



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

March 2, 2004

Diane Hoelzer, P.E.
Mark Goodwin & Associates, PA
P.O. Box 90606
Albuquerque, NM 87199

**Re: Paseo de Estrella Subdivision (Formerly Paseo de Estrella and Vista Estrella,
in Vista del Norte Development), SIA/Financial Guarantee Release
Engineer's Stamp dated 1-30-02 (D16/D12)
Certification dated 3-01-04**

Dear Ms. Hoelzer,

Based upon the information provided in your submittal received 3-02-04, the
above referenced certification is approved for ~~release~~ of SIA and Financial Guarantee.

If you have any questions, you can contact me at 924-3981.

Sincerely,

Kristal D. Metro
Engineering Associate, Planning Dept.
Development and Building Services

C: Arlene Portillo, COA# 687181
file

DRAINAGE REPORT
FOR
Vista Estrella and Paseo de Estrella
Subdivisions
at
Vista del Norte



Mark Goodwin & Associates, PA
February 2002
DLH

I. PROJECT DESCRIPTION

This project site is identified as Tract T-2-A-1-C and is located within Vista del Norte Unit 2. The site is sandwiched between Vista Monte Drive and Vista del Norte Drive near the Las Lomitas Drive / Vista del Norte intersection. The tract of land is proposed to be developed into two separate residential subdivisions. The north portion encompassing approximately 22.77 acres (Paseo de Estrella) is proposed to be built into a 76 lot residential gated community with private streets and public utilities. The south portion encompassing approximately 17.32 acres (Vista Estrella) is proposed to be built into an 86 lot residential community.

II. DRAINAGE DESIGN CRITERIA AND PREVIOUS REPORTS

The design criteria used in this report was in accordance with Section 22.2 Hydrology of the Development Process Manual, Volume 2, Design Criteria, January 1993 edition. The 100-year 6-hour storm event was analyzed to determine street capacities using $P(1 \text{ hr}) = 2.00"$, $P(6 \text{ hr}) = 2.30"$. The onsite Land Treatment values were determined using "Table A-5 Percent Treatment D" in the DPM. AHYMO printouts are provided in Appendix A. Two summary of hydrology tables are provided in the report.

III. EXISTING DRAINAGE CONDITIONS

This site was rough graded as part of the approved master grading plan for Vista del Norte Unit 1 several years ago. The site is relatively flat with a gentle fall towards the north.

IV. DEVELOPED DRAINAGE CONDITIONS

This site is part of the Vista del Norte Master Drainage Plan. A portion of the site will drain to the North Pond through an internal storm sewer that connects to the proposed storm sewer in Calle Comodo, (Vista del Norte subdivision Units 4, 5A and 5B) which discharges into the Vista del Norte North Pond. The remaining portion of the site will flow in a storm sewer that discharges into the Vista del Norte Middle Pond. The previous basin wide storm sewer analysis prepared as part of the Vista del Norte Subdivision (D-16/D-2) Drainage Plan was updated and is included in the Appendix of this report. Also the "Vista Del Norte Overview of Major Drainage Basins" and "Vista del Norte Subbasin Boundaries and Street Flow" Exhibits from that report have been updated and revised to reflect this project's drainage plan. These exhibits are in the back pocket.

The northern project, Paseo de Estrella, is divided into three subbasins. Runoff from two of the subbasins flows to the adjacent streets, Vista del Norte Drive and Vista Monte Drive. At the Vista del Norte Drive entrance two inlets will intercept about half of the runoff reaching this point. At the Vista Monte Drive entrance, the onsite runoff will be intercepted by two inlets in Vista Monte Drive a short distance south of the entrance road under a sump inlet condition.

The southern project, Vista Estrella, is divided into three subbasins. Runoff from all three subbasins flows to a low area where it is intercepted by the required number of sump inlets. In each case the sump inlets were designed to intercept two times the 100 year peak discharge.

Runoff from the 4 acre park will be intercepted by one of three beehive grates located along the perimeter of the park as shown on the G&D plan and the "Subbasin Boundary & Street Flow Exhibit".

The required offsite storm sewer in Vista Monte Drive, Vista del Norte Drive and Calle Comodo right-of-way is in the process of being designed for DRC submittal at the writing of this report.

