0.75

| ORIFICE DIAMETER | 0.6*A orif | H | - H grate | =HEAD | Q orif (MAX) | OUTFLOW | STORAGE | ELEVATION |
|---|---|---|---|---|---|---|---|---|
| 11.75 | 0.452 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.00 |
| 11.75 | 0.452 | 2.49 | 0.18 | 2.31 | 5.51 | 1.83 | 0.005 | 0.25 |
| 11.75 | 0.452 | 2.74 | 0.20 | 2.54 | 5.78 | 5.20 | 0.038 | 0.50 |
| 11.75 | 0.452 | 2.99 | 0.22 | 2.77 | 6.03 | 6.03 | 0.129 | 0.75 |
| 11.75 | 0.452 | 3.24 | 0.24 | 3.00 | 6.28 | 6.28 | 0.306 | 1.00 |

```
                    HYDROGRAPH NUMBER        B8C

     RUNOFF VOLUME =       0.566 ACRE-FT
     PEAK DISCHARGE RATE =        12.3 CFS
     PEAK OCCURRED AT  1.50 HRS.


**
** ROUTE FLOW THROUGH PARKING LOT POND 3' DEEP INLET
** 11.75" ORIFICE
ROUTE RESERVOIR      ID=10   HYD=B8C      INFLOW ID=9  CODE=00
                    OUTFLOW(cfs)    STORAGE(ac-ft)    ELEV(ft)
                         0.00             0.000        100.00
                         1.83             0.005        100.25
                         5.78             0.038        100.50
                         6.03             0.129        100.75
                         6.28             0.306        101.00


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


                INFLOW      WATER      WATER      TOTAL
   TIME       DISCHARGE    ELEV       VOLUME     OUTFLOW
   (HRS)        (CFS)      (FT)       (A-F)      (CFS)


     0.0          0.0      100.0       0.0
PEAK DISCHARGE =       5.98 CFS.
MAXIMUM WATER ELEVATION =  100.7 FT.
MAXIMUM RESERVOIR STORAGE =     0.11 ACRE-FT.
    PRINT HYD              ID=10   CODE=0

                    HYDROGRAPH NUMBER        B8C


     RUNOFF VOLUME =       0.425 ACRE-FT
     PEAK DISCHARGE RATE =         6.0 CFS
     PEAK OCCURRED AT  1.70 HRS.
```

| POND | B-9 | | MAX WSEL= | 42.50 | HGL in= | 40.06 | | LENGTH = | ---- |
|---|---|---|---|---|---|---|---|---|---|
| | | | GRT ELEV= | 37.50 | DELT WSEL= | 1.00 | | WIDTH = | ---- |
| | | | | | | | | @ DEPTH = | 5 |

| ORIFICE DIAMETER | 0.6*A orif | H | - H grate | =HEAD | Q orif (MAX) | OUTFLOW | STORAGE | ELEVATION |
|---|---|---|---|---|---|---|---|---|
| 7.5 | 0.184 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.00 |
| 7.5 | 0.184 | 0.00 | -0.41 | 0.41 | 0.95 | 0.95 | 0.012 | 1.00 |
| 7.5 | 0.184 | 0.00 | -0.42 | 0.42 | 0.96 | 0.96 | 0.025 | 2.00 |
| 7.5 | 0.184 | 0.44 | 0.01 | 0.43 | 0.97 | 0.97 | 0.097 | 3.00 |
| 7.5 | 0.184 | 1.44 | 0.02 | 1.42 | 1.76 | 1.76 | 0.197 | 4.00 |
| 7.5 | 0.184 | 2.44 | 0.03 | 2.41 | 2.29 | 2.29 | 0.308 | 5.00 |
| | | | | | | | * | |

* HAND ENTERED: DETERMINED IN PREVIOUS REPORT

```
                    HYDROGRAPH NUMBER          B9

      RUNOFF VOLUME =       0.443 ACRE-FT
      PEAK DISCHARGE RATE =         9.7 CFS
      PEAK OCCURRED AT  1.50 HRS.


**
** ROUTE FLOW THROUGH POND B9
** 7.5" ORIFICE
ROUTE RESERVOIR      ID=11   HYD=B9      INFLOW ID=7   CODE=00
                     OUTFLOW(cfs)    STORAGE(ac-ft)    ELEV(ft)
                          0.00             0.0          100.0
                          0.95             0.012        100.76
                          0.96             0.025        101.76
                          0.97             0.097        102.76
                          1.76             0.197        103.76
                          2.29             0.308        105.0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                INFLOW       WATER      WATER      TOTAL
  TIME        DISCHARGE     ELEV      VOLUME     OUTFLOW
  (HRS)        (CFS)        (FT)      (A-F)      (CFS)


    0.0          0.0       100.0       0.0
PEAK DISCHARGE =       1.86 CFS.
MAXIMUM WATER ELEVATION =  104.0 FT.
MAXIMUM RESERVOIR STORAGE =     0.22 ACRE-FT.
    PRINT HYD              ID=11   CODE=0

                    HYDROGRAPH NUMBER          B9


      RUNOFF VOLUME =       0.251 ACRE-FT
      PEAK DISCHARGE RATE =         1.9 CFS
      PEAK OCCURRED AT  2.05 HRS.
```

| POND | B-13 | | MAX WSEL= | 40.25 | HGL in= | 38.99 | | LENGTH = | 150 |
|---|---|---|---|---|---|---|---|---|---|
| | | | GRT ELEV= | 39.25 | DELT WSEL= | 0.25 | | WIDTH = | 150 |
| | | | | | | | | @ DEPTH = | 0.75 |

| ORIFICE DIAMETER | 0.6*A orif | H | - H grate | =HEAD | Q orif (MAX) | OUTFLOW | STORAGE | ELEVATION |
|---|---|---|---|---|---|---|---|---|
| 27 | 2.386 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.00 |
| 27 | 2.386 | 0.51 | 0.00 | 0.51 | 13.67 | 0.63 | 0.005 | 0.25 |
| 27 | 2.386 | 0.76 | 0.00 | 0.76 | 16.69 | 1.79 | 0.038 | 0.50 |
| 27 | 2.386 | 1.01 | 0.00 | 1.01 | 19.24 | 2.45 | 0.129 | 0.75 |
| 27 | 2.386 | 1.26 | 0.00 | 1.26 | 21.49 | 2.82 | 0.306 | 1.00 |

OUTFLOW CONTROLLED BY VENTED LID

```
                    HYDROGRAPH NUMBER        B13

      RUNOFF VOLUME =       0.366 ACRE-FT
      PEAK DISCHARGE RATE =         8.0 CFS
      PEAK OCCURRED AT  1.50 HRS.


**
** ROUTE FLOW THROUGH PARKING LOT POND VENTED LID INLET
**
ROUTE RESERVOIR    ID=1   HYD=B13      INFLOW ID=1   CODE=00
                   OUTFLOW(cfs)    STORAGE(ac-ft)    ELEV(ft)
                        0.00             0.000        100.00
                        0.63             0.005        100.25
                        1.79             0.038        100.50
                        2.45             0.129        100.75
                        2.82             0.306        101.00


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          INFLOW       WATER      WATER      TOTAL
  TIME    DISCHARGE    ELEV       VOLUME     OUTFLOW
  (HRS)    (CFS)       (FT)       (A-F)      (CFS)


    0.0        0.0      100.0        0.0
PEAK DISCHARGE =       2.45 CFS.
MAXIMUM WATER ELEVATION =  100.7 FT.
MAXIMUM RESERVOIR STORAGE =     0.13 ACRE-FT.
    PRINT HYD              ID=1   CODE=0

                    HYDROGRAPH NUMBER        B13


      RUNOFF VOLUME =       0.274 ACRE-FT
      PEAK DISCHARGE RATE =         2.4 CFS
      PEAK OCCURRED AT  1.85 HRS.
```

| POND | B-14 | | MAX WSEL= | 41.25 | HGL in= | 38.76 | | LENGTH = | 150 |
|---|---|---|---|---|---|---|---|---|---|
| | | | GRT ELEV= | 40.25 | DELT WSEL= | 0.25 | | WIDTH = | 150 |
| | | | | | | | | @ DEPTH = | 0.75 |

| ORIFICE DIAMETER | 0.6*A orif | H | - H grate | =HEAD | Q orif (MAX) | OUTFLOW | STORAGE | ELEVATION |
|---|---|---|---|---|---|---|---|---|
| 5.25 | 0.090 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.00 |
| 5.25 | 0.090 | 1.74 | 0.01 | 1.73 | 0.95 | 0.95 | 0.005 | 0.25 |
| 5.25 | 0.090 | 1.99 | 0.01 | 1.98 | 1.02 | 1.02 | 0.038 | 0.50 |
| 5.25 | 0.090 | 2.24 | 0.01 | 2.23 | 1.08 | 1.08 | 0.129 | 0.75 |
| 5.25 | 0.090 | 2.49 | 0.01 | 2.48 | 1.14 | 1.14 | 0.306 | 1.00 |

```
                    HYDROGRAPH NUMBER        B14

     RUNOFF VOLUME =       0.386 ACRE-FT
     PEAK DISCHARGE RATE =         8.6 CFS
     PEAK OCCURRED AT  1.50 HRS.

**
** ROUTE FLOW THROUGH PARKING LOT POND 3' DEEP INLET
** 5.25" ORIFICE
ROUTE RESERVOIR      ID=4   HYD=B14:POND     INFLOW ID=4  CODE=00
                     OUTFLOW(cfs)   STORAGE(ac-ft)   ELEV(ft)
                          0.00            0.000        100.00
                          0.95            0.005        100.25
                          1.02            0.038        100.50
                          1.08            0.129        100.75
                          1.14            0.306        101.00

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

                INFLOW      WATER      WATER      TOTAL
  TIME        DISCHARGE    ELEV      VOLUME     OUTFLOW
  (HRS)         (CFS)      (FT)      (A-F)      (CFS)

    0.0          0.0      100.0       0.0
PEAK DISCHARGE =       1.11 CFS.
MAXIMUM WATER ELEVATION =  100.9 FT.
MAXIMUM RESERVOIR STORAGE =     0.21 ACRE-FT.
    PRINT HYD              ID=4   CODE=0

                    HYDROGRAPH NUMBER    B14:POND

     RUNOFF VOLUME =       0.288 ACRE-FT
     PEAK DISCHARGE RATE =         1.1 CFS
     PEAK OCCURRED AT  2.15 HRS.
```

| POND | B-15 | | MAX WSEL= | 43.25 | HGL in= | 39.58 | | LENGTH = | 150 |
|---|---|---|---|---|---|---|---|---|---|
| | | | GRT ELEV= | 42.25 | DELT WSEL= | 0.25 | | WIDTH = | 150 |
| | | | | | | | | @ DEPTH = | 0.75 |

| ORIFICE DIAMETER | 0.6*A orif | H | - H grate | =HEAD | Q orif (MAX) | OUTFLOW | STORAGE | ELEVATION |
|---|---|---|---|---|---|---|---|---|
| 7.5 | 0.184 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.00 |
| 7.5 | 0.184 | 2.92 | 0.04 | 2.88 | 2.51 | 1.83 | 0.005 | 0.25 |
| 7.5 | 0.184 | 3.17 | 0.04 | 3.13 | 2.61 | 2.61 | 0.038 | 0.50 |
| 7.5 | 0.184 | 3.42 | 0.04 | 3.38 | 2.72 | 2.72 | 0.129 | 0.75 |
| 7.5 | 0.184 | 3.67 | 0.05 | 3.62 | 2.81 | 2.81 | 0.306 | 1.00 |

```
                    HYDROGRAPH NUMBER        B15


     RUNOFF VOLUME =       0.342 ACRE-FT
     PEAK DISCHARGE RATE =         7.5 CFS
     PEAK OCCURRED AT  1.50 HRS.


**
** ROUTE FLOW THROUGH PARKING LOT POND 3' DEEP INLET
** 7.5" ORIFICE
ROUTE RESERVOIR      ID=5   HYD=B15:POND      INFLOW ID=5  CODE=00
                   OUTFLOW(cfs)    STORAGE(ac-ft)    ELEV(ft)
                        0.00            0.000        100.00
                        1.83            0.007        100.25
                        2.61            0.057        100.50
                        2.72            0.194        100.75
                        2.81            0.306        101.00


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


                 INFLOW      WATER      WATER      TOTAL
   TIME        DISCHARGE    ELEV       VOLUME     OUTFLOW
   (HRS)        (CFS)       (FT)       (A-F)      (CFS)

    0.0          0.0       100.0        0.0
PEAK DISCHARGE =       2.64 CFS.
MAXIMUM WATER ELEVATION =  100.6 FT.
MAXIMUM RESERVOIR STORAGE =     0.10 ACRE-FT.
    PRINT HYD              ID=5   CODE=0

                    HYDROGRAPH NUMBER    B15:POND


     RUNOFF VOLUME =       0.264 ACRE-FT
     PEAK DISCHARGE RATE =         2.6 CFS
     PEAK OCCURRED AT  1.80 HRS.
```

| POND | B-22 | | MAX WSEL= | 45.00 | HGL in= | 43.04 | | LENGTH = | 60 |
|---|---|---|---|---|---|---|---|---|---|
| | DOCK | | GRT ELEV= | 42.00 | DELT WSEL= | 1.00 | | WIDTH = | 40 |
| | | | | | | | | @ DEPTH = | 3 |

| ORIFICE DIAMETER | 0.6*A orif | H | - H grate | =HEAD | Q orif (MAX) | OUTFLOW | STORAGE | ELEVATION |
|---|---|---|---|---|---|---|---|---|
| 15 | 0.736 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.00 |
| 15 | 0.736 | 0.50 | 0.09 | 0.41 | 3.78 | 3.78 | 0.003 | 1.00 |
| 15 | 0.736 | 0.96 | 0.17 | 0.79 | 5.25 | 5.25 | 0.024 | 2.00 |
| 15 | 0.736 | 1.96 | 0.35 | 1.61 | 7.50 | 7.50 | 0.083 | 3.00 |

```
                    HYDROGRAPH NUMBER   B22:DOCK

      RUNOFF VOLUME =       0.427 ACRE-FT
      PEAK DISCHARGE RATE =         9.2 CFS
      PEAK OCCURRED AT  1.50 HRS.


**
** ROUTE FLOW THROUGH DOCK POND
** 15" ORIFICE
ROUTE RESERVOIR      ID=4   HYD=B22:DOCK      INFLOW ID=3  CODE=00
                   OUTFLOW(cfs)    STORAGE(ac-ft)    ELEV(ft)
                        0.00            0.000          42.0
                        3.78            0.003          43.0
                        5.25            0.024          44.0
                        7.50            0.083          45.0


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


   TIME      INFLOW      WATER      WATER      TOTAL
  (HRS)    DISCHARGE     ELEV      VOLUME     OUTFLOW
            (CFS)       (FT)       (A-F)      (CFS)


    0.0        0.0       42.0       0.0
PEAK DISCHARGE =       6.17 CFS.
MAXIMUM WATER ELEVATION =   44.4 FT.
MAXIMUM RESERVOIR STORAGE =     0.05 ACRE-FT.
    PRINT HYD            ID=4   CODE=0

                    HYDROGRAPH NUMBER    B22:DOCK


      RUNOFF VOLUME =       0.314 ACRE-FT
      PEAK DISCHARGE RATE =         6.2 CFS
      PEAK OCCURRED AT  1.60 HRS.
```

****** POND B-26 CONTINUED ******

| TIME (HRS) | INFLOW DISCHARGE (CFS) | WATER ELEV (FT) | WATER VOLUME (A-F) | TOTAL OUTFLOW (CFS) |
|---|---|---|---|---|
| 0.0 | 0.0 | 29.2 | 0.0 | |
| 0.2 | 0.0 | 29.2 | 0.0 | 0.0 |
| 0.3 | 0.0 | 29.2 | 0.0 | 0.0 |
| 0.5 | 0.0 | 29.2 | 0.0 | 0.0 |
| 0.7 | 0.0 | 29.2 | 0.0 | 0.0 |
| 0.8 | 0.0 | 29.2 | 0.0 | 0.0 |
| 1.0 | 0.0 | 29.2 | 0.0 | 0.0 |
| 1.2 | 0.1 | 29.2 | 0.0 | 0.1 |
| 1.3 | 25.2 | 34.1 | 0.0 | 23.1 |
| 1.5 | 94.9 | 38.5 | 0.4 | 34.4 |
| 1.7 | 76.1 | 41.5 | 1.2 | 41.5 |
| 1.8 | 56.9 | 42.4 | 1.5 | 43.7 |
| 2.0 | 46.5 | 42.7 | 1.6 | 44.4 |
| 2.2 | 32.2 | 42.5 | 1.5 | 44.1 |
| 2.3 | 19.5 | 41.8 | 1.3 | 42.3 |
| 2.5 | 13.0 | 40.7 | 0.9 | 39.6 |
| 2.7 | 9.2 | 39.1 | 0.6 | 36.0 |
| 2.8 | 8.1 | 37.1 | 0.2 | 31.0 |
| 3.0 | 7.1 | 30.4 | 0.0 | 6.0 |
| 3.2 | 5.9 | 30.5 | 0.0 | 6.5 |
| 3.3 | 4.1 | 30.0 | 0.0 | 3.9 |
| 3.5 | 2.8 | 29.8 | 0.0 | 2.9 |
| 3.7 | 1.6 | 29.5 | 0.0 | 1.6 |

PEAK DISCHARGE = 44.45 CFS.
MAXIMUM WATER ELEVATION = 42.7 FT.
MAXIMUM RESERVOIR STORAGE = 1.58 ACRE-FT.
PRINT HYD ID=20 CODE=0

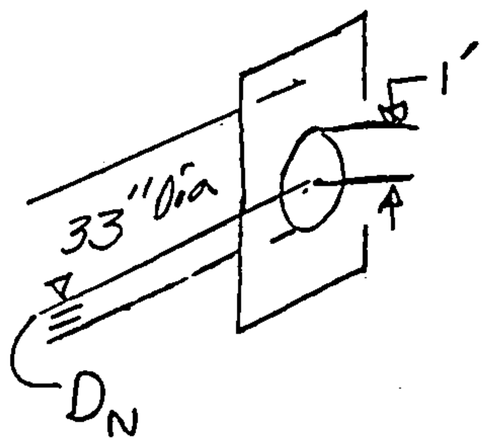
HYDROGRAPH NUMBER B26:POND

RUNOFF VOLUME = 5.529 ACRE-FT
PEAK DISCHARGE RATE = 44.4 CFS
PEAK OCCURRED AT 2.03 HRS.

# Backflow Pond: Basin B-26

Determine flow when Plate 1st becomes sealed

Assume 24"ϕ Orifice Plate




$$Q = .6\,\pi(1)^2\sqrt{64.4(1')} = 15.1\text{ cfs}$$

Preliminary Hydrology shows that

$$Q_{84''\,peak} = 164 \approx 4(44) = 4Q_{33''\,peak}$$

$$\therefore D_{N_{84''}} = 2.67'$$
$Q = 60$ cfs

MH12A Inv 33" — MH12 Inv 84"

$$D_{Flow_{33''}} = 2.67' - (29.18 - 28.32)$$
$Q = 15$ cfs
$$= 1.8'$$

$\therefore$ Water Surface required to achieve

$$1'\text{ Head} = 1.8' + 1.0' + 29.18$$

Head — Inv 33'

$$= 32.0'$$

Determine flow when 33" pipe becomes sealed

$$D_{N_{84''}} = 33'' + (29.18 - 28.32) = 43''$$

$$Q_{84''} = 105\text{ cfs} \qquad Q_{33''} = \tfrac{1}{4}\,105\text{ cfs} = 26.3\text{ cfs}$$

Head required to push 26.3 cfs

$$Q = .6\,\pi(1)^2\sqrt{64.4(H)} = 26.3\text{ cfs}$$
$$H = 3.02'$$

$$\therefore WSEL = 34.95' = 3.02' + \frac{33''}{12} + 29.18$$

BOHANNAN-HUSTON INC.

PROJECT NAME Cottonwood Mall SHEET _____ OF A2-34

PROJECT NO. 90316.83 BY MSJ DATE 6/94

SUBJECT _____ CH'D _____ DATE _____

# Back Flow Pond: Basin B-26

Determine Peak flow from pond assuming WSEL = 43.1 and HGL dn is calculated at peak flow in pipe

$HGL_{dn} = 36.0$ ⇒ (see HGL spreadsheet).

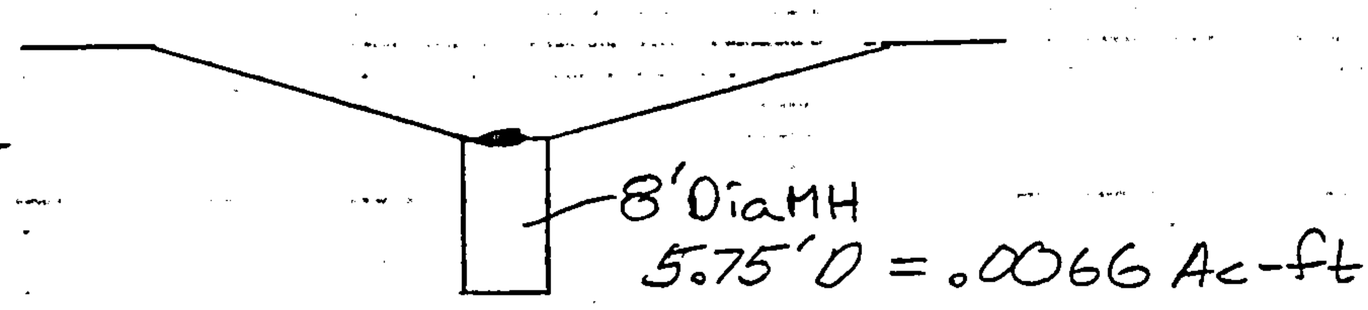
$$Q = .6(\pi)\left(\frac{25.5''}{24''}\right)^2\sqrt{64.4(43.1-36.0)} = 45.4\text{ cfs}$$

After some Preliminary design calcs it was determined that the orifice plate needed to be 25.5"$\phi$ and remaining calc's use this #.

All other Flows have been calculated linearly between 26.3 cfs and 45.4 cfs

Volumes between ELEV = 29.2 and ELEV = 34.95 are based on 8' Dia MH $\frac{(1'\text{ Deep}) \times \pi (8/2)^2}{(43560\ \text{sqft/Ac})} = .00115\ \text{Ac-ft/ft}$

∴ Pond Volumes = Previously Calc'd Values + .0066 Ac-ft




BOHANNAN-HUSTON INC.

PROJECT NAME Cottonwood Mall SHEET ____ OF AZ-35

PROJECT NO. 90316.83 BY MSJ DATE 6/94

SUBJECT ____ CH'D ____ DATE ____

84"RCP -- SLOPE=0.1%

CULVERT RATING TABLE

84. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 2.00 SLOPE = 0.00100

| FLOW DEPTH (IN) | FLOW AREA (SQ FT) | DISCHARGE (CFS) | VELOCITY (FPS) |
|---|---|---|---|
| 2.00000 | 0.23829 | 0.19759 | 0.82919 |
| 4.00000 | 0.66910 | 0.87407 | 1.30633 |
| 6.00000 | 1.22013 | 2.07252 | 1.69861 |
| 8.00000 | 1.86437 | 3.80635 | 2.04163 |
| 10.00000 | 2.58559 | 6.07672 | 2.35023 |
| 12.00000 | 3.37238 | 8.87763 | 2.63245 |
| 14.00000 | 4.21600 | 12.19804 | 2.89327 |
| 16.00000 | 5.10941 | 16.02323 | 3.13603 |
| 18.00000 | 6.04667 | 20.33548 | 3.36309 |
| 20.00000 | 7.02266 | 25.11465 | 3.57623 |
| 22.00000 | 8.03285 | 30.33854 | 3.77681 |
| 24.00000 | 9.07316 | 35.98304 | 3.96588 |
| 26.00000 | 10.13984 | 42.02246 | 4.14429 |
| 28.00000 | 11.22943 | 48.42957 | 4.31274 |
| 30.00000 | 12.33868 | 55.17576 | 4.47177 |
| 32.00000 | 13.46450 | 62.23108 | 4.62186 |
| 34.00000 | 14.60395 | 69.56429 | 4.76339 |
| 36.00000 | 15.75418 | 77.14294 | 4.89666 |
| 38.00000 | 16.91244 | 84.93329 | 5.02194 |
| 40.00000 | 18.07602 | 92.90043 | 5.13943 |
| 42.00000 | 19.24224 | 101.00813 | 5.24929 |
| 44.00000 | 20.40847 | 109.21883 | 5.35164 |
| 46.00000 | 21.57204 | 117.49366 | 5.44657 |
| 48.00000 | 22.73030 | 125.79224 | 5.53412 |
| 50.00000 | 23.88053 | 134.07257 | 5.61430 |
| 52.00000 | 25.01998 | 142.29097 | 5.68709 |
| 54.00000 | 26.14580 | 150.40170 | 5.75242 |
| 56.00000 | 27.25504 | 158.35677 | 5.81018 |
| 58.00000 | 28.34463 | 166.10571 | 5.86022 |
| 60.00000 | 29.41131 | 173.59471 | 5.90231 |
| 62.00000 | 30.45162 | 180.76646 | 5.93619 |
| 64.00000 | 31.46181 | 187.55875 | 5.96147 |
| 66.00000 | 32.43781 | 193.90344 | 5.97770 |
| 68.00000 | 33.37506 | 199.72458 | 5.98425 |
| 70.00000 | 34.26847 | 204.93535 | 5.98029 |
| 72.00000 | 35.11209 | 209.43343 | 5.96471 |
| 74.00000 | 35.89888 | 213.09303 | 5.93592 |
| 76.00000 | 36.62010 | 215.74968 | 5.89156 |
| 78.00000 | 37.26435 | 217.16789 | 5.82777 |
| 80.00000 | 37.81537 | 216.95769 | 5.73729 |
| 82.00000 | 38.24619 | 214.26642 | 5.60229 |
| 84.00000 | 38.48450 | 202.01634 | 5.24929 |

@ $D_N = 2.67'$

$Q \simeq 60$ cfs

AZ-36

HYDROGRAPH NUMBER B26

RUNOFF VOLUME = 0.116 ACRE-FT
PEAK DISCHARGE RATE = 2.5 CFS
PEAK OCCURRED AT 1.50 HRS.

```
**
** ADD FLOW FROM PREVIOUS BASINS
ADD HYD          ID=19    HYD=POND    ID  I=17  ID  II=18
PRINT HYD        ID=19    CODE=5
```

HYDROGRAPH NUMBER POND

RUNOFF VOLUME = 5.527 ACRE-FT
PEAK DISCHARGE RATE = 105.0 CFS
① PEAK OCCURRED AT 1.53 HRS.

