DRAINAGE REPORT
FOR
PIÑON POINTE AT VENTANA RANCH
(TRACT Y-1A-2)

DECEMBER 22, 2000

Prepared for:

LAS VENTANAS LIMITED PARTNERSHIP
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APPENDICES

EXHIBITS

I. PURPOSE

The purpose of this report is to present the drainage management plan for Piñon Pointe at Ventana Ranch (Tract Y-1A-2 of the Ventana Ranch Master Plan) and to obtain approval of the preliminary/final plat and grading plan by the Development Review Board (DRB). The proposed development of Piñon Pointe consists of 92 single family detached residential lots on approximately 14.63 acres as well as the construction of a detention pond within Tract Y-1A-4, located to the west the subdivision.

II. METHODOLOGIES

Site conditions will be analyzed for a 10-year and 100-year, 6-hour storm event in accordance with the City of Albuquerque Drainage Ordinance and the Development Process Manual (DPM) Volume 2, Design Criteria, Section 22.2, Hydrology, for the City of Albuquerque, January 1993.

The site, as described in the 'Site Location and Characteristics' section below, is approximately 14.63 acres. Therefore, Part A of the DPM, Section 22.2, which provides a simplified procedure for projects with sub-basins smaller than 40 acres was used.

The existing approved drainage report referenced in the preparation of this plan is the "Las Ventanas Subdivision Drainage Master Plan" (LVDMP) prepared by Bohannan Huston (originally dated April 1995 and updated October 1995). Additional information was provided in "Addendum 2 for the Design Analysis Report for Ventana Ranch Subdivision Drainage Facilities" prepared by Bohannan Huston dated December 1997. These reports identify downstream drainage improvements, including the AMAFCA North Branch Piedras Marcadas Diversion Channel, which was built in phases from 1995 to 1998 by Sandia Properties, to which developed flows from this tract will ultimately drain.

III. SITE LOCATION AND CHARACTERISTICS

Ventana Ranch is a 940-acre development located west of Paradise Hills between Paseo del Norte and Irving Boulevards. Piñon Pointe is located in the northwestern quadrant of the Ventana Ranch Master Plan. The proposed subdivision is bounded by Ventana Ranch Open Space Tracts (Tracts Y-1A-3 and Y-1A-5) and a public desiltation pond tract (Tract Y-1A-4) that are adjacent to the Ventana Ranch western boundary, Mesa Vista Subdivision to the south, Tract Y-1A-1 to the north, and Las Ventanas Road/West Pointe Subdivision Unit 2 to the east. The site will be accessible from Las Ventanas Road.

IV. EXISTING HYDRAULIC AND HYDROLOGIC CONDITIONS

In its existing condition, the site consists of undulating terrain with slopes from 5% to less than 1%. The proposed subdivision is located within existing Basin 504W, see Exhibit 3 for Existing Basin Map. Existing drainage patterns direct the runoff to the east. Basin 504W receives flow from Basin 501, which is directly west of Basin 504W. The flows conveyed from Basin 501 are carried via an existing natural arroyo, Tributary "A", through the proposed subdivision site. There are no recognized FEMA Floodplains within the proposed development.

V. PROPOSED HYDRAULIC AND HYDROLOGIC CONDITIONS

Discharge generated by Piñon Pointe will flow through the internal streets when fully developed to low points located on Shawna Street on either side of intersection of Prairie Falcon Avenue and Shawna Street. Most of the on-site flows will be collected internally; only a small portion (1.1cfs) of Prairie Flacon Avenue will discharge into Las Ventanas Road. There are four highpoints. Two are located on Shawna Street at the north and south tract boundaries. The other two highpoints are located on Blue Heron Street and Prairie Falcon Avenue. This site will be graded to convey the flow to the entrance of the subdivision, where it will be collected at two lowpoints by inlets. Blue Heron Street will discharge into Prairie Falcon Avenue. Eagle Avenue and Harrier Avenue will discharge into Shawna Street. There are two inlets upstream of the low point on Prairie Falcon Avenue on either of the roads, which will collect some flow. Any residual will be carried to Shawna Street and be collected as previously mentioned.

A desiltation pond is proposed in the 2.3-acre tract (Tract Y-1A-4), and will intercept flow from an off-site existing arroyo, which previously ran through the subdivision. The pond has been designed to accept the fully developed runoff from the off-site basin. The runoff from the pond will be carried via a new 66" storm drain in Prairie Falcon Avenue to an existing storm drain in Las Ventanas Road and ultimately to the existing North Branch Piedras Marcadas Channel (see addendum #2).

A. On-Site Basins

The proposed site is broken into six (6) major basins. Each major basin is divided into two (2) or three (3) sub-basins for analysis reasons. Major basins are described below. For sub-basin data, see Appendix A at the back of this report.

Basin 1 (0.53ac, Q_{100}=2.0cfs) is the west side of Las Ventanas Road (Basin 1-1) and the entrance road (Basin 1-2), Prairie Falcon Avenue, up to the intersection of Prairie Falcon and Shawna. The runoff, 1.1cfs, from Basin 1-2 will flow west to Las Ventanas Road where it will combine with the flow from Basin 1-1 (0.9cfs) and be collected by inlets downstream on Las Ventanas Road.

Basin 2 (4.46ac, Q_{100}=15.9cfs) is northern most basin. Basin 2 contains Basin 2-1, Basin 2-2, and Basin 2-3; see Appendix A for more information. Basin 2 consists of twenty-nine (29) lots, 63 through 91. The runoff will flow in Harrier Avenue and into Shawna Street where it will be collected at the lowpoint, just north of the intersection of Prairie Falcon and Shawna, by one Type "A" double grate, double wing inlet on the east side of the road.

Basin 3 (4.29ac, Q_{100}=15.4cfs) is in the center of the tract, south of Basin 2. Basin 3 contains Basin 3-1, Basin 3-2, and Basin 3-3; see Appendix A for more information. Basin 3 consists of twenty-four (24) lots, 39 through 62. Runoff will flow in Prairie Falcon Avenue where 9.24cfs will be collected by one Type "A" double grate, single wing inlet on each side of the road. The residual flow (6.16cfs) will be carried to the lowpoints in Shawna Street on either side of the intersection of Prairie Falcon Avenue and Shawna Street.

Basin 4 (5.55ac, Q_{100}=19.9cfs) is the southern most basin and south of Basin 3. Basin 4 contains Basin 4-1, Basin 4-2 and Basin 4-3; see Appendix A for more information Basin 4 consists of thirty-eight (38) lots, 1 through 38. Runoff will flow in Eagle Avenue, onto Shawna Street it will be collected by one Type "A" double grate, double wing inlet on the east side of the road.

Basin 5 (2.31ac) includes the proposed pond, which will discharge 400.92cfs into the 66" proposed storm drain in Prairie Falcon Avenue via an 84" pond outlet pipe. This flow will ultimately be carried to the North Branch Pierdas Marcadas Channel. The pond is described in further detail below. Two sub-basins (Basin 5-1 and Basin 5-3) discharge into the Harrier Avenue and Eagle Avenue and the flow will be carried downstream to the lowpoints in Shawna Street.

B. Desiltation Pond and Storm Drain Analysis

1. Hydrology

The hydrology used in the analysis of the pond and the downstream storm drain is based on the hydrology contained in the LVDMP. The 100-year peak discharge (fully developed) carried to the pond from basin 501 is 432cfs. The 2-yr developed condition bulked discharge to the pond is 119cfs. However, at this time Basin 501 is undeveloped and the 100-year discharge is 135cfs and the 2-year discharge for undeveloped flow negligible.

These flows include a sediment-bulking factor applied to all clean water flows in order to account for the increase in runoff due to sediment in the flow. A bulking factor of 2.5% was used for both the 100-year and the 2-year flow. This was the value specified in the LVDMP and is more conservative value the 2.0% bulking factor used in the PMDMP (Piedras Marcadas Drainage Master Plan).

2. Desiltation Pond Analysis

The primary function of the pond is to remove sediment prior to discharging to a closed conduit system. As a secondary function the pond will serve to slightly attenuate the peak flow.

3. Design Criteria

The pond layout is based on the following criteria:

1. The pond is sized to remove 100% of the fine sand (0.1 millimeter particle size) from the 2-year storm event.

2. The pond basin will have sediment capacity for 2 years of average annual sediment yield.

3. There will be a minimum of 2.0' of freeboard from the 100-year fully developed conditions water surface to the top of the pond.

4. Sediment Storage

The Tract Y-1A-2 Pond has been designed to store 2 times the average annual sediment volume. In general, this means that sediment from the pond will have to be removed approximately every 2 years, depending on intensity of events.

The 2-year storm is considered equivalent to the average annual storm. The average annual sediment volume was calculated by multiplying the 2-year clear water volume (8.2 ac-ft) by an average bulking factor. Table 2, Sediment Storage Summary, lists the average annual sediment yield and the sediment storage for the pond.

Table 2

Sediment Storage Summary

Pond	Average Annual Sediment	Design Interval	Sediment Storage
Tract 10 B	0.21 ac-ft	2 years	0.42 ac-ft

The total sediment storage (depth ~ 2.4') was subtracted from the actual volume of the ponds prior to routing runoff through the pond in the AHYMO models.

5. Pond Design

The pond consists of three main elements – the inlet structure, the pond, and the outlet storm drain structure. The features of the pond are shown on Figure 2 in Appendix D.