VISTA DEL NORTE To Middle Pond

TABLE 1A: SUMMARY OF HYDROLOGY

SUBASIN ID	AREA (acres)	# Lots	N value	Land Treat. D	Land Treat.B/C	Q(100) cfs	Runoff Volume (Ac.Ft.)
TRACT B Units 1A,1B,2							
B1	4.46390	15	3.4	37	31.5	15.02	0.540
B2	6.38110	27	4.2	44	28.0	22.36	0.827
B3	2.23313	9	4.0	42	29.0	7.75	0.284
B4	3.04049	13	4.3	44	28.0	10.66	0.394
B5	1.76108	7	4.0	42	29.0	6.11	0.224
B6	3.90157	15	3.8	41	29.5	13.46	0.492
B7	1.82050	8	4.4	45	27.5	6.41	0.238
B8	3.72812	14	3.8	40	30.0	12.77	0.465
B9	3.55313	14	3.9	42	29.0	12.31	0.452
B10	1.07287	5	4.7	47	26.5	3.83	0.143
B11	3.28183	13	4.0	42	29.0	11.38	0.417
E1.1	3.60627	17	4.7	47	26.5	12.85	0.480
E1.3	5.09469	22	4.3	44	28.0	17.85	0.660
E2.2	2.61663	10	3.8	41	29.5	9.02	0.330
E3	3.99604	0	park	0	30/70	11.22	0.329
V4	1.36085	0	road	80	20.0	5.85	0.240
Los Prados Subd.	18.45000			55	22.5	68.57	2.637
SUB TOTAL	35.23772	189				247.42	9.152

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VISTA DEL NORTE

To North Pond

TABLE 1B: SUMMARY OF HYDROLOGY

SUBBASIN ID	AREA (acres)	# Lots	N value	Land Treat. D	Land Treat.B/C	Q(100) cfs	Runoff Volume (Ac.Ft.)
TRACT D Units 4A,4B,5A,5B							
D1	4.18410	22	5.3	51	24.5	15.24	0.578
D2	4.51190	26	5.8	55	22.5	16.78	0.645
D3	1.61074	7	4.3	44	28.0	5.66	0.209
D4	2.60643	11	4.2	44	28.0	9.14	0.338
D5	4.48173	24	5.4	52	24.0	16.41	0.624
D6	4.69405	26	5.5	53	23.5	17.27	0.659
D7	6.86337	39	5.7	55	22.5	25.51	0.980
D8	1.26515	5	4.0	42	29.0	4.40	0.161
D9	5.19326	25	4.8	48	26.0	18.60	0.698
D10	2.12068	10	4.7	47	26.5	7.56	0.283
D11	2.94873	15	5.1	50	25.0	10.68	0.404
D12	1.07444	5	4.7	47	26.5	3.84	0.143
D13	2.00810	11	5.5	53	23.5	7.40	0.282
D14	2.83001	12	4.2	44	28.0	9.92	0.367
D15	3.23216	16	5.0	49	25.5	11.65	0.438
D16	1.36359	8	5.9	56	22.0	5.11	0.197
V3	1.91705	0		80	20.0	8.23	0.338
E2.1	4.47180	18	4.0	42	29.0	15.50	0.569
V2	1.68459	0		80	20.0	7.24	0.297
V1	3.25785	0		78	22.0	13.88	0.567
E1.2	9.60630	47	4.9	49	25.5	34.59	1.303
E2.3	10.46263	50	4.8	48	26.0	37.46	1.407
Bernardo Trails BT1	4.46080	26		60	40/0	16.27	0.641
Bernardo Trails BT2	6.65600	44		60	40/0	24.27	0.956
Bernardo Trails BT3	13.68320	92		60	40/0	49.87	1.966
AMAFCA slope BT4A	1.16992			0	0/100	3.59	0.108
AMAFCA slope BT5A	3.57760			0	0/100	10.98	0.329
AMAFCA slope BT6A	2.09380			0	0/100	6.42	0.193
TRACT N	5.05000			90	10.0	22.01	0.929
TRACT T-1 (*)	11.50000			58	42.5/0	20.50	1.652