Since the Hydrograph peaks at approx. 1.5 hrs, determine the maximum flow out of Pond B-26 at this time (see ②)

```
**
** ROUTE FLOW THROUGH POND B26
** 25.50" ORIFICE
ROUTE RESERVOIR     ID=20   HYD=B26:POND     INFLOW ID=19  CODE=00
```

| OUTFLOW(cfs) | STORAGE(ac-ft) | ELEV(ft) |
|---|---|---|
| 0.0 | 0.0 | 29.2 |
| 4.9 | 0.0011 | 30.2 |
| 15.1 | 0.0021 | 32.0 |
| 26.3 | 0.0066 | 34.95 |
| 28.7 | 0.096 | 36.10 |
| 31.1 | 0.212 | 37.10 |
| 33.5 | 0.359 | 38.10 |
| ③ 35.9 | 0.542 | 39.10 |
| 38.2 | 0.765 | 40.10 |
| 40.6 | 1.034 | 41.10 |
| 43.0 | 1.353 | 42.10 |
| 45.4 | 1.726 | 43.10 |

@Q=35

WSEL = 38.73

This WSEL becomes the new HGLup and it has been assumed that HGL = EGL (standing water in pond). A new HGL begins at this point.

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

| TIME (HRS) | INFLOW DISCHARGE (CFS) | WATER ELEV (FT) | WATER VOLUME (A-F) | TOTAL OUTFLOW (CFS) |
|---|---|---|---|---|
| 0.0 | 0.0 | 29.2 | 0.0 | |

PEAK DISCHARGE = 45.18 CFS.
MAXIMUM WATER ELEVATION = 43.0 FT.
MAXIMUM RESERVOIR STORAGE = 1.69 ACRE-FT.

| | | | |
|---|---|---|---|
| * | 45.3 | 2.183 | 109.00 |
| * | 46.9 | 2.877 | 110.00 |

PRINT HYD ID=20 CODE=5

HYDROGRAPH NUMBER B26:POND

| TIME HRS | FLOW CFS | TIME HRS | FLOW CFS | TIME HRS | FLOW CFS |
|---|---|---|---|---|---|
| 0.000 | 0. | 1.333 | 24. | 2.667 | 37. |
| 0.167 | 0. | 1.500 | 35. | 2.833 | 31. |
| 0.333 | 0. | 1.667 | 42. | 3.000 | 2. |
| 0.500 | 0. | 1.833 | 44. | 3.167 | 5. |
| 0.667 | 0. | 2.000 | 45. | 3.333 | 2. |
| 0.833 | 0. | 2.167 | 45. | 3.500 | 2. |
| 1.000 | 0. | 2.333 | 43. | | |

@1.5

Q=35cfs

② From this flow is determined Pond WSEL at the cross section in time for which HGL has been calculated (see ③)

# POND D-1 - WARD TBA

## VOLUME COMPARISON

### ORIGINAL CONDITION

BASINS B-10 & D-1 FLOWING INTO 7-BAR LOOP RD, TOTAL = 2.33 AC

B-10 = 0.76 AC, PAVED = 0.47 AC
LANDSCAPED = 0.29 AC

D-1 = 1.57 AC, PAVED = 1.47 AC
LANDSCAPED = 0.10 AC

$$CN = \frac{(98)(.47+1.47)+(61)(.29+.10)}{2.33} = 91.8$$

$$S = 0.89, \quad q = \frac{((2.2-.2(.89))^2}{2.2+.8(.89)} = 1.40''$$

$$V = qA = (1.40)(2.33) = 3.27 \text{ IN-AC} = \boxed{11,861 \text{ ft}^3}$$

$Q_{TOTAL}$ = 9.7 cfs

### PROPOSED CONDITION

BASIN D-1 INTO POND, D-2 & D-3 INTO 7-BAR LOOP ROAD, TOTAL = 2.84 AC

D-1 = 1.85 AC, PAVED = 1.63
Q = 7.7 cfs, $Q_{PONDED}$ = 4.1 cfs L/SCP = 0.22

D-2 = 0.68 AC, PAVED = 0.45
Q = 2.5 cfs L/SCP = 0.23

TOTAL PAVED = 2.26 AC
TOTAL L/SCP = 0.58 AC

D-3 = 0.31 AC, PAVED = 0.17
Q = 0.9 cfs L/SCP = 0.14

$$CN = \frac{(98)(2.26)+(61)(0.58)}{2.84} = 90.44$$

$$S = 1.06 \rightarrow q = \frac{((2.2-0.2(1.06))^2}{2.2+0.8(1.06)} = 1.30$$

$$V = qA = (1.30)(2.84) = 3.69 \text{ IN-AC} = 13,388 \text{ ft}^3 \text{ - WITHOUT POND}$$

$V_{PONDED}$ = 2,126 ft³, 13,388 − 2,126 = 11,262 ft³ - WITH POND

$Q_{TOTAL\ PONDED}$ = 7.5 cfs

BOHANNAN-HUSTON INC.

AZ-38

PROJECT NAME COTTONWOOD MALL SHEET 8 OF 10
PROJECT NO. 9013505 BY D.F. DATE 4/13/92
SUBJECT DRAINAGE - PONDS CH'D DATE

# POND D-1 HYDROGRAPH

- OFF SITE BASIN

- INFLOW BASIN: D-1, Q = 7.6 cfs
  OUTFLOW = 4" ϕ DRAIN &
  12" SIDEWALK CULVERT

BASIN AREA = 1.85 AC
PAVED = 1.63 AC
L/SCAPED = 0.22 AC

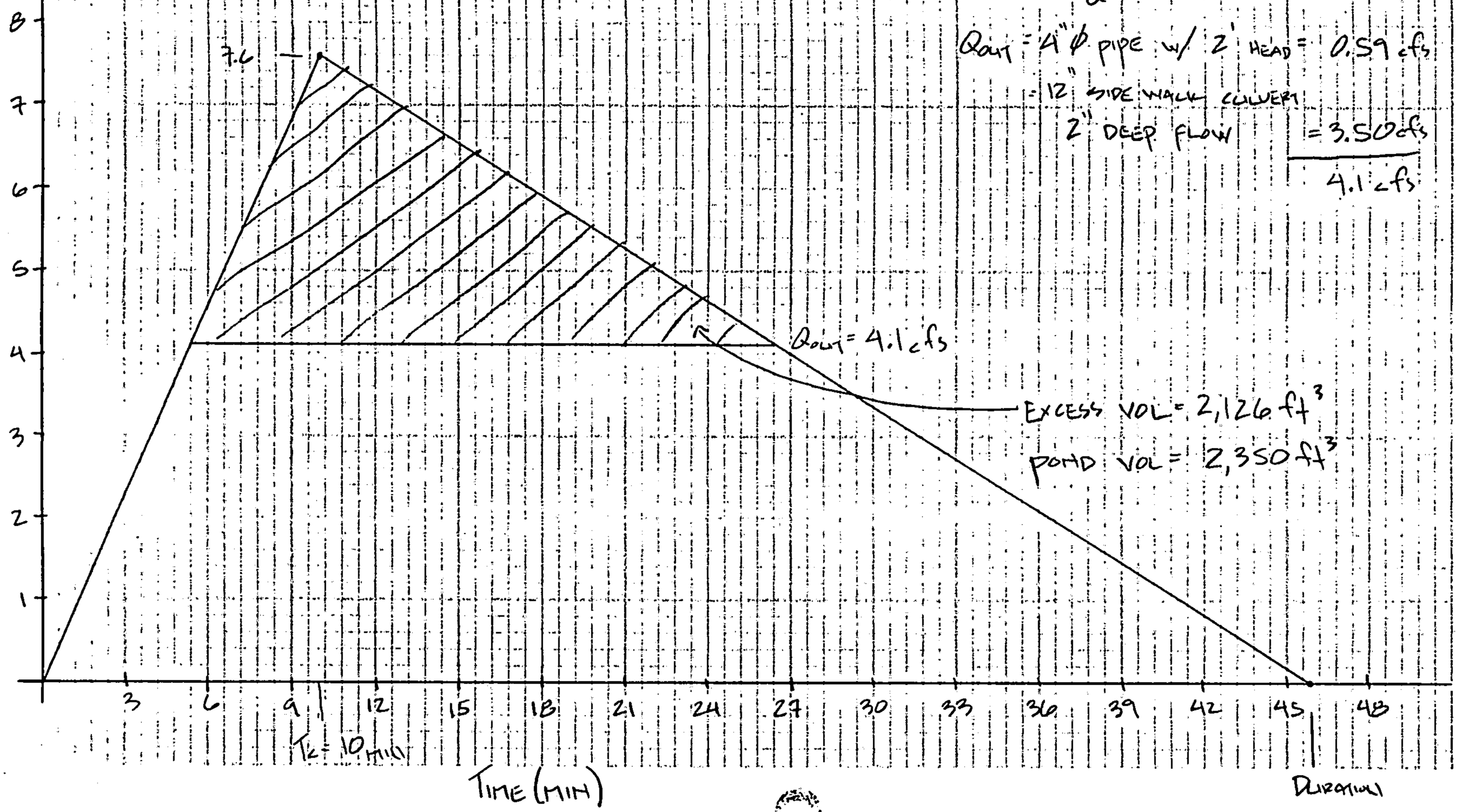
$$CN = \frac{(98)(1.63)+(61)(0.22)}{1.85} = 93.6$$

$$S = 0.68, \quad q = \frac{(2.2-.2(S))^2}{(2.2+.8(S))} = 1.55$$

$$V = qA = (1.55)(1.85) = 10{,}407 \text{ ft}^3$$

$$D = \frac{2V}{Q} = \frac{2(10{,}407)}{7.6} = 45.6 \text{ MIN}$$

$Q_{OUT}$ = 4" ϕ PIPE w/ 2' HEAD = 0.59 cfs
= 12" SIDEWALK CULVERT
2" DEEP FLOW = 3.50 cfs
4.1 cfs

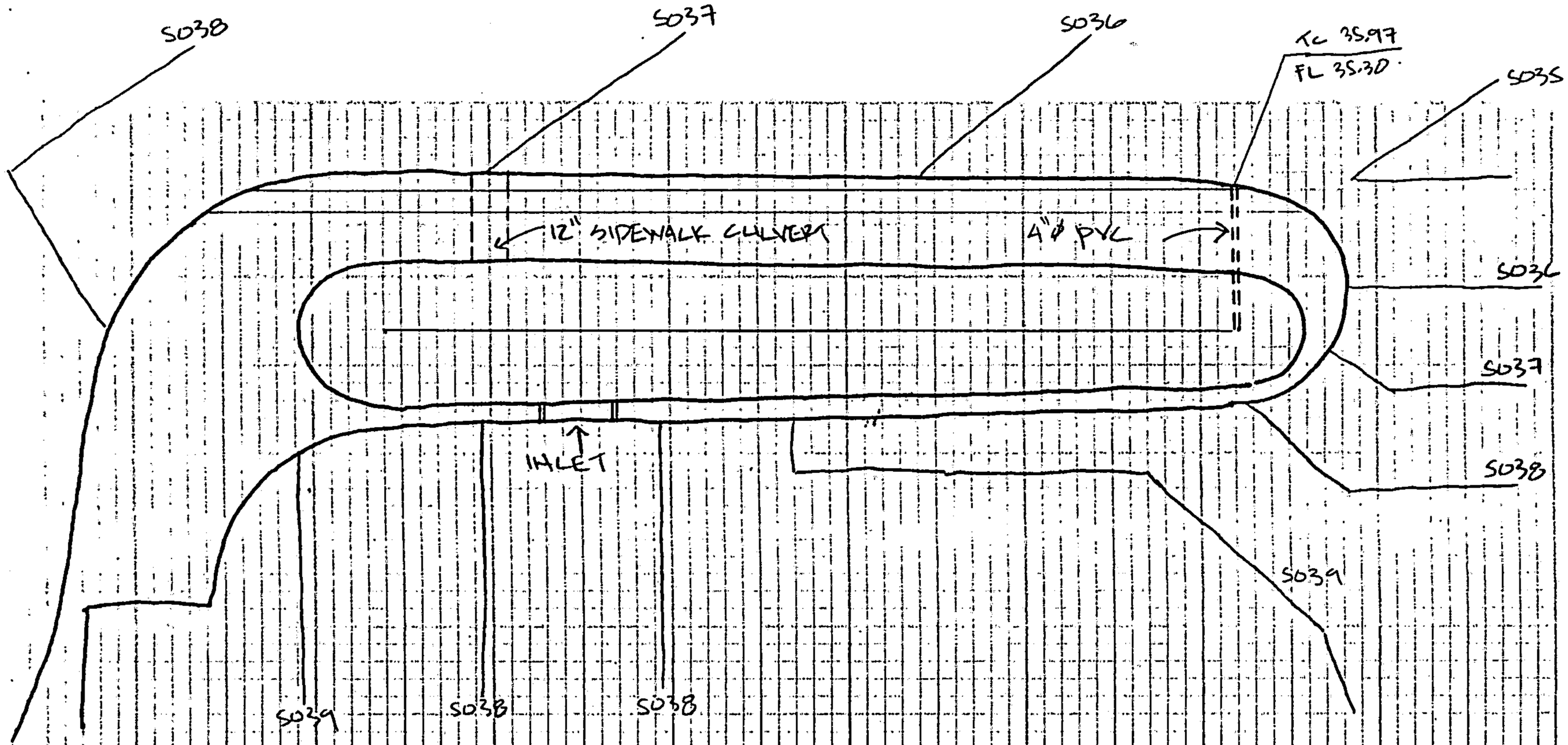



BOHANNAN-HUSTON INC.

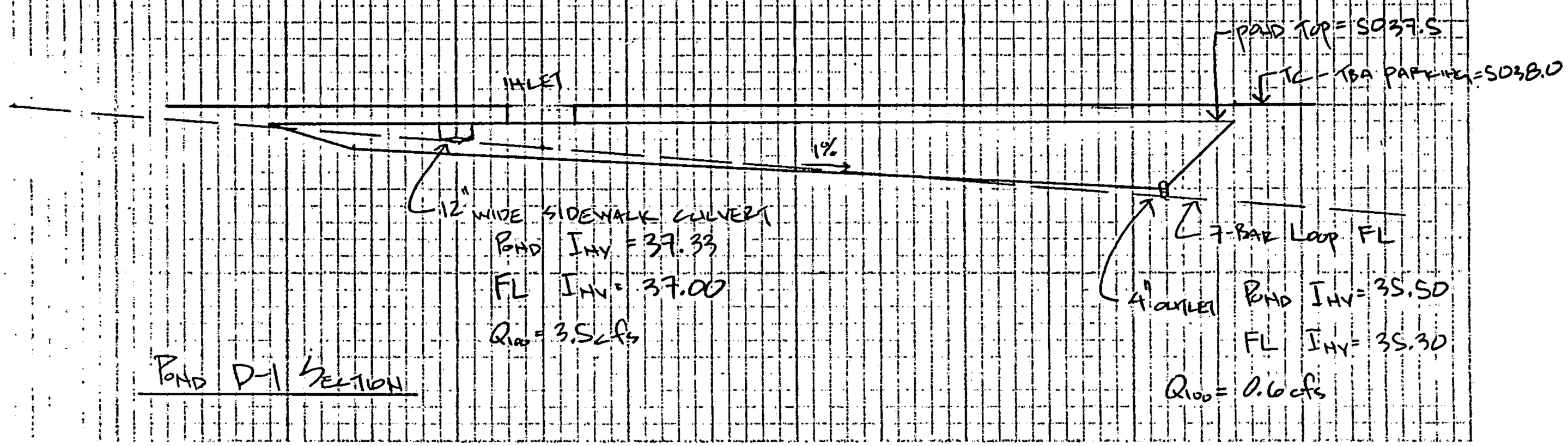
A2-39

PROJECT NAME Cottonwood Mall
PROJECT NO. 1013505
SUBJECT Drainage - Ponds

SHEET 9 OF 10
BY DF DATE 4/13/92
CH'D DATE




POND D-1 PLAN - WARD TBA




POND D-1 SECTION

BOHANNAN-HUSTON INC.

A2-40

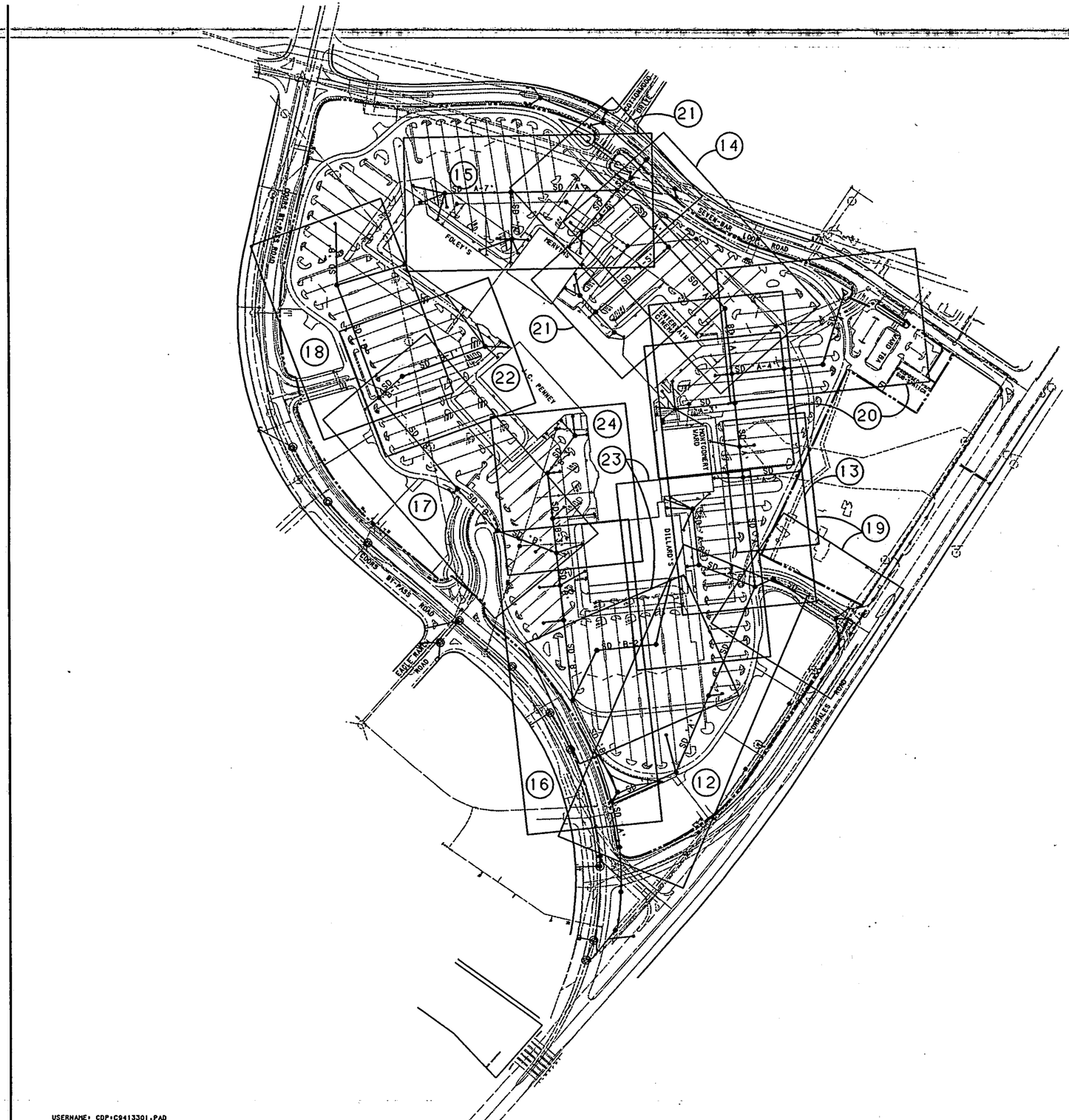
PROJECT NAME Cottonwood Mall SHEET 10 OF 10

PROJECT NO. 9013505 BY D.F. DATE 4/13/92

SUBJECT Drainage - Ponds CH'D DATE

# HGL COMPUTATIONS

STORM DRAIN LAYOUT . . . . . A2-42
STORM DRAIN PLANS & PROFILES W/HGL INFORMATION . . . . . A2-43
HGL SPREADSHEET . . . . . A2-57
NORMAL DEPTH CALCULATIONS . . . . . A2-60




## LEGEND

- PROJECT BOUNDARY
- EXISTING SANITARY SEWER LINE
- EXISTING SANITARY SEWER MANHOLE
- EXISTING WATER LINE
- EXISTING GATE VALVE
- EXISTING FIRE HYDRANT
- EXISTING WATER METER
- EXISTING STORM DRAIN LINE
- EXISTING STORM DRAIN MANHOLE
- EXISTING STORM DRAIN INLET
- PROPOSED SANITARY SEWER LINE
- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED WATER LINE
- PROPOSED GATE VALVE
- PROPOSED FIRE HYDRANT
- PROPOSED FIRELINE
- PROPOSED WATER METER
- PROPOSED STORM DRAIN LINE
- PROPOSED STORM DRAIN MANHOLE
- PROPOSED STORM DRAIN INLET
- FUTURE STORM DRAIN LINE
- FUTURE STORM DRAIN INLET
- (10) SHEET NUMBER

N

200 100 0 200

SCALE: 1" = 200'

USERNAME: CDP:C9413301.PAD
FILENAME: SDLAYOUT.CRF

BHI JOB NO. 90316.83

AS BUILT INFORMA

CONTRACTOR

WORK STAKED BY
STAKING CHECKED BY
ACCEPTANCE BY
FIELD VERIFICATION BY
DRAWINGS CORRECTED BY

MICRO-FILM INFORM

RECORDED BY
NO.

BENCH MARKS

THE BENCHMARK IS THE ACS STATION 1-B-13. ELEVATION 5045.088. THE BRASS TABLET IS SET IN THE TOP OF A CONCRETE POST LOCATED 170 FT. SOUTHWEST OF THE JUNCTION OF COORS RD. N.W. AND IRVING BLVD. N.W.

SURVEY INFORMATION

FIELD NOTES

| NO. | BY | DATE |
|---|---|---|
| | | |

ENGINEERS SEAL

REVISIONS

| NO. | DATE | REMARKS | BY |
|---|---|---|---|
| | | | |

DESIGN

DESIGNED BY KLD.MSJ DATE 6/94
DRAWN BY TSG.SAR DATE 6/94


7500 JEFFERSON NE. COURTYARD I
ALBUQUERQUE, NM 87109
(505) 823-1000

BOHANNAN HUSTON INC.

EASTERLING & ASSOCIATES, INC.
CONSULTING ENGINEERS
5843 PARADISE BLVD. N.W. ALBQ., N.M., 87114
OFFICE (505) 898-8021 FAX (505) 898-8501


CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

TITLE: MALL SITE IMPROVEMENTS
SAD 223 - PART 2
STORM DRAIN LAYOUT SHEET

| APPROVALS | ENGINEER | DATE | APPROVALS | ENGINEER | DATE |
|---|---|---|---|---|---|
| D.R.C. Chair | | | WATER | | |
| TRANS. DEV. | | | WASTE WATER | | |
| HYDROLOGY | | | NMUI | | |
| PARKS | | | CODE / MECH | | |

PROJECT NO. 4193.92 | MAP NO. A13&14 B13&14 | SHEET 4 OF 30

A2-42

7/27

USERNAME: CDP+EC9413301.PNP3
FILENAME: SD-PNP2.GRF

SCALE: 1" = 50' (HORIZ.)
1" = 5' (VERT.)

BHI JOB NO. 90316.83

AS BUILT INFORM

| | | |
|---|---|---|
| CONTRACTOR | | |
| WORK STAKED BY | | |
| INSPECTOR'S ACCEPTANCE BY | | |
| FIELD VERIFICATION BY | | |
| DRAWINGS CORRECTED BY | | |

MICRO-FILM INFOR

BENCH MARKS

THE BENCHMARK IS THE ACS STATION 1-B-13. ELEVATION 5045.088. THE BRASS TABLET IS SET IN THE TOP OF A CONCRETE POST LOCATED 170 FT. SOUTHWEST OF THE JUNCTION OF COORS RD. N.W. AND IRVING BLVD. N.W.

