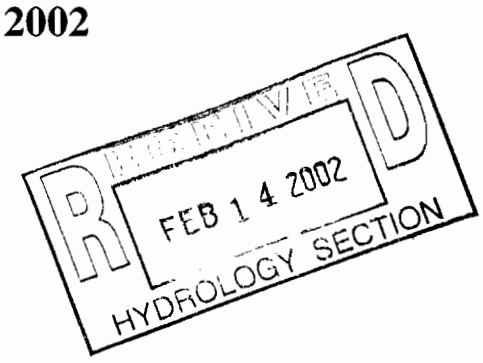
DRAINAGE REPORT

for

SEVILLE SUBDIVISION
UNIT 4
Albuquerque, New Mexico

FEBRUARY 2002



I, Daniel S. Aguirre, do hereby certify that this report was prepared by me or under my direction and that I am a duly registered Professional Engineer under the laws of the State of New Mexico.

Daniel S. Aguirre, P.E.
NM No. 11955

2/12/02
Date

Introduction

Wilson & Company prepared this drainage report under contract to Curb West, Inc. The document provides a basis for the design of storm water conveyance systems within Seville Unit 4. The first objective of this report is to analyze the hydrologic characteristics associated with the existing and developed conditions. The second is to present the proposed storm drain design used to mitigate the storm runoff generated by Seville Unit 4.

Seville Unit 4 is located in Northwest Albuquerque and is part of the overall Seville Subdivision. Currently, the site typically slopes from west to east at grades of 2 to 5%. It is presently undeveloped and covered with typical West Mesa desert vegetation. Historically, the site drains easterly into the West Branch of the Calabacillas Arroyo, then into Swinburne Dam.

Developed flows will discharged into the West Branch Calabacillas Arroyo via a proposed storm drain system. The West Branch discharges directly into the Swinburne Detention facility. This facility has been designed to provide detention for the upstream developed condition.

Project Description

The proposed development is located within the city limits of Albuquerque, New Mexico. Seville Subdivision Unit 4 is a development within the Seville Subdivision. Seville Subdivision is bounded on the south by Irving Blvd., on the east and north by the main branch of the Calabacillas Arroyo, and on the west by Universe Blvd. Seville is immediately west of the confluence of the west branch and the main stem of the Calabacillas Arroyo. Unit 4 is centrally located within the Seville Subdivision, bounded on the east by Kayenta Blvd, on the south by the West Branch and the proposed park dedication, and on the north and west by undeveloped lands within the future limits of Seville Subdivision. See Exhibit A, Vicinity Map.

The current legal description of the proposed development is "Tract 1-B-2, being a replat of Tract 1-B, Seville, within the Alameda Grant in projected Section 3, Township 11 north, Range 2 east, New Mexico Principal Meridian, City of Albuquerque, Bernalillo County, New Mexico". The site is within the tract formerly known as "Parcel 1, Lands of F. Otto and Dorothy W. Hass". The proposed legal description is "Seville Subdivision Unit Four, being a replat of Tract 1-B-2, Seville".

Exhibit B contains the September 20, 1996 FEMA Flood Insurance Rate Maps for the area which includes the proposed subdivision layout. The FEMA floodplain does not encroach on the subdivision in any location. Unit 4 will discharge to the West Branch of the Calabacillas Arroyo, which is identified as a floodplain.

The site is located on Zone Atlas Sheet A-10-Z. See Exhibit C for site location on this Zone Atlas Sheet. Seville Subdivision Unit 4 is currently zoned R-LT.

Project Background and Documents

Seville Subdivision currently includes Units 1 and 2. Unit 1 infrastructure is in place and homes are currently under construction. Unit 2 infrastructure is currently being constructed. Drainage design was approved for Units 1 and 2 in a report titled "Drainage Report for Seville Subdivision" (Easterling & Associates, Inc., June 2000). The report for Units 1 and 2 addressed the area that includes Unit 4 as future development that would discharge, in part, to the west branch and in part to the main stem of the Calabacillas Arroyo.

The TVI west campus is currently undergoing design and review with the City of Albuquerque and Bernalillo County. The campus will be located north of the West Branch along the west side of Universe Blvd. TVI will construct the west half of Universe Blvd. The drainage from the west, which has historically entered Seville Subdivision across the Universe Blvd. right of way, will be diverted to the West Branch at Universe Blvd.