TRACT T-4-A	21.43000			90	10.0	46.52	3.942
TRACT O-1	3.82000				0/100	11.73	0.352
TRACT O-2 (*)	3.66860			90	10/O	8.00	0.675
TRACT P (*)	23.98000			90	10.0	52.00	4.411
LL	4.73000			80	0/20.4	19.45	0.804
SUB TOTAL	188.20858	539				593.68	28.445

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PASEO DE ESTRELLA AND VISTA ESTRELLA

TABLE 2 SUMMARY OF STREET CAPACITIES

LOCATION	CURB	CROWN	WIDTH ft.	SLOPE %	Q cfs	DEPTH ft	EG ft.
Diamondback/Sidewinder	Mtb	Y	28' FF	0.006	9.0	0.33	0.39
Diamondback/Sidewinder	Mtb	Y	28' FF	0.0066	10.0	0.33	0.40
Sidewinder	Std	Y	28' FF	0.006	19.85	0.48	0.59
Diamondback	Std	Y	28' FF	0.006	25.11	0.52	0.66

Mtb = Mountable Curb
Std = Standard Curb

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
INPUT FILE = VDN N&MP.DAT

RUN DATE (MON/DAY/YR) = 01/25/2002
USER NO. = M_GOODWIN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1	NOTATION
START											
RAINFALL	TYPE= 2										TIME= .00
COMPUTE NM HYD	100.D12	-	1	.00324	7.43	.278	1.61327	1.500	3.587 PER IMP=	2.600	RAIN24=
COMPUTE NM HYD	100.D13	-	2	.00485	11.31	.429	1.65683	1.500	3.642 PER IMP=	48.00	
ADD HYD	101.10	1& 2	3	.00809	18.74	.707	1.63933	1.500	3.620	51.00	
COMPUTE NM HYD	100.D11	-	1	.00461	10.68	.404	1.64231	1.500	3.623 PER IMP=	50.00	
ADD HYD	101.10	1& 3	2	.01270	29.42	1.111	1.64039	1.500	3.621		
COMPUTE NM HYD	100.D10	-	1	.00331	7.56	.283	1.59875	1.500	3.567 PER IMP=	47.00	
ADD HYD	101.10	1& 2	3	.01601	36.99	1.393	1.63175	1.500	3.610		
COMPUTE NM HYD	100.D9	-	1	.01130	26.18	.990	1.64231	1.500	3.620 PER IMP=	50.00	
ADD HYD	101.10	1& 3	2	.02731	63.17	2.383	1.63611	1.500	3.614		
COMPUTE NM HYD	100.D7	-	1	.00898	21.38	.822	1.71492	1.500	3.718 PER IMP=	55.00	
ADD HYD	101.10	1& 2	3	.03629	84.55	3.205	1.65561	1.500	3.640		
COMPUTE NM HYD	100.D8	-	1	.00198	4.40	.161	1.52615	1.500	3.474 PER IMP=	42.00	
ADD HYD	101.10	1& 3	40	.03827	88.94	3.365	1.64892	1.500	3.631		
COMPUTE NM HYD	100.D16	-	1	.00219	5.21	.200	1.71492	1.500	3.727 PER IMP=	55.00	
COMPUTE NM HYD	100.V3	-	2	.00335	9.19	.377	2.11559	1.500	4.294 PER IMP=	80.00	
ADD HYD	101.10	1& 2	3	.00553	14.41	.577	1.95712	1.500	4.070		
COMPUTE NM HYD	100.D14	-	1	.00420	9.48	.352	1.56971	1.500	3.526 PER IMP=	45.00	
ADD HYD	101.10	1& 3	2	.00973	23.89	.929	1.78983	1.500	3.835		
COMPUTE NM HYD	100.D15	-	1	.00212	4.80	.178	1.56971	1.500	3.532 PER IMP=	45.00	
COMPUTE NM HYD	100.E21	-	3	.00696	15.36	.561	1.51163	1.500	3.446 PER IMP=	41.00	
ADD HYD	101.10	1& 3	4	.00909	20.16	.739	1.52513	1.500	3.466		
ADD HYD	101.10	2& 4	3	.01882	44.05	1.668	1.66203	1.500	3.657		
COMPUTE NM HYD	100.V2	-	1	.00263	7.24	.297	2.11559	1.500	4.297 PER IMP=	80.00	
ADD HYD	101.10	1& 3	2	.02145	51.28	1.965	1.71767	1.500	3.735		
COMPUTE NM HYD	100.V1	-	1	.00509	13.88	.567	2.09032	1.500	4.261 PER IMP=	78.00	
COMPUTE NM HYD	100.E12	-	3	.01493	34.02	1.273	1.59875	1.500	3.561 PER IMP=	47.00	
ADD HYD	101.10	1& 3	4	.02002	47.90	1.840	1.72372	1.500	3.739		
ADD HYD	101.10	2& 4	3	.04147	99.19	3.805	1.72059	1.500	3.737		
COMPUTE NM HYD	100.E23	-	1	.01647	37.33	1.392	1.58423	1.500	3.541 PER IMP=	46.00	
ADD HYD	101.10	1& 3	2	.05794	136.52	5.197	1.68182	1.500	3.682		
COMPUTE NM HYD	100.D4	-	1	.00389	8.73	.323	1.55519	1.500	3.508 PER IMP=	44.00	
ADD HYD	101.10	1& 2	3	.06183	145.25	5.520	1.67385	1.500	3.671		
COMPUTE NM HYD	100.D6	-	1	.00733	17.27	.659	1.68588	1.500	3.680 PER IMP=	53.00	
ADD HYD	101.10	1& 3	2	.06916	162.52	6.179	1.67512	1.500	3.672		
COMPUTE NM HYD	100.D5	-	1	.00700	16.41	.624	1.67136	1.500	3.661 PER IMP=	52.00	
ADD HYD	101.10	1& 2	3	.07617	178.93	6.803	1.67477	1.500	3.671		
ADD HYD	101.10	40& 3	41	.11443	267.87	10.169	1.66612	1.500	3.658		
COMPUTE NM HYD	100.D2	-	1	.00705	16.78	.645	1.71492	1.500	3.719 PER IMP=	55.00	
COMPUTE NM HYD	100.D3	-	2	.00288	6.47	.239	1.55519	1.500	3.510 PER IMP=	44.00	
ADD HYD	101.10	1& 2	3	.00933	23.25	.884	1.66854	1.500	3.658		
COMPUTE NM HYD	100.D1	-	1	.00654	15.24	.578	1.65683	1.500	3.641 PER IMP=	51.00	
ADD HYD	101.10	1& 3	2	.01647	38.48	1.461	1.66387	1.500	3.651		