SURVEY INFORMATION

FIELD NOTES

| NO. | BY | DATE |
|---|---|---|
| | | |

ENGINEERS SEAL

REVISIONS

| NO. | DATE | REMARKS | BY |
|---|---|---|---|
| | | | |

DESIGN


7500 JEFFERSON NE. COURTYARD I
ALBUQUERQUE, NM 87109
(505) 823-1000
ROMAHN HUSTON INC.

EASTERLING & ASSOCIATES, INC.
CONSULTING ENGINEERS
5643 PARADISE BLVD. N.W. ALBQ., N.M., 87114
OFFICE (505) 898-8021 FAX (505) 898-8501

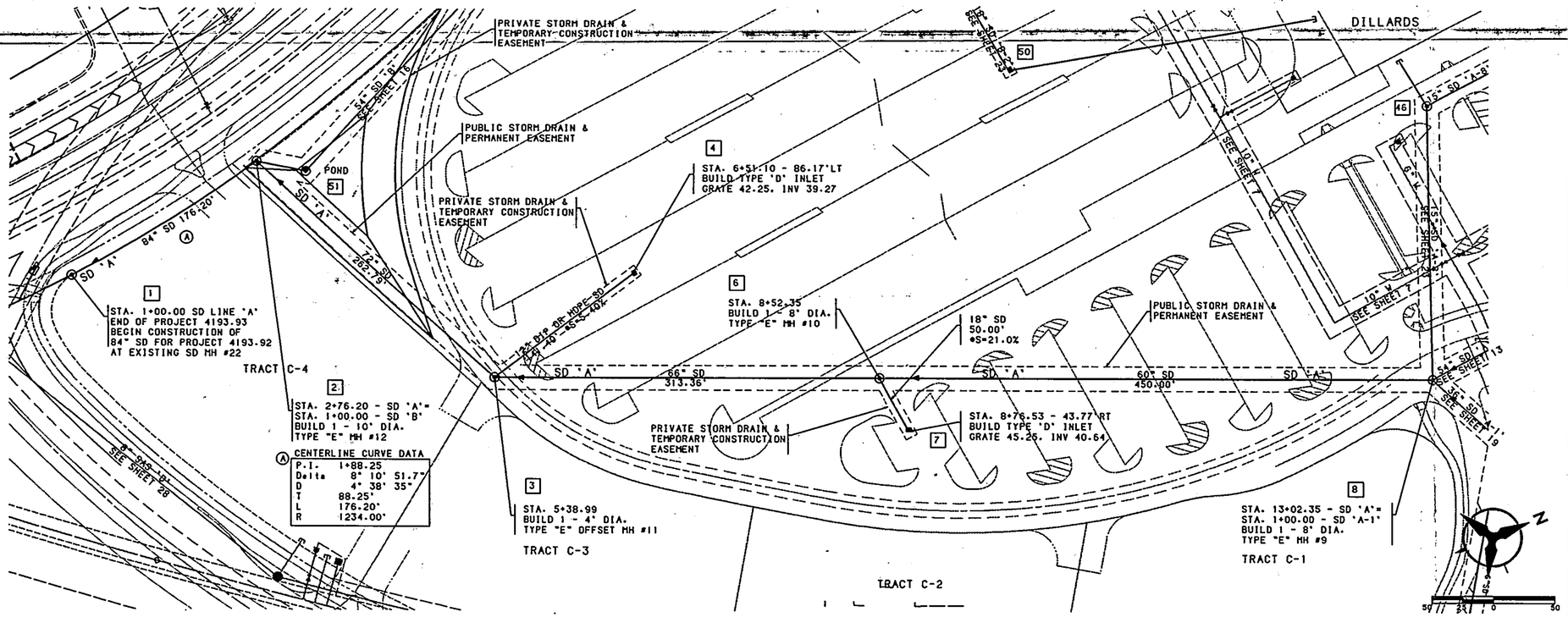

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

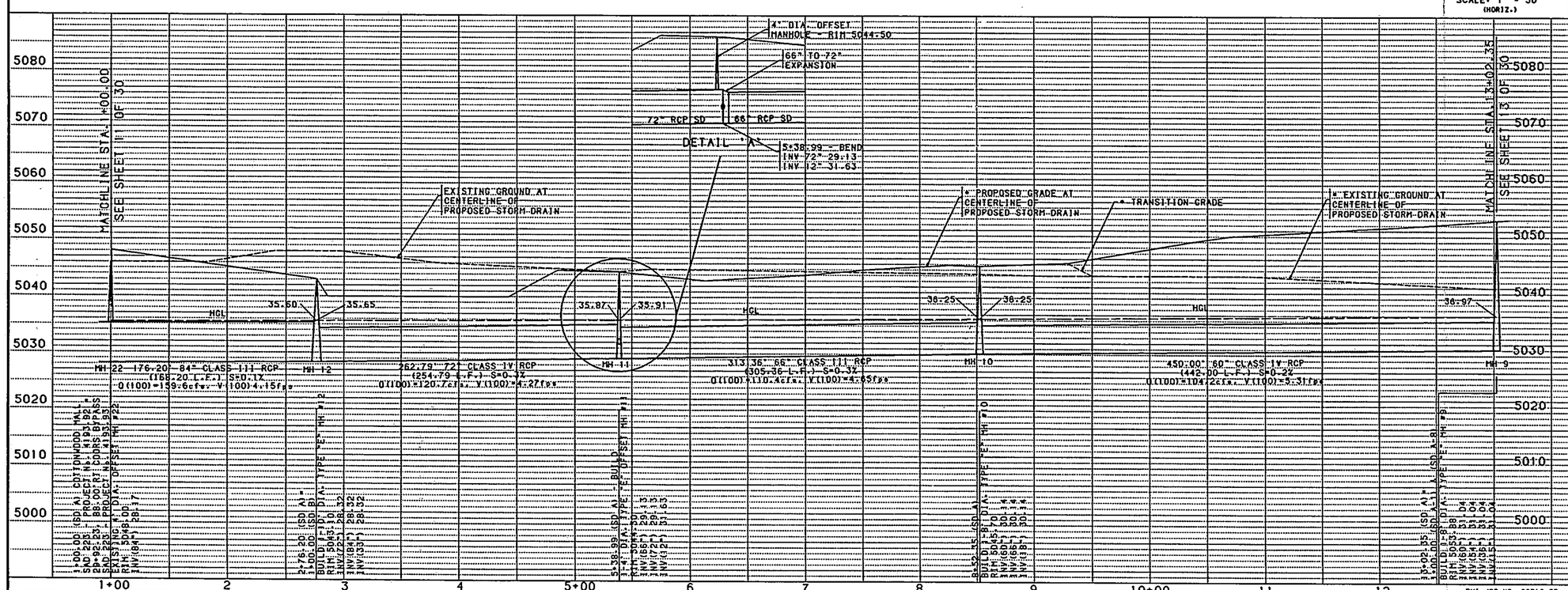
TITLE: MALL SITE IMPROVEMENTS
SAD 223 - PART 2
EXISTING STORM DRAIN CONDITIONS

| APPROVALS | ENGINEER | DATE | APPROVALS | ENGINEER |
|---|---|---|---|---|
| D.R.C. Chair | | | WATER | |
| TRANS. DEV. | | | WASTE WATER | |
| HYDROLOGY | | | NMUI | |
| PARKS | | | CODE/MECH | |

| PROJECT NO. | 4193.92 | MAP NO. A13&14 B13&14 | SHEET 11 | 0 |
|---|---|---|---|---|

A2-43




| COORDINATE DATA | | | |
|---|---|---|---|
| POINT | EASTING | NORTHING | DESCRIPTION |
| 1 | 78758.30 | 25839.63 | MANHOLE |
| 2 | 78728.86 | 26013.20 | MANHOLE |
| 3 | 78968.12 | 26121.90 | MANHOLE |
| 4 | 78932.39 | 26258.71 | 'D' INLET |
| 6 | 79090.11 | 26410.54 | MANHOLE |
| 7 | 79139.84 | 26415.76 | 'D' INLET |
| 8 | 79265.30 | 26825.04 | MANHOLE |
| 46 | 79055.17 | 26908.55 | MANHOLE |
| 50 | 78895.80 | 26606.79 | 'D' INLET |
| 51 | 78752.17 | 26047.18 | MANHOLE |

* SURFACE GRADE AT TIME OF PIPE INSTALLATION

AS BUILT INFORMATION

| | | | |
|---|---|---|---|
| CONTRACTOR | | | |
| WORK STAKED BY | | | |
| INSPECTOR'S ACCEPTANCE BY | | | |
| FIELD VERIFICATION BY | | | |
| DRAWINGS CORRECTED BY | | | |
| HYCRO-FILM INFORM | | | |
| RECORDED BY | | | |
| NO. | | | |

BENCH MARKS

THE BENCHMARK IS THE ACS STATION 1-B-13. ELEVATION 5045.088. THE BRASS TABLET IS SET IN THE TOP OF A CONCRETE POST LOCATED 170 FT. SOUTHWEST OF THE JUNCTION OF COORS RD. N.W. AND IRVING BLVD. N.W.

SURVEY INFORMATION

FIELD NOTES

| NO. | BY | DATE |
|---|---|---|
| | | |

ENGINEERS SEAL

REVISIONS

| NO. | DATE | REMARKS | BY |
|---|---|---|---|
| | | | |

DESIGNED BY KLD.MSJ DESIGN DATE 6/94
DRAWN BY TSG.SAR DATE 6/94


7500 JEFFERSON NE. COURTYARD I
ALBUQUERQUE, NM 87109
(505) 823-1000
ROMANIAK HUSTON INC.

EASTERLING & ASSOCIATES, INC.
CONSULTING ENGINEERS
5643 PARADISE BLVD. N.W. ALBQ., N.M., 87114
OFFICE (505) 898-8021 FAX (505) 898-8501


CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

TITLE: MALL SITE IMPROVEMENTS
SAD 223 - PART 2
STORM DRAIN 'A' 1+00.00 TO 13+02.35

| APPROVALS | ENGINEER | DATE | APPROVALS | ENGINEER | DATE |
|---|---|---|---|---|---|
| D.R.C. Chair | | | WATER | | |
| TRANS. DEV. | | | WASTE WATER | | |
| HYDROLOGY | | | NMUI | | |
| PARKS | | | CODE / MECH | | |

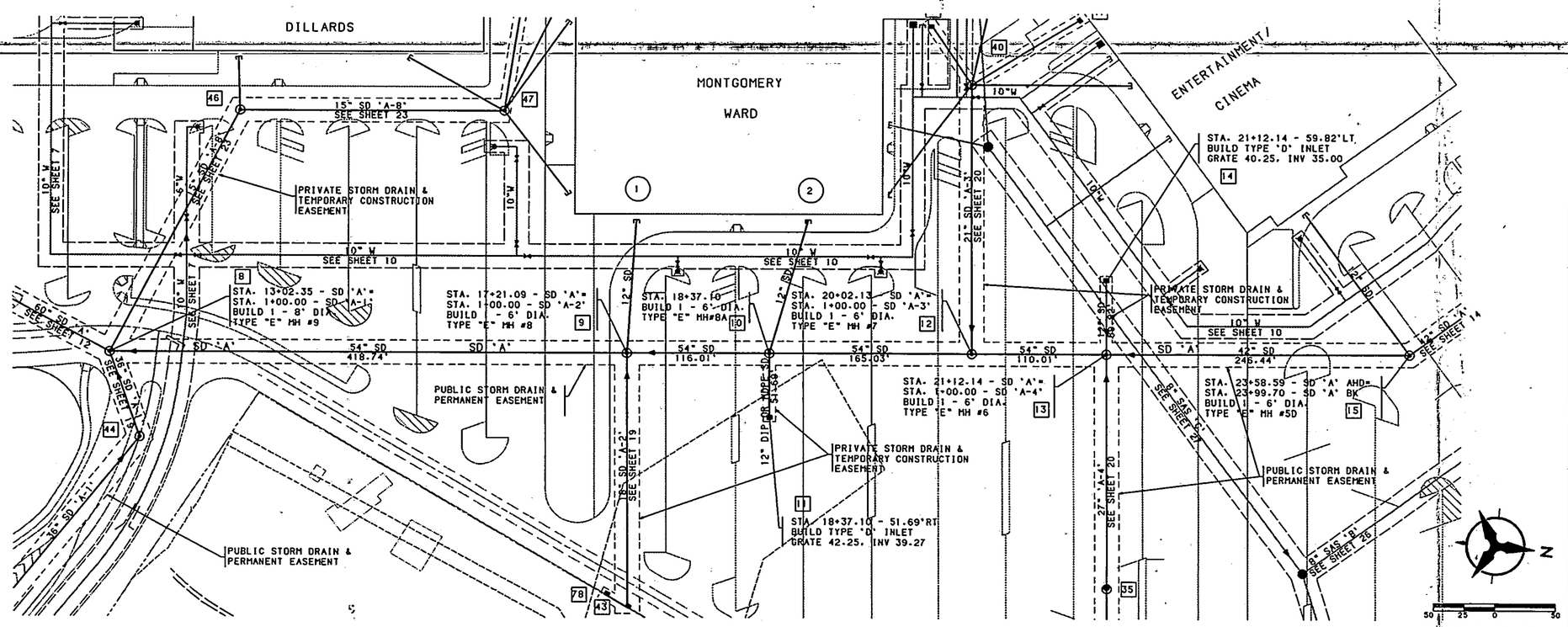
BHI JOB NO. 90316.03

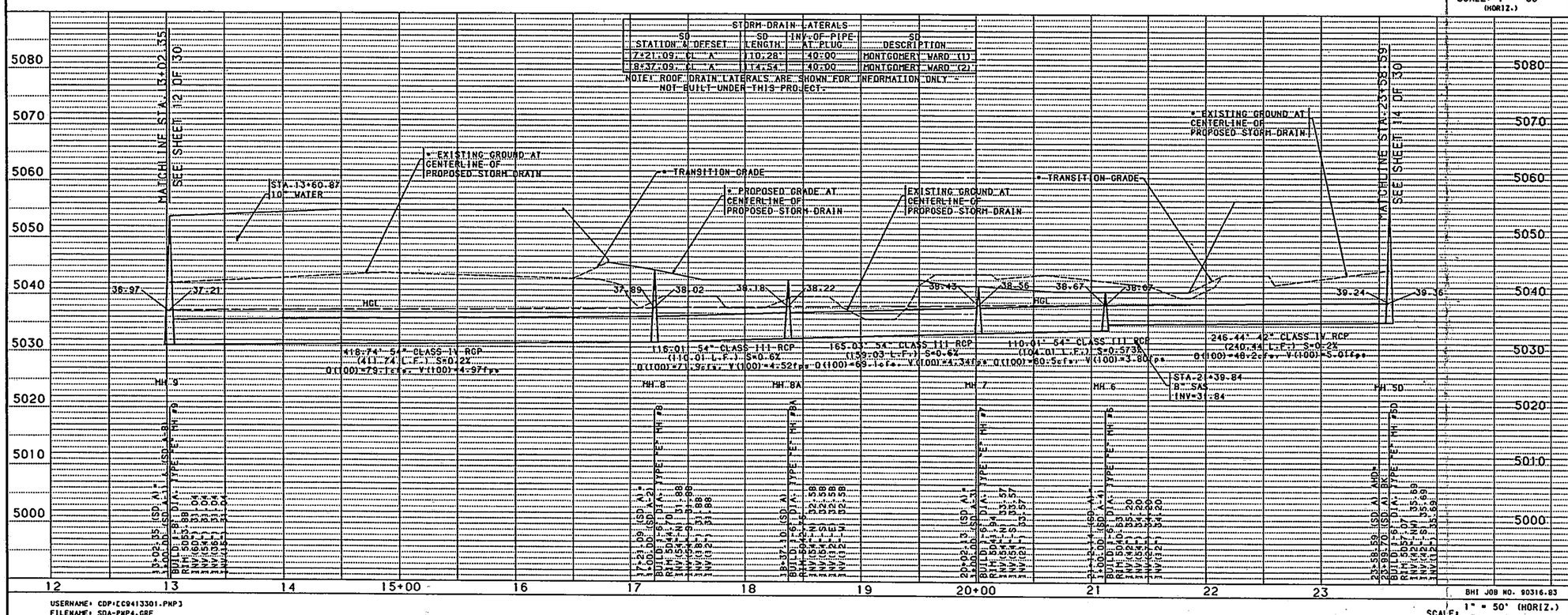
SCALE: 1" = 50' (HORIZ.) 1" = 10' (VERT.)

PROJECT NO. 4193.92 MAP NO. A13&14 B13&14 SHEET 12 OF 30

USERNAME: CDP=EC9413301.PMP3
FILENAME: SDA-PMP3.GRF

A2-44




| COORDINATE DATA | | | |
|---|---|---|---|
| POINT | EASTING | NORTHING | DESCRIPTION |
| 8 | 79265.30 | 26825.04 | MANHOLE |
| 9 | 79221.53 | 27241.48 | MANHOLE |
| 10 | 79209.41 | 27356.85 | MANHOLE |
| 11 | 79260.81 | 27362.25 | 'D' INLET |
| 12 | 79192.16 | 27520.98 | MANHOLE |
| 13 | 79180.66 | 27630.39 | MANHOLE |
| 14 | 79121.15 | 27624.14 | 'D' INLET |
| 15 | 79154.90 | 27875.48 | MANHOLE |
| 35 | 79374.69 | 27650.78 | MANHOLE |
| 40 | 78970.44 | 27497.68 | MANHOLE |
| 41 | 78904.78 | 27580.33 | 'D' INLET |
| 42 | 78922.70 | 27459.36 | 'D' INLET |
| 43 | 79431.57 | 27263.56 | 'C' INLET |
| 44 | 79333.02 | 26856.59 | MANHOLE |
| 46 | 79055.17 | 26908.55 | MANHOLE |
| 47 | 79032.84 | 27121.02 | MANHOLE |
| 78 | 79423.20 | 27245.39 | 'A' INLET |

* SURFACE GRADE AT TIME OF PIPE INSTALLATION


7500 JEFFERSON NE, COURTYARD I
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(505) 823-1000
BOHANNAN HUSTON INC.

EASTERLING & ASSOCIATES, INC
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5643 PARADISE BLVD. N.W. ALBQ., N.M. 87114
OFFICE (505) 898-8021 FAX (505) 898-8501


CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

TITLE: MALL SITE IMPROVEMENTS
SAD 223 - PART 2
STORM DRAIN 'A' 13+02.35 TO 23+58.59

| APPROVALS | ENGINEER | DATE | APPROVALS | ENGINEER | DATE |
|---|---|---|---|---|---|
| D.R.C. Chair | | | WATER | | |
| TRANS. DEV. | | | WASTE WATER | | |
| HYDROLOGY | | | NMUI | | |
| PARKS | | | CODE / MECH. | | |

| PROJECT NO. | 4193.92 | MAP NO. | A13&14 B13&14 | SHEET | 13 | OF | 30 |
|---|---|---|---|---|---|---|---|

AS BUILT INFORMATION

| | | |
|---|---|---|
| CONTRACTOR | | |
| YORK STAKED BY | | |
| INSPECTOR'S ACCEPTANCE BY | | |
| FIELD VERIFICATION BY | | |
| DRAWINGS CORRECTED BY | | |

MICRO-FILM INFORMATION

| RECORDED BY | | |
|---|---|---|
| NO. | | |

BENCH MARKS

THE BENCHMARK IS THE ACS STATION 1-B-13. ELEVATION 5045.088. THE BRASS TABLET IS SET IN THE TOP OF A CONCRETE POST LOCATED 170 FT. SOUTHWEST OF THE JUNCTION OF COORS RD. N.W. AND IRVING BLVD. N.W.

SURVEY INFORMATION

FIELD NOTES

| NO. | BY | DATE |
|---|---|---|
| | | |

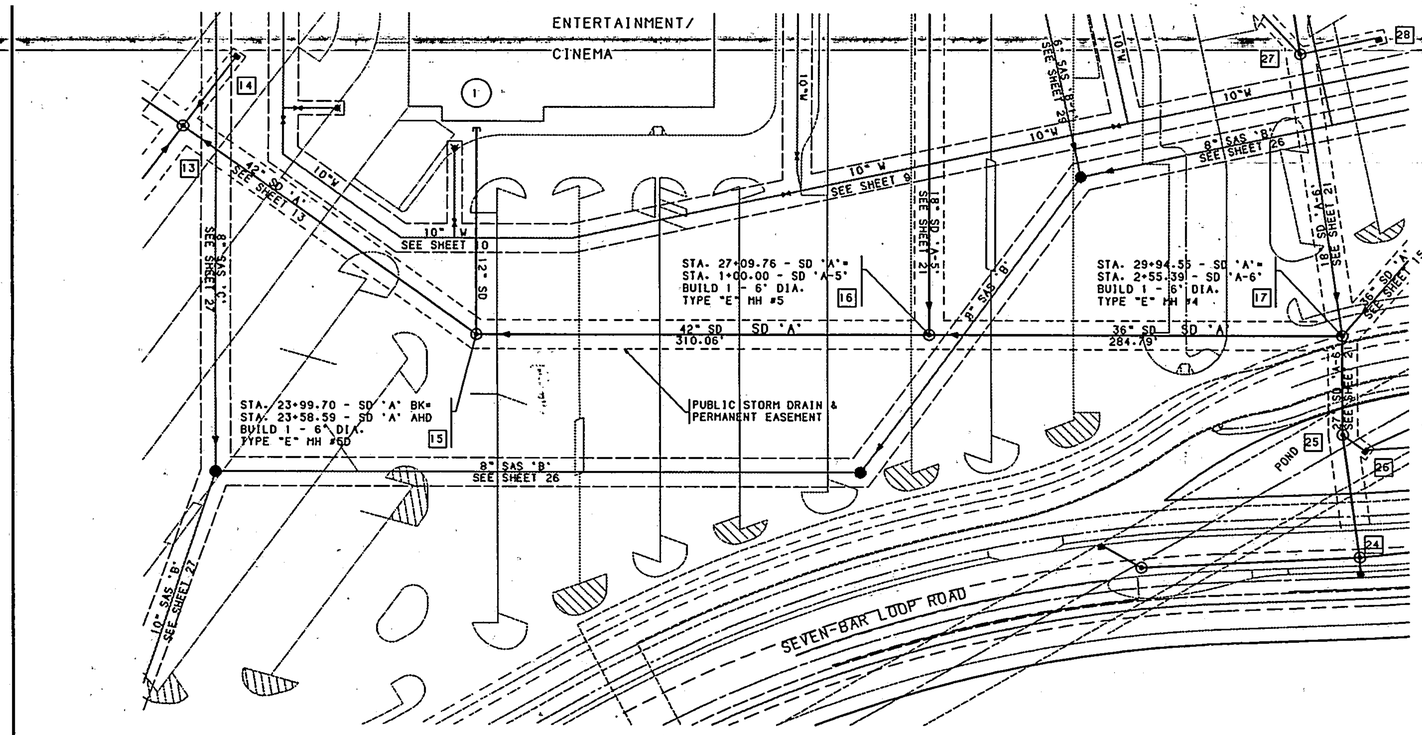
ENGINEERS SEAL

REVISIONS

| NO. | DATE | REMARKS | BY |
|---|---|---|---|
| | | | |

| | | | |
|---|---|---|---|
| DESIGNED BY | KLD.MSJ | DESIGN | DATE 6/94 |
| DRAWN BY | TSG.SAR | | DATE 6/94 |

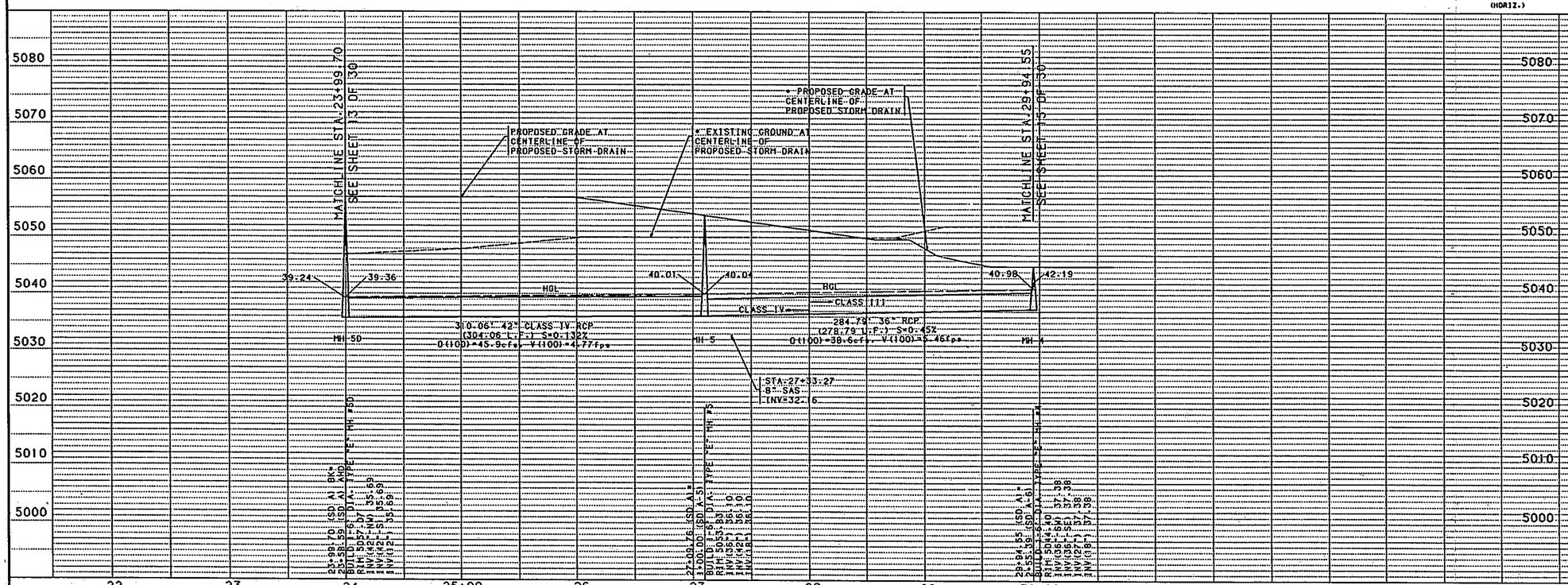
A2-45




| STORM DRAIN LATERALS | | | |
|---|---|---|---|
| SD STATION & OFFSET | SD LENGTH | INV. OF PIPE AT PLUG | SD DESCRIPTION |
| 23+99.70, CL 'A' | 143.92' | 60.25 | ENTER./CINEMA (1) |

NOTE: ROOF DRAIN LATERALS ARE SHOWN FOR INFORMATION ONLY - NOT BUILT UNDER THIS PROJECT.

SCALE: 1" = 50' (HORIZ.)




BHI JOB NO. 90316.83

SCALE: 1" = 50' (HORIZ.)
1" = 10' (VERT.)