The inlet structure consists of a grouted boulder rundown constructed by placing basalt boulders along a 4H:1V slope and grouting them in place. The sidewalls of the rundown will be at a 2:1 slope. Two gently sloping berms will direct runoff within the existing arroyo to the boulder rundown. The berms will be an earthen core armored with dumped basalt riprap and covered with additional earthen cover. The rundown is designed to convey the 100-year fully developed flow with a freeboard of two feet. The rundown will extend to the pond bottom at elevation 5477.0'.

The pond geometry is long and narrow to create a longer flow path to increase the deposition of sediment. The pond side slopes will be at a 3H:1V slope or flatter to an elevation of 5487'. Dumped basalt riprap will be placed along the northern edge of the pond bottom up to elevation 5480'. An access road for maintenance purposes will be incorporated into the pond side at the south end of the pond. The road will be at a 6:1 slope. There is area south and west of the proposed pond access road that can be utilized as a temporary sediment stockpile area.

The outlet structure is made up of an 84" RCP constructed within a concrete headwall structure. The invert of the 84" RCP will be set at 5476.5'. There will be a two-foot high berm near the pipe inlet to further assure sediment will drop out prior to entering the storm drain. The RCP will connect to the proposed storm drain via an 84" by 66" reducer.

Appendix D contains the design analysis of the pond and the AHYMO model for both the pond and the downstream storm drain. This output shows that the 100-yr fully developed bulked flow will produce a water surface elevation of 5484.85'. This will provide 2.15' of freeboard within the pond. The maximum storage at this elevation is 1.61 ac-ft (excluding the sediment). The peak discharge from the pond will be 401cfs.

6. Storm Drain Analysis

The analysis of the storm drain includes the complete storm drain system from the pond outlet to the North Branch of the Piedras Marcadas Diversion Channel. This storm drain was referred to as 'Tributary A' within Addendum 2 of the DAR for the Ventana Ranch Subdivision Drainage Facilities.

The proposed storm drain connects to the existing 78" storm drain near the intersection of Prairie Falcon Avenue and Las Ventanas Road. The drain bends at a 45° angle and proceeds along Prairie Falcon Avenue at a 0.60% slo The system receives flow from 4 inlets within Tract Y-1A-2 and the pond on the western edge of the tract. Upstream of the first two inlets the storm drain will be reduced to a 66" RCP via a 78" x 66" reducer. This pipe size will be carried up gradient to near the western extent of Prairie Falcon Avenue. From this location horizontal bend and a vertical curve and will extend the drain to meet the 84" RC from the pond outlet structure. The two pipes will be joined via an 84" x 66' reducer. Appendix E contains the analysis of the entire storm drain hydraulics.

C. Off-Site Basin

The offsite basin on Las Ventanas Road is combined with Basin 1 of Onsite Basins. See previous section for information.

Basin 6 (1.14ac, Q_{100}=3.30cfs) is the offsite basin on Tract Y1-A just north of the Basin 2 and the tract boundary. This basin contains the 3:1 tie-back from Tract Y-1A-2 and these minor flows will discharge into a temporary swale just north of the Tract Y-1A- northern boundary line similar to the previous north "cut slopes" on Mesa Vista, Cantabri and Briar Ridge Subdivisions in Ventana Ranch. The flow will then be discharged into Shawna Street where it will be picked up by inlets downstream. This swale is temporary until the next phase of earthwork is completed on the next northern phase.

As mentioned previously in the Existing Conditions section, Basin 501 (175 acres is directly west of the subdivision site. Basin 501 will discharge 432cfs when fully developed (existing, undeveloped flow is 135cfs) to the proposed detention pond, via an existing arroyo. See section B. Desiltation Pond and Storm Drain Analysis for more details.

VI. CONCLUSION

The LVDMP governs the development of Tract Y-1A-2 of the Ventar [illegible] Increases in runoff, depth and velocity due to proposed development are wi [illegible] anticipated within the previously approved Master Drainage Plan for this are [illegible] safely conveyed by the improvements proposed in this drainage plan to exis [illegible] which have adequate capacity to accept such runoff. Erosion and dust contr [illegible] erosion control berms, snow fencing and sedimentation basins, are propose [illegible] washing or blowing into paved streets, storm drains, and existing developme [illegible] we believe this report supports the preliminary/final plat and grading plan sub [illegible] approved as requested.

DRB Project No.:	
DRC Project No.:	
Prelim. Plat Approved:	
Prelim. Plat Expires:	
Date Submitted:	12/14/00

Figure 12

INFRASTRUCTURE LIST

EXHIBIT "A"
TO SUBDIVISION IMPROVEMENTS AGREEMENT
DEVELOPMENT REVIEW BOARD (D.R.B.) REQUIRED INFRASTRUCTURE LIST

PINON POINTE AT VENTANA RANCH
(TRACT Y-1A-2, VENTANA RANCH)

Following is a summary of PUBLIC/PRIVATE Infrastructure required to be constructed or financially guaranteed for the above development. This listing is not necessarily a complete listing. During the SIA process and/or in the review of the construction drawings, if the DRC Chair determines that appurtenant items and/or unforeseen items have not been included in the infrastructure listing, the DRC Chair may include those items in the listing and related financial guarantee. Likewise, if the DRC Chair determines that appurtenant or non-essential items can be deleted from the listing, those items may be deleted as well as the related portions of the financial guarantees. All such revisions require approval by the DRC Chair, the User Department and agent/owner. If such approvals are obtained, these revisions to the listing will be incorporated administratively. In addition, any unforeseen items which arise during construction which are necessary to complete the project and which normally are the Subdivider's responsibility will be required as a condition of project acceptance and close out by the City.

Size	Type Improvement	Location	From	To
PUBLIC ROADWAY IMPROVEMENTS – (ON SITE)				
22' F-F (IN) 24' F-F (OUT)	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE SIDEWALK ON THE BOTH SIDES	PRAIRIE FALCON AVENUE	LAS VENTANA ROAD	SHAWNA STREET
32' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE SIDEWALK ON THE BOTH SIDES*	PRAIRIE FALCON AVENUE	SHAWNA STREET	HARRIER AVENUE
32' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE SIDEWALK ON THE BOTH SIDES*	SHAWNA STREET	NORTH BOUNDARY	SOUTH BOUNDARY
32' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE SIDEWALK ON THE BOTH SIDES*	HARRIER AVENUE	PRAIRIE FALCON AVENUE	SHAWNA STREET
32' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE SIDEWALK ON THE BOTH SIDES*	BLUE HERON STREET	PRAIRIE FALCON AVENUE	EAGLE AVENUE
32' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE SIDEWALK ON THE BOTH SIDES*	EAGLE AVENUE	BLUE HERON STREET	SHAWNA STREET
STREET LIGHTS AS PER THE COA DPM *SIDEWALKS TO BE DEFERRED				
PUBLIC ROADWAY IMPROVEMENTS – (OFF SITE)				
36' F-F (½ STREET)	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & 10' WIDE ASPHALT SIDEWALK ON WEST SIDE	LAS VENTANAS ROAD	PRAIRIE FALCON AVENUE	NORTH TRACT BOUNDARY
PUBLIC DRAINAGE IMPROVEMENTS (SERVING DESILTATION POND & OFF-SITE)				
66" DIA-78	RCP W/ NEC. MANHOLES & STUB-OUTS	PRAIRIE FALCON AVENUE	TRACT Y-1A-4 DESILTATION POND	LAS VENTANAS ROAD
42" DIA	RCP W/ NEC. MANHOLES	LAS VENTANAS ROAD	PRAIRIE FALCON AVENUE	NORTH TRACT BOUNDARY

A PERMANENT DESILTATION POND WITHIN TRACT Y-1A-2 IS REQUIRED TO INTERCEPT OFF SITE FLOWS. AN ENGINEERING CERTIFICATION OF THE DESILTATION POND WITHIN TRACT Y-1A-4 AND THE GRADING PLAN OF PINON POINTE AT VENTANA RANCH IS REQUIRED PRIOR TO THE RELEASE OF FINANCIAL GUARANTY'S.

24" RCP	RCP SD	SHAWNA	LOT 7	Lot 88

Size	Type Improvement	Location	From	To
PUBLIC DRAINAGE IMPROVEMENTS (ON SITE)				
18" DIA	RCP W/ NEC. INLETS AT LOW POINT	PRAIRIE FALCON AVENUE	SHAWNA STREET	LAS VENTANA ROAD
18" DIA	RCP W/ NEC. INLETS IN FRONT OF LOTS 9 AND 87	SHAWNA STREET	PRAIRIE FALCON AVENUE	LOTS 9 & 87
PUBLIC WATER LINE IMPROVEMENTS (ON SITE)				
8" DIA (ZONE 4W)	WATER LINE W/ NEC. VALVES FH'S, MJ'S & RJ'S*	PRAIRIE FALCON AVENUE	LAS VENTANAS ROAD	HARRIER AVENUE
8" DIA (ZONE 4W)	WATER LINE W/ NEC. VALVES FH'S, MJ'S & RJ'S*	HARRIER AVENUE	PRAIRIE FALCON AVENUE	SHAWNA AVENUE
8" DIA (ZONE 4W)	WATER LINE W/ NEC. VALVES FH'S, MJ'S & RJ'S*	BLUE HERON STREET	PRAIRIE FALCON AVENUE	EAGLE AVENUE
8" DIA (ZONE 4W)	WATER LINE W/ NEC. VALVES FH'S, MJ'S & RJ'S*	EAGLE AVENUE	BLUE HERON STREET	SHAWNA STREET
8" DIA (ZONE 4W)	WATER LINE W/ NEC. VALVES FH'S, MJ'S & RJ'S*	SHAWNA STREET	SOUTH TRACT BOUNDARY	NORTH TRACT BOUNDARY

*ALL HOUSE PADS WITH AN ELEVATION HIGHER THAN 5485 WILL REQUIRE MODIFIED HOUSE PIPING AS SPECIFIED IN A LETTER FROM BOB GAY TO CLEVE MATTHEWS, DATED NOVEMBER 3, 1998.