ADD HYD	101.10	41&	2	43	.13090	306.35	11.630	1.66584	1.500	3.657	
COMPUTE NM HYD	100.BT1	-	-	1	.00697	16.27	.641	1.72413	1.500	3.647	PER IMP= 60.00
COMPUTE NM HYD	100.BT4A	-	-	2	.00183	3.59	.108	1.10462	1.500	3.073	PER IMP= .00
ADD HYD	101.10	1&	2	3	.00880	19.86	.749	1.59535	1.500	3.528	
COMPUTE NM HYD	100.TN	-	-	1	.00789	22.01	.929	2.20728	1.500	4.358	PER IMP= 90.00
ADD HYD	101.10	1&	3	2	.01669	41.87	1.677	1.88466	1.500	3.921	
COMPUTE NM HYD	100.BT2	-	-	1	.01040	24.27	.956	1.72413	1.500	3.646	PER IMP= 60.00
ADD HYD	101.10	1&	2	3	.02709	66.14	2.634	1.82301	1.500	3.815	
COMPUTE NM HYD	100.BT3	-	-	1	.02138	49.87	1.966	1.72413	1.500	3.645	PER IMP= 60.00
COMPUTE NM HYD	100.BT5A	-	-	4	.00559	10.98	.329	1.10462	1.500	3.068	PER IMP= .00
ADD HYD	101.10	1&	4	2	.02697	60.85	2.295	1.59570	1.500	3.525	
COMPUTE NM HYD	100.BT6A	-	-	1	.00327	6.42	.193	1.10462	1.500	3.070	PER IMP= .00
ADD HYD	101.10	1&	2	4	.03024	67.27	2.488	1.54260	1.500	3.476	
ADD HYD	101.10	3&	4	44	.05733	133.41	5.122	1.67509	1.500	3.636	
COMPUTE NM HYD	100.T1	-	-	1	.01797	41.92	1.652	1.72413	1.500	3.645	PER IMP= 60.00
ROUTE RESERVOIR	POND.T1	1	20		.01797	20.51	1.652	1.72411	1.700	1.784	AC-FT= .408
COMPUTE NM HYD	100.P	-	-	1	.03747	104.45	4.411	2.20728	1.500	4.356	PER IMP= 90.00
ROUTE RESERVOIR	POND.P	1	21		.03747	52.02	4.411	2.20727	1.650	2.169	AC-FT= .844
COMPUTE NM HYD	100.T4A	-	-	1	.03348	93.35	3.942	2.20728	1.500	4.356	PER IMP= 90.00
ROUTE RESERVOIR	POND.T4A	1	22		.05544	46.52	3.942	2.20727	1.650	2.171	AC-FT= .769
ADD HYD	101.10	20&	21	30	.08892	72.53	6.063	2.05065	1.700	2.044	
ADD HYD	101.10	30&	22	31	.00573	119.05	10.005	2.10963	1.700	2.092	
COMPUTE NM HYD	100.O2	-	-	1	.00573	15.99	.675	2.20728	1.500	4.359	PER IMP= 90.00
ROUTE RESERVOIR	POND.O2	1	23		.00573	8.00	.675	2.20722	1.650	2.181	AC-FT= .201
ADD HYD	101.10	31&	23	32	.09465	127.05	10.680	2.11553	1.650	2.097	
COMPUTE NM HYD	100.LL	-	-	1	.00739	19.45	.804	2.03979	1.500	4.112	PER IMP= 79.60
ADD HYD	101.10	32&	1	33	.10204	143.89	11.484	2.11004	1.500	2.203	
COMPUTE NM HYD	100.O1	-	-	1	.00597	11.73	.352	1.10462	1.500	3.068	PER IMP= .00
ADD HYD	101.10	33&	1	34	.10802	155.62	11.836	2.05444	1.500	2.251	
ADD HYD	101.10	34&	43	35	.23892	461.97	23.465	1.84153	1.500	3.021	
ADD HYD	101.10	35&	44	36	.29625	595.38	28.587	1.80932	1.500	3.140	
ROUTE RESERVOIR	NORTH.POND	36	12		.29625	4.14	9.361	.59250	3.350	.022	AC-FT= 24.345
COMPUTE NM HYD	100.B1	-	-	1	.00697	15.02	.540	1.45355	1.500	3.368	PER IMP= 37.00
COMPUTE NM HYD	100.B2	-	-	2	.00997	22.36	.827	1.55519	1.500	3.504	PER IMP= 44.00
ADD HYD	101.10	1&	2	3	.01694	37.38	1.367	1.51334	1.500	3.448	
COMPUTE NM HYD	100.B3	-	-	1	.00349	7.75	.284	1.52615	1.500	3.469	PER IMP= 42.00
ADD HYD	101.10	1&	3	2	.02043	45.13	1.651	1.51551	1.500	3.452	
COMPUTE NM HYD	100.B4	-	-	1	.00475	10.66	.394	1.55519	1.500	3.506	PER IMP= 44.00
ADD HYD	101.10	1&	2	3	.02518	55.79	2.045	1.52298	1.500	3.462	
COMPUTE NM HYD	100.B5	-	-	1	.00275	6.11	.224	1.52615	1.500	3.472	PER IMP= 42.00
ADD HYD	101.10	1&	3	2	.02793	61.90	2.269	1.52328	1.500	3.463	
COMPUTE NM HYD	100.B6	-	-	1	.00610	13.46	.492	1.51163	1.500	3.446	PER IMP= 41.00
ADD HYD	101.10	1&	2	3	.03403	75.35	2.761	1.52119	1.500	3.460	
COMPUTE NM HYD	100.B7	-	-	1	.00284	6.41	.238	1.56971	1.500	3.529	PER IMP= 45.00
ADD HYD	101.10	1&	3	2	.03687	81.77	2.999	1.52491	1.500	3.465	
COMPUTE NM HYD	100.B8	-	-	1	.00582	12.77	.465	1.49711	1.500	3.427	PER IMP= 40.00
ADD HYD	101.10	1&	2	3	.04269	94.53	3.463	1.52112	1.500	3.460	
COMPUTE NM HYD	100.B9	-	-	1	.00555	12.31	.452	1.52615	1.500	3.467	PER IMP= 42.00
ADD HYD	101.10	1&	3	2	.04824	106.85	3.915	1.52169	1.500	3.461	
COMPUTE NM HYD	100.B10	-	-	1	.00168	3.83	.143	1.59875	1.500	3.574	PER IMP= 47.00
ADD HYD	101.10	1&	2	3	.04992	110.68	4.058	1.52427	1.500	3.465	