USERNAME: CDP(CC9413301.PMP)
FILENAME: SDA-PMP5.GRF

| COORDINATE DATA | | | |
|---|---|---|---|
| POINT | EASTING | NORTHING | DESCRIPTION |
| 13 | 79180.66 | 27630.39 | MANHOLE |
| 14 | 79121.16 | 27624.14 | 'D' INLET |
| 15 | 79154.90 | 27875.48 | MANHOLE |
| 16 | 78947.43 | 28105.90 | MANHOLE |
| 17 | 78756.87 | 28317.54 | MANHOLE |
| 24 | 78864.06 | 28429.56 | MANHOLE |
| 25 | 78808.06 | 28363.63 | MANHOLE |
| 26 | 78806.18 | 28381.31 | 'D' INLET |
| 27 | 78629.37 | 28163.49 | MANHOLE |
| 28 | 78584.68 | 28195.31 | 'D' INLET |

• SURFACE GRADE AT TIME OF PIPE INSTALLATION


7500 JEFFERSON NE, COURTYARD I
ALBUQUERQUE, NM 87109
(505) 823-1000
BOHMAN HUSTON INC.

EASTERLING & ASSOCIATES, INC
CONSULTING ENGINEERS
5643 PARADISE BLVD. N.W. ALBQ., N.M., 87114
OFFICE (505) 898-8021 FAX (505) 898-8501


CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

TITLE: MALL SITE IMPROVEMENTS
SAD 223 - PART 2
STORM DRAIN 'A' 23+99.70 TO 29+94.55

| APPROVALS | ENGINEER | DATE | APPROVALS | ENGINEER | DATE |
|---|---|---|---|---|---|
| D.R.C. Chair | | | WATER | | |
| TRANS. DEV. | | | WASTE WATER | | |
| HYDROLOGY | | | NMUI | | |
| PARKS | | | CODE / MECH | | |

| NO. | DATE | REMARKS | BY |
|---|---|---|---|
| | | REVISIONS | |

DESIGNED BY KLD,HSJ DESIGN DATE 6/94
DRAWN BY TSG,SAR DATE 6/94

ENGINEERS SEAL

SURVEY INFORMATION
FIELD NOTES

| NO. | BY | DATE |
|---|---|---|
| | | |

BENCH MARKS

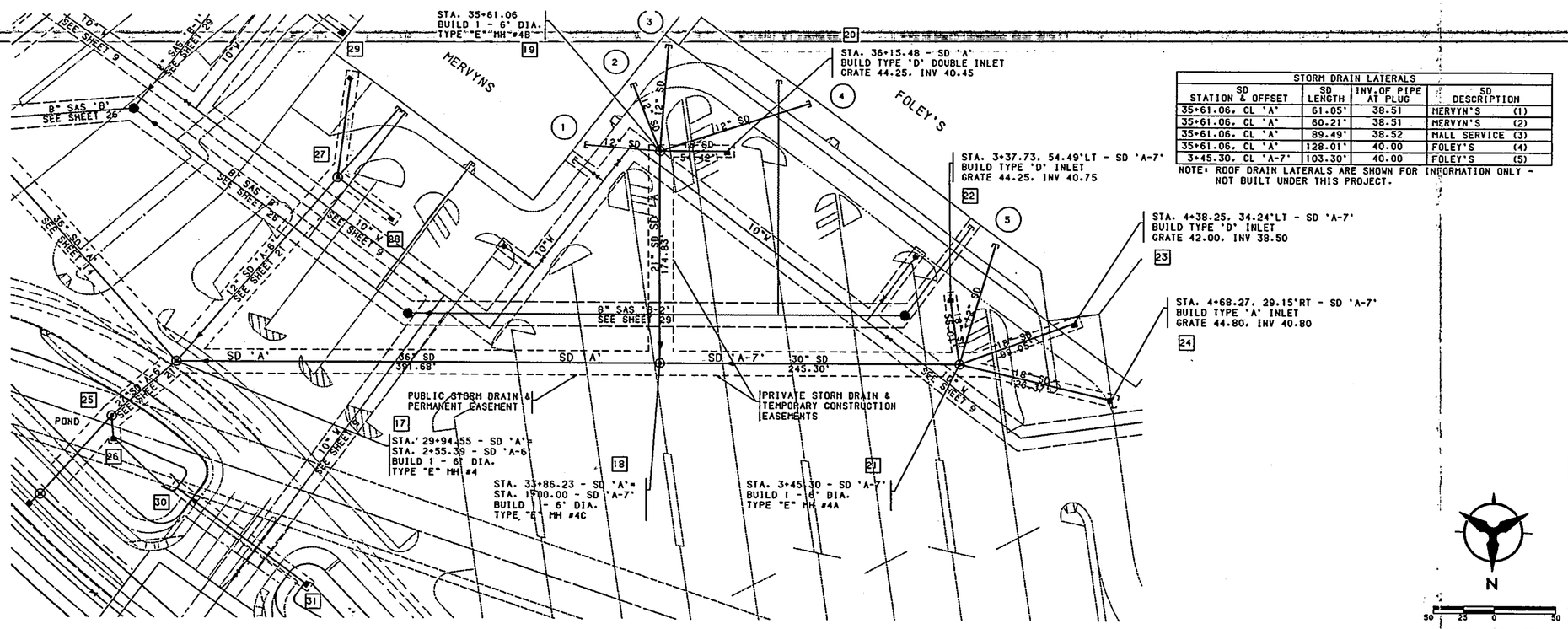
THE BENCHMARK IS THE ACS STATION 1-B-13. ELEVATION 5045.088. THE BRASS TABLET IS SET IN THE TOP OF A CONCRETE POST LOCATED 170 FT. SOUTHWEST OF THE JUNCTION OF COORS RD. N.W. AND IRVING BLVD. N.W.

AS BUILT INFORMATION

CONTRACTOR
WORK STAKED BY
INSPECTOR'S ACCEPTANCE BY
FIELD VERIFICATION BY
DRAWINGS CORRECTED BY
MICRO-FILM INFORMATION
RECORDED BY
NO.

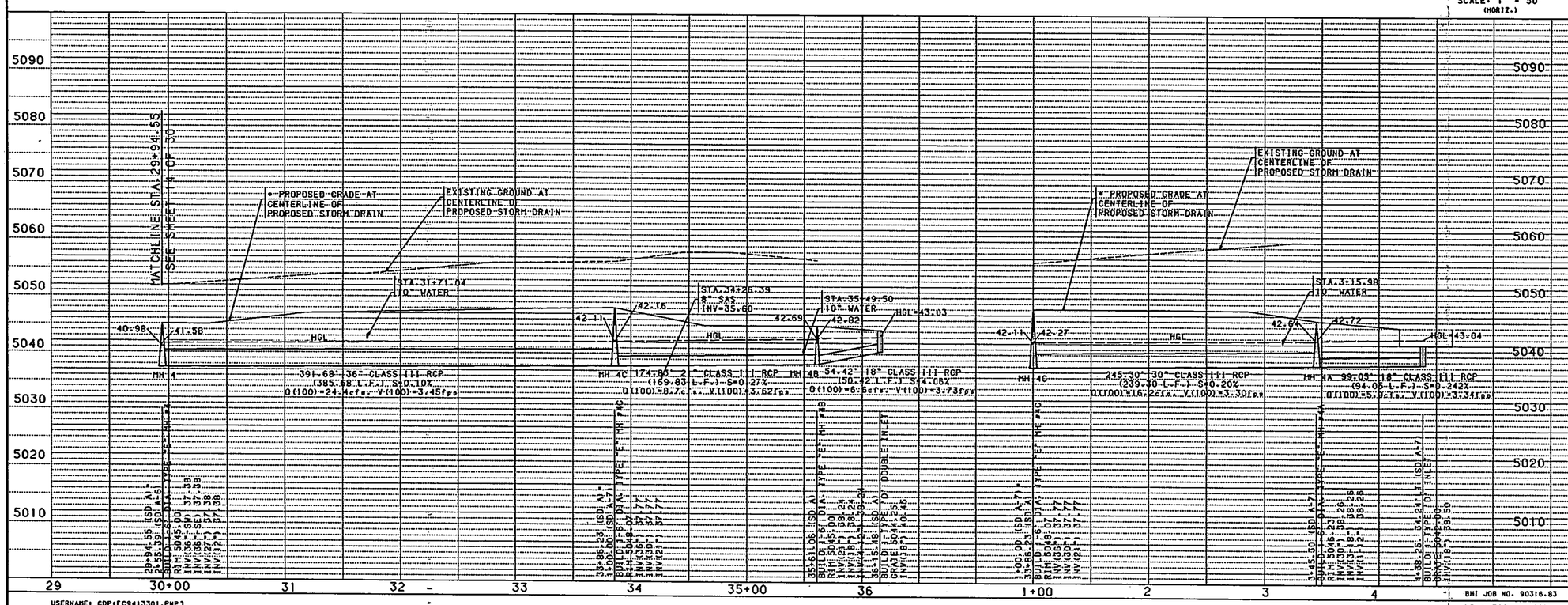
PROJECT NO. 4193.92 | MAP NO. A13&14 B13&14 | SHEET 14 OF 30

AZ-46




| STORM DRAIN LATERALS | | | |
|---|---|---|---|
| SD STATION & OFFSET | SD LENGTH | INV. OF PIPE AT PLUG | SD DESCRIPTION |
| 35+61.06, CL 'A' | 61.05' | 38.51 | MERVYN'S (1) |
| 35+61.06, CL 'A' | 60.21' | 38.51 | MERVYN'S (2) |
| 35+61.06, CL 'A' | 89.49' | 38.52 | MALL SERVICE (3) |
| 35+61.06, CL 'A' | 128.01' | 40.00 | FOLEY'S (4) |
| 3+45.30, CL 'A-7' | 103.30' | 40.00 | FOLEY'S (5) |

NOTE: ROOF DRAIN LATERALS ARE SHOWN FOR INFORMATION ONLY - NOT BUILT UNDER THIS PROJECT.




| COORDINATE DATA | | | |
|---|---|---|---|
| POINT | EASTING | NORTHING | DESCRIPTION |
| 17 | 78756.87 | 28317.54 | MANHOLE |
| 18 | 78365.25 | 28310.11 | MANHOLE |
| 19 | 78368.57 | 28135.31 | MANHOLE |
| 20 | 78314.16 | 28134.28 | 'D' INLET |
| 21 | 78119.99 | 28305.46 | MANHOLE |
| 22 | 78128.60 | 28251.12 | 'D' INLET |
| 23 | 78027.71 | 28269.46 | 'D' INLET |
| 24 | 77986.50 | 28332.27 | 'A' INLET |
| 25 | 78808.06 | 28363.63 | MANHOLE |
| 26 | 78806.18 | 28381.31 | 'D' INLET |
| 27 | 78629.37 | 28163.49 | MANHOLE |
| 28 | 78584.68 | 28195.31 | 'D' INLET |
| 29 | 78620.32 | 28079.46 | 'D' INLET |
| 30 | 78754.52 | 28422.19 | OUTLET |
| 31 | 78649.83 | 28498.38 | 'D' INLET |

• SURFACE GRADE AT TIME OF PIPE INSTALLATION


7500 JEFFERSON NE, COURTYARD I
ALBUQUERQUE, NM 87109
(505) 823-1000
BOHANNAN HUSTON INC.

EASTERLING & ASSOCIATES, INC
CONSULTING ENGINEERS
5643 PARADISE BLVD. N.W. ALBQ., N.M. 87114
OFFICE (505) 898-8021 FAX (505) 898-8501


CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

TITLE: MALL SITE IMPROVEMENTS
SAD 223 - PART 2
STORM DRAIN 'A' 29+94.55 TO 35+61.06 & 'A-7'

| APPROVALS | ENGINEER | DATE | APPROVALS | ENGINEER | DATE |
|---|---|---|---|---|---|
| D.R.C. Chair | | | WATER | | |
| TRANS. DEV. | | | WASTE WATER | | |
| HYDROLOGY | | | NMUI | | |
| PARKS | | | CODE / MECH. | | |

| PROJECT NO. | 4193.92 | MAP NO. | A13&14 B13&14 | SHEET | 15 | OF | 30 |
|---|---|---|---|---|---|---|---|

AS BUILT INFORMATION
CONTRACTOR
WORK STAKED BY
INSPECTOR'S ACCEPTANCE BY
FIELD VERIFICATION BY
DRAWINGS CORRECTED BY
MICRO-FILM INFORMATION
RECORDED BY
NO.

BENCH MARKS
THE BENCHMARK IS THE ACS STATION 1-B-13. ELEVATION 5045.088. THE BRASS TABLET IS SET IN THE TOP OF A CONCRETE POST LOCATED 170 FT. SOUTHWEST OF THE JUNCTION OF COORS RD. N.W. AND IRVING BLVD. N.W.

SURVEY INFORMATION
FIELD NOTES
NO. BY DATE

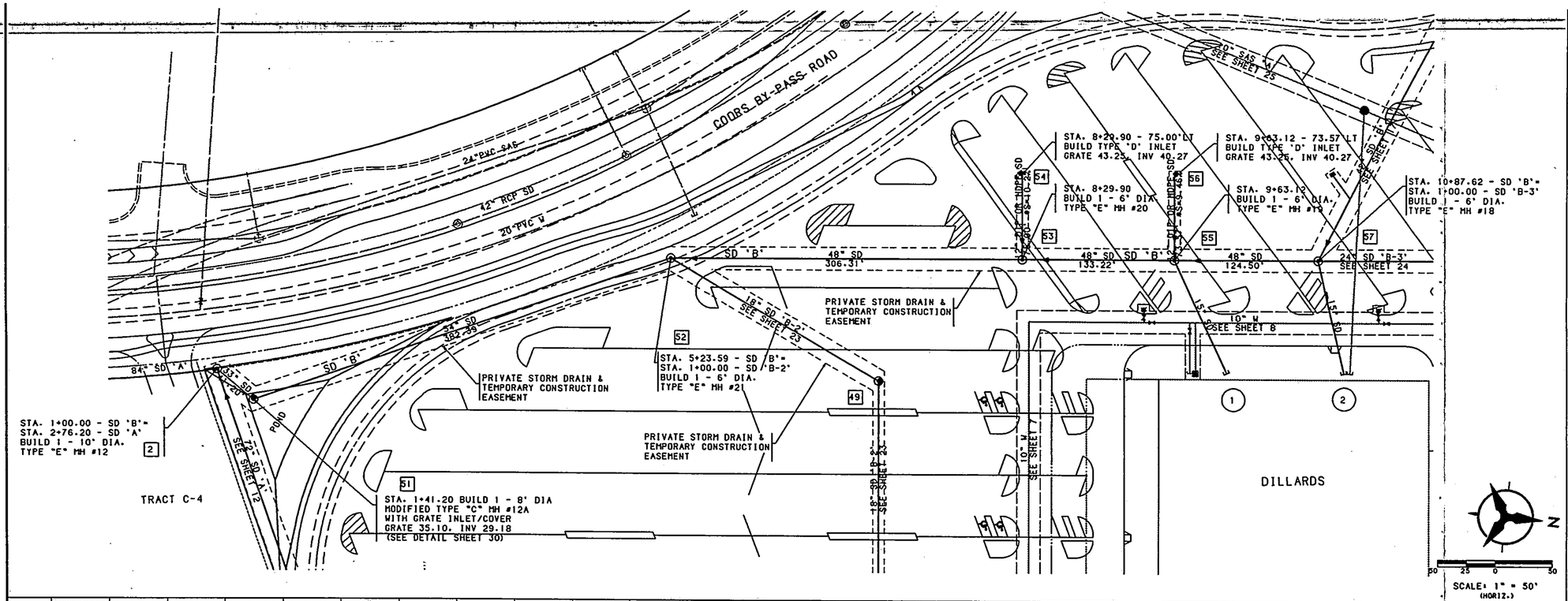
ENGINEERS SEAL

| NO. | DATE | REVISIONS | BY |
|---|---|---|---|
| | | REMARKS | |
| | | DESIGN | |

DESIGNED BY KLD.MSJ DATE 6/94
DRAWN BY TSG.SAR DATE 6/94

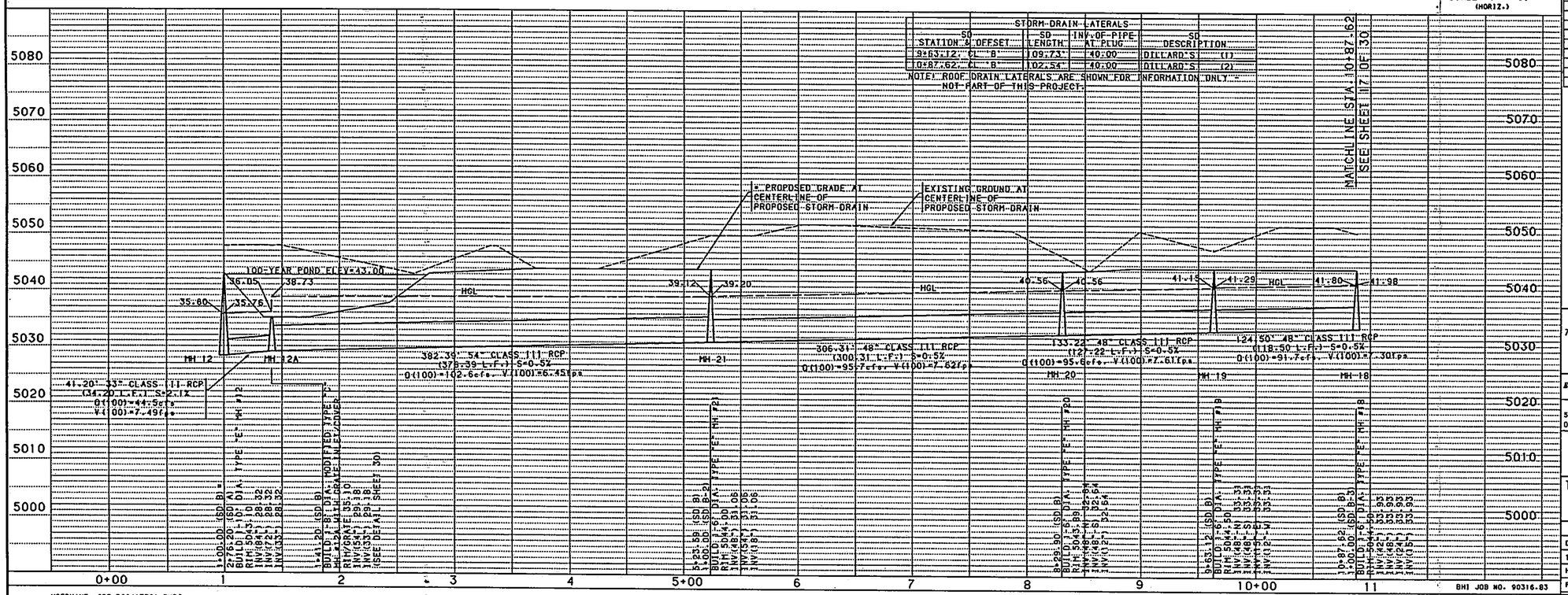
USERNAME: CDP:[CC9413301.PNP]
FILENAME: SDA-PNP6.GRF

A2-47




| STORM DRAIN LATERALS | | | | |
|---|---|---|---|---|
| STATION & OFFSET | SD LENGTH | INV. OF PIPE AT PLUG | SD DESCRIPTION | |
| 9+63.12', CL - B | 109.73' | 40.00 | DILLARD'S | (1) |
| 10+87.62', CL - B | 102.54' | 40.00 | DILLARD'S | (2) |

NOTE: ROOF DRAIN LATERALS ARE SHOWN FOR INFORMATION ONLY NOT PART OF THIS PROJECT.




USERNAME: CDP=EC9413301.PNP3
FILENAME: SDB-PMP7.GRF

SCALE: 1" = 50' (HORIZ.)
1" = 10' (VERT.)

BHI JOB NO. 90316.83

| COORDINATE DATA | | | |
|---|---|---|---|
| POINT | EASTING | NORTHING | DESCRIPTION |
| 2 | 78728.86 | 26013.20 | MANHOLE |
| 49 | 78677.01 | 26583.79 | MANHOLE |
| 51 | 78752.17 | 26047.18 | MANHOLE |
| 52 | 78588.53 | 26392.78 | MANHOLE |
| 53 | 78556.51 | 26697.41 | MANHOLE |
| 54 | 78482.00 | 26688.85 | 'D' INLET |
| 55 | 78542.59 | 26829.90 | MANHOLE |
| 56 | 78467.79 | 26824.08 | 'D' INLET |
| 57 | 78529.57 | 26953.72 | MANHOLE |

* SURFACE GRADE AT TIME OF PIPE INSTALLATION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OFFICE (505) 898-8021 FAX (505) 898-8501


CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

TITLE: MALL SITE IMPROVEMENTS
SAD 223 - PART 2
STORM DRAIN 'B' 1+00.00 TO 10+87.62

| APPROVALS | ENGINEER | DATE | APPROVALS | ENGINEER | DATE |
|---|---|---|---|---|---|
| D.R.C. Chair | | | WATER | | |
| TRANS. DEV. | | | WASTE WATER | | |
| HYDROLOGY | | | NMUI | | |
| PARKS | | | CODE / MECH | | |

| NO. | DATE | REMARKS | BY |
|---|---|---|---|
| | | REVISIONS | |

DESIGNED BY KLD.HSJ DESIGN DATE 6/94
DRAWN BY TSG.SAR DATE 6/94

PROJECT NO. 4193.92 | MAP NO. A13&14 B13&14 | SHEET 16 OF 30

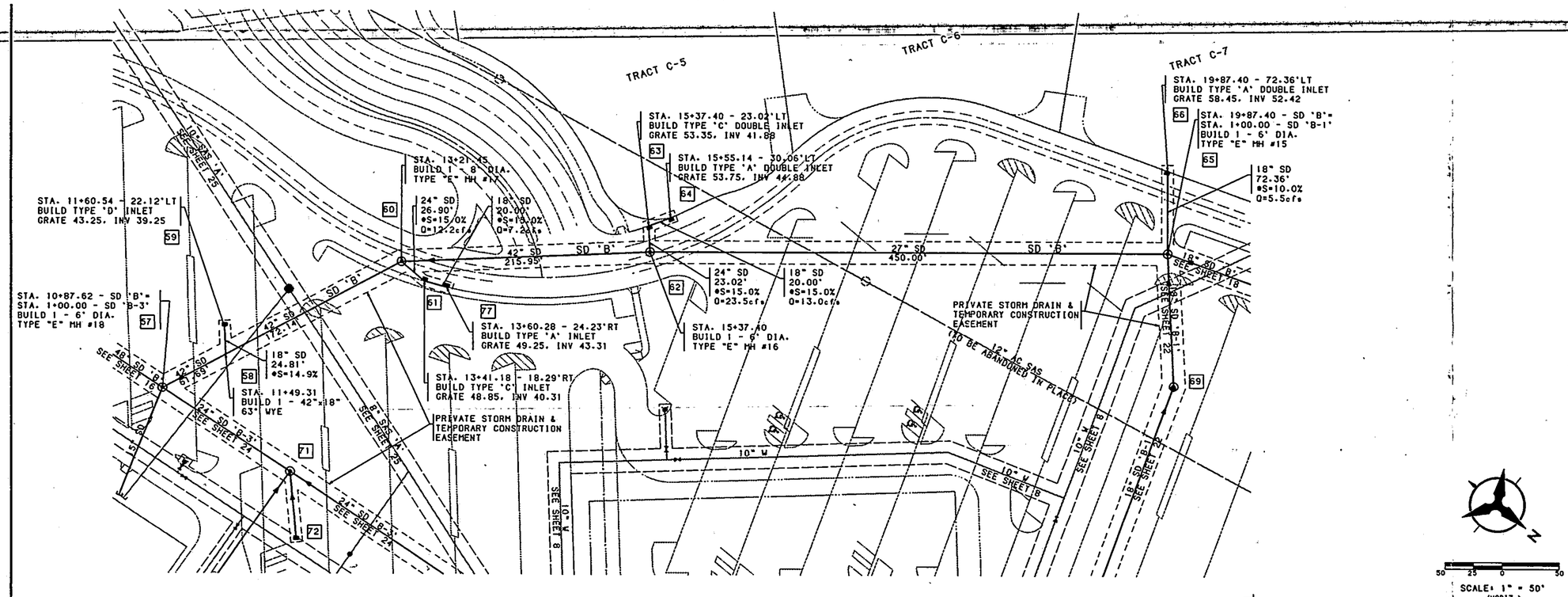
AZ-48

AS BUILT INFORMATION
CONTRACTOR
WORK STAKED BY
ACCEPTANCE BY
FIELD VERIFICATION BY
DRAWINGS CORRECTED BY
MICRO-FILM INFORMATION
RECORDED BY
NO.

BENCH MARKS
THE BENCHMARK IS THE ACS STATION 1-B-13.
ELEVATION 5045.088. THE BRASS TABLET IS SET
IN THE TOP OF A CONCRETE POST LOCATED 170 FT.
SOUTHWEST OF THE JUNCTION OF COORS RD. N.W.
AND IRVING BLVD. N.W.

SURVEY INFORMATION
FIELD NOTES
NO. BY DATE

ENGINEERS SEAL




## COORDINATE DATA

| POINT | EASTING | NORTHING | DESCRIPTION |
|---|---|---|---|
| 57 | 78529.57 | 26953.72 | MANHOLE |
| 58 | 78472.01 | 26975.90 | WYE |
| 59 | 78453.57 | 26959.30 | 'D' INLET |
| 60 | 78311.37 | 27037.79 | MANHOLE |
| 61 | 78311.45 | 27064.70 | 'C' INLET |
| 62 | 78165.02 | 27196.59 | MANHOLE |
| 63 | 78148.10 | 27181.00 | 'C' INLET |
| 64 | 78130.63 | 27190.72 | 'A' INLET |
| 65 | 77874.42 | 27540.18 | MANHOLE |
| 66 | 77819.17 | 27493.45 | 'A' INLET |
| 69 | 77960.76 | 27619.47 | MANHOLE |
| 71 | 78515.81 | 27084.68 | MANHOLE |
| 72 | 78556.45 | 27125.94 | 'D' INLET |
| 77 | 78302.88 | 27082.76 | 'A' INLET |

• SURFACE GRADE AT TIME OF PIPE INSTALLATION


7500 JEFFERSON NE. COURTYARD I
ALBUQUERQUE, NM 87109
(505) 823-1000
BOHANNAN HUSTON INC.

EASTERLING & ASSOCIATES, INC
CONSULTING ENGINEERS
5643 PARADISE BLVD. N.W. ALBQ., N.M. 87114
OFFICE (505) 898-8021 FAX (505) 898-8501


CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

TITLE: MALL SITE IMPROVEMENTS
SAD 223 - PART 2
STORM DRAIN 'B' 10+87.62 TO 19+87.40

| APPROVALS | ENGINEER | DATE | APPROVALS | ENGINEER | DATE |
|---|---|---|---|---|---|
| D.R.C. Chair | | | WATER | | |
| TRANS. DEV. | | | WASTE WATER | | |
| HYDROLOGY | | | NMUI | | |
| PARKS | | | CODE / MECH | | |

BHI JOB NO. 90316.83

SCALE: 1" = 50' (HORIZ.)
1" = 10' (VERT.)

PROJECT NO. 4193.92 | MAP NO. A13&14 B13&14 | SHEET 17 OF 30

AS BUILT INFORMATION

| | | |
|---|---|---|
| CONTRACTOR | | |
| WORK STAKED BY | | |
| STAKING CHECKED BY | | |
| ACCEPTANCE BY | | |
| FIELD VERIFICATION BY | | |
| DRAWINGS CORRECTED BY | | |
| MICRO-FILM INFORMATION | | |
| RECORDED BY | | |
| NO. | | |

BENCH MARKS

THE BENCHMARK IS THE ACS STATION 1-B-13. ELEVATION 5045.088. THE BRASS TABLET IS SET IN THE TOP OF A CONCRETE POST LOCATED 170 FT. SOUTHWEST OF THE JUNCTION OF COORS RD. N.W. AND IRVING BLVD. N.W.