Size	Type Improvement	Location	From	To
PUBLIC SANITARY SEWER IMPROVEMENTS (ON –SITE)				
8" DIA	SANITARY SEWER W/ NEC. MH'S AND SERVICES*	PRAIRIE FALCON AVENUE	SHAWNA STREET	HARRIER AVENUE
8" DIA	SANITARY SEWER W/ NEC. MH'S AND SERVICES	HARRIER AVENUE	PRAIRIE FALCON AVENUE	SHAWNA STREET
8" DIA	SANITARY SEWER W/ NEC. MH'S AND SERVICES	EAGLE AVENUE	BLUE HERON STREET	SHAWNA STREET
8" DIA	SANITARY SEWER W/ NEC. MH'S AND SERVICES	SHAWNA STREET	SOUTH TRACT BOUNDARY	NORTH TRACT BOUNDARY

Prepared by:______________________________

Print Name: Kevin Patton, PE

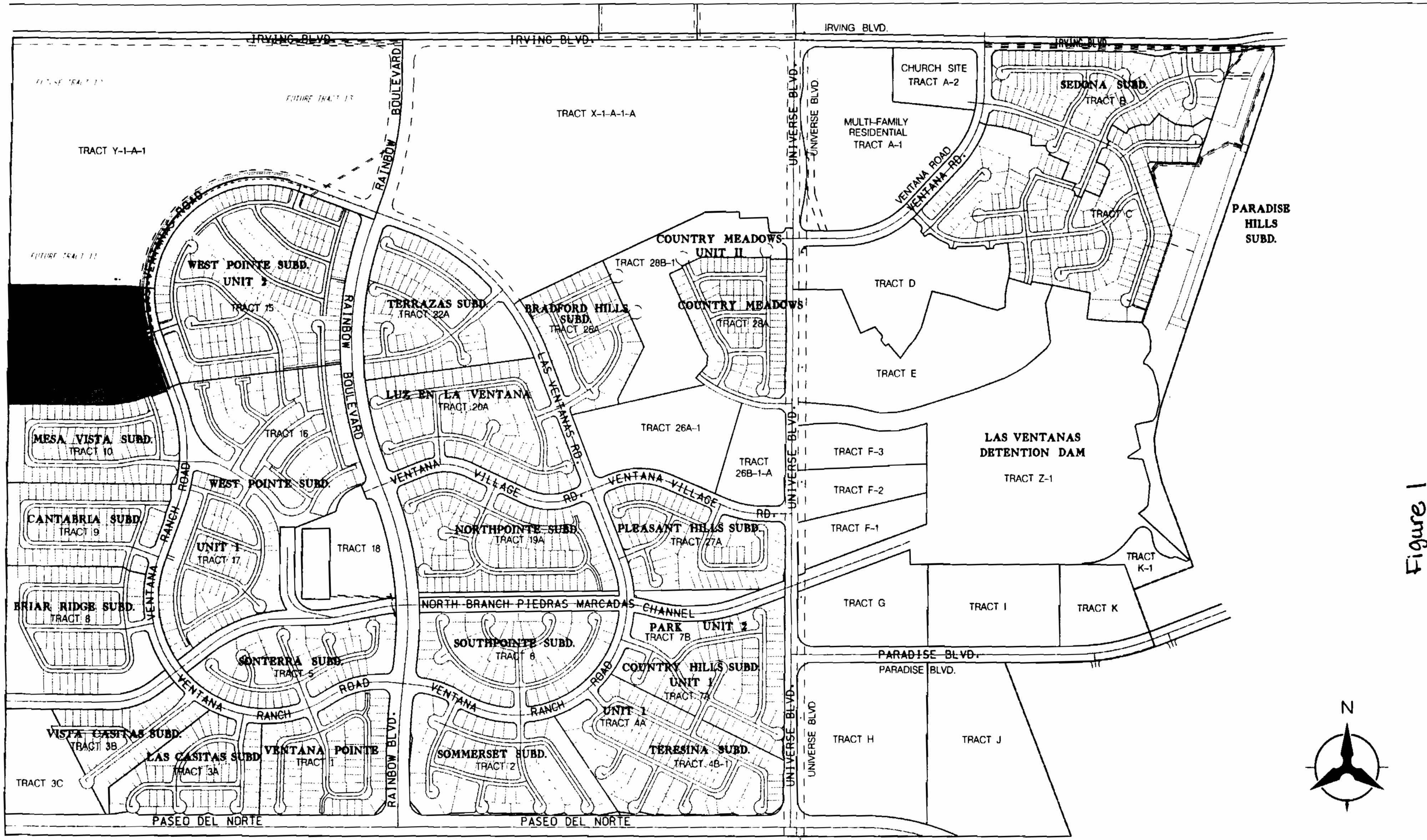
Firm: Bohannan Huston

DEVELOPMENT REVIEW BOARD MEMBER APPROVALS

Transportation Dev.	Date	Utilities Dev.	Date	Parks & G.S.	Date
City Engineer	Date	AMAFCA	Date	DRB Chair	Date

DRC REVISIONS

REVISIONS	DATE	DRC CHAIR	USER DEPT	AGENT/OWNER



VICINITY MAP: NOT TO SCALE ZONE MAP NO. B-9

Figure 1

TRACT 10B @ VENTANA RANCH

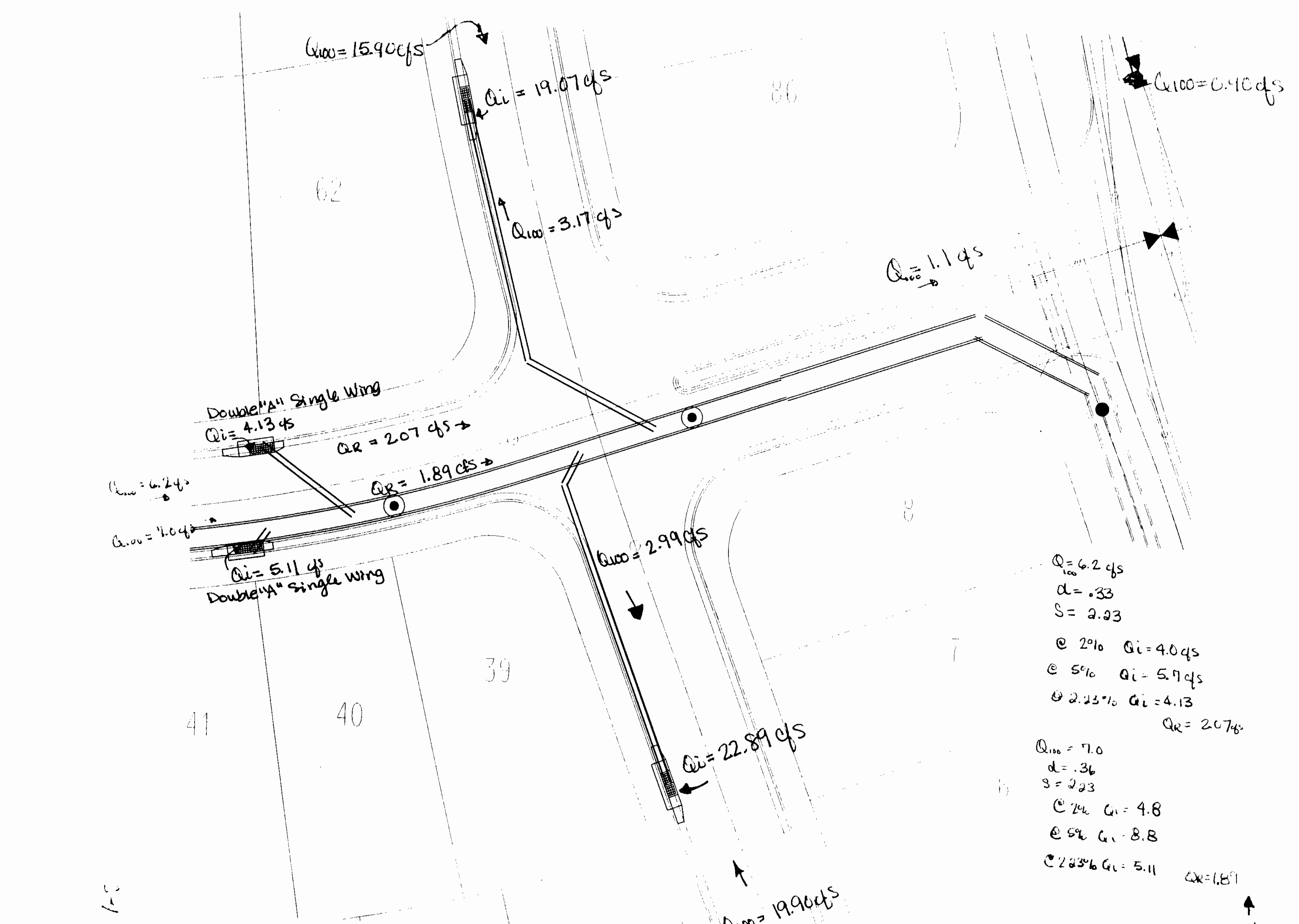
	BASIN I.D.	AREA (AC)	UNITS #	% LAND TREATMENT A	B	C	D	DISCHARGE (CFS) 10 YR	100YR
	HYRDOLOGICAL VOLUMETRIC & DISCHARGE DATA (EXISTING)								
	Tract 10B	14.63		98.0%	0.0%	2.0%	0.0%	4.0	19.0
	HYRDOLOGICAL VOLUMETRIC & DISCHARGE DATA (DEVELOPED)								
	1-1	**0.24**	**0**	**0.0%**	**14.2%**	**14.2%**	**71.6%**	**0.6**	**0.9**
	1-2	**0.29**	**0**	**0.0%**	**14.2%**	**14.2%**	**71.6%**	**0.7**	**1.1**
	2-1	2.02	14	0.0%	20.5%	20.5%	59.0%	4.4	7.2
	2-2	1.31	9	0.0%	20.5%	20.5%	59.0%	2.8	4.7
	2-3	1.13	6	0.0%	20.5%	20.5%	59.0%	2.4	4.0
	3-1	1.73	12	0.0%	20.5%	20.5%	59.0%	3.7	6.2
	3-2	1.96	9	0.0%	20.5%	20.5%	59.0%	4.2	7.0
	3-3	0.60	3	0.0%	17.4%	17.4%	65.3%	1.4	2.2
	4-1	2.00	14	0.0%	20.5%	20.5%	59.0%	4.3	7.2
	4-2	2.23	17	0.0%	20.5%	20.5%	59.0%	4.8	8.0
	4-3	1.32	8	0.0%	20.5%	20.5%	59.0%	2.9	4.7
	5-1	0.56	0	0.0%	50.0%	50.0%	0.0%	0.6	1.4
	5-2	1.24	0	0.0%	41.0%	41.0%	18.0%	1.8	3.5
	5-3	0.63	0	0.0%	50.0%	50.0%	0.0%	0.7	1.5
	6	**1.14**	**0**	**0.0%**	**0.0%**	**100.0%**	**0.0%**	**1.7**	**3.3**
TOTAL		**18.40**	**92**					**37**	**63**