100.B11	-	1	.00320	6.95	.251	1.46807	1.500	3.392	PER IMP=	38.00
101.10	1& 3	2	.05312	117.63	4.309	1.52088	1.500	3.460		
100.E11	-	1	.00564	13.00	.489	1.62779	1.500	3.603	PER IMP=	49.00
101.10	1& 2	3	.05876	130.64	4.798	1.53113	1.500	3.474		
100.E13	-	1	.00814	18.37	.682	1.56971	1.500	3.524	PER IMP=	45.00
101.10	1& 3	2	.06690	149.00	5.480	1.53582	1.500	3.480		
100.E22	-	1	.00396	8.79	.322	1.52615	1.500	3.468	PER IMP=	42.00
101.10	1& 2	3	.07086	157.80	5.802	1.53528	1.500	3.479		
100.E3	-	1	.00624	11.22	.329	.98689	1.500	2.808	PER IMP=	.00
101.10	1& 3	2	.07711	169.02	6.131	1.49087	1.500	3.425		
100.V4	-	1	.00213	5.85	.240	2.11559	1.500	4.299	PER IMP=	80.00
101.10	1& 2	3	.07923	174.87	6.371	1.50763	1.500	3.448		
100.00	-	1	.02883	68.57	2.637	1.71492	1.500	3.716	PER IMP=	55.00
101.10	1& 3	43	.10806	243.43	9.008	1.56293	1.500	3.520		
POND.100	43	13	.10806	14.62	9.006	1.56267	2.250	.211	AC-FT=	6.654
100.Q	-	1	.00373	10.42	.440	2.20728	1.500	4.362	PER IMP=	90.00
100.R	-	1	.00309	8.64	.364	2.20728	1.500	4.363	PER IMP=	90.00
100.S	-	1	.00088	2.45	.103	2.20728	1.500	4.382	PER IMP=	90.00
FINISH										