Existing Conditions

(Refer to Plate 1 – Existing Conditions)

The existing site of Unit 4 typically slopes from northwest to southeast at grades of 2 to 5%. It is presently undeveloped and covered with typical west mesa desert vegetation. Historically, the site discharges via sheet flows and minor channelization into the West Branch of the Calabacillas Arroyo. The West Branch discharges directly into Swinburne detention facility. The Swinburne facility was designed to provide runoff detention of the 100 year event for contributing area upstream of the facility. A crossing structure at the Kayenta Blvd. crossing of the West Branch was designed and constructed with Unit 1 of Seville Subdivision. This structure was designed to safely pass 100-year developed flows. The development of Universe Blvd. with the TVI campus, as previously discussed, will divert flows entering the Seville Subdivision site from the west to the West Branch via street flow and storm drain located within the Universe Blvd. right of way.

Developed Conditions

(Refer to Plate 2 – Developed Conditions)

The developed site will consist of 96 lots of single family housing. The west half of Kayenta Blvd.. as it is adjacent to the site, will be constructed with this development. A park has been located to the south of the site. The park location and conditions have been discussed with the Parks and Recreation Division and they have agreed to the dedication. A portion of the dedication will be made with this development. The balance will be

dedicated and/or purchased by Parks and Recreation with a future development Unit within Seville.

Drainage under developed conditions will discharge as it has historically to the West Branch of the Calabacillas Arroyo. Flows will be conveyed to the discharge point via street flows and storm drain located within the City rights of way and an easement across the proposed park location. Parks and Recreation has agreed to the easement and its location.

The hydrologic analysis for the developed condition was completed using the Arid Lands Hydrologic Model (AHYMO) Version 1997.02. (See Appendices A & B for input and output data). Methodology outlined in Section 22.2 of the City of Albuquerque Development Process Manual was also incorporated into this analysis. Street flows have been evaluated using Flow Master by Haested Methods. Street flows were analyzed for the use of roll type curb where capacities permitted. Inlets are located to prevent exceeding the street flow capacities per the DPM. See Appendix C and Exhibit D for street capacity analysis. Storm Drain design and analysis was performed using *StormCAD* by Haested Methods. See Appendix D for *StormCAD* output.

Basins 1, 2, and 3 are calculated as future development. Basin 1 is approximately 17 acres and drains northeasterly into the main stem of the Calabacillas Arroyo. Basin 2 is just over 15 acres in size and generates a peak flow of 56.63 cfs. This storm runoff will drain southeasterly into the West Branch of the Calabacillas Arroyo via streets and proposed storm drains. The storm drain design for Unit 4 accommodates this future discharge.

Basins 4 through 8 include development within the boundaries of Unit 4. Collectively, these basins comprise an area of almost 17 acres, and the storm runoff generated by these will be directed southerly and collected by the proposed storm drain.

Offsite flow affecting Unit 4 is minimal and will be naturally directed southeasterly around the site by the proposed grading conditions along the westerly boundary of Unit 4.

Grading Plan

The Seville Unit 4 Grading Plan is attached as Plate 3. It illustrates the overall grading concept for the subdivision as well as the proposed storm drain.

Conclusion

The analysis indicates that the proposed system is adequate to handle the storm runoff generated by the site. Wilson & Company recommends that the proposed storm drain system undergo regular maintenance activities. This should include removing debris from grate inlets, as well as removing sediment buildup within the pipe system. The

Future area contributing flow to the Unit 4 storm drainage system should be analyzed in greater detail at the time of development to ensure that the runoff is within the constraints of this design. The downstream condition of the West Branch of the Calabacillas basin has been designed to accommodate developed discharge of the entire basin. Therefore, we are proposing no detention of runoff with this development.