NOTES: 1) Impervious percentages were calculated from the DPM equation A-4, with the remaining percentages distributed evenly between land treatment types B and C, except for Basins 1 & 5. Percentage of type D for Basins 1 & 5 were calculated from a cross-section and the rest was distributed evenly between land treatments types B and C.

N=UNITS/ACRES = 6.3

%D= 7*SQRT((N*N)+(5*N)) = 59.0 %

A-1/1



Q100 = 15.90cfs
Qi = 19.07cfs
Q100 = 3.17cfs
Q100 = 0.40cfs
Q100 = 1.1cfs
62
86
8
7
39
40
41
Double "A" Single Wing
Qi = 4.13 cfs
QR = 207 cfs
QR = 1.89 cfs
Q100 = 6.2cfs
Q100 = 7.0cfs
Qi = 5.11 cfs
Double "A" Single Wing
Q100 = 2.99cfs
Qi = 22.89 cfs
Q100 = 19.90cfs
Q100 = 6.2 cfs
d = .33
S = 2.23
@ 2% Qi = 4.0cfs
@ 5% Qi = 5.7cfs
@ 2.23% Qi = 4.13
QR = 2.07cfs
Q100 = 7.0
d = .36
S = 2.23
@ 2% Qi = 4.8
@ 5% Qi = 8.8
@ 2.23% Qi = 5.11
QR = 1.89

ANALYSIS OF AN INLET IN A SUMP CONDITION - **On each side of entrance @ lowpoint**

INLET TYPE: Double Grate Type "A" with curb opening wings on both sides on inlet.

WEIR: Q=C*L*H^1.5		ORIFICE: Q=C*A*(2*G*H)**0.5	
Wing opening	Grate opeining	Grate opening	Wing opening
C= 3.0	C=3.0	C=0.6	C=0.6
L= 4.0 ft	L(double grate)=[2(2.67')+2(1.8')]=8.	A(double grate)=8.19 sf	A=2.0 sf
Q=3.0(4.0')H**1.5= 12.0H**1.5	Q=3.0(8.94)H^1.5=26.82*H^1.5	Q=4.194*(64.4*H)^0.5	Q=1.2*(64.4*H)^0.5

	WS ELEVATION	HEIGHT ABOVE INLET	Q (CFS) WEIR "A" OPENING	Q (CFS) WEIR DOUBLE GRATE	Q (CFS) ORIFICE DOUBLE GRATE	TOTAL Q (CFS)	COMMENTS:
~FL @ INLET	0.00	0.00	0.00	0.00	0.00	0.00	Flow at double "A" inlet w/ two wing openings
	0.10	0.10	0.38	0.85	12.47	1.61	Weir controls on grate analysis
	0.20	0.20	1.07	2.40	17.64	4.55	
	0.30	0.30	1.97	4.41	21.60	8.35	
	0.40	0.40	3.04	6.78	24.94	12.86	
	0.50	0.50	4.24	9.48	27.88	17.97	Q(100 yr) = 19.07 cfs is provided at this depth
	0.60	0.60	5.58	12.46	30.55	23.62	
TOP OF CURB	0.70	0.70	7.03	15.71	32.99	29.76	
	0.80	0.80	8.59	19.19	35.27	36.36	Q(2x100 yr) = 38.14 cfs is provided at this depth
	0.90	0.90	10.25	22.90	37.41	43.39	
ROW LIMIT	1.00	1.00	12.00	26.82	39.43	50.82	

NOTE: The total runoff intercepted by the inlet at the low point in the road is:

Qr(100) = 2*[(runoff of the wing opening) + (the lesser of the weir or orifice amount taken by the double grate)].

THE 100 YR STORM EVENT = 19.07 CFS at the sump condition

THE 2 x 100 YR STORM EVENT = 38.14 at the sump condition

ANALYSIS OF AN INLET IN A SUMP CONDITION - **On each side of entrance @ lowpoint**

INLET TYPE: Double Grate Type "A" with curb opening wings on both sides on inlet.

<u>WEIR:</u> Q=C*L*H^1.5

<u>Wing opening</u>
C= 3.0
L= 4.0 ft
Q=3.0(4.0')H**1.5= 12.0H**1.5

<u>Grate opeining</u>
C=3.0
L(double grate)=[2(2.67')+2(1.8')]=8.
Q=3.0(8.94)H^1.5=26.82*H^1.5

<u>ORIFICE:</u> Q=C*A*(2*G*H)**0.5

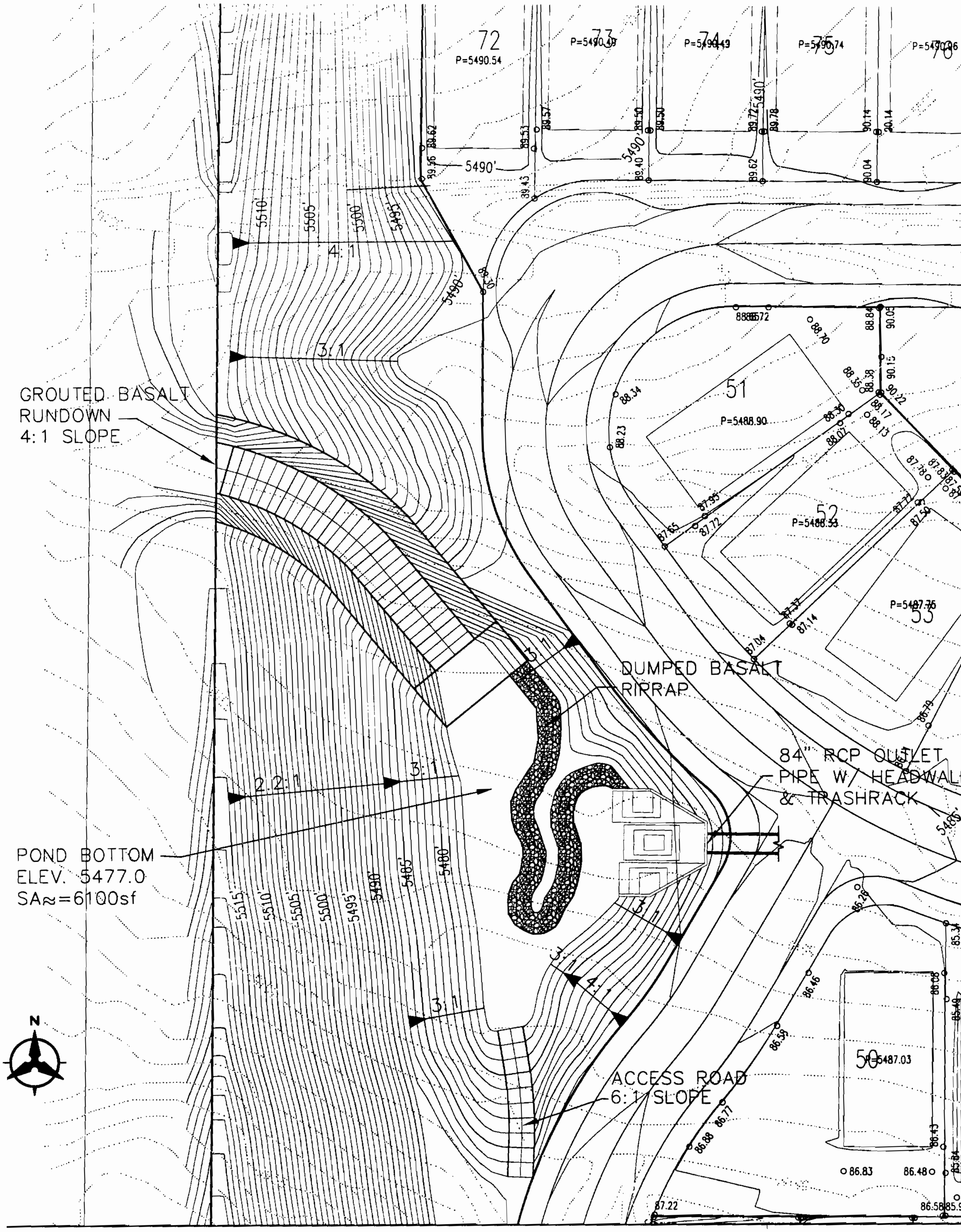
<u>Grate opening</u>
C=0.6
A(double grate)=8.19 sf
Q=4.194*(64.4*H)^0.5