SURVEY INFORMATION

FIELD NOTES

| NO. | BY | DATE |
|---|---|---|
| | | |

ENGINEERS SEAL

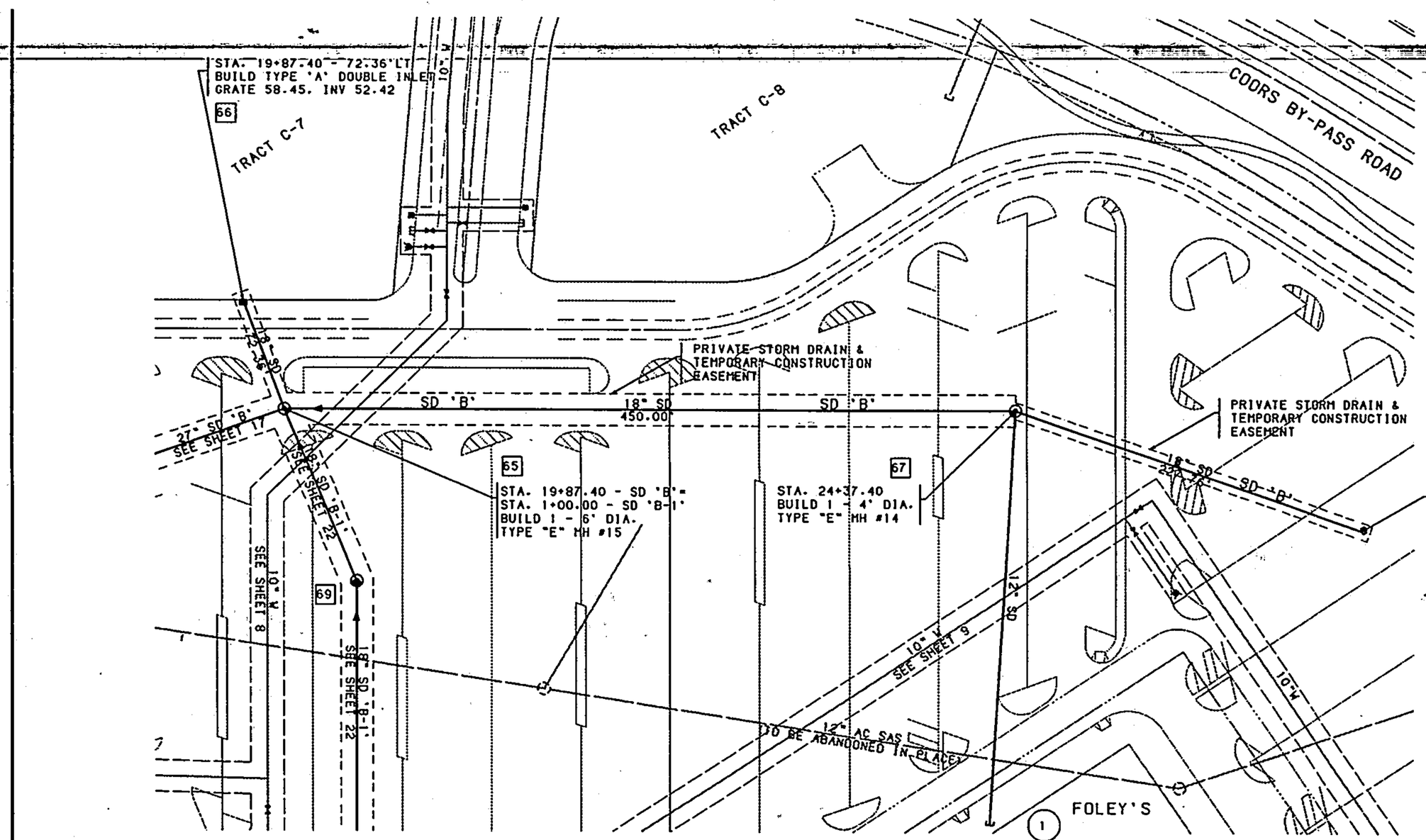
REVISIONS

| NO. | DATE | REMARKS | BY |
|---|---|---|---|
| | | | |

DESIGNED BY KLD.MSJ DESIGN DATE 6/94
DRAWN BY TSG.SAR DATE 6/94

USERNAME: CDP:[C9413301.PMP]
FILENAME: SDB-PMP8.GRF

A2-49

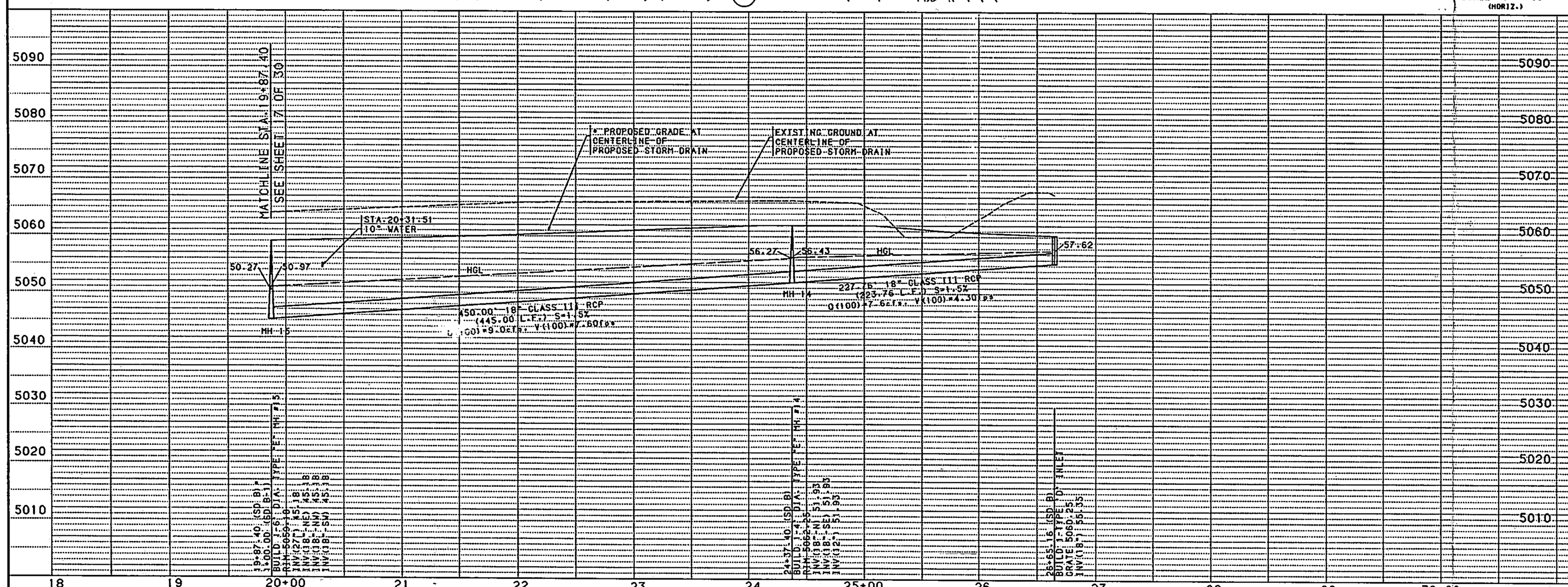



| STORM DRAIN LATERALS | | | | |
|---|---|---|---|---|
| SD STATION & OFFSET | SD LENGTH | INV. OF PIPE AT PLUG | SD DESCRIPTION | |
| 24+37.40. CL 'B' | 262.29' | 57.50 | FOLEY'S | (1) |

NOTE: ROOF DRAIN LATERALS ARE SHOWN FOR INFORMATION ONLY - NOT BUILT UNDER THIS PROJECT.

SCALE: 1" = 50' (HORIZ.)

| COORDINATE DATA | | | |
|---|---|---|---|
| POINT | EASTING | NORTHING | DESCRIPTION |
| 65 | 77874.42 | 27540.18 | MANHOLE |
| 66 | 77819.17 | 27493.45 | 'A' INLET |
| 67 | 77718.87 | 27962.44 | MANHOLE |
| 68 | 77715.09 | 28190.17 | 'D' INLET |
| 69 | 77960.76 | 27619.47 | MANHOLE |




BHI JOB NO. 90316.B3

SCALE: 1" = 50' (HORIZ.) 1" = 10' (VERT.)

USERNAME: CDP:EC9413301.PKP3
FILENAME: SDB-PKP9.GRF

AS BUILT INFORMATION

CONTRACTOR
WORK STAKED BY
INSPECTOR'S ACCEPTANCE BY
FIELD VERIFICATION BY
DRAWINGS CORRECTED BY

MICRO-FILM INFORMATION

RECORDED BY
NO.

BENCH MARKS

THE BENCHMARK IS THE ACS STATION 1-B-13.
ELEVATION 5045.088. THE BRASS TABLET IS SET IN THE TOP OF A CONCRETE POST LOCATED 170 FT. SOUTHWEST OF THE JUNCTION OF COORS RD. N.W. AND IRVING BLVD. N.W.

SURVEY INFORMATION

FIELD NOTES

| NO. | BY | DATE |
|---|---|---|

ENGINEERS SEAL

| NO. | DATE | REMARKS | BY |
|---|---|---|---|

REVISIONS

DESIGNED BY KLD,MSJ DESIGN DATE 6/94
DRAWN BY TSG,SAR DATE 6/94

• SURFACE GRADE AT TIME OF PIPE INSTALLATION


7500 JEFFERSON NE. COURTYARD I
ALBUQUERQUE. NM 87109
(505) 823-1000
BOHANNAN HUSTON INC.

EASTERLING & ASSOCIATES, INC.
CONSULTING ENGINEERS
5643 PARADISE BLVD. N.W. ALBQ., N.M., 87114
OFFICE (505) 898-8021 FAX (505) 898-8501

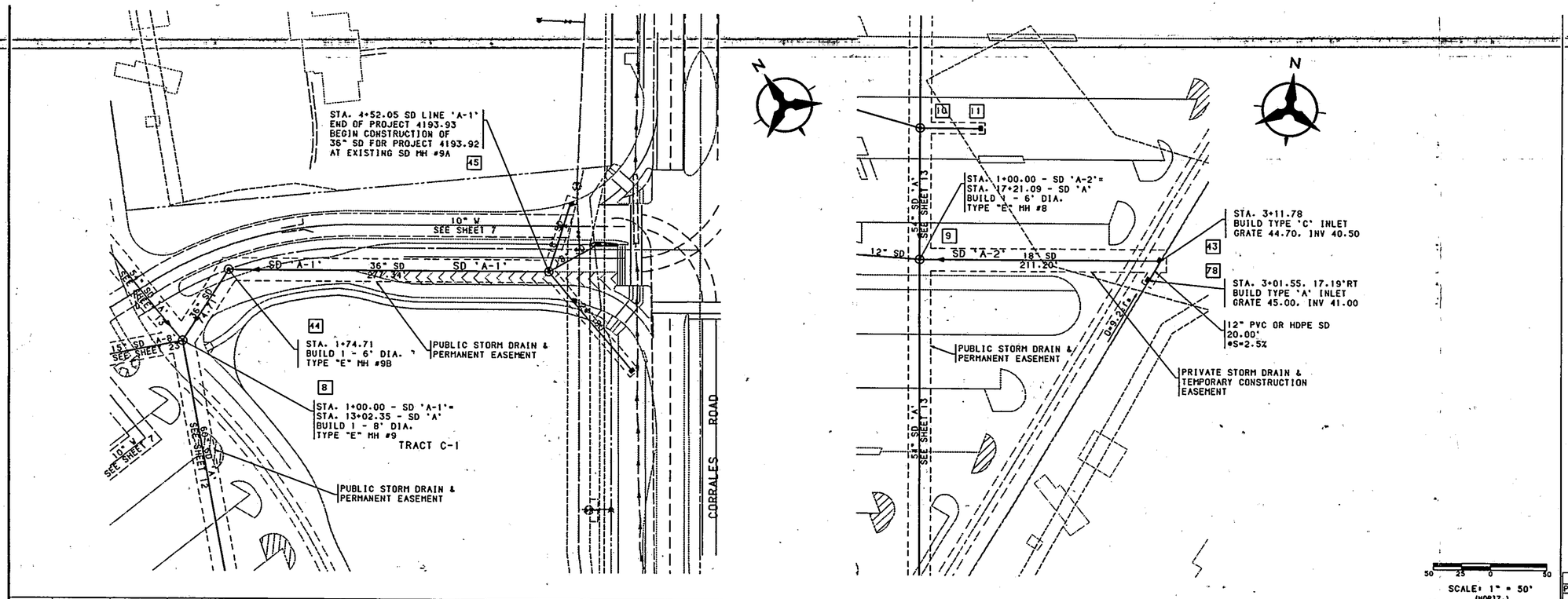

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

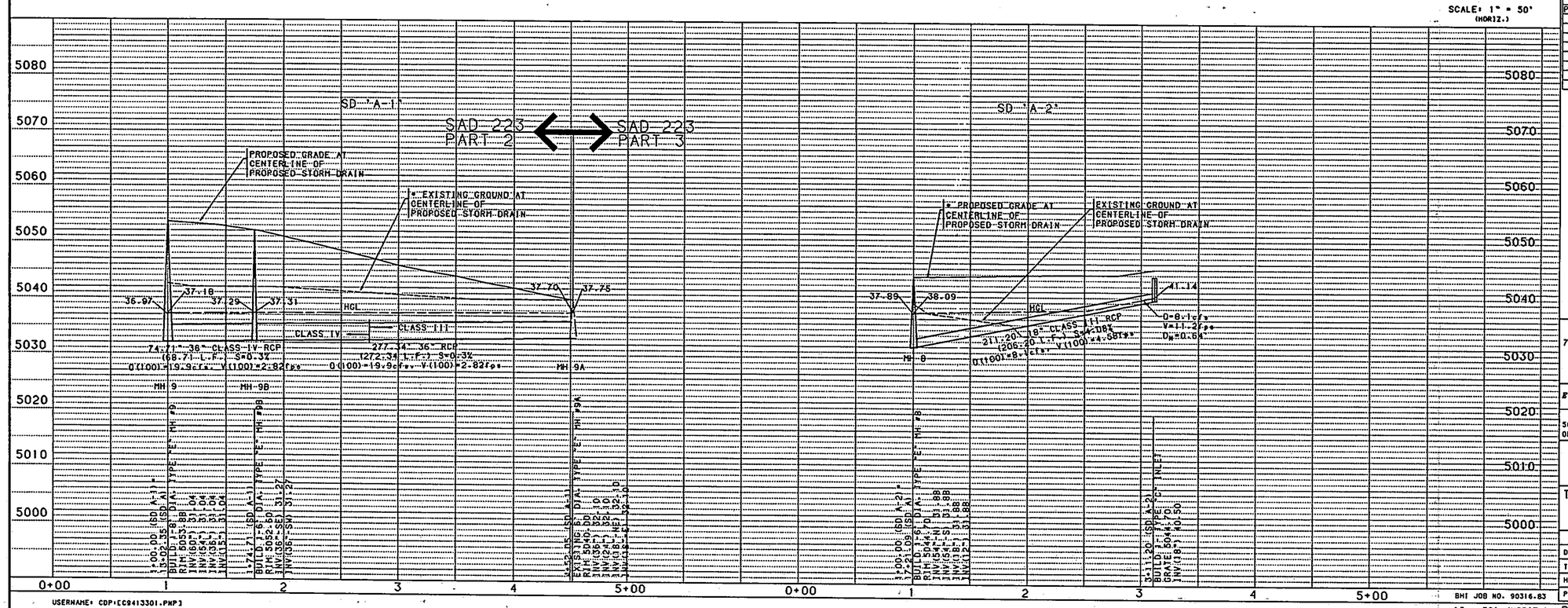
TITLE: MALL SITE IMPROVEMENTS
SAD 223 - PART 2
STORM DRAIN 'B' 19+87.40 TO 26+65.16

| APPROVALS | ENGINEER | DATE | APPROVALS | ENGINEER | DATE |
|---|---|---|---|---|---|
| D.R.C. Chair | | | WATER | | |
| TRANS. DEV. | | | WASTE WATER | | |
| HYDROLOGY | | | NMUI | | |
| PARKS | | | CODE / MECH | | |

PROJECT NO. 4193.92 | MAP NO. A13&14 B13&14 | SHEET 18 OF 30

AZ-50




USERNAME: CDP:EC9413301.PMP3
FILENAME: SDAI-2.GRF

| COORDINATE DATA | | | |
|---|---|---|---|
| POINT | EASTING | NORTHING | DESCRIPTION |
| 8 | 79265.30 | 26825.04 | MANHOLE |
| 9 | 79221.53 | 27241.48 | MANHOLE |
| 10 | 79209.41 | 27356.85 | MANHOLE |
| 11 | 79260.81 | 27362.25 | 'D' INLET |
| 43 | 79431.57 | 27263.56 | 'C' INLET |
| 44 | 79333.02 | 26856.59 | MANHOLE |
| 45 | 79565.61 | 26705.54 | MANHOLE |
| 78 | 79423.20 | 27245.39 | 'A' INLET |

• SURFACE GRADE AT TIME OF PIPE INSTALLATION

AS BUILT INFORMATION

| | | |
|---|---|---|
| CONTRACTOR | | |
| WORK STAKED BY | | |
| INSPECTOR'S CHANGES BY | | |
| FIELD VERIFICATION BY | | |
| DRAWINGS CORRECTED BY | | |

MICRO-FILM INFORMATION

RECORDED BY
NO.

BENCH MARKS

THE BENCHMARK IS THE ACS STATION 1-B-13. ELEVATION 5045.088. THE BRASS TABLET IS SET IN THE TOP OF A CONCRETE POST LOCATED 170 FT. SOUTHWEST OF THE JUNCTION OF COORS RD. N.W. AND IRVING BLVD. N.W.

SURVEY INFORMATION

FIELD NOTES

| NO. | BY | DATE |
|---|---|---|
| | | |

ENGINEERS SEAL

| NO. | DATE | REMARKS | BY |
|---|---|---|---|
| | | REVISIONS | |

DESIGNED BY KLD.MSJ DESIGN DATE 6/94
DRAWN BY TSG.SAR DATE 6/94


7500 JEFFERSON NE. COURTYARD I
ALBUQUERQUE, NM 87109
(505) 823-1000
BOHANNAN HUSTON INC.

EASTERLING & ASSOCIATES, INC
CONSULTING ENGINEERS
5643 PARADISE BLVD. N.W. ALBQ., N.M. 87114
OFFICE (505) 898-8021 FAX (505) 898-8501


CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

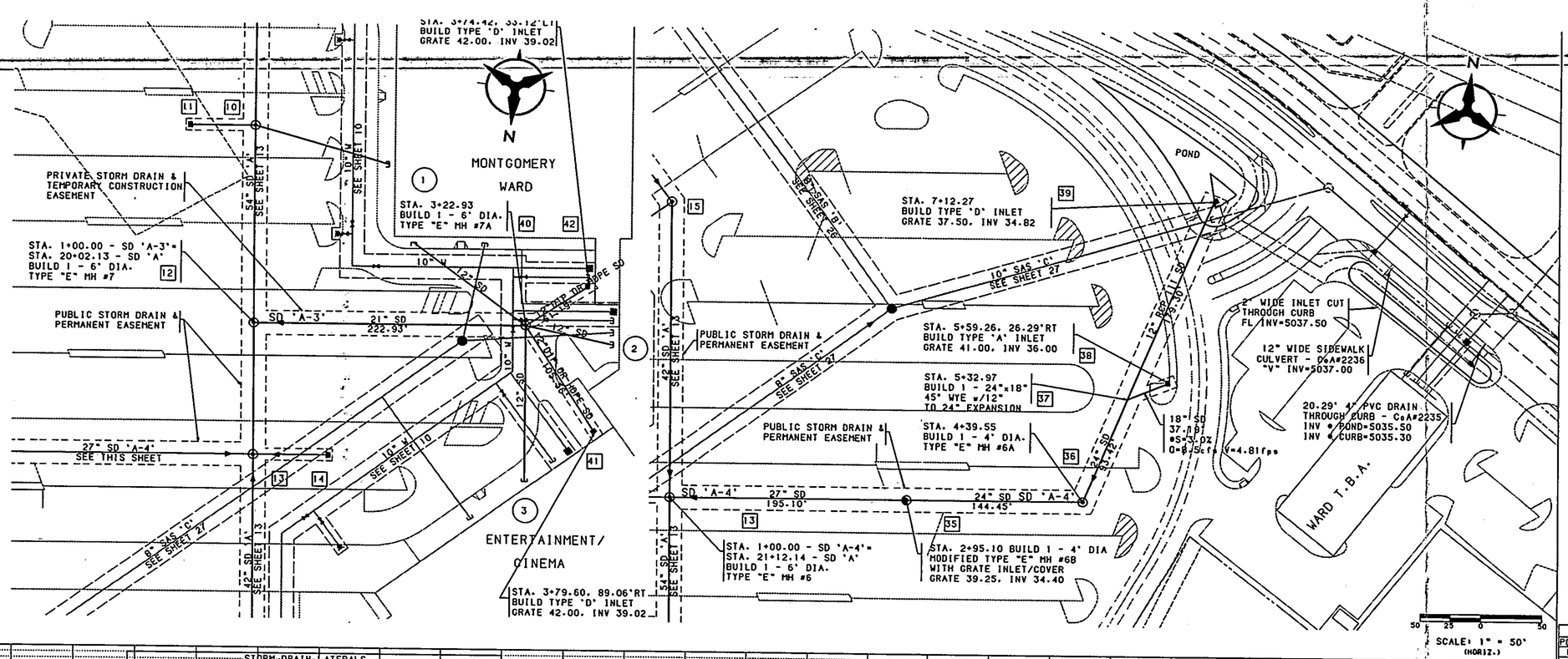
TITLE: MALL SITE IMPROVEMENTS
SAD 223 - PART 2
STORM DRAINS 'A-1' & 'A-2'

| APPROVALS | ENGINEER | DATE | APPROVALS | ENGINEER | DATE |
|---|---|---|---|---|---|
| D.R.C. Chair | | | WATER | | |
| TRANS. DEV. | | | WASTE WATER | | |
| HYDROLOGY | | | NMUI | | |
| PARKS | | | CODE / MECH | | |

SCALE: 1" = 50' (HORIZ.)
1" = 10' (VERT.)

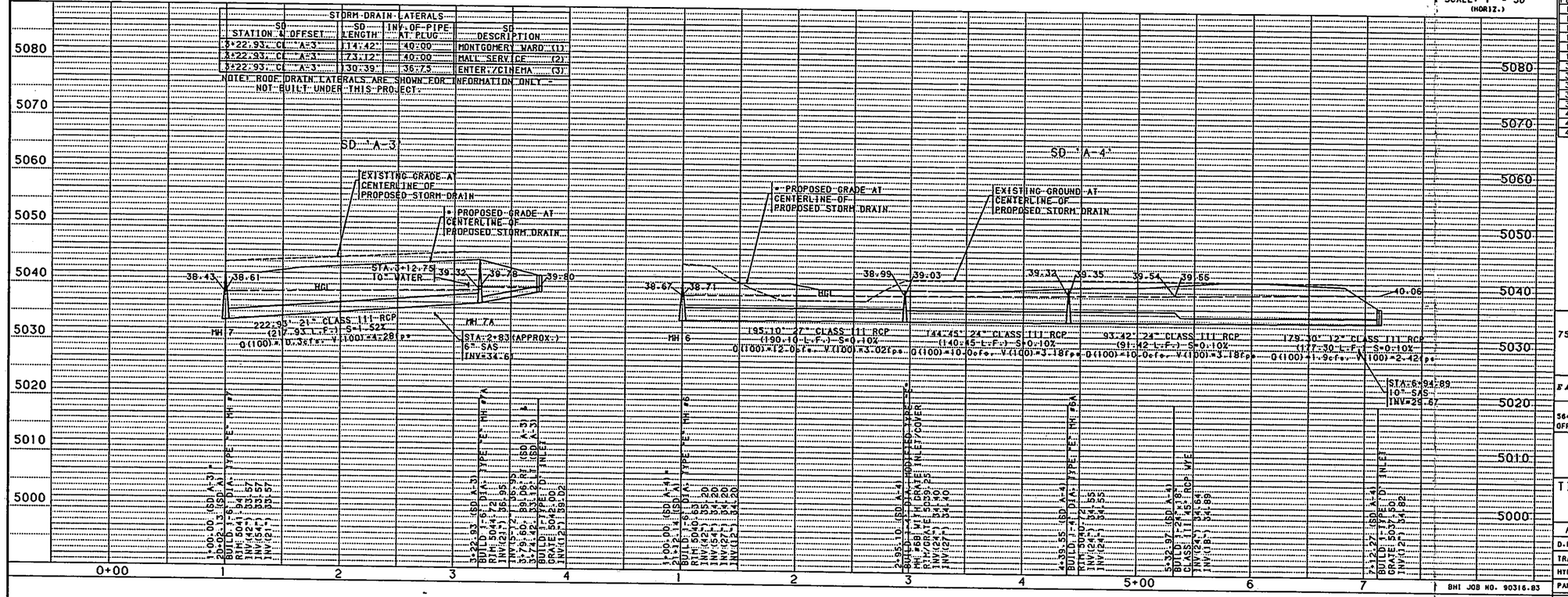
PROJECT NO. 4193.92 | MAP NO. A13&14 B13&14 | SHEET 19 OF 30

A2-51




| STORM DRAIN LATERALS | | | | |
|---|---|---|---|---|
| SD STATION & OFFSET | SD LENGTH | INV. OF PIPE AT PLUG | SD DESCRIPTION | |
| 3+22.93, CL "A-3" | 14.42' | 40.00 | MONTGOMERY WARD | (1) |
| 3+22.93, CL "A-3" | 73.12' | 40.00 | MALL SERVICE | (2) |
| 3+22.93, CL "A-3" | 130.39' | 36.75 | ENTERTAINMENT/CINEMA | (3) |

NOTE: ROOF DRAIN LATERALS ARE SHOWN FOR INFORMATION ONLY - NOT BUILT UNDER THIS PROJECT.




SCALE: 1" = 10' (VERT.)