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02c RUN DATE (MON/DAY/YR) =02/15/2002

INPUT FILE = ex-10.txt USER NO.= AHYMO-C-9803c01UNML1B-AH

PAGE = 1

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	NOTATION
START										TIME=0.00
RAINFALL TYPE= 1										RAIN6=1.467
SEDIMENT BULK										PK BF =1.07
COMPUTE NM HYD	4.10	-	1	.06820	8.16	.364	.09997	1.600	.187	PER IMP= .00
FINISH										

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02c RUN DATE (MON/DAY/YR) =02/15/2002

INPUT FILE = EX-100.TXT USER NO.= AHYMO-C-9803c01UNMLIB-AH

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	PEAK AREA (SQ MI)	RUNOFF DISCHARGE (CFS)	VOLUME (AC-FT)	TIME TO RUNOFF (INCHES)	CFS PEAK (HOURS)	PAGE = 1 PER ACRE NOTATION
START							TIME= .00		
RAINFALL TYPE= 1							RAIN6= 2.200		
SEDIMENT BULK							PK BF = 1.07		
COMPUTE NM HYD	4.10	-	1	.06820	41.86	1.786	.49106	1.600	.959 PER IMP= .00
FINISH									

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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	NOTATION
START										TIME=0.00
RAINFALL TYPE= 1										RAIN6=1.467
COMPUTE NM HYD	4.40	-	4	.00718	10.32	.341	.88974	1.500	2.245	PER IMP= 60.00
COMPUTE NM HYD	4.50	-	5	.00536	7.71	.254	.88974	1.500	2.249	PER IMP= 60.00
ADD HYD	AP-2	4& 5	12	.01254	18.03	.595	.88969	1.500	2.247	
COMPUTE NM HYD	4.60	-	6	.00531	7.64	.252	.88974	1.500	2.249	PER IMP= 60.00
ADD HYD	AP-3	12& 6	18	.01785	25.67	.847	.88969	1.500	2.247	
COMPUTE NM HYD	4.70	-	7	.00647	9.31	.307	.88974	1.500	2.248	PER IMP= 60.00
ADD HYD	AP-4	18& 7	25	.02432	34.98	1.154	.88969	1.500	2.248	
COMPUTE NM HYD	4.80	-	8	.00215	3.79	.132	1.15479	1.500	2.755	PER IMP= 90.00
ADD HYD	AP-5	25& 8	33	.02647	38.78	1.286	.91121	1.500	2.289	
FINISH										

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - VERSION: 1997.02c
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USER NO.= AHYMO-C-9803c01UNMLIB-AH

TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)
		START						
TIME= .00								
		RAINFALL TYPE= 1						
RAIN6= 2.200								
		COMPUTE NM HYD	4.40	- 4	.00718	16.93	.589	
1.53936	1.500	3.684 PER IMP= 60.00						
		COMPUTE NM HYD	4.50	- 5	.00536	12.66	.440	
1.53936	1.500	3.691 PER IMP= 60.00						
		ADD HYD	AP-2	4& 5 12	.01254	29.59	1.029	
1.53931	1.500	3.687						
		COMPUTE NM HYD	4.60	- 6	.00531	12.54	.436	
1.53936	1.500	3.691 PER IMP= 60.00						
		ADD HYD	AP-3	12& 6 18	.01785	42.13	1.465	
1.53931	1.500	3.688						
		COMPUTE NM HYD	4.70	- 7	.00647	15.28	.531	
1.53936	1.500	3.690 PER IMP= 60.00						
		ADD HYD	AP-4	18& 7 25	.02432	57.41	1.997	
1.53931	1.500	3.689						
		COMPUTE NM HYD	4.80	- 8	.00215	5.83	.214	
1.86836	1.500	4.236 PER IMP= 90.00						
		ADD HYD	AP-5	25& 8 33	.02647	63.24	2.211	
1.56603	1.500	3.733						
		FINISH						

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02c RUN DATE (MON/DAY/YR) =02/15/2002

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PAGE = 1

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	NOTATION
START										TIME=0.00
RAINFALL TYPE= 1										RAIN6=1.47
COMPUTE NM HYD	4.10	-	1	.02670	38.39	1.267	.88974	1.500	2.247	PER
IMP= 60.00										
COMPUTE NM HYD	4.20	-	2	.00427	6.15	.203	.88974	1.500	2.250	PER
IMP= 60.00										
COMPUTE NM HYD	4.30	-	3	.01968	28.30	.934	.88974	1.500	2.247	PER
IMP= 60.00										
FINISH										

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02c RUN DATE (MON/DAY/YR) =02/15/2002