<u>Wing opening</u>
C=0.6
A=2.0 sf
Q=1.2*(64.4*H)^0.5

	WS ELEVATION	HEIGHT ABOVE INLET	Q (CFS) WEIR "A" OPENING	Q (CFS) WEIR DOUBLE GRATE	Q (CFS) ORIFICE DOUBLE GRATE	TOTAL Q (CFS)	**COMMENTS:**
~FL @ INLET	0.00	0.00	0.00	0.00	0.00	0.00	Flow at double "A" inlet w/ two wing openings
	0.10	0.10	0.38	0.85	12.47	1.61	Weir controls on grate analysis
	0.20	0.20	1.07	2.40	17.64	4.55	
	0.30	0.30	1.97	4.41	21.60	8.35	
	0.40	0.40	3.04	6.78	24.94	12.86	
	0.50	0.50	4.24	9.48	27.88	17.97	Q(100 yr) = 22.89 cfs is provided at this depth
	0.60	0.60	5.58	12.46	30.55	23.62	
TOP OF CURB	0.70	0.70	7.03	15.71	32.99	29.76	
	0.80	0.80	8.59	19.19	35.27	36.36	
	0.90	0.90	10.25	22.90	37.41	43.39	Q(2x100 yr) = 45.78 cfs is provided at this depth
ROW LIMIT	1.00	1.00	12.00	26.82	39.43	50.82	

NOTE: The total runoff intercepted by the inlet at the low point in the road is:

Qr(100) = 2*[(runoff of the wing opening) + (the lesser of the weir or orifice amount taken by the double grate)].
THE 100 YR STORM EVENT = 22.89 CFS at the sump condition
THE 2 x 100 YR STORM EVENT = 45.78 at the sump condition



50' 25' 0 50'

SCALE: 1"=50'

FIGURE 2 TRACT 10B PRELIMINARY POND AND DROP STRUCTURE LAYOUT

D-1

01251\HYDRO\DESIGN\PLANS\10BPOND.DWG

1. SIZE POND BASED ON SETTLING VELOCITY

⇒ Design Particle: Fine Sand (0.1mm)

⇒ 100% Removal of Design Particle

⇒ V_s = settling velocity = 0.013 fps

Surface Area SA = (1.2)(Q_2)/V_s

Q_2 DEVELOPED BULKED = 117 cfs

= (1.2)(117 cfs)/(0.013 fps)

= 6209 sf

Assume Pond Length = 3 times width

⇒ (3w)(w) = 6209 sf

w = 46'

L = 138'

2. SIZE POND BASED ON SEDIMENT STORAGE

⇒ Use 2 Yr storm as Average Annual

⇒ Q_2 = 115 cfs unbulked

Q_2 = 117 cfs bulked

V_2 = 8.2 ac-ft clear water

2.5% bulking factor ⇒ Sediment Vol. = 0.21 ac ft.

Bohannan Huston

ENGINEERS PLANNERS PHOTOGRAMMETRISTS SURVEYORS SOFTWARE DEVELOPERS

PROJECT NAME VENTANA RANCH-TRACT 103 SHEET 1 OF 15

PROJECT NO. 01 25181 02 BY JWH DATE 8/31

SUBJECT DESILTATION POND CH'D ____ DATE ____

D-2

Try 2 Year Sediment Removal

⇒ Sed. Vol = (2 × 0.21 ac-ft) = 0.42 ac-ft.

Assume 2' depth ⇒ SA bottom ≈ 9,150 sf.

Length = 3 times width ⇒ (3W)(W)

W = 55' ~~1 YR*~~ 40

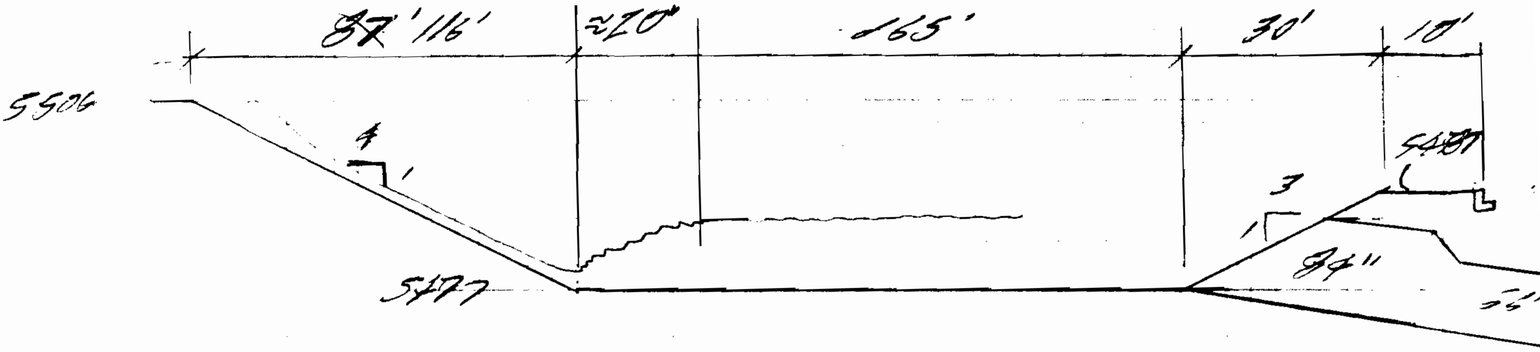
L = 165' 120

OVERALL STRUCTURE / POND FOOTPRINT

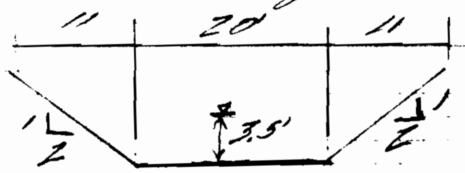
Top Elev = 5506

Bottom Elev = 5480

Slope 3:1 = Length = 78'



Total Length = 303'



1 Year Sediment Removal

⇒ SA = 4575 sf

⇒ W = 40'

L = 120'

* REMOVAL CYCLE

BOHANNAN-HUSTON INC.

PROJECT NAME VENTANA RANCH · TRACT 10B SHEET 2 OF

PROJECT NO. 01 251 A1 BY FWA DATE 3/31/00

SUBJECT DESILTATION POND CH'D DATE

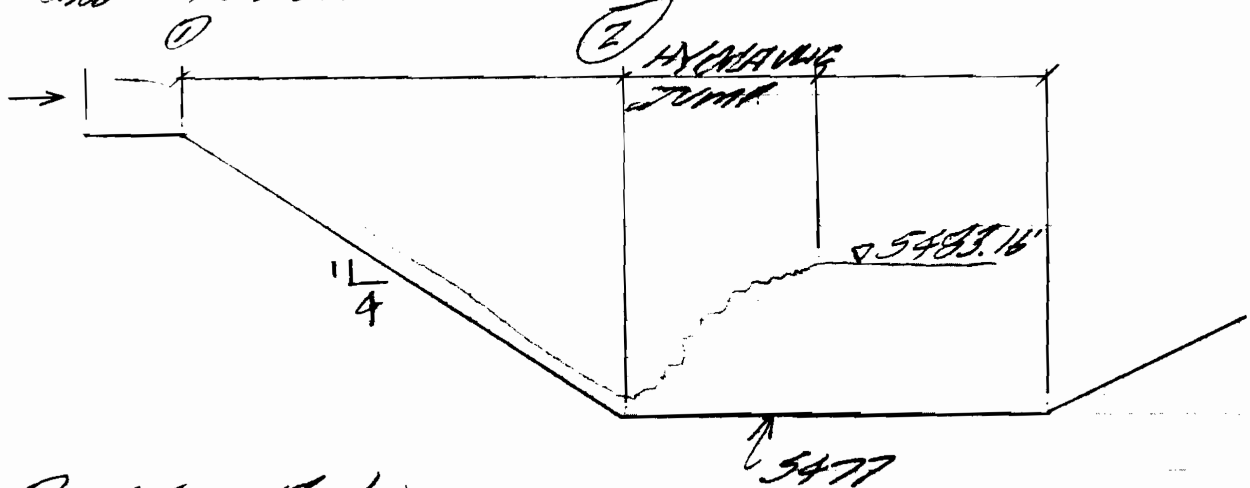
D-3

1. POND INLET / DROP STRUCTURE DESIGN

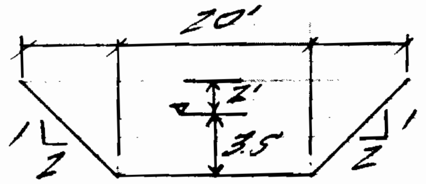
Proposed Drop Structure: Grouted Basalt Boulder

Design Event: 100 Yr Fully Developed Condition

Q_{100} = 432 cfs



① Weir Analysis



→ y_n = 3.45'
V = 4.65 fps
See following pages

② Manning's Eqn Analysis
Same section as weir
S: 0.25 (4:1)
n: 0.045

→ y_n = 1.15'
V = 16.77 fps

HYDRAULIC JUMP

y_1 = 1.15'
V_1 = 16.77 fps
A_1 = 25.77 sf
T_1 = 24.62'