**Paseo de Estrella and Vista Estrella Subdivision
Vista del Norte**

CALCULATIONS FOR SUMP INLETS

Capacity is measured by the weir equation at the lip of the gutter assuming an allowable ponding elevation equal to the lowest adjacent right of way elevation. The length of the double grate facing the street is 6.0' and the maximum depth is 0.722' at the lip of the gutter. The sides are each 2' long and the average depth is 0.899'. These depths assume an 8" curb with right of way 9' behind the curb for an additional depth of 0.18' above the top of curb. From the weir equation:

For Double 'C' Inlet

*Front Q cap = (3.0) x (6.0') x (0.722)**1.5 = 11.04 cfs*

*Sides Q cap = (3.0) x (4.0') x (0.899) **1.5 = 10.23 cfs*

Total Q cap = 11.04 cfs + 10.23 cfs = 21.27 cfs (per double inlet)

For Single 'C' Inlet

*Front Q cap = (3.0) x (3.00') x (0.722) **1.5 = 5.52 cfs*

*Sides Q cap = (3.0) x (4.0') x (0.899) **1.5 = 10.22 cfs*

Total Q cap = 5.52 cfs + 10.22 cfs = 15.74 cfs (per single inlet)

When there is no overflow to the onsite retention pond the sump inlets are designed for approximately 2 times the 100 year peak flow.

Paseo de Estrella Subdivision

Peak Q(100year) = 37.33 cfs

Use (2) Double 'A' inlets and (2) Single 'A' inlets (Intercepts 74 cfs)

Vista Estrella Subdivision

Peak Q (100 year) = 34.02 cfs

Use (1) Double 'A' inlets and (3) Single 'A' inlets (intercepts 68.5 cfs)