INPUT FILE = fuoff.txt USER NO.= AHYMO-C-9803c01UNMLIB-AH

PAGE = 1

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	NOTATION
START										TIME=0.00
RAINFALL TYPE= 1										RAIN6=2.200
COMPUTE NM HYD	4.10	-	1	.02670	63.00	2.192	1.53936	1.500	3.687	PER IMP= 60.00
COMPUTE NM HYD	4.20	-	2	.00427	10.10	.351	1.53936	1.500	3.692	PER IMP= 60.00
COMPUTE NM HYD	4.30	-	3	.01968	46.44	1.616	1.53936	1.500	3.687	PER IMP= 60.00
FINISH										

Worksheet for Irregular Channel

Project Description	
Project File	t:\projects\x1218052\eng\flowmaster\streetfl.fm2
Worksheet	26f-f s=0.88%
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.008800	ft/ft

Elevation range: 99.13 ft to 100.00 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	100.00	0.00	46.00	0.017
9.80	99.80			
10.00	99.13			
12.00	99.26			
23.00	99.48			
34.00	99.26			
36.00	99.13			
36.20	99.80			
46.00	100.00			

Discharge	16.93	cfs

Results		
Wtd. Mannings Coefficient	0.017	
Water Surface Elevation	99.56	ft
Flow Area	5.77	ft²
Wetted Perimeter	26.92	ft
Top Width	26.26	ft
Height	0.43	ft
Critical Depth	99.58	ft
Critical Slope	0.007065	ft/ft
Velocity	2.94	ft/s
Velocity Head	0.13	ft
Specific Energy	99.70	ft
Froude Number	1.10	
Flow is supercritical.		

Worksheet for Irregular Channel

Project Description	
Project File	t:\projects\x1218052\eng\flowmaster\streetfl.fm2
Worksheet	26f-f s=2.00%
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.020000	ft/ft

Elevation range: 99.13 ft to 100.00 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	100.00	0.00	46.00	0.017
9.80	99.80			
10.00	99.13			
12.00	99.26			
23.00	99.48			
34.00	99.26			
36.00	99.13			
36.20	99.80			
46.00	100.00			

Discharge	12.66	cfs

Results		
Wtd. Mannings Coefficient	0.017	
Water Surface Elevation	99.49	ft
Flow Area	3.78	ft²
Wetted Perimeter	26.76	ft
Top Width	26.21	ft
Height	0.36	ft
Critical Depth	99.54	ft
Critical Slope	0.007511	ft/ft
Velocity	3.35	ft/s
Velocity Head	0.17	ft
Specific Energy	99.66	ft
Froude Number	1.56	
Flow is supercritical.		

26f-f s=3.50%

Worksheet for Irregular Channel

Project Description	
Project File	t:\projects\x1218052\eng\flowmaster\streetfl.fm2
Worksheet	26f-f s=3.50%
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.035000	ft/ft
Elevation range: 99.13 ft to 100.00 ft.		

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	100.00	0.00	46.00	0.017
9.80	99.80			
10.00	99.13			
12.00	99.26			
23.00	99.48			
34.00	99.26			
36.00	99.13			
36.20	99.80			
46.00	100.00			

Discharge	12.54	cfs

Results		
Wtd. Mannings Coefficient	0.017	
Water Surface Elevation	99.46	ft
Flow Area	3.07	ft²
Wetted Perimeter	24.61	ft
Top Width	24.11	ft
Height	0.33	ft
Critical Depth	99.54	ft
Critical Slope	0.007528	ft/ft
Velocity	4.08	ft/s
Velocity Head	0.26	ft
Specific Energy	99.72	ft
Froude Number	2.02	
Flow is supercritical.		
Flow is divided.		

Worksheet for Irregular Channel

Project Description	
Project File	t:\projects\x1218052\eng\flowmaster\streetfl.fm2
Worksheet	28f-f s=2.11%
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.021100	ft/ft
Discharge	50.00	cfs

Elevation range: 99.13 ft to 100.00 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	100.00	0.00	48.00	0.017
9.80	99.80			
10.00	99.13			
12.00	99.26			
24.00	99.50			
36.00	99.26			
38.00	99.13			
38.20	99.80			
48.00	100.00			

Results		
Wtd. Mannings Coefficient	0.017	
Water Surface Elevation	99.66	ft
Flow Area	8.77	ft²
Wetted Perimeter	29.13	ft
Top Width	28.32	ft
Height	0.53	ft
Critical Depth	99.83	ft
Critical Slope	0.005809	ft/ft
Velocity	5.70	ft/s
Velocity Head	0.51	ft
Specific Energy	100.17	ft
Froude Number	1.81	
Flow is supercritical.		