→ $F_1 = \frac{V_1}{\sqrt{g \frac{A_1}{T_1}}}$ = 2.89'

Bohannan Huston

ENGINEERS PLANNERS PHOTOGRAMMETRISTS SURVEYORS SOFTWARE DEVELOPERS

PROJECT NAME VENTANA RANCH - TRACT 10B SHEET 3 OF
PROJECT NO. 01 251A1 BY JWA DATE 10/10/00
SUBJECT DESILTATION POND CH'D DATE

Using hydraulic jump eqn.

$$\frac{y_2}{y_1} = \frac{1}{2}\left(\sqrt{1+8F_1^2} - 1\right)$$

$$y_2 = \left(\frac{1.15}{2}\right)\left(\sqrt{1+(8)(2.89)^2} - 1\right)$$

$y_2 = 4.16'$

⇒ Water Surface in Pond

= Pond Elev. + Sediment + y_2

= 5477 + 2' + 4.16' = 5483.16

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ENGINEERS PLANNERS PHOTOGRAMMETRISTS SURVEYORS SOFTWARE DEVELOPERS

PROJECT NAME Ventana Ranch - Tract 10B SHEET 9 OF

PROJECT NO. 01 2S1A1 BY GWA DATE 10/10/00

SUBJECT DESILTATION POND CH'D DATE

VENTANA RANCH - TRACT 10B

BHI JOB NO. 01 251A1
DESILTATION POND VOLUME CALCULATIONS

POND VOLUMES

ELEVATION	AREA (ac)	VOLUME (ac-ft)	CUMMULATIVE VOLUME (ac-ft)	REQUIRED SEDIMENT STORAGE VOLUME (ac-ft)	NET STORAGE VOLUME (ac-ft)
5477	0.131				
5478	0.163	0.147	0.147	0.420	-0.273
5479	0.196	0.179	0.326	0.420	-0.094
5480	0.228	0.212	0.538	0.420	0.118
5481	0.260	0.244	0.782	0.420	0.362
5482	0.293	0.277	1.059	0.420	0.639
5483	0.325	0.309	1.368	0.420	0.948
5484	0.358	0.341	1.709	0.420	1.289
5485	0.390	0.374	2.083	0.420	1.663
5486	0.422	0.406	2.490	0.420	2.070
5487	0.455	0.439	2.928	0.420	2.508

NOTE: REQUIRED SEDIMENT STORAGE VOLUME IS EQUAL TO 2 TIMES THE AVERAGE ANNUAL SEDIMENT VOLUME. THE 100 YEAR SEDIMENT VOLUME IS INCLUDED IN THE BULKED INFLOW HYDROGRAPH

2 yrs of sediment achieved at depth of 2.4' ≈ 2.0'
OK

Back calculate pond dimensions

SA = (0.42 ac-ft)(43560 ft²/ac) / 2.4'

= 7623

L = 3 x width = 3w² = 7623

w = 50.4'

L = 151.2

Actual Dimensions ≈ ≈ 45
L ≈ 160 OK

Determining Pond Outlet Q

84" RCP Invert = 5476.5'

Assume Inlet Rundown Ø 0.5' below RCP inlet

WS El.	Head	HW/D	Q out
76.5	Ø		Ø
77	.5	.07	4.6
78	1.5	.21	39
79	2.5	.36	55
80	3.5	.50	100
81	4.5	.64	150
82	5.5	.79	220
83	6.5	.93	285
84	7.5	1.07	350
85	8.5	1.21	410
86	9.5	1.36	460
87	10.5	1.5	525

(From Chart 14, Bureau of Public Rds, Jan 1963) — Q out for 80–87

Q out for 77–78: Outside Limits of Nomograph Use Orifice Eqn. Below

Q out for 79: From Storm & Sanitary Culvert Analysis

$Q = CA\sqrt{2gh}$

$C = .67$

~~A = 38.5~~

$2g = 64.4$

$Q_{H=1.5} = (.67)(6)\sqrt{(64.4)(1.5)}$
$= 39$

$A_{H=1.5} = 6.07\ SF$ From CAD

$Q_{H=.5} = (.67)(1.21)\sqrt{64.4 \times .5}$
$= 4.6$

$A_{H=.5} = 1.21\ SF$ From ACAD

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PROJECT NAME Tract 10B Pond SHEET 13 OF

PROJECT NO. BY SMA DATE 12/7/06

SUBJECT Outlet Discharge CH'D DATE

Shaded cells require user input. Non-shaded cells cannot be edited.*
Revised to show new grading/layout from CDP due to need to tie to existing SAS to south
VENTANA RANCH TRIBUTARY A STORM DRAIN DIVERSION
***** HYDRAULIC GRADE LINE CALCULATIONS *****

Manning's n = 0.013 for pipe
Q = Pond 398.00, Tract 11 48.00, Tract 10B 51.30; Length 497.30

JUNCTION LOSSES: Dia. 3 (in.), Junct. Angle, <delta>y, Ht(inc.), Ht(dec.)