BHI JOB NO. 90316.83

USERNAME=[C9413301.PNP]
FILENAME=SDA3-4.GRF

## COORDINATE DATA

| POINT | EASTING | NORTHING | DESCRIPTION |
|---|---|---|---|
| 10 | 79209.41 | 27356.85 | MANHOLE |
| 11 | 79260.81 | 27362.25 | 'D' INLET |
| 12 | 79192.16 | 27520.98 | MANHOLE |
| 13 | 79180.66 | 27630.39 | MANHOLE |
| 14 | 79121.16 | 27624.14 | 'D' INLET |
| 15 | 79154.90 | 27875.48 | MANHOLE |
| 35 | 79374.69 | 27650.78 | MANHOLE |
| 36 | 79518.35 | 27665.87 | MANHOLE |
| 37 | 79545.70 | 27755.20 | WYE |
| 38 | 79578.54 | 27772.64 | 'A' INLET |
| 39 | 79598.18 | 27926.65 | 'D' INLET |
| 40 | 78970.44 | 27497.68 | MANHOLE |
| 41 | 78904.78 | 27580.33 | 'D' INLET |
| 42 | 78922.70 | 27459.36 | 'D' INLET |

* SURFACE GRADE AT TIME OF PIPE INSTALLATION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OFFICE (505) 898-8021 FAX (505) 898-8501


CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

TITLE: MALL SITE IMPROVEMENTS
SAD 223 - PART 2
STORM DRAINS 'A-3' & 'A-4'

| APPROVALS | ENGINEER | DATE | APPROVALS | ENGINEER | DATE |
|---|---|---|---|---|---|
| D.R.C. Chair | | | WATER | | |
| TRANS. DEV. | | | WASTE WATER | | |
| HYDROLOGY | | | NMUI | | |
| PARKS | | | CODE / MECH | | |

| NO. | DATE | REMARKS | BY |
|---|---|---|---|
| | | REVISIONS | |

DESIGNED BY KLD,MSJ DESIGN DATE 6/94
DRAWN BY TSG,SAR DATE 6/94

AS BUILT INFORMATION
CONTRACTOR
WORK STAKED BY
INSPECTOR'S ACCEPTANCE BY
FIELD VERIFICATION BY
DRAWINGS CORRECTED BY
MICRO-FILM INFORMATION
RECORDED BY
DATE
NO.

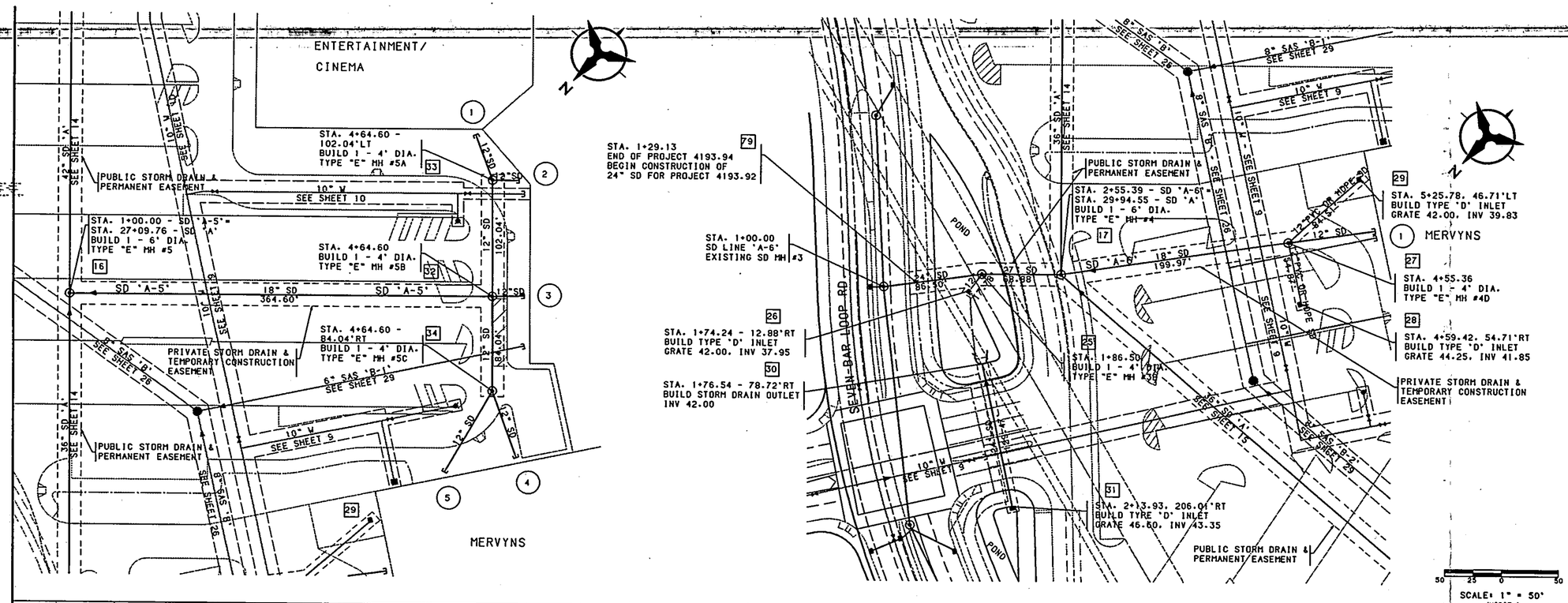
BENCH MARKS
THE BENCHMARK IS THE ACS STATION 1-B-13.
ELEVATION 5045.088. THE BRASS TABLET IS SET
IN THE TOP OF A CONCRETE POST LOCATED 170 FT.
SOUTHWEST OF THE JUNCTION OF COORS RD. N.W.
AND IRVING BLVD. N.W.

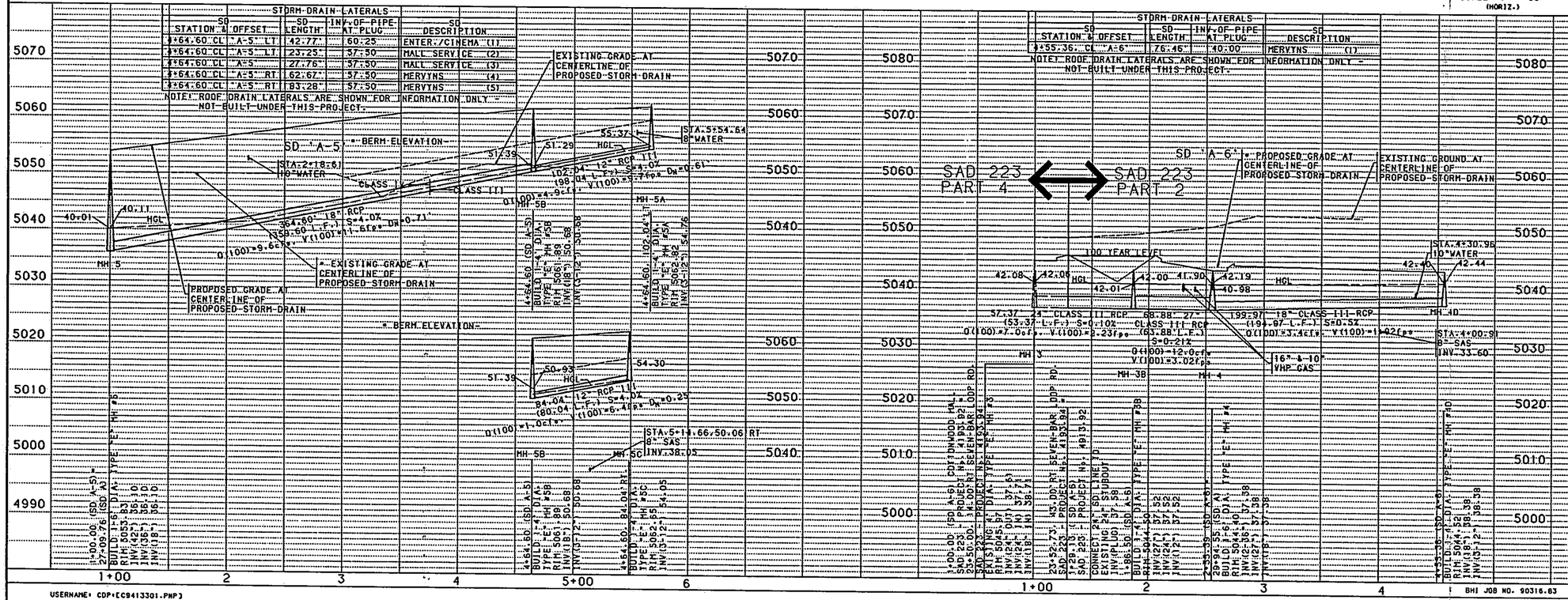
SURVEY INFORMATION
FIELD NOTES
NO. BY DATE

ENGINEERS SEAL

PROJECT NO. 4193.92
MAP NO. A13&14 B13&14
SHEET 20 OF 30

AZ-52




| COORDINATE DATA | | | |
|---|---|---|---|
| POINT | EASTING | NORTHING | DESCRIPTION |
| 16 | 78947.43 | 28105.90 | MANHOLE |
| 17 | 78756.87 | 28317.54 | MHAHOLE |
| 79 | 78845.20 | 28407.36 | MATCH PLUG |
| 25 | 78808.06 | 28363.63 | MANHOLE |
| 26 | 78806.18 | 28381.31 | "D" INLET |
| 27 | 78629.37 | 28163.49 | MANHOLE |
| 28 | 78584.68 | 28195.31 | "D" INLET |
| 29 | 78620.32 | 28079.46 | "D" INLET |
| 30 | 78754.52 | 28422.19 | OUTLET |
| 31 | 78649.83 | 28498.38 | "D" INLET |
| 32 | 78676.48 | 27861.93 | MANHOLE |
| 33 | 78744.86 | 27786.20 | MANHOLE |
| 34 | 78620.24 | 27924.39 | MANHOLE |

AS BUILT INFORMATION

CONTRACTOR
STAKED BY
INSPECTOR'S ACCEPTANCE BY
FIELD VERIFICATION BY
DRAWINGS CORRECTED BY

MICRO-FILM INFORMATION

RECORDED BY
NO.

BENCH MARKS

THE BENCHMARK IS THE ACS STATION 1-B-13.
ELEVATION 5045.088. THE BRASS TABLET IS SET IN THE TOP OF A CONCRETE POST LOCATED 170 FT. SOUTHWEST OF THE JUNCTION OF COORS RD. N.W. AND TRYING BLVD. N.W.

SURVEY INFORMATION

FIELD NOTES

| NO. | BY | DATE |
|---|---|---|
| | | |

ENGINEERS SEAL

| NO. | DATE | REMARKS | BY |
|---|---|---|---|
| | | REVISIONS | |

DESIGNED BY KLD.HSJ DESIGN DATE 6/94
DRAWN BY TSG.SAR DATE 6/94

• SURFACE GRADE AT TIME OF PIPE INSTALLATION


7500 JEFFERSON NE. COURTYARD I
ALBUQUERQUE, NM 87109
(505) 823-1000
BOHANNAN-HUSTON INC.

EASTERLING & ASSOCIATES, INC
CONSULTING ENGINEERS
5843 PARADISE BLVD. N.W. ALBQ., N.M. 87114
OFFICE (505) 898-8021 FAX (505) 898-8501

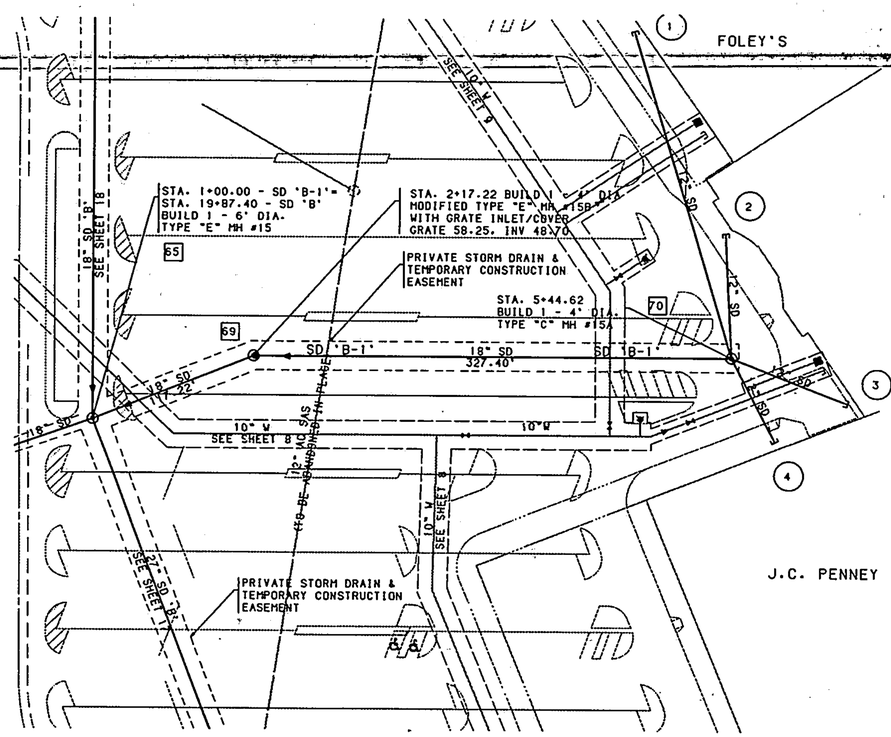

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

TITLE: MALL SITE IMPROVEMENTS
SAD 223 - PART 2
STORM DRAINS 'A-5' & 'A-6'

| APPROVALS | ENGINEER | DATE | APPROVALS | ENGINEER | DATE |
|---|---|---|---|---|---|
| D.R.C. Chair | | | WATER | | |
| TRANS. DEV. | | | WASTE WATER | | |
| HYDROLOGY | | | NPUI | | |
| PARKS | | | CODE / MECH | | |

PROJECT NO. 4193.92 | MAP NO. A13&14 B13&14 | SHEET 21 OF 30

AZ-53



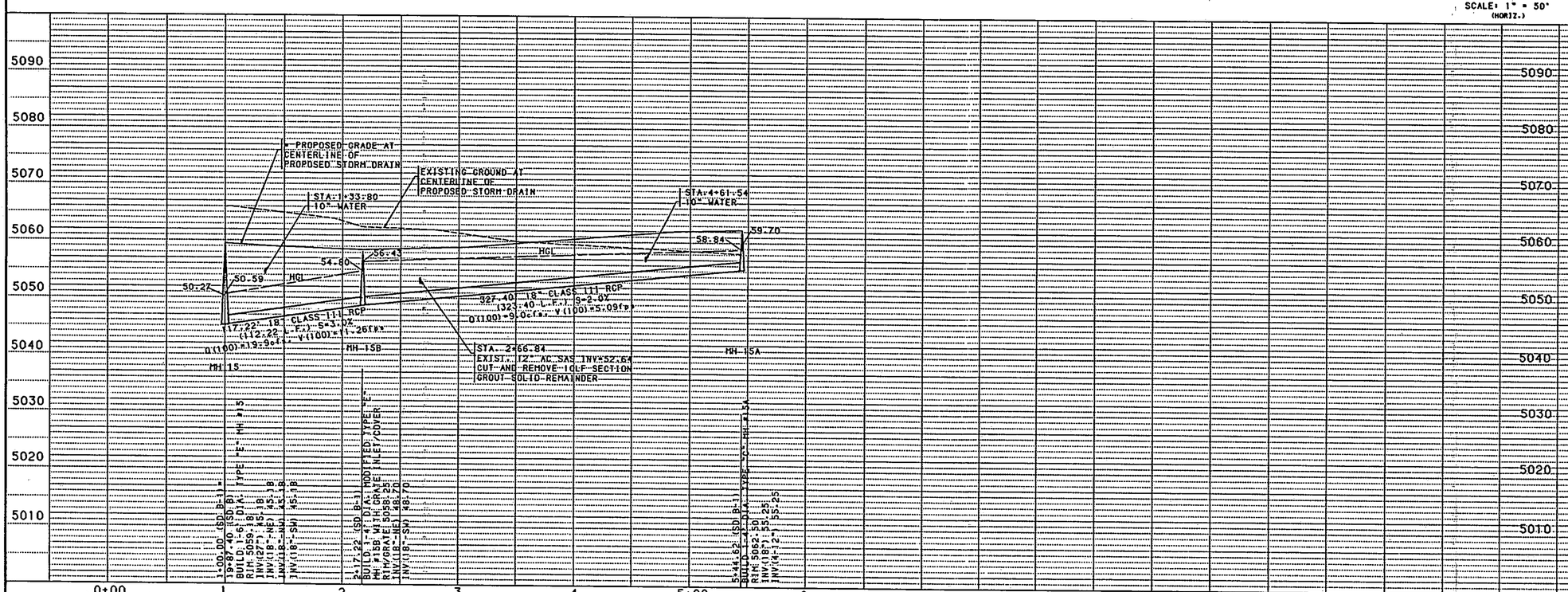

| STORM DRAIN LATERALS | | | |
|---|---|---|---|
| SD STATION & OFFSET | SD LENGTH | INV. OF PIPE AT PLUG | SD DESCRIPTION |
| 5+44.62. CL 'B-1' | 239.22' | 57.50 | FOLEY'S (1) |
| 5+44.62. CL 'B-1' | 86.20' | 57.50 | MALL SERVICE (2) |
| 5+44.62. CL 'B-1' | 86.03' | 57.50 | MALL SERVICE (3) |
| 5+44.62. CL 'B-1' | 66.20' | 57.50 | J.C. PENNEY (4) |

NOTE: ROOF DRAIN LATERALS ARE SHOWN FOR INFORMATION ONLY - NOT BUILT UNDER THIS PROJECT.

N

50 25 0 50
SCALE: 1" = 50' (HORIZ.)

| COORDINATE DATA | | | |
|---|---|---|---|
| POINT | EASTING | NORTHING | DESCRIPTION |
| 65 | 77874.42 | 27540.18 | MANHOLE |
| 69 | 77950.76 | 27619.47 | MANHOLE |
| 70 | 78267.98 | 27732.64 | MANHOLE |




USERNAME: CDP:CC9413301.PMP3
FILENAME: SDB1.GRF

BHI JOB NO. 90316.03

SCALE: 1" = 50' (HORIZ.) 1" = 10' (VERT.)

• SURFACE GRADE AT TIME OF PIPE INSTALLATION


7500 JEFFERSON NE. COURTYARD I
ALBUQUERQUE, NM 87109
(505) 823-1000
BOHANNAN HUSTON INC.

EASTERLING & ASSOCIATES, INC
CONSULTING ENGINEERS
5643 PARADISE BLVD. N.W. ALBQ., N.M., 87114
OFFICE (505) 898-8021 FAX (505) 898-8501


CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

TITLE: MALL SITE IMPROVEMENTS
SAD 223 - PART 2
STORM DRAIN 'B-1' PLAN & PROFILE

| APPROVALS | ENGINEER | DATE | APPROVALS | ENGINEER | DATE |
|---|---|---|---|---|---|
| D.R.C. Chair | | | WATER | | |
| TRANS. DEV. | | | WASTE WATER | | |
| HYDROLOGY | | | NMUI | | |
| PARKS | | | CODE / MECH | | |

| PROJECT NO. | MAP NO. | SHEET | OF |
|---|---|---|---|
| 4193.92 | A13&14 B13&14 | 22 | 30 |

AS BUILT INFORMATION

CONTRACTOR

WORK STAKED BY

INSPECTOR'S AGREEMENT MADE BY

FIELD VERIFICATION BY

DRAWINGS CORRECTED BY

MICRO-FILM INFORMATION

RECORDED BY

NO.

BENCH MARKS

THE BENCHMARK IS THE ACS STATION 1-B-13. ELEVATION 5045.088. THE BRASS TABLET IS SET IN THE TOP OF A CONCRETE POST LOCATED 170 FT. SOUTHWEST OF THE JUNCTION OF COORS RD. N.W. AND IRVING BLVD. N.W.

SURVEY INFORMATION

FIELD NOTES

| NO. | BY | DATE |
|---|---|---|

ENGINEERS SEAL

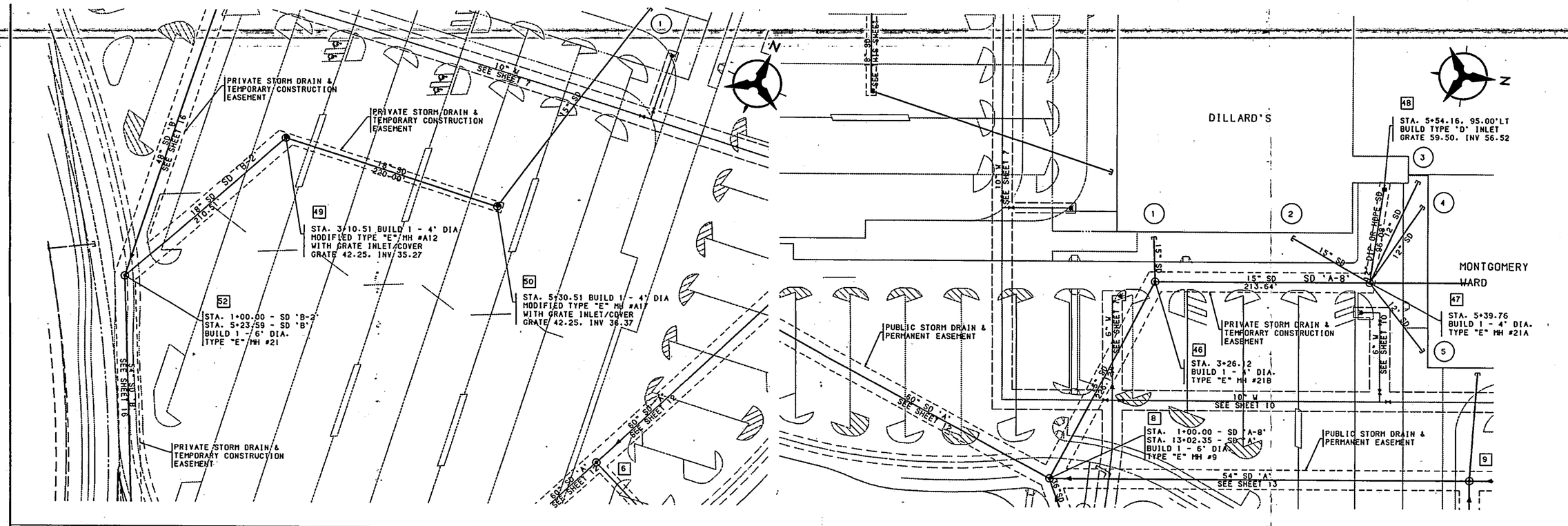
REVISIONS

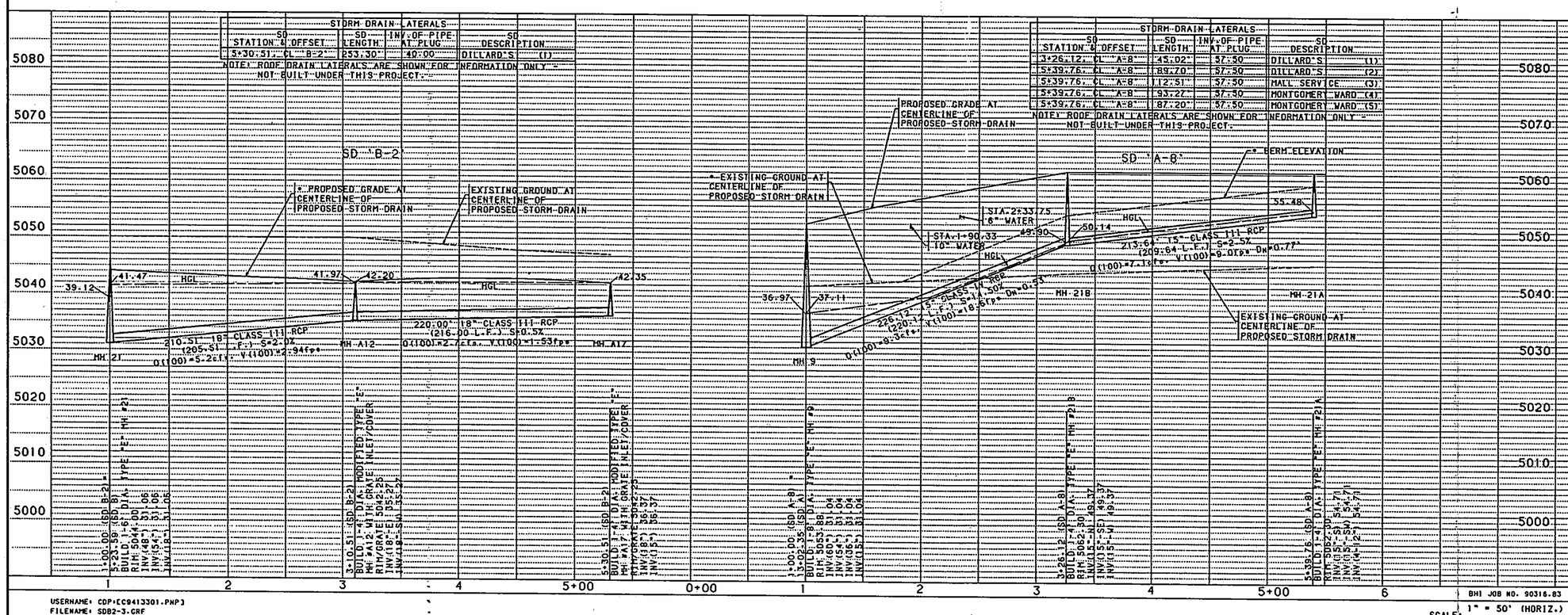
| NO. | DATE | REMARKS | BY |
|---|---|---|---|

DESIGNED BY KLD.MSJ DESIGN DATE 6/94

DRAWN BY TSG.SAR DATE 6/94

A2-54




| COORDINATE DATA | | | |
|---|---|---|---|
| POINT | EASTING | NORTHING | DESCRIPTION |
| 6 | 79090.11 | 26410.54 | MANHOLE |
| 8 | 79265.30 | 26825.04 | MANHOLE |
| 9 | 79221.53 | 27241.48 | MANHOLE |
| 46 | 79055.17 | 26908.55 | MANHOLE |
| 47 | 79032.84 | 27121.02 | MANHOLE |
| 48 | 78936.86 | 27125.41 | 'D' INLET |
| 49 | 78677.01 | 26583.79 | MANHOLE |
| 50 | 78895.80 | 26606.79 | 'D' INLET |
| 52 | 78588.53 | 26392.78 | MANHOLE |

* SURFACE GRADE AT TIME OF PIPE INSTALLATION


7500 JEFFERSON NE. COURTYARD I
ALBUQUERQUE, NM 87109
(505) 823-1000
ROMANIAK HUSTON INC.

EASTERLING & ASSOCIATES, INC
CONSULTING ENGINEERS
5643 PARADISE BLVD. N.W. ALBQ., N.M., 87114
OFFICE (505) 898-8021 FAX (505) 898-8501


CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

TITLE: MALL SITE IMPROVEMENTS
SAD 223 - PART 2
STORM DRAINS 'B-2' & 'A-8'

| APPROVALS | ENGINEER | DATE | APPROVALS | ENGINEER | DATE |
|---|---|---|---|---|---|
| D.R.C. Chair | | | WATER | | |
| TRANS. DEV. | | | WASTE WATER | | |
| HYDROLOGY | | | NMUI | | |
| PARKS | | | CODE / MECH | | |

BHI JOB NO. 90316.83

SCALE: 1" = 50' (HORIZ.) 1" = 10' (VERT.)