36f-f s=2.85%
Worksheet for Irregular Channel

Project Description	
Project File	t:\projects\x1218052\eng\flowmaster\streetfl.fm2
Worksheet	36f-f s=2.85%
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.028500	ft/ft

Elevation range: 99.13 ft to 100.00 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	100.00	0.00	56.00	0.017
9.80	99.80			
10.00	99.13			
12.00	99.26			
28.00	99.58			
44.00	99.26			
46.00	99.13			
46.20	99.80			
56.00	100.00			

Discharge	5.83	cfs

Results		
Wtd. Mannings Coefficient	0.017	
Water Surface Elevation	99.40	ft
Flow Area	1.85	ft²
Wetted Perimeter	18.73	ft
Top Width	18.31	ft
Height	0.27	ft
Critical Depth	99.45	ft
Critical Slope	0.008676	ft/ft
Velocity	3.15	ft/s
Velocity Head	0.15	ft
Specific Energy	99.56	ft
Froude Number	1.75	
Flow is supercritical.		
Flow is divided.		

26roll s=0.88%
Worksheet for Irregular Channel

Project Description	
Project File	t:\projects\x1218052\eng\flowmaster\streetfl.fm2
Worksheet	26roll s=0.88%
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.008800	ft/ft

Elevation range: 99.52 ft to 100.00 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	100.00	0.00	46.00	0.017
10.00	99.80			
11.00	99.52			
12.00	99.54			
23.00	99.76			
34.00	99.54			
35.00	99.52			
36.00	99.80			
46.00	100.00			

Discharge	10.00	cfs

Results		
Wtd. Mannings Coefficient	0.017	
Water Surface Elevation	99.80	ft
Flow Area	4.16	ft²
Wetted Perimeter	26.24	ft
Top Width	26.16	ft
Height	0.28	ft
Critical Depth	99.81	ft
Critical Slope	0.007751	ft/ft
Velocity	2.40	ft/s
Velocity Head	0.09	ft
Specific Energy	99.89	ft
Froude Number	1.06	
Flow is supercritical.		

26roll s=1.36%
Worksheet for Irregular Channel

Project Description	
Project File	t:\projects\x1218052\eng\flowmaster\streetfl.fm2
Worksheet	26roll s=1.36%
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope	0.013600 ft/ft			
Elevation range: 99.52 ft to 100.00 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	100.00	0.00	46.00	0.017
10.00	99.80			
11.00	99.52			
12.00	99.54			
23.00	99.76			
34.00	99.54			
35.00	99.52			
36.00	99.80			
46.00	100.00			
Discharge	12.00 cfs			

Results		
Wtd. Mannings Coefficient	0.017	
Water Surface Elevation	99.80	ft
Flow Area	4.06	ft²
Wetted Perimeter	26.07	ft
Top Width	25.98	ft
Height	0.28	ft
Critical Depth	99.84	ft
Critical Slope	0.007592	ft/ft
Velocity	2.95	ft/s
Velocity Head	0.14	ft
Specific Energy	99.93	ft
Froude Number	1.32	
Flow is supercritical.		

Worksheet for Irregular Channel

Project Description	
Project File	t:\projects\x1218052\eng\flowmaster\streetfl.fm2
Worksheet	26roll s=2.00%
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

Channel Slope 0.020000 ft/ft

Elevation range: 99.52 ft to 100.00 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	100.00	0.00	46.00	0.017
10.00	99.80			
11.00	99.52			
12.00	99.54			
23.00	99.76			
34.00	99.54			
35.00	99.52			
36.00	99.80			
46.00	100.00			

Discharge 15.00 cfs

Results

Wtd. Mannings Coefficient	0.017	
Water Surface Elevation	99.80	ft
Flow Area	4.15	ft²
Wetted Perimeter	26.18	ft
Top Width	26.10	ft
Height	0.28	ft
Critical Depth	99.87	ft
Critical Slope	0.007394	ft/ft
Velocity	3.62	ft/s
Velocity Head	0.20	ft
Specific Energy	100.00	ft
Froude Number	1.60	

Flow is supercritical.