Station	Structure	Diam. (in.)	Q (cfs)	Area	Vel.	K	Sf	Length (ft.)	MH Dia. (ft.)	JNCT Angle	Hf	Hb	Hj	Hmh	Ht	Total Losses	HGL(dn)	HGL(up)	Low Point	HV	EGL(dn)	EGL(up)	Dia. 3 (in.)	Junct. Angle	<delta>y	Ht(inc.)	Ht(dec.)	Actual Slope (ft/ft)	Elev.	Depth
10+00	OUTFALL								0.00	0.00		0.00	0.00	0.00	0.00	0.00		5451.58	5453.58	2.31	5453.89	5453.89	0	0	0.0000	0.2313	0.0000		5444.66	8.92
		84	469.7	38.48	12.20	6388	0.0054	66.16			0.36					0.36												0.0095	0.63	
10+66.16	MH #1								8.00	0.00		0.00	0.00	0.12	0.00	0.12	5451.94	5452.05	5455.00	2.31	5454.25	5454.37	0	0	0.0000	0.0000	0.0000		5445.29	9.71
		84	469.7	38.48	12.20	6388	0.0054	8.00			0.04					0.04												0.0095	0.08	
10+74.16	VERT #1								0.00	0.00		0.00	0.00	0.12	0.00	0.12	5452.10	5452.21	5453.90	2.31	5454.41	5454.53	0	0	0.0000	0.0000	0.0000		5445.36	8.54
		84	469.7	38.48	12.20	6388	0.0054	8.00			0.04					0.04												0.0050	0.04	
10+82.16	BEND #1								0.00	38.51		0.30	0.00	0.12	0.00	0.42	5452.26	5452.67	5454.01	2.31	5454.57	5454.99	0	0	0.0000	0.0000	0.0000		5445.40	8.61
		84	469.7	38.48	12.20	6388	0.0054	301.41			1.63					1.63												0.0050	1.51	
13+83.57	MH#2								8.00	0.00		0.00	0.00	0.00	0.00	0.00	5454.30	5454.28	5459.10	2.33	5456.62	5456.62	0	0	0.0000	0.0000	0.0000		5446.91	12.19
		84	471.7	38.48	12.26	6388	0.0055	8.00			0.04					0.04												0.0050	0.04	
13+91.57	BEND #2 XXXXX								0.00	20.14		0.22	0.00	0.12	0.00	0.34	5454.33	5454.66	5457.90	2.33	5456.66	5457.00	0	0	0.0000	0.0000	0.0000		5446.95	10.95
		84	471.7	38.48	12.26	6388	0.0055	82.59			0.45					0.45												0.0050	0.41	
14+74.16	VERT #2								0.00	0.00		0.00	0.00	0.12	0.00	0.12	5455.11	5455.23	5459.50	2.33	5457.45	5457.56	0	0	0.0000	0.0000	0.0000		5447.36	12.14
		84	471.7	38.48	12.26	6388	0.0055	255.00			1.39					1.39												0.0190	4.85	
17+29.16	MH #3								8.00	0.00		0.00	0.00	0.12	0.00	0.12	5456.62	5456.74	5462.71	2.33	5458.95	5459.07	0	0	0.0000	0.0000	0.0000		5452.21	10.50
		84	471.7	38.48	12.26	6388	0.0055	8.00			0.04					0.04												0.0190	0.15	
17+37.16	BEND #3								0.00	31.32		0.28	0.00	0.12	0.00	0.39	5456.78	5457.17	5464.45	2.33	5459.11	5459.51	0	0	0.0000	0.0000	0.0000		5452.36	12.09
		84	471.7	38.48	12.26	6388	0.0055	4.00			0.02					0.02												0.0190	0.08	
17+41.16	Reducer/VERT #3								0.00	0.00		0.00	0.00	0.00	0.01	0.01	5457.20	5456.40	5464.50	3.14	5459.53	5459.54	0	0	0.0000	0.0000	0.0119		5452.44	12.06
		78	471.7	33.18	14.21	5243	0.0081	157.54			1.28					1.28												0.0050	0.79	
18+98.7	MH#4								8.00	0.00		0.00	0.00	0.16	0.00	0.16	5457.68	5457.83	5466.24	3.14	5460.81	5460.97	0	0	0.0000	0.0000	0.0000		5453.23	13.01
		78	471.7	33.18	14.21	5243	0.0081	43.37			0.35					0.35												0.0050	0.22	
19+06.70	BEND #4								0.00	45.00		0.44	0.00	0.16	0.00	0.60	5458.19	5458.79	5467.39	3.14	5461.32	5461.92	0	0	0.0000	0.0000	0.0000		5453.44	13.95
		78	471.7	33.18	14.21	5243	0.0081	31.98			0.26					0.26												0.0050	0.16	
19+38.68	VERT #4								0.00	0.00		0.00	0.00	0.16	0.00	0.16	5459.04	5459.20	5467.00	3.14	5462.18	5462.34	0	0	0.0000	0.0000	0.0000		5453.60	13.40
		78	471.7	33.18	14.21	5243	0.0081	8.32			0.07					0.07												0.0456	0.38	
19+47.00	WYE #1								0.00	0.00		0.00	0.18	0.00	0.00	0.18	5459.27	5459.72	5467.00	2.86	5462.41	5462.59	24	45	0.4527	0.0000	0.0000		5453.98	13.02
		78	450.7	33.18	13.58	5243	0.0074	25.40			0.19					0.19												0.0456	1.16	
19+72.40	Inlet								0.00	0.00		0.00	0.08	0.00	0.00	0.08	5459.91	5460.06	5466.27	2.79	5462.77	5462.85	18	90	0.1515	0.0000	0.0000		5455.14	11.13
		78	444.7	33.18	13.40	5243	0.0072	18.97			0.14					0.14												0.0456	0.87	
19+90.37	BEND #5								0.00	41.99		0.38	0.00	0.14	0.00	0.52	5460.20	5460.72	5467.34	2.79	5462.99	5463.51	0	0	0.0000	0.0000	0.0000		5456.00	11.34
		78	444.7	33.18	13.40	5243	0.0072	25.98			0.19					0.19												0.0456	1.18	
20+16.35	VERT #5								0.00	0.00		0.00	0.00	0.14	0.00	0.14	5460.90	5461.04	5467.37	2.79	5463.69	5463.83	0	0	0.0000	0.0000	0.0000		5457.19	10.18
		78	444.7	33.18	13.40	5243	0.0072	316.02			2.27					2.27												0.0060	1.90	
23+32.37	MH#5								8.00	0.00		0.00	0.00	0.14	0.00	0.14	5463.32	5463.46	5467.54	2.79	5466.11	5466.25	0	0	0.0000	0.0000	0.0000		5459.09	8.45
Begin New Proje	T1+	78	444.7	33.18	13.40	5243	0.0072	459.42			3.31					3.31												0.0060	2.76	
40+88.34	MH SD#1								8.00	0.00		0.00	0.00	0.14	0.00	0.14	5466.76	5466.90	5472.31	2.79	5469.55	5469.69	0	0	0.0000	0.0000	0.0000		5461.84	10.47
	T2	78	444.7	33.18	13.40	5243	0.0072	8.00			0.06					0.06												0.0060	0.05	
	BEND								0.00	45.00		0.39	0.00	0.14	0.00	0.53	5466.96	5467.49	5472.36	2.79	5469.75	5470.28	0	0	0.0000	0.0000	0.0000		5461.89	10.47
	T3	78	444.7	33.18	13.40	5243	0.0072	8.00			0.06					0.06												0.0060	0.05	
	WYE								0.00	0.00		0.00	0.23	0.00	0.00	0.23	5467.55	5468.04	5472.41	2.53	5470.34	5470.57	42	45	0.4924	0.0000	0.0000		5461.94	10.47
Begin New	T4 +	78	423.3	33.18	12.76	5243	0.0065	31.88			0.21					0.21												0.0060	0.19	
	Bend								0.00	45.00		0.36	0.00	0.13	0.00	0.48	5468.25	5468.73	5472.80	2.53	5470.78	5471.26	0	0	0.0000	0.0000	0.0000		5462.13	10.67
		78	423.3	33.18	12.76	5243	0.0065	63.76			0.42					0.42												0.0026	0.17	
	Reducer								0.00	0.00		0.00	0.00	0.00	0.08	0.08	5469.15	5466.83	5473.70	4.93	5471.68	5471.76	0	0	0.0000	0.0000	0.0795		5462.30	11.40
		66	423.3	23.76	17.82	3358	0.0159	29.87			0.47					0.47												0.0026	0.08	
	MH								4.00	0.00		0.00	0.00	0.25	0.00	0.25	5467.30	5467.55	5474.20	4.93	5472.23	5472.48	0	0	0.0000	0.0000	0.0000		5462.37	11.83
		66	423.3	23.76	17.82	3358	0.0159	12.00			0.19					0.19												0.0026	0.03	
	Wye								0.00	0.00		0.00	0.18	0.00	0.00	0.18	5467.74	5468.13	5474.40	4.72	5472.67	5472.85	24	45	0.3909	0.0000	0.0000		5462.40	12.00
		66	414.3	23.76	17.44	3358	0.0152	24.00			0.37					0.37												0.0026	0.06	
	Wye								0.00	0.00		0.00	0.19	0.00	0.00	0.19	5468.50	5468.89	5474.85	4.51	5473.22	5473.40	24	45	0.3977	0.0000	0.0000		5462.47	12.38
		66	404.9	23.76	17.04	3358	0.0145	60.26			0.88					0.88												0.0026	0.16	
	New MH								4.00	0.00		0.00	0.00	0.23	0.00	0.23	5469.77	5469.99	5475.61	4.51	5474.28	5474.50	0	0	0.0000	0.0000	0.0000		5462.62	12.99
		66	404.9	23.76	17.04	3358	0.0145	13.00			0.19					0.19												0.0082	0.11	
	Wye								0.00	0.00		0.00	0.04	0.00	0.00	0.04	5470.18	5470.27	5475.82	4.47	5474.69	5474.74	18	45	0.0868	0.0000	0.0000		5462.73	13.09
		66	402.9	23.76	16.96	3358	0.0144	26.90			0.39					0.39												0.0082	0.22	
	Wye								[illegible]	[illegible]		0.00	0.04	0.00	0.00	0.04	5470.66	5470.75	5476.29	4.42	5475.12	5475.17	18	90	0.0884 (Enters almost vertically)	0.0000	0.0000		5462.95	13.34
		66	400.9	23.76	16.87	3358	0.0143	225.48			3.21					3.21												0.0082	1.84	
	MH								[illegible]	0.00		0.00	0.00	0.22	0.00	0.22	5473.96	5474.18	5481.22	4.42	5478.38	5478.60	0	0	0.0000	0.0000	0.0000		5464.79	16.43
		66	400.9	23.76	16.87	3358	0.0143	227.97			3.25					3.25												0.0082	1.86	
	MH								[illegible]	[illegible]		0.00	0.00	0.22	0.00	0.22	5477.43	5477.65	5485.42	4.42	5481.85	5482.07	0	0	0.0000	0.0000	0.0000		5466.65	18.77
		66	400.9	23.76	16.87	3358	0.0143	8.00			0.11					0.11												0.0082	0.07	
	Bend								[illegible]	[illegible]		0.39	0.00	0.22	0.00	0.61	5477.77	5478.37	5485.69	4.42	5482.19	5482.79	0	0	0.0000	0.0000	0.0000		5466.71	18.98
		66	400.9	23.76	16.87	3358	0.0143	8.00			0.11					0.11												0.0082	0.07	
	Reducer								[illegible]	[illegible]		0.00	0.00	0.00	0.06	0.06	5478.49	5481.29	5486.42 ?	1.69	5482.91	5482.97	0	0	0.0000	0.0647	0.0000		5466.78	19.64
	Outlet Stub	84	400.9	38.48	10.42	6388	0.0039	8.00			0.03					0.03												0.0082	0.07	
	Vertical Bend								[illegible]	[illegible]		0.00	0.00	0.08	0.00	0.08	5481.32	5481.40	5486.42 ?	1.69	5483.00	5483.09	0	0	0.0000	0.0000	0.0000		5466.84	19.58
	Outlet Stub	84	400.9	38.48	10.42	6388	0.0039	31.00			0.12					0.12												0.3300	10.23	

Upstream of Wye N. of Future Conifer Ave — 5482.93 — 5483.02

***** HYDRAULIC GRADE LINE CALCULATIONS *****

Manning's n = 0.013 for pipe

Station	Structure	Diam. (in.)	Q (cfs)	Area	Vel.	K	Sf	Length (ft.)	MH Dia. (ft.)	JNCT Angle	Hf	Hb	Hj	Hmh	Ht	Total Losses	HGL(dn)	HGL(up)	Low Point	HV	EGL(dn)	EGL(up)
	WYE								0.00	0.00		0.00	0.00	0.00	0.00	0.00		5468.04	5472.41	0.39	5468.43	5468.43
		42	48.0	9.62	4.99	1006	0.0023	79.00			0.18					0.18						
	Cap								0.00	0.00		0.00	0.00	0.02	0.00	0.02	5468.22	5468.24	5472.68	0.39	5468.61	5468.63
		42	48.0	9.62	4.99	1006	0.0023	8.00			0.02					0.02						

JUNCTION LOSSES

Dia. 3 (in.)	Junct. Angle	<delta>y	Ht(inc.)	Ht(dec.)	Actual Slope	Elev.	Depth
0	0	0.0000	0.0386	0.0000		5461.94	10.47
					0.0060	0.47	
0	0	0.0000	0.0000	0.0000		5462.41	10.27
					0.0060	0.05	