PROJECT NO. 4193.92 | MAP NO. A13&14 B13&14 | SHEET 23 OF 30

A2-55

AS BUILT INFORMATION

| | | | |
|---|---|---|---|
| CONTRACTOR | | | |
| WORK STAKED BY | | | |
| INSPECTOR'S INITIALS | | | |
| FIELD DOCUMENTATION BY | | | |
| DRAWINGS CORRECTED BY | | | |
| RECORDED BY | | | |
| NO. | | | |

BENCH MARKS

THE BENCHMARK IS THE ACS STATION 1-B-13. ELEVATION 5045.088. THE BRASS TABLET IS SET IN THE TOP OF A CONCRETE POST LOCATED 170 FT. SOUTHWEST OF THE JUNCTION OF COORS RD. N.W. AND IRVING BLVD. N.W.

SURVEY INFORMATION

FIELD NOTES

| NO. | BY | DATE |
|---|---|---|
| | | |

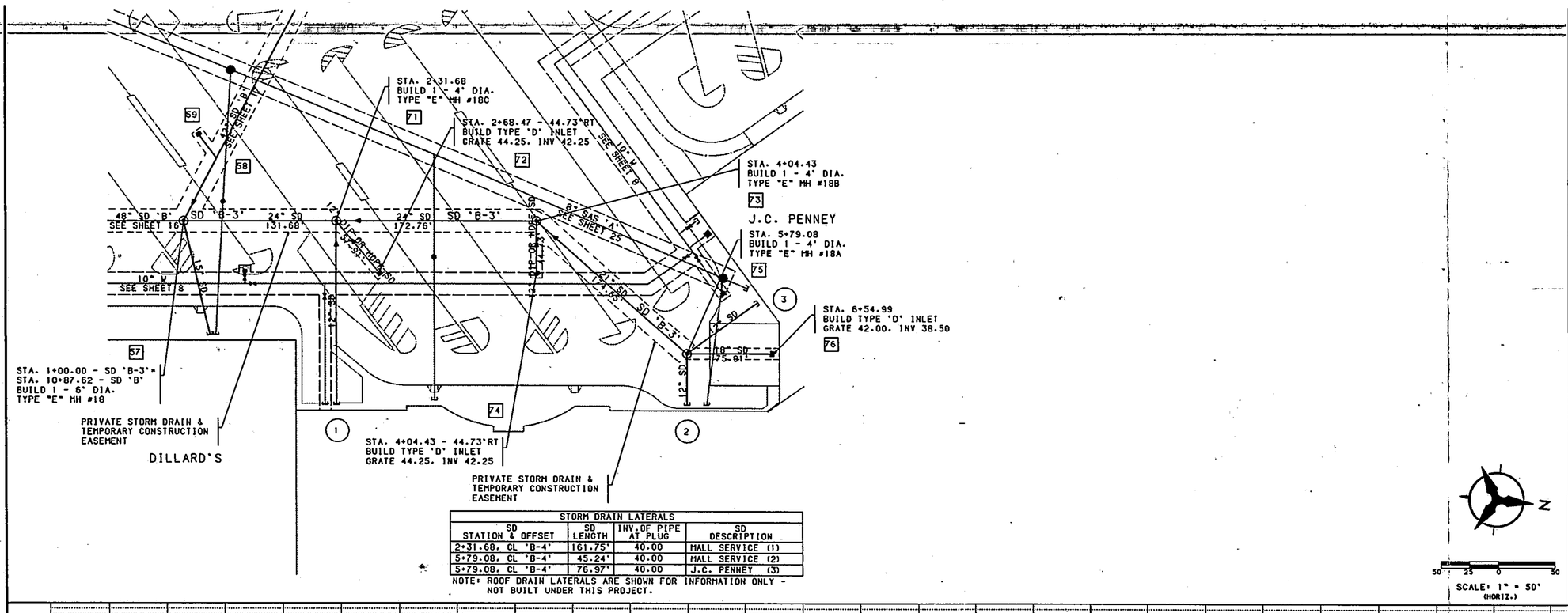
ENGINEERS SEAL

| NO. | DATE | REMARKS | BY |
|---|---|---|---|
| | | | |

REVISIONS

| | | | |
|---|---|---|---|
| DESIGNED BY | KLD.HSJ | DESIGN | DATE 6/94 |
| DRAWN BY | TSC.SAR | | DATE 6/94 |

USERNAME: CDP:[C9413301.PNP]
FILENAME: SDB2-3.GRF

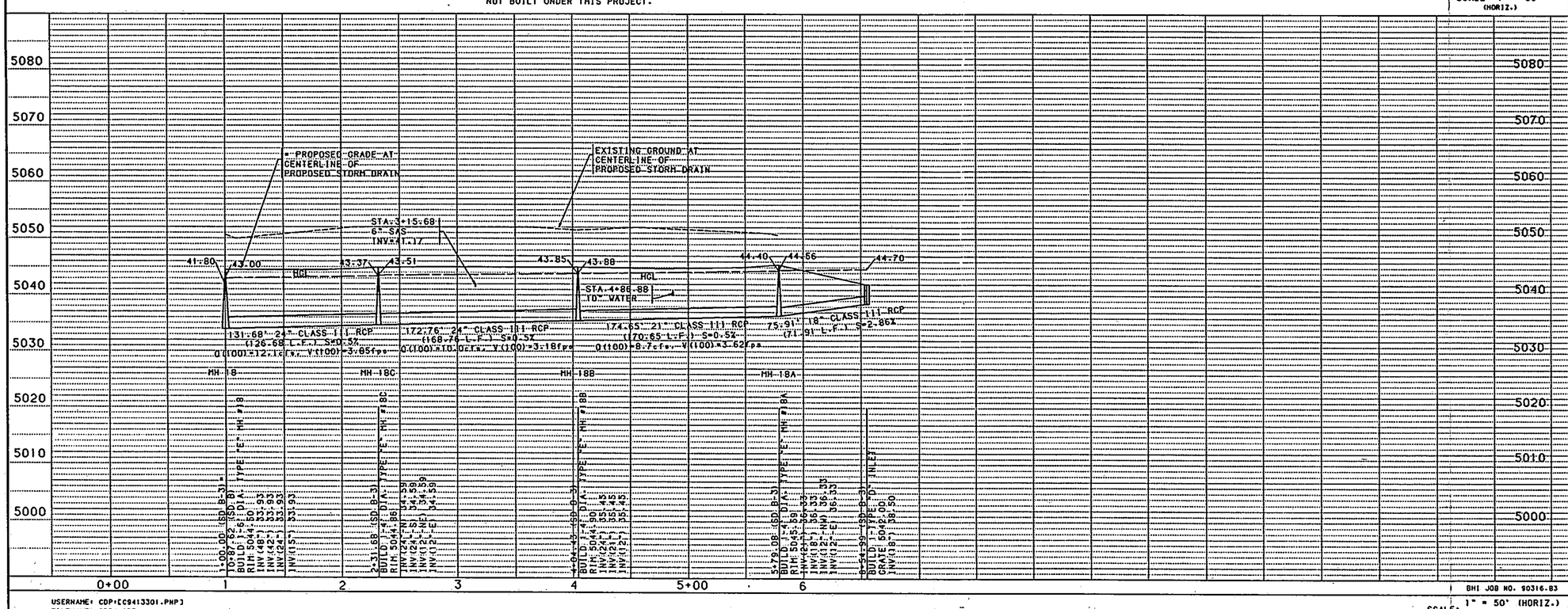



| STORM DRAIN LATERALS | | | |
|---|---|---|---|
| SD STATION & OFFSET | SD LENGTH | INV. OF PIPE AT PLUG | SD DESCRIPTION |
| 2+31.68, CL 'B-4' | 161.75' | 40.00 | MALL SERVICE (1) |
| 5+79.08, CL 'B-4' | 45.24' | 40.00 | MALL SERVICE (2) |
| 5+79.08, CL 'B-4' | 76.97' | 40.00 | J.C. PENNEY (3) |

NOTE: ROOF DRAIN LATERALS ARE SHOWN FOR INFORMATION ONLY - NOT BUILT UNDER THIS PROJECT.

50 25 0 50
SCALE: 1" = 50' (HORIZ.)

| COORDINATE DATA | | | |
|---|---|---|---|
| POINT | EASTING | NORTHING | DESCRIPTION |
| 57 | 78529.57 | 26953.72 | MANHOLE |
| 58 | 78472.01 | 26975.90 | WYE |
| 59 | 78453.57 | 26959.30 | 'D' INLET |
| 71 | 78515.81 | 27084.68 | MANHOLE |
| 72 | 78556.45 | 27125.94 | 'D' INLET |
| 73 | 78497.75 | 27256.49 | MANHOLE |
| 74 | 78542.24 | 27261.16 | 'D' INLET |
| 75 | 78600.02 | 27398.06 | MANHOLE |
| 76 | 78592.08 | 27473.56 | 'D' INLET |




• SURFACE GRADE AT TIME OF PIPE INSTALLATION

USERNAME: CDP:[C9413301.PNP]
FILENAME: SDB4.GRF

BHI JOB NO. 90316.83

SCALE: 1" = 50' (HORIZ.)
1" = 10' (VERT.)

AS BUILT INFORMATION

| CONTRACTOR | | |
|---|---|---|
| WORK STAKED BY | | |
| INSPECTOR'S ACCEPTANCE BY | | |
| VERIFICATION BY | | |
| DRAWINGS CORRECTED BY | | |
| RECORDED BY | | |
| NO. | | |

BENCH MARKS

THE BENCHMARK IS THE ACS STATION 1-B-13. ELEVATION 5045.088. THE BRASS TABLET IS SET IN THE TOP OF A CONCRETE POST LOCATED 170 FT. SOUTHWEST OF THE JUNCTION OF COORS RD. N.W. AND IRVING BLVD. N.W.

SURVEY INFORMATION

FIELD NOTES

| NO. | BY | DATE |
|---|---|---|
| | | |

ENGINEERS SEAL

REVISIONS

| NO. | DATE | REMARKS | BY |
|---|---|---|---|
| | | | |

DESIGNED BY KLD.HSJ DESIGN DATE 6/94
DRAWN BY TSG.SAR DATE 6/94

ROMAN HUSTON INC.

EASTERLING & ASSOCIATES, INC.
CONSULTING ENGINEERS
5643 PARADISE BLVD. N.W. ALBQ., N.M. 87114
OFFICE (505) 898-8021 FAX (505) 898-8501

7500 JEFFERSON NE, COURTYARD I
ALBUQUERQUE, NM 87109
(505) 823-1000

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

TITLE: MALL SITE IMPROVEMENTS
SAD 223 - PART 2
STORM DRAIN 'B-3' PLAN & PROFILE

| APPROVALS | ENGINEER | DATE | APPROVALS | ENGINEER | DATE |
|---|---|---|---|---|---|
| D.R.C. Chair | | | WATER | | |
| TRANS. DEV. | | | WASTE WATER | | |
| HYDROLOGY | | | NMUI | | |
| PARKS | | | CODE / MECH | | |

PROJECT NO. 4193.92 | MAP NO. A13&14 B13&14 | SHEET 24 OF 30

A2-56

SUMMARY OF HYDRAULIC CALCULATIONS
COTTONWOOD MALL TO CALABACILLAS ARROYO
FILENAME: CDP2:[C9413301.HYDRO] C_HGLMJ.WK4

| Station | Structure | Diam. | Q | Area | Vel. | HV | K | Sf | Length | MH Dia. | Angle | Hf | Hb | Hj | Hmh | Ht | Total Losses | HGL(dn) | HGL(up) | Grate Elevation | Low Point | EGL(dn) | EGL(up) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 21+86.02 | ARROYO | | | | | | | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 33.82 | | 1000 | 34.51 | 34.51 |
| | | 84 | 257.3 | 38.48 | 6.69 | 0.69 | 6388 | 0.0016 | 44.00 | | | 0.07 | | | | | | | | | | | |
| 22+30.02 | BEND | | | | | | | | | | 30 | | 0.08 | 0.00 | 0.00 | 0.00 | 0.08 | 33.89 | 33.98 | | 1000 | 34.59 | 34.67 |
| | | 84 | 255.9 | 38.48 | 6.65 | 0.69 | 6388 | 0.0016 | 40.00 | | | 0.06 | | | | | | | | | | | |
| 22+70.02 | BEND | | | | | | | | | | 30 | | 0.08 | 0.00 | 0.00 | 0.00 | 0.08 | 34.04 | 34.13 | | 1000 | 34.73 | 34.81 |
| | | 84 | 254.5 | 38.48 | 6.61 | 0.68 | 6388 | 0.0016 | 24.36 | | | 0.04 | | | | | | | | | | | |
| 22+94.38 | INLET 23-1 | | | | | | | | | | | | 0.00 | 0.08 | 0.00 | 0.00 | 0.08 | 34.17 | 34.33 | | 1000 | 34.85 | 34.93 |
| | | 84 | 238.7 | 38.48 | 6.20 | 0.60 | 6388 | 0.0014 | 275.00 | | | 0.38 | | | | | | | | | | | |
| 25+69.38 | JNC.IN 23 | | | | | | | | | | | | 0.00 | 0.05 | 0.00 | 0.00 | 0.05 | 34.72 | 35.05 | | 1000 | 35.31 | 35.37 |
| | | 84 | 174.1 | 38.48 | 4.52 | 0.32 | 6388 | 0.0007 | 25.76 | | | 0.02 | | | | | | | | | | | |
| 25+83.67 | BEND | | | | | | | | | | 30 | | 0.04 | 0.00 | 0.00 | 0.00 | 0.04 | 35.07 | 35.11 | | 1000 | 35.39 | 35.42 |
| | | 84 | 174.1 | 38.48 | 4.52 | 0.32 | 6388 | 0.0007 | 26.61 | | | 0.02 | | | | | | | | | | | |
| 26+07.83 | INLET E5 | | | | | | | | | | | | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 | 35.12 | 35.14 | | 1000 | 35.44 | 35.45 |
| | | 84 | 171.8 | 38.48 | 4.46 | 0.31 | 6388 | 0.0007 | 56.64 | | | 0.04 | | | | | | | | | | | |
| 26+64.47 | INLET E4 | | | | | | | | | | | | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 | 35.18 | 35.22 | | 1000 | 35.49 | 35.50 |
| | | 84 | 163.1 | 38.48 | 4.24 | 0.28 | 6388 | 0.0007 | 52.94 | | | 0.03 | | | | | | | | | | | |
| 27+10.11 | BEND | | | | | | | | | | 30 | | 0.03 | 0.00 | 0.00 | 0.00 | 0.03 | 35.25 | 35.28 | | 1000 | 35.53 | 35.56 |
| | | 84 | 163.1 | 38.48 | 4.24 | 0.28 | 6388 | 0.0007 | 132.72 | | | 0.09 | | | | | | | | | | | |
| 28+42.83 | INLET E3 | | | | | | | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 35.37 | 35.37 | | 1000 | 35.65 | 35.65 |
| | | 84 | 162.9 | 38.48 | 4.23 | 0.28 | 6388 | 0.0007 | 37.65 | | | 0.02 | | | | | | | | | | | |
| 28+80.48 | INLET E2 | | | | | | | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 35.40 | 35.41 | | 1000 | 35.67 | 35.68 |
| | | 84 | 161.2 | 38.48 | 4.19 | 0.27 | 6388 | 0.0006 | 67.61 | | | 0.04 | | | | | | | | | | | |
| 29+48.09 | INLET E1 | | | | | | | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 35.45 | 35.46 | | 1000 | 35.72 | 35.73 |
| | | 84 | 159.6 | 38.48 | 4.15 | 0.27 | 6388 | 0.0006 | 220.34 | | | 0.14 | | | | | | | | | | | |
| *BRANCH B: FLOWS COLLECTED ALONG SOUTHWEST SIDE OF MALL* | | | | | | | | | | | | | | | | | | | | | | | |
| 1+00.00 | MH 12 | | | | | | | | | 8 | 40 | | 0.07 | 0.66 | 0.00 | 0.03 | 0.77 | 35.60 | 35.76 | | 43.10 | 35.86 | 36.63 |
| | | 33 | 44.5 | 5.94 | 7.49 | 0.87 | 529 | 0.0071 | 41.20 | | | 0.29 | | | | | | | | | | | |
| 1+41.20 | MH 12A | | | | | | | | | 6 | 60 | | 0.12 | 0.00 | 0.00 | 0.00 | 0.12 | 36.05 | 38.73 | | 43.10 | 36.92 | 38.73 |
| | | 54 | 102.6 | 15.90 | 6.45 | 0.65 | 1966 | 0.0027 | 382.39 | | | 1.04 | | | | | | | 38.73 | 35.10 PONDING HGL =EGL | | | 38.73 |
| | | | | | | | | | | | | | | | | | | | (see page A2-37) | | | | |
| BRANCH B-2: FLOWS FROM DILLARD'S PARKING LOT | | | | | | | | | | | | | | | | | | | | | | | |
| | *MH 21* | | | | | | | | | 6 | 30 | | 0.04 | 1.76 | 0.00 | 0.04 | 1.84 | 39.12 | 41.47 | | 44.66 | 39.77 | 41.61 |
| | | 18 | 5.2 | 1.77 | 2.94 | 0.13 | 105 | 0.0025 | 210.51 | | | 0.52 | | | | | | | | | | | |
| | *INLET A12* | | | | | | | | | 4 | 60 | | 0.01 | 0.10 | 0.00 | 0.00 | 0.11 | 41.99 | 42.20 | 42.25 | 42.25 | 42.12 | 42.23 |
| | | 18 | 2.7 | 1.77 | 1.53 | 0.04 | 105 | 0.0007 | 220.00 | | | 0.15 | | | | | | | | 42.25 | | | |
| 5+23.59 | MH 21 | | | | | | | | | 6 | 19 | | 0.07 | 0.25 | 0.00 | 0.00 | 0.33 | 39.12 | 39.20 | | 44.66 | 39.77 | 40.10 |
| | | 48 | 95.7 | 12.57 | 7.62 | 0.90 | 1436 | 0.0044 | 306.31 | | | 1.36 | | | | | | | | | | | |
| 8+29.90 | MH 20 | | | | | | | | | 6 | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 40.56 | 40.56 | 43.25 | 43.89 | 41.46 | 41.46 |
| | | 48 | 95.6 | 12.57 | 7.61 | 0.90 | 1436 | 0.0044 | 133.22 | | | 0.59 | | | | | | | | | | | |
| 9+63.12 | MH 19 | | | | | | | | | 6 | | | 0.00 | 0.07 | 0.00 | 0.00 | 0.07 | 41.15 | 41.29 | 43.25 | 44.50 | 42.05 | 42.12 |
| | | 48 | 91.7 | 12.57 | 7.30 | 0.83 | 1436 | 0.0041 | 124.50 | | | 0.51 | | | | | | | | | | | |
| BRANCH B-3: FLOWS FROM MALL AND ASSOCIATED PARKING LOT | | | | | | | | | | | | | | | | | | | | | | | |
| | *MH 18* | | | | | | | | | 6 | | | 0.00 | 0.56 | 0.00 | 0.04 | 0.60 | 41.80 | 43.00 | | 44.50 | 42.63 | 43.23 |
| | | 24 | 12.1 | 3.14 | 3.85 | 0.23 | 226 | 0.0029 | 131.68 | | | 0.38 | | | | | | | | | | | |
| | *MH 18C* | | | | | | | | | 6 | | | 0.00 | 0.07 | 0.00 | 0.00 | 0.07 | 43.37 | 43.51 | 44.25 | 44.86 | 43.60 | 43.67 |
| | | 24 | 10.0 | 3.14 | 3.18 | 0.16 | 226 | 0.0020 | 172.76 | | | 0.34 | | | | | | | | | | | |
| | *MH 18B* | | | | | | | | | 6 | 42 | | 0.02 | 0.05 | 0.00 | 0.00 | 0.07 | 43.85 | 43.88 | 44.25 | 45.00 | 44.01 | 44.08 |
| | | 21 | 8.7 | 2.41 | 3.62 | 0.20 | 158 | 0.0030 | 174.65 | | | 0.53 | | | | | | | | | | | |
| | *MH 18A* | | | | | | | | | 6 | 45 | | 0.02 | 0.07 | 0.00 | 0.00 | 0.09 | 44.40 | 44.56 | | 45.59 | 44.61 | 44.70 |
| | | 18 | 5.2 | 1.77 | 2.94 | 0.13 | 105 | 0.0025 | 70.00 | | | 0.17 | | | | | | | | 42.00 | | | |
| 10+87.62 | MH 18 | | | | | | | | | 6 | 63 | | 0.15 | 0.19 | 0.00 | 0.00 | 0.35 | 41.80 | 41.98 | | 44.50 | 42.63 | 42.98 |
| | | 42 | 77.0 | 9.62 | 8.00 | 0.99 | 1006 | 0.0059 | 62.00 | | | 0.36 | | | | | | | | | | | |
| | *WYE* | | | | | | | | | | | | 0.00 | -0.51 | 0.00 | 0.02 | -0.49 | 42.34 | 42.36 | 44.25 | 45.00 | 43.34 | 42.85 |
| | | 18 | 9.9 | 1.77 | 5.60 | 0.49 | 105 | 0.0089 | 24.81 | | | 0.22 | | | | | | 42.58 | | 43.25 | 44.25 | | |
| | *INLET A8* | | | | | | | | | | | | | | | | | | | | | | |
| 11+49.62 | WYE | | | | | | | | | | | | 0.00 | 0.16 | 0.00 | 0.00 | 0.16 | 42.34 | 42.73 | 43.25 | 43.25 | 43.34 | 43.49 |
| | | 42 | 67.4 | 9.62 | 7.01 | 0.76 | 1006 | 0.0045 | 171.83 | | | 0.77 | | | | | | | | | | | |
| 13+21.45 | MH 17 | | | | | | | | | 6 | 26 | | 0.07 | 0.24 | 0.00 | 0.00 | 0.31 | 43.50 | 44.05 | 48.90 | 48.95 | 44.27 | 44.57 |
| | | 42 | 55.9 | 9.62 | 5.81 | 0.52 | 1006 | 0.0031 | 215.95 | | | 0.67 | | | | | | | | | | | |