26roll s=3.50%
Worksheet for Irregular Channel

Project Description	
Project File	t:\projects\x1218052\eng\flowmaster\streetfl.fm2
Worksheet	26roll s=3.50%
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.035000	ft/ft

Elevation range: 99.52 ft to 100.00 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	100.00	0.00	46.00	0.017
10.00	99.80			
11.00	99.52			
12.00	99.54			
23.00	99.76			
34.00	99.54			
35.00	99.52			
36.00	99.80			
46.00	100.00			

Discharge	19.50	cfs

Results		
Wtd. Mannings Coefficient	0.017	
Water Surface Elevation	99.80	ft
Flow Area	4.10	ft²
Wetted Perimeter	26.07	ft
Top Width	25.99	ft
Height	0.28	ft
Critical Depth	99.91	ft
Critical Slope	0.007162	ft/ft
Velocity	4.76	ft/s
Velocity Head	0.35	ft
Specific Energy	100.15	ft
Froude Number	2.11	
Flow is supercritical.		

28roll s=1.95%
Worksheet for Irregular Channel

Project Description	
Project File	t:\projects\x1218052\eng\flowmaster\streetfl.fm2
Worksheet	28roll s=1.95%
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

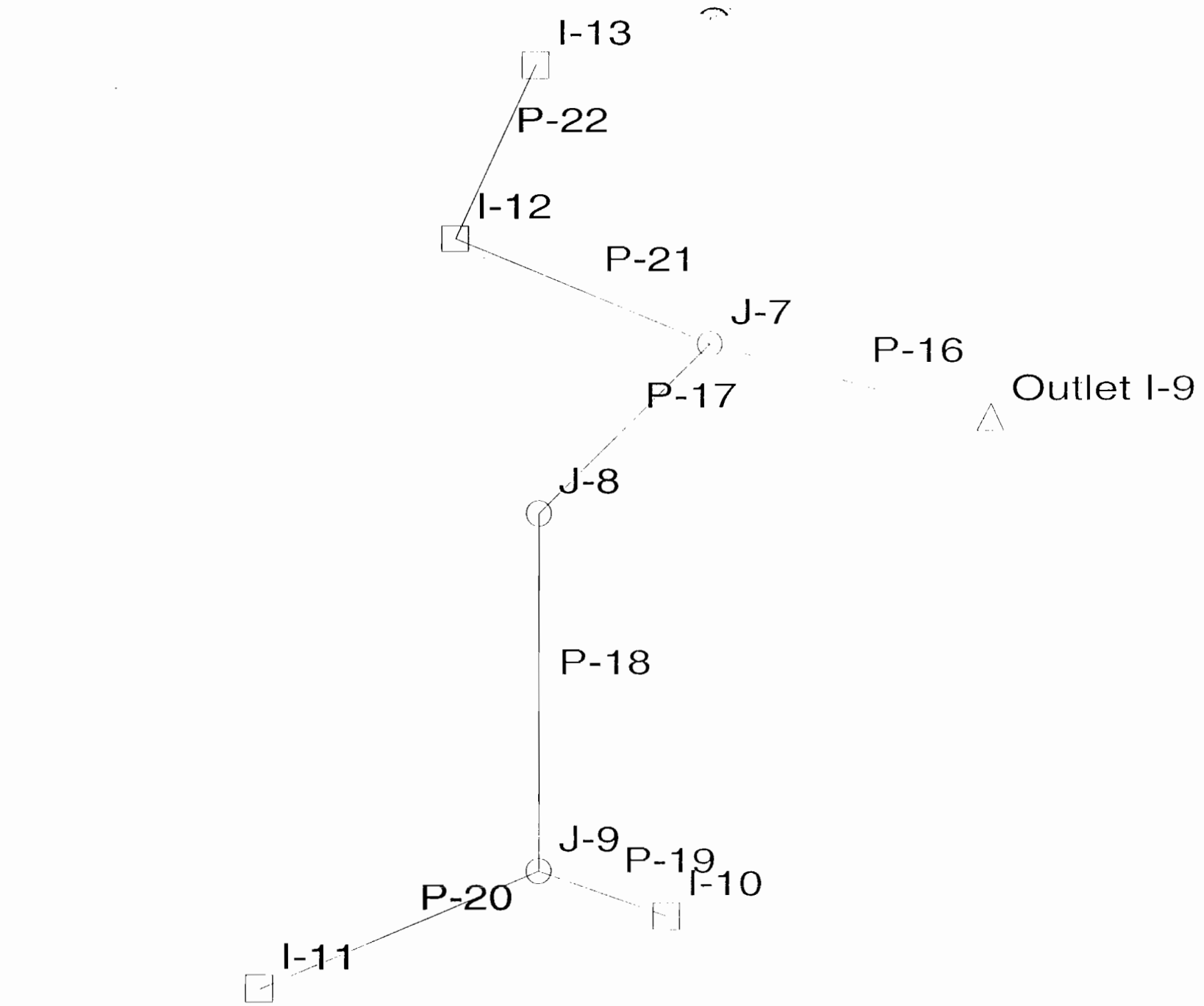
Input Data		
Channel Slope	0.019500	ft/ft