N. Inlet

***** HYDRAULIC GRADE LINE CALCULATIONS *****

Manning's n = 0.013 for pipe

Station	Structure	Diam. (in.)	Q (cfs)	Area	Vel.	K	Sf	Length (ft.)	MH Dia. (ft.)	JNCT Angle	Hf	Hb	Hj	Hmh	Ht	Total Losses	HGL(dn)	HGL(up)	Low Point	HV	EGL(dn)	EGL(up)
	Wye								0.00	0.00		0.00	0.00	0.00	0.00	0.00		5468.13	5474.40	0.57	5468.70	5468.70
		24	19.0	3.14	6.05	226	0.0071	44.56			0.31					0.31						
	Bend								0.00	45.00		0.08	0.00	0.03	0.00	0.11	5468.44	5468.55	5474.58	0.57	5469.01	5469.12
		24	19.0	3.14	6.05	226	0.0071	81.72			0.58					0.58						
	Inlet								0.00	0.00		0.00	0.00	0.03	0.00	0.03	5469.13	5469.16	5473.24	0.57	5469.70	5469.73
	Dummy	24	19.0	3.14	6.05	226	0.0071	81.72			0.58					0.58						

JUNCTION LOSSES

Dia. 3 (in.)	Junct. Angle	<delta>y	Ht(inc.)	Ht(dec.)	Actual Slope	Elev.	Depth
0	0	0.0000	0.0569	0.0000		5462.40	12.00
					0.0508	2.26	
0	0	0.0000	0.0000	0.0000		5464.67	9.91
					0.0508	4.15	
0	0	0.0000	0.0000	0.0000		5468.82	4.42
					0.0508	4.15	

S. Inlet

***** HYDRAULIC GRADE LINE CALCULATIONS *****

Manning's n = 0.013 for pipe

Station	Structure	Diam. (in.)	Q (cfs)	Area	Vel.	K	Sf	Length (ft.)	MH Dia. (ft.)	JNCT Angle	Hf	Hb	Hj	Hmh	Ht	Total Losses	HGL(dn)	HGL(up)	Low Point	HV	EGL(dn)	EGL(up)
	Wye								0.00	0.00		0.00	0.00	0.00	0.00	0.00		5468.89	5474.85	0.82	5469.72	5469.72
		24	22.9	3.14	7.29	226	0.0102	11.05			0.11					0.11						
	Bend								0.00	45.00		0.12	0.00	0.04	0.00	0.16	5469.01	5469.16	5474.76	0.82	5469.83	5469.99
		24	22.9	3.14	7.29	226	0.0102	96.80			0.99					0.99						
	Inlet								0.00	0.00		0.00	0.00	0.04	0.00	0.04	5470.16	5470.20	5472.89	0.82	5470.98	5471.02
	Dummy	24	22.9	3.14	7.29	226	0.0102	8.00			0.08					0.08						

JUNCTION LOSSES

Dia. 3 (in.)	Junct. Angle	<delta>y	Ht(inc.)	Ht(dec.)	Actual Slope	Elev.	Depth
0	0	0.0000	0.0824	0.0000		5462.47	12.38
					0.0557	0.62	
0	0	0.0000	0.0000	0.0000		5463.08	11.68
					0.0557	5.39	
0	0	0.0000	0.0000	0.0000		5468.47	4.42
					0.0557	0.45	

N. inlet Perpend. To conifer

***** HYDRAULIC GRADE LINE CALCULATIONS *****

Manning's n = 0.013 for pipe

Station	Structure	Diam. (in.)	Q (cfs)	Area	Vel.	K	Sf	Length (ft.)	MH Dia. (ft.)	JNCT Angle	Hf	Hb	Hj	Hmh	Ht	Total Losses	HGL(dn)	HGL(up)	Low Point	HV	EGL(dn)	EGL(up)
	MH								0.00	0.00		0.00	0.00	0.00	0.00	0.00		5470.27	5475.82	0.08	5470.36	5470.36
		18	4.1	1.77	2.34	105	0.0015	35.88			0.06					0.06						
	Inlet								0.00	0.00		0.00	0.00	0.00	0.00	0.00	5470.33	5470.33	5475.82	0.08	5470.41	5470.42
	Dummy	18	4.1	1.77	2.34	105	0.0015	8.00			0.01					0.01						

JUNCTION LOSSES

Dia. 3 (in.)	Junct. Angle	<delta>y	Ht(inc.)	Ht(dec.)	Actual Slope	Elev.	Depth
0	0	0.0000	0.0085	0.0000		5462.73	13.09
					0.2640	9.47	
0	0	0.0000	0.0000	0.0000		5472.20	3.62
					0.2640	2.11	

S. inlet Perpend. To conifer

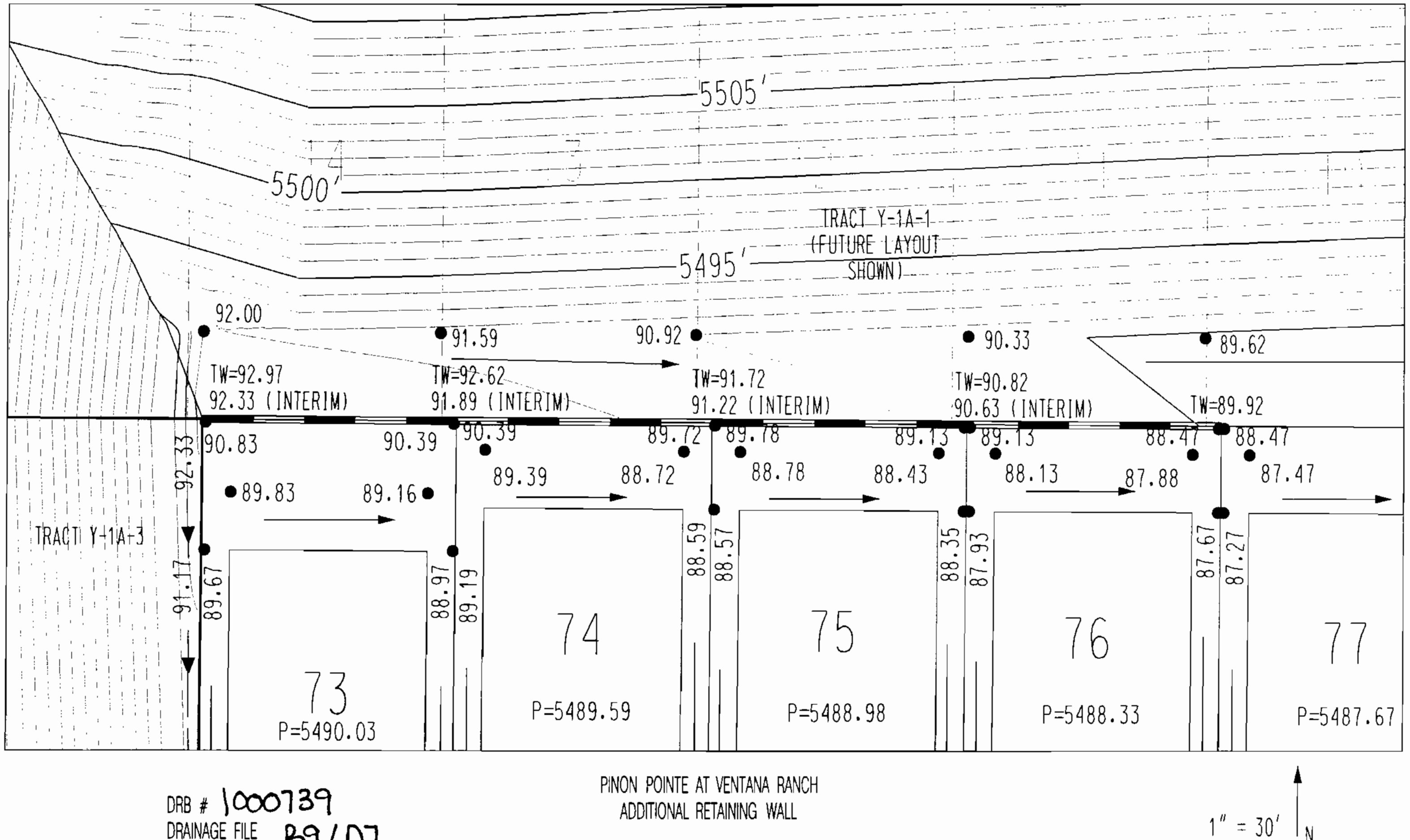
***** HYDRAULIC GRADE LINE CALCULATIONS *****

Manning's n = 0.013 for pipe

Station	Structure	Diam. (in.)	Q (cfs)	Area	Vel.	K	Sf	Length (ft.)	MH Dia. (ft.)	JNCT Angle	Hf	Hb	Hj	Hmh	Ht	Total Losses	HGL(dn)	HGL(up)	Low Point	HV	EGL(dn)	EGL(up)
	MH								0.00	0.00		0.00	0.00	0.00	0.00	0.00		5470.75	5476.29	0.13	5470.88	5470.88
		18	5.1	1.77	2.89	105	0.0024	8.54			0.02					0.02						
	Inlet								0.00	0.00		0.00	0.00	0.01	0.00	0.01	5470.77	5470.77	5475.97	0.13	5470.90	5470.90
	Dummy	18	5.1	1.77	2.89	105	0.0024	8.00			0.02					0.02						

JUNCTION LOSSES

Dia. 3 (in.)	Junct. Angle	<delta>y	Ht(inc.)	Ht(dec.)	Actual Slope	Elev.	Depth
0	0	0.0000	0.0130	0.0000		5462.95	13.34
					1.5100	12.90	
0	0	0.0000	0.0000	0.0000		5475.84	0.13
					1.5100	12.08	



DRB # 1000739
DRAINAGE FILE B9/D7

PINON POINTE AT VENTANA RANCH
ADDITIONAL RETAINING WALL