A2-57

SUMMARY OF HYDRAULIC CALCULATIONS
COTTONWOOD MALL TO CALABACILLAS ARROYO
FILENAME: CDP2:[C9413301.HYDRO] C_HGLMJ.WK4

| Station | Structure | Diam. | Q | Area | Vel. | HV | K | Sf | Length | MH Dia. | Angle | Hf | Hb | Hj | Hmh | Ht | Total Losses | HGL(dn) | HGL(up) | Grate Elevation | Low Point | EGL(dn) | EGL(up) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15+37.40 | MH 16 | | | | | | | | | 6 | 3 | | 0.03 | 0.77 | 0.00 | 0.02 | 0.82 | 44.71 | 44.94 | 53.45 | 53.94 | 45.24 | 46.06 |
| | | 27 | 33.7 | 3.98 | 8.48 | 1.12 | 310 | 0.0118 | 450.00 | | | 5.33 | | | | | | | | | | | |
| | BRANCH B-1: FLOWS FROM FOLEYS , JC PENNY AND PARKING LOT | | | | | | | | | | | | | | | | | | | | | | |
| | *MH 15* | | | | | | | | | 6 | 85 | | 0.29 | 0.85 | 0.00 | 0.02 | 1.17 | 50.27 | 50.59 | | 59.00 | 51.39 | 52.56 |
| | | 18 | 19.9 | 1.77 | 11.26 | 1.97 | 105 | 0.0359 | 117.22 | | | 4.21 | | | | | | | | | | | |
| | *INLET A2* | | | | | | | | | 6 | 10 | | 0.07 | 0.00 | 0.00 | 0.00 | 0.07 | 54.80 | 56.43 | 58.25 | 58.25 | 56.77 | 56.84 |
| | | 18 | 9.0 | 1.77 | 5.09 | 0.40 | 105 | 0.0073 | 327.40 | | | 2.40 | | | | | | | | | | | |
| | *MH 15A* | | | | | | | | | 6 | 110 | | 0.05 | 0.50 | 0.00 | 0.02 | 0.57 | 58.84 | 59.70 | | 62.50 | 59.24 | 59.81 |
| | | 12 | 2.1 | 0.79 | 2.67 | 0.11 | 36 | 0.0035 | 200.00 | | | 0.69 | | | | | | | | | | | |
| 19+87.40 | MH 15 | | | | | | | | | 6 | 20 | | 0.07 | 1.88 | 0.00 | 0.04 | 1.98 | 50.27 | 52.97 | 58.60 | 59.50 | 51.39 | 53.37 |
| | | 18 | 9.0 | 1.77 | 5.09 | 0.40 | 105 | 0.0073 | 450.00 | | | 3.30 | | | | | | | | | | | |
| 24+37.40 | MH 14 | | | | | | | | | 6 | 28 | | 0.04 | 0.00 | 0.00 | 0.00 | 0.04 | 56.27 | 56.43 | | 62.25 | 56.67 | 56.71 |
| | | 18 | 7.6 | 1.77 | 4.30 | 0.29 | 105 | 0.0052 | 227.76 | | | 1.19 | | | | | | | | 60.25 | | | |
| *BRANCH A: FLOWS COLLECTED ALONG NORTHEAST SIDE OF MALL* | | | | | | | | | | | | | | | | | | | | | | | |
| 2+76.20 | MH 12 | | | | | | | | | 8 | 90 | | 0.05 | 0.02 | 0.00 | 0.00 | 0.07 | 35.60 | 35.65 | | 43.10 | 35.86 | 35.94 |
| | | 72 | 120.7 | 28.27 | 4.27 | 0.28 | 4235 | 0.0008 | 262.79 | | | 0.21 | | | | | | | | | | | |
| 5+38.99 | MH 11 | | | | | | | | | 8 | 42 | | 0.04 | 0.05 | 0.00 | 0.00 | 0.09 | 35.87 | 35.91 | 42.25 | 47.72 | 36.15 | 36.24 |
| | | 66 | 110.4 | 23.76 | 4.65 | 0.34 | 3358 | 0.0011 | 313.36 | | | 0.34 | | | | | | | | | | | |
| 8+52.35 | MH 10 | | | | | | | | | 6 | | | 0.00 | 0.10 | 0.00 | 0.00 | 0.10 | 36.25 | 36.25 | 45.80 | 46.17 | 36.58 | 36.69 |
| | | 60 | 104.2 | 19.63 | 5.31 | 0.44 | 2604 | 0.0016 | 450.00 | | | 0.72 | | | | | | | | | | | |
| | BRANCH A-1: FLOWS FROM DILLARDS AND MONTGOMERY WARD | | | | | | | | | | | | | | | | | | | | | | |
| | *MH 9* | | | | | | | | | 6 | 90 | | 0.13 | 0.45 | 0.00 | 0.02 | 0.60 | 36.97 | 37.11 | | 53.88 | 37.41 | 38.01 |
| | | 15 | 9.3 | 1.23 | 7.58 | 0.89 | 65 | 0.0207 | 226.12 | | | 4.69 | | | | | | | | | | | |
| | *MH 21B* | | | | | | | | | 6 | 60 | | 0.11 | 0.23 | 0.00 | 0.00 | 0.34 | 41.80 | 42.51 | | 62.20 | 42.69 | 43.03 |
| | | 15 | 7.1 | 1.23 | 5.79 | 0.52 | 65 | 0.0121 | 213.64 | | | 2.58 | | | | | | | | | | | |
| | *MH 21A* | | | | | | | | | 6 | 150 | | 0.08 | 0.66 | 0.00 | 0.02 | 0.76 | 45.09 | 46.22 | | 59.50 | 45.61 | 46.37 |
| | | 12 | 2.5 | 0.79 | 3.18 | 0.16 | 36 | 0.0049 | 100.00 | | | 0.49 | | | | | | | | 59.50 | | | |
| | BRANCH A-2: FLOWS FROM C BASINS | | | | | | | | | | | | | | | | | | | | | | |
| | *MH 9* | | | | | | | | | 6 | 45 | | 0.04 | -0.10 | 0.00 | 0.01 | -0.05 | 36.97 | 37.18 | | 53.88 | 37.41 | 37.36 |
| | | 33 | 19.8 | 5.94 | 3.33 | 0.17 | 529 | 0.0014 | 74.71 | | | 0.10 | | | | | | | | | | | |
| | *MH 9B* | | | | | | | | | 6 | 45 | | 0.02 | 0.00 | 0.00 | 0.00 | 0.02 | 37.29 | 37.31 | | 52.60 | 37.46 | 37.48 |
| | | 33 | 19.8 | 5.94 | 3.33 | 0.17 | 529 | 0.0014 | 277.34 | | | 0.39 | | | | | | | | | | | |
| | *MH 9A* | | | | | | | | | 6 | 45 | | 0.03 | 0.13 | 0.00 | 0.00 | 0.16 | 37.70 | 37.75 | 38.27 | 40.00 | 37.87 | 38.03 |
| | | 24 | 13.3 | 3.14 | 4.23 | 0.28 | 226 | 0.0035 | 50.26 | | | 0.17 | | | | | | | | 38.00 | | | |
| 13+02.35 | MH 9 | | | | | | | | | 6 | 20 | | 0.04 | 0.15 | 0.00 | 0.00 | 0.19 | 36.97 | 37.21 | | 53.88 | 37.41 | 37.59 |
| | | 54 | 79.1 | 15.90 | 4.97 | 0.38 | 1966 | 0.0016 | 418.74 | | | 0.68 | | | | | | | | | | | |
| | *MH 8* | | | | | | | | | 6 | 90 | | 0.06 | -0.01 | 0.00 | 0.00 | 0.05 | 37.89 | 38.09 | | 52.60 | 38.27 | 38.32 |
| | | 18 | 6.9 | 1.77 | 3.90 | 0.24 | 105 | 0.0043 | 211.00 | | | 0.91 | | | | | | | | | | | |
| 17+21.09 | MH 8 | | | | | | | | | 6 | | | 0.00 | 0.07 | 0.00 | 0.00 | 0.07 | 37.89 | 38.02 | | 48.90 | 38.27 | 38.34 |
| | | 54 | 71.9 | 15.90 | 4.52 | 0.32 | 1966 | 0.0013 | 116.01 | | | 0.16 | | | | | | | | | | | |
| 18+37.10 | MH 8A | | | | | | | | | 6 | | | 0.00 | 0.02 | 0.00 | 0.00 | 0.02 | 38.18 | 38.22 | 42.25 | 42.25 | 38.49 | 38.52 |
| | | 54 | 69.1 | 15.90 | 4.34 | 0.29 | 1966 | 0.0012 | 165.03 | | | 0.20 | | | | | | | | | | | |
| | BRANCH A-3: FLOWS FROM MONTGOMERY WARD AND ENTERTAINMENT CENTER | | | | | | | | | | | | | | | | | | | | | | |
| | *MH 7* | | | | | | | | | 6 | 90 | | 0.05 | 0.06 | 0.00 | 0.00 | 0.11 | 38.43 | 38.61 | | 44.50 | 38.72 | 38.83 |
| | | 21 | 9.0 | 2.41 | 3.74 | 0.22 | 158 | 0.0032 | 220.00 | | | 0.71 | | | | | | | | | | | |
| | *MH 7A* | | | | | | | | | 6 | 30 | | 0.01 | 0.20 | 0.00 | 0.04 | 0.25 | 39.32 | 39.78 | 42.00 | 42.00 | 39.54 | 39.79 |
| | | 12 | 0.3 | 0.79 | 0.38 | 0.00 | 36 | 0.0001 | 61.19 | | | 0.00 | | | | | | | | 42.00 | | | |
| 20+02.13 | MH 7 | | | | | | | | | 6 | | | 0.00 | 0.07 | 0.00 | 0.00 | 0.07 | 38.43 | 38.56 | | 44.00 | 38.72 | 38.79 |
| | | 54 | 60.5 | 15.90 | 3.80 | 0.22 | 1966 | 0.0009 | 110.00 | | | 0.10 | | | | | | | | | | | |
| | BRANCH A-4: FLOWS FROM BASIN B-9, B-10, AND B-13 | | | | | | | | | | | | | | | | | | | | | | |
| | *MH 6* | | | | | | | | | 6 | 90 | | 0.04 | -0.08 | 0.00 | 0.00 | -0.05 | 38.67 | 38.71 | | 40.60 | 38.89 | 38.85 |
| | | 27 | 12.0 | 3.98 | 3.02 | 0.14 | 310 | 0.0015 | 190.00 | | | 0.29 | | | | | | | | | | | |
| | *MH INLET* | | | | | | | | | 4 | | | 0.00 | 0.05 | 0.00 | 0.00 | 0.05 | 38.99 | 39.03 | 39.25 | 39.25 | 39.13 | 39.19 |
| | | 24 | 10.0 | 3.14 | 3.18 | 0.16 | 226 | 0.0020 | 150.00 | | | 0.29 | | | | | | | | | | | |

A2-58

SUMMARY OF HYDRAULIC CALCULATIONS
COTTONWOOD MALL TO CALABACILLAS ARROYO
FILENAME: CDP2:[C9413301.HYDRO] C_HGLMJ.WK4

| Station | Structure | Diam. | Q | Area | Vel. | HV | K | Sf | Length | MH Dia. | Angle | Hf | Hb | Hj | Hmh | Ht | Total Losses | HGL(dn) | HGL(up) | Grate Elevation | Low Point | EGL(dn) | EGL(up) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *MH 6A* | | | | | | | | | 6 | 70 | | 0.03 | 0.00 | 0.00 | 0.00 | 0.03 | 39.32 | 39.35 | | 41.50 | 39.48 | 39.51 |
| | | 24 | 10.0 | 3.14 | 3.18 | 0.16 | 226 | 0.0020 | 95.00 | | | 0.19 | | | | | | | | | | | |
| | *WYE* | | | | | | | | | | | | 0.00 | -0.05 | 0.00 | 0.00 | -0.05 | 39.54 | 39.55 | 41.00 | 41.00 | 39.69 | 39.64 |
| | | 12 | 1.9 | 0.79 | 2.42 | 0.09 | 36 | 0.0028 | 180.00 | | | 0.51 | | | | | | | | 37.50 | | | |
| 21+12.14 | MH 6 | | | | | | | | | 6 | | | 0.00 | 0.17 | 0.00 | 0.00 | 0.17 | 38.67 | 38.67 | 40.25 | 49.81 | 38.89 | 39.06 |
| | | 42 | 48.2 | 9.62 | 5.01 | 0.39 | 1006 | 0.0023 | 245.00 | | | 0.56 | | | | | | | | | | | |
| 23+58.59 | MH 5D | | | | | | | | | 6 | 45 | | 0.05 | 0.04 | 0.00 | 0.00 | 0.09 | 39.24 | 39.36 | | 57.20 | 39.62 | 39.71 |
| | | 42 | 45.9 | 9.62 | 4.77 | 0.35 | 1006 | 0.0021 | 310.06 | | | 0.65 | | | | | | | | | | | |
| 27+09.76 | MH 5 | | | | | | | | | 6 | | | 0.00 | 0.14 | 0.00 | 0.00 | 0.14 | 40.01 | 40.04 | | 54.91 | 40.36 | 40.50 |
| | | 36 | 38.6 | 7.07 | 5.46 | 0.46 | 667 | 0.0033 | 281.97 | | | 0.94 | | | | | | | | | | | |
| | BRANCH A-6a: FLOWS FROM SEVEN BAR LOOP RD AND PONDS | | | | | | | | | | | | | | | | | | | | | | |
| | *MH 4* | | | | | | | | | 6 | 90 | | 0.06 | 0.52 | 0.00 | 0.02 | 0.59 | 40.98 | 41.90 | | 46.56 | 41.44 | 42.04 |
| | | 27 | 12.0 | 3.98 | 3.02 | 0.14 | 310 | 0.0015 | 68.88 | | | 0.10 | | | | | | | | | | | |
| | *MH 3B* | | | | | | | | | 6 | 5 | | 0.00 | -0.07 | 0.00 | 0.00 | -0.06 | 42.00 | 42.01 | | 46.10 | 42.14 | 42.08 |
| | | 24 | 6.9 | 3.14 | 2.20 | 0.07 | 226 | 0.0009 | 57.37 | | | 0.05 | | | | | | | | 42.00 | | | |
| | *MH 3* | | | | | | | | | 6 | 90 | | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 42.06 | 42.08 | | 46.00 | 42.14 | 42.15 |
| | | 24 | 6.9 | 3.14 | 2.20 | 0.07 | 226 | 0.0009 | 210.00 | | | 0.20 | | | | | | | | | | | |
| | BRANCH A-6b: FLOWS FROM MERVYN'S AND PARKING LOT | | | | | | | | | | | | | | | | | | | | | | |
| | *MH 4* | | | | | | | | | 6 | 90 | | 0.04 | 0.72 | 0.00 | 0.04 | 0.80 | 40.98 | 42.19 | | 46.56 | 41.44 | 42.25 |
| | | 18 | 3.4 | 1.77 | 1.92 | 0.06 | 105 | 0.0010 | 200.00 | | | 0.21 | | | | | | | | | | | |
| | *MH 4D* | | | | | | | | | 6 | 90 | | 0.02 | 0.08 | 0.00 | 0.00 | 0.09 | 42.40 | 42.44 | 42.80 | 45.00 | 42.46 | 42.55 |
| | | 12 | 2.1 | 0.79 | 2.67 | 0.11 | 36 | 0.0035 | 55.00 | | | 0.19 | | | | | | | | 44.25 | | | |
| 29+94.55 | MH 4 | | | | | | | | | 6 | 50 | | 0.05 | 0.28 | 0.00 | 0.00 | 0.32 | 40.98 | 41.58 | | 45.02 | 41.44 | 41.77 |
| | | 36 | 24.4 | 7.07 | 3.45 | 0.19 | 667 | 0.0013 | 391.68 | | | 0.52 | | | | | | | | | | | |
| | BRANCH A-7: FLOWS FROM FOLEY'S AND PARKING LOT | | | | | | | | | | | | | | | | | | | | | | |
| | *MH 4C* | | | | | | | | | 6 | | | 0.00 | 0.14 | 0.00 | 0.00 | 0.14 | 42.11 | 42.27 | | 48.07 | 42.29 | 42.44 |
| | | 30 | 16.2 | 4.91 | 3.30 | 0.17 | 410 | 0.0016 | 240.00 | | | 0.37 | | | | | | | | | | | |
| | *MH 4A* | | | | | | | | | 6 | 90 | | 0.03 | 0.05 | 0.00 | 0.00 | 0.08 | 42.64 | 42.72 | | 44.00 | 42.81 | 42.89 |
| | | 18 | 5.9 | 1.77 | 3.34 | 0.17 | 105 | 0.0032 | 99.00 | | | 0.31 | | | | | | | | 42.00 | | | |
| 33+86.23 | MH 4C | | | | | | | | | 6 | 90 | | 0.04 | 0.03 | 0.00 | 0.00 | 0.07 | 42.11 | 42.16 | | 48.07 | 42.29 | 42.37 |
| | | 21 | 8.7 | 2.41 | 3.62 | 0.20 | 158 | 0.0030 | 174.83 | | | 0.53 | | | | | | | | | | | |
| 35+61.06 | MH 4B | | | | | | | | | 6 | 90 | | 0.04 | 0.10 | 0.00 | 0.00 | 0.15 | 42.69 | 42.82 | | 44.50 | 42.89 | 43.04 |
| | | 18 | 6.6 | 1.77 | 3.73 | 0.22 | 105 | 0.0039 | 54.42 | | | 0.21 | | | | | | | | 44.25 | | | |

A2-59

Normal Depth Calc: 12" Connector – Basin B-16
Line "A-2"

12" RCP -- SLOPE=2.5%

CULVERT RATING TABLE

12. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 1.00 SLOPE = 0.02500

| FLOW DEPTH (IN) | FLOW AREA (SQ FT) | DISCHARGE (CFS) | VELOCITY (FPS) |
|---|---|---|---|
| 1.00000 | 0.03126 | 0.08009 | 2.56212 |
| 2.00000 | 0.08604 | 0.34015 | 3.95331 |
| 3.00000 | 0.15355 | 0.77166 | 5.02557 |
| 4.00000 | 0.22917 | 1.35047 | 5.89283 |
| 5.00000 | 0.30975 | 2.04469 | 6.60103 |
| 6.00000 | 0.39270 | 2.81664 | 7.17252 |
| 7.00000 | 0.47564 | 3.62334 | 7.61775 |
| 8.00000 | 0.55623 | 4.41582 | 7.93891 |
| 9.00000 | 0.63185 | 5.13687 | 8.12986 |
| 10.00000 | 0.69936 | 5.71468 | 8.17134 |
| 11.00000 | 0.75414 | 6.04087 | 8.01030 |
| 12.00000 | 0.78540 | 5.63329 | 7.17252 |

@Q=5.6cfs
$D_N$=.82'
V=8.1fps

Normal Depth Calc: 18" SD - Basin B-16
Line "A-Z"

18" RCP -- SLOPE=4.1%

CULVERT RATING TABLE

18. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 1.00 SLOPE = 0.04100

| FLOW DEPTH (IN) | FLOW AREA (SQ FT) | DISCHARGE (CFS) | VELOCITY (FPS) |
|---|---|---|---|
| 1.00000 | 0.03862 | 0.12788 | 3.31101 |
| 2.00000 | 0.10733 | 0.55387 | 5.16044 |
| 3.00000 | 0.19359 | 1.28429 | 6.63402 |
| 4.00000 | 0.29241 | 2.30344 | 7.87755 |
| 5.00000 | 0.40056 | 3.58568 | 8.95170 |
| 6.00000 | 0.51564 | 5.09899 | 9.88872 |
| 7.00000 | 0.63565 | 6.80639 | 10.70784 |
| 8.00000 | 0.75883 | 8.66669 | 11.42113 |
| 9.00000 | 0.88357 | 10.63482 | 12.03616 |
| 10.00000 | 1.00831 | 12.66170 | 12.55730 |
| 11.00000 | 1.13150 | 14.69394 | 12.98626 |
| 12.00000 | 1.25151 | 16.67287 | 13.32224 |
| 13.00000 | 1.36659 | 18.53295 | 13.56150 |
| 14.00000 | 1.47474 | 20.19851 | 13.69632 |
| 15.00000 | 1.57355 | 21.57698 | 13.71227 |
| 16.00000 | 1.65981 | 22.54187 | 13.58096 |
| 17.00000 | 1.72852 | 22.87300 | 13.23268 |
| 18.00000 | 1.76715 | 21.26965 | 12.03616 |

@ Q = 8.1 cfs
$D_N$ = .64'
V = 11.2 fps

Normal Depth Calc: 18"SO - Basin B-5
Line "A-5"

18" RCP -- SLOPE=4.0%

CULVERT RATING TABLE

18. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 1.00 SLOPE = 0.04000

| FLOW DEPTH (IN) | FLOW AREA (SQ FT) | DISCHARGE (CFS) | VELOCITY (FPS) |
|---|---|---|---|
| 1.00000 | 0.03862 | 0.12631 | 3.27038 |
| 2.00000 | 0.10733 | 0.54707 | 5.09712 |
| 3.00000 | 0.19359 | 1.26853 | 6.55262 |
| 4.00000 | 0.29241 | 2.27517 | 7.78089 |
| 5.00000 | 0.40056 | 3.54169 | 8.84186 |
| 6.00000 | 0.51564 | 5.03643 | 9.76739 |
| 7.00000 | 0.63565 | 6.72287 | 10.57645 |
| 8.00000 | 0.75883 | 8.56035 | 11.28098 |
| 9.00000 | 0.88357 | 10.50432 | 11.88847 |
| 10.00000 | 1.00831 | 12.50634 | 12.40322 |
| 11.00000 | 1.13150 | 14.51364 | 12.82692 |
| 12.00000 | 1.25151 | 16.46829 | 13.15877 |
| 13.00000 | 1.36659 | 18.30554 | 13.39510 |
| 14.00000 | 1.47474 | 19.95067 | 13.52826 |
| 15.00000 | 1.57355 | 21.31223 | 13.54402 |
| 16.00000 | 1.65981 | 22.26527 | 13.41431 |
| 17.00000 | 1.72852 | 22.59234 | 13.07032 |
| 18.00000 | 1.76715 | 21.00866 | 11.88848 |

@Q=9.6 cfs

$D_N$ = .71'

V = 11.6 fps

Normal Depth Calc: 12"SD - Basin B-5, Line "A-5."

12" RCP -- SLOPE=4.0%

CULVERT RATING TABLE

12. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 1.00 SLOPE = 0.04000

| FLOW DEPTH (IN) | FLOW AREA (SQ FT) | DISCHARGE (CFS) | VELOCITY (FPS) |
|---|---|---|---|
| 1.00000 | 0.03126 | 0.10131 | 3.24085 |
| 2.00000 | 0.08604 | 0.43025 | 5.00058 |
| 3.00000 | 0.15355 | 0.97608 | 6.35690 |
| 4.00000 | 0.22917 | 1.70823 | 7.45391 |
| 5.00000 | 0.30975 | 2.58635 | 8.34972 |
| 6.00000 | 0.39270 | 3.56280 | 9.07260 |
| 7.00000 | 0.47564 | 4.58320 | 9.63577 |
| 8.00000 | 0.55623 | 5.58563 | 10.04202 |
| 9.00000 | 0.63185 | 6.49768 | 10.28355 |
| 10.00000 | 0.69936 | 7.22857 | 10.33602 |
| 11.00000 | 0.75414 | 7.64116 | 10.13232 |
| 12.00000 | 0.78540 | 7.12561 | 9.07261 |

@Q=1.0cfs
$D_N$=.25'
V=6.4fps

@Q=4.9cfs
$D_N$=.61'
V=9.7fps

Normal Depth Calc: 15"SD - Basin B-8-A
Line "A-8"

15" RCP -- SLOPE=14.5%

CULVERT RATING TABLE

15. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 1.00 SLOPE = 0.14500

| FLOW DEPTH (IN) | FLOW AREA (SQ FT) | DISCHARGE (CFS) | VELOCITY (FPS) |
|---|---|---|---|
| 1.00000 | 0.03513 | 0.21798 | 6.20421 |
| 2.00000 | 0.09727 | 0.93687 | 9.63163 |
| 3.00000 | 0.17472 | 2.15408 | 12.32848 |
| 4.00000 | 0.26271 | 3.82758 | 14.56950 |
| 5.00000 | 0.35808 | 5.89694 | 16.46815 |
| 6.00000 | 0.45839 | 8.28927 | 18.08344 |
| 7.00000 | 0.56155 | 10.92150 | 19.44895 |
| 8.00000 | 0.66564 | 13.70119 | 20.58359 |
| 9.00000 | 0.76879 | 16.52602 | 21.49603 |
| 10.00000 | 0.86910 | 19.28202 | 22.18614 |
| 11.00000 | 0.96447 | 21.83949 | 22.64398 |
| 12.00000 | 1.05246 | 24.04387 | 22.84542 |
| 13.00000 | 1.12991 | 25.69277 | 22.73871 |
| 14.00000 | 1.19205 | 26.45587 | 22.19360 |
| 15.00000 | 1.22718 | 24.59815 | 20.04438 |

@Q=9.3cfs
$D_N$=.53'
V=18.6fps

Normal Depth Calc: 15" SD - Basin B-16
Line "A-8"

15" RCP -- SLOPE=2.5%

CULVERT RATING TABLE

15. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 1.00 SLOPE = 0.02500

| FLOW DEPTH (IN) | FLOW AREA (SQ FT) | DISCHARGE (CFS) | VELOCITY (FPS) |
|---|---|---|---|
| 1.00000 | 0.03513 | 0.09051 | 2.57616 |
| 2.00000 | 0.09727 | 0.38902 | 3.99932 |
| 3.00000 | 0.17472 | 0.89443 | 5.11912 |
| 4.00000 | 0.26271 | 1.58931 | 6.04966 |
| 5.00000 | 0.35808 | 2.44857 | 6.83803 |
| 6.00000 | 0.45839 | 3.44193 | 7.50874 |
| 7.00000 | 0.56155 | 4.53491 | 8.07574 |
| 8.00000 | 0.66564 | 5.68911 | 8.54687 |
| 9.00000 | 0.76879 | 6.86205 | 8.92574 |
| 10.00000 | 0.86910 | 8.00642 | 9.21229 |
| 11.00000 | 0.96447 | 9.06835 | 9.40240 |
| 12.00000 | 1.05246 | 9.98367 | 9.48604 |
| 13.00000 | 1.12991 | 10.66834 | 9.44173 |
| 14.00000 | 1.19205 | 10.98520 | 9.21539 |
| 15.00000 | 1.22718 | 10.21383 | 8.32298 |

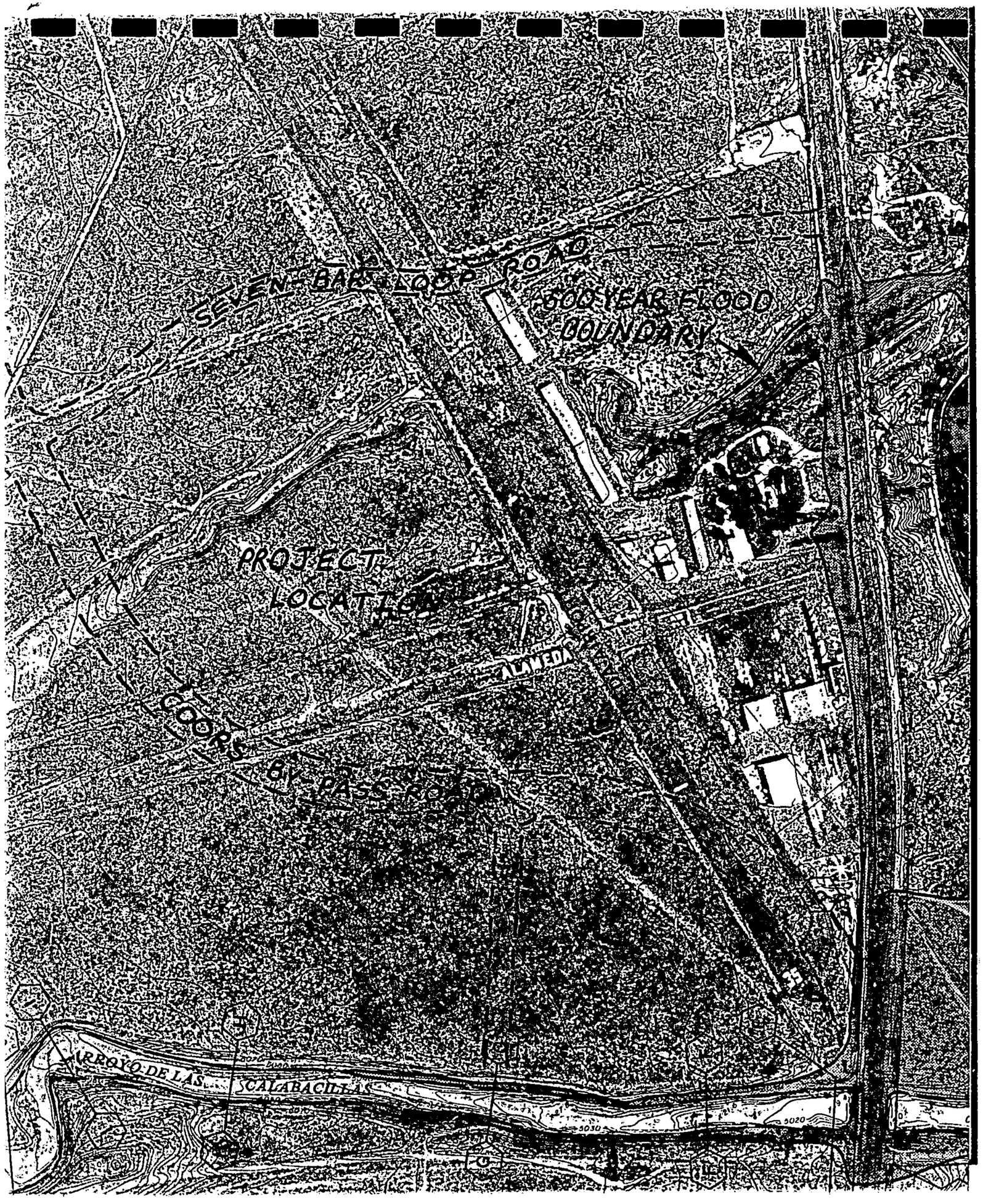
@Q=7.1cfs
$D_N$=.77'
V=9.0fps

PLATE 1

CONCEPTUAL GRADING AND DRAINAGE PLAN

PLATE 2

NFIP FLOOD BOUNDARY AND FLOODWAY MAP




NATIONAL FLOOD INSURANCE PROGRAM

TAKEN FROM:

# FLOODWAY

## FLOOD BOUNDARY AND FLOODWAY MAP

CITY OF

## ALBUQUERQUE, NEW MEXICO

BERNALILLO COUNTY

PANEL 2 OF 50

N

**COMMUNITY-PANEL NUMBER**

**350002 0002**

**EFFECTIVE DATE:**

**SEPTEMBER 15, 1983**

Federal Emergency Management Agency

PLATE 2