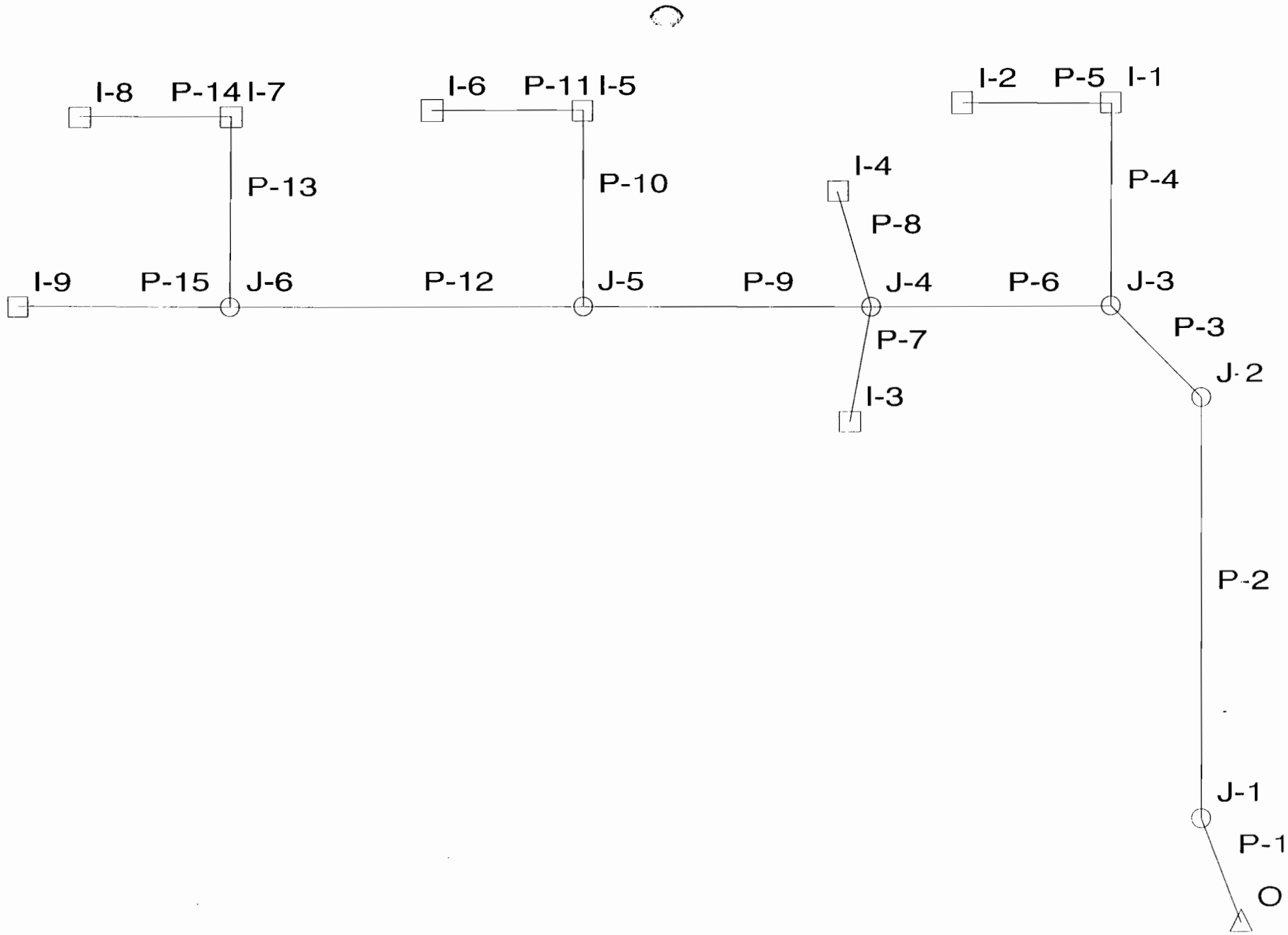
Elevation range: 99.52 ft to 100.00 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	100.00	0.00	48.00	0.017
10.00	99.80			
11.00	99.52			
12.00	99.54			
24.00	99.78			
36.00	99.54			
37.00	99.52			
38.00	99.80			
48.00	100.00			

Discharge	14.50	cfs

Results		
Wtd. Mannings Coefficient	0.017	
Water Surface Elevation	99.80	ft
Flow Area	4.22	ft²
Wetted Perimeter	28.22	ft
Top Width	28.13	ft
Height	0.28	ft
Critical Depth	99.86	ft
Critical Slope	0.007512	ft/ft
Velocity	3.44	ft/s
Velocity Head	0.18	ft
Specific Energy	99.99	ft
Froude Number	1.57	
Flow is supercritical.		


I-13
P-22
I-12
P-21
J-7
P-16
P-17
Outlet I-9
J-8
P-18
J-9
P-19
I-10
P-20
I-11



Project Title: Seville Unit 4 Storm Drain
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Easterling & Associates

 37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Project Engineer: rmm
StormCAD v1.0
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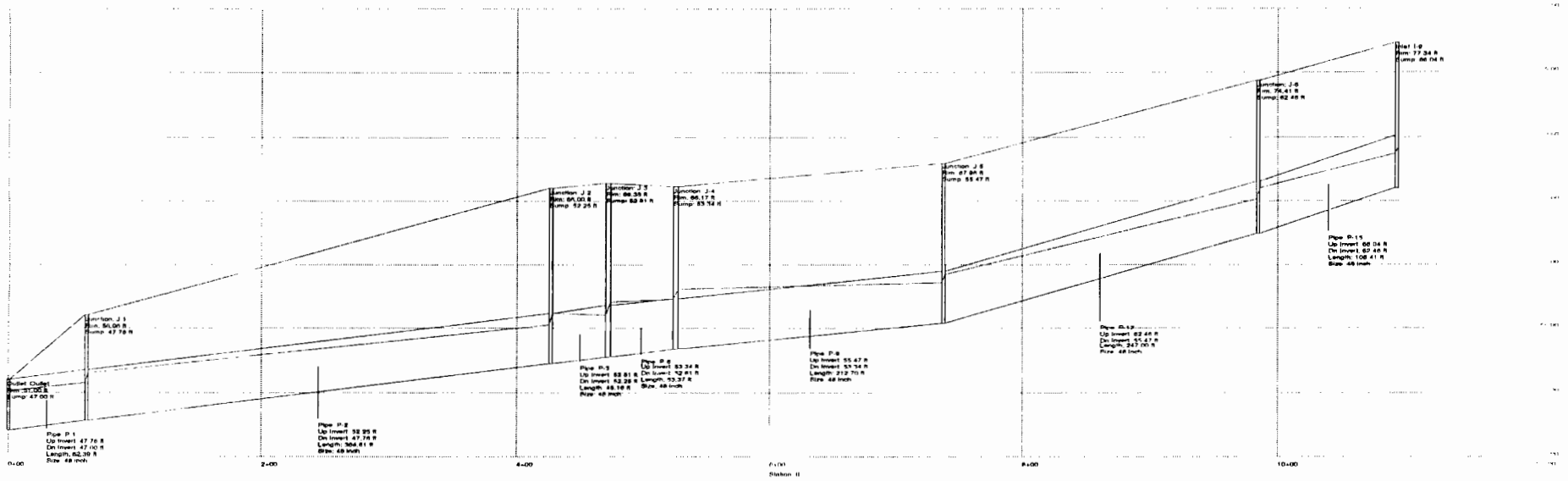

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