

***DRAINAGE REPORT***  
***FOR***  
***VENTANA RANCH TRACT Y-1B***  
***Mesa Vista Subdivision***

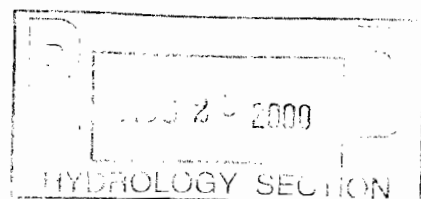
***August 2000***

***PREPARED FOR:***

***Sandia Properties LTD. CO.***  
***#10 Tramway Loop NE***  
***Albuquerque, NM 87122-2017***


***PREPARED BY:***

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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  
  
8/23/2000  
\_\_\_\_\_  
Date

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## **Introduction**

Wilson & Company prepared this drainage report under contract to *Sandia Properties LTD. CO.* The document provides a basis for the design of storm water conveyance systems within Ventana Ranch Tract Y-1B (shown as Tract 10 Phase I in previous drainage reports). This report addresses the hydrology associated with the existing and developed conditions for the subdivision site.

## **Methodologies Used for Analysis**

Hydrologic analysis in this report conforms to Section 22.2, Hydrology, of the Development Process Manual, Design Criteria for the City of Albuquerque, New Mexico (COA DPM). The modified rational method was used to determine the runoff rates for Tract Y-1B. Hydraulic analysis of the street flow was computed using FlowMaster. The storm drain inlets were designed using HEC-12.

Existing approved drainage reports referenced in this the preparation of this report include the "Las Ventanas Drainage Master Plan" prepared by Bohannon Huston (dated October 1995) and "Addendum No. 2 for the Design Analysis Report for Ventana Ranch Subdivision Drainage Facilities", also prepared by Bohannon Huston.

## **Related Platting Actions**

The preliminary plat will be submitted concurrently with the drainage report for the Development Review Board review and approval. A copy of the preliminary plat is included as Plate 1.

## **Site Location**

Tract Y-1B is located in the Ventana Ranch development area west of the the intersection of Las Ventanas Rd. and West Pointe Dr.. The Ventana Ranch development area is a 940 acre development located west of Paradise Hills between Paseo Del Norte and Irving Boulevard. Zone atlas sheet B-9-Z (Figure 1) contains Tract Y-1B.

The proposed development is located within Zone X (outside the 500-yr floodplain) of the FEMA FIRM map. Figure 2 shows the proposed development located on the floodplain map.

## **Existing Conditions**

### ***On-site Existing Conditions***

The site is currently undeveloped. The existing conditions map from the "Las Ventanas Drainage Master Plan" (Figure 3) shows Tract Y-1B located within basin 318B. The site

drains south to the newly constructed Las Ventanas Detention Dam. Infrastructure improvements have been made since the completion of the drainage master plan. The improvements include an 84" storm drain with a 42" stub out to Tract Y-1B. The following shows the existing on site flow calculations:

Ventana Ranch Tract Y-1B Existing Hydrology									
Basin	Area		Land Treatment Types				Peak Runoff		
			(acres)	A	B	C	D	10-yr (cfs)	100-yr (cfs)
1	5.1668	Existing Conditions	100%	0%	0%	0%	1.24	6.67	1.29
2	6.1424	Existing Conditions	100%	0%	0%	0%	1.47	7.92	1.29
3	1.4804	Existing Conditions	100%	0%	0%	0%	0.36	1.91	1.29
4	1.1146	Existing Conditions	0%	0%	100%	0%	1.66	3.20	2.87
Q <sub>100</sub> = 19.7 cfs									

### ***Off-site Existing Conditions***

A small portion of basin 318A from the DMP drains through this site in the existing conditions. Figure 3 shows the off-site basin. The off-site basin area is 2.686 acres. This off-site basin generates a 100-yr flow of 3.46 cfs (Appendix A).

## **Proposed Conditions**

### ***On-site Developed Conditions***

The site will be developed with 73 dwelling units, roadway, sidewalks, and curb and gutter. The site will be graded to convey runoff to the southeast corner of the tract. The developed runoff will be captured at this point with inlets and conveyed to the 84" storm drain per Addendum No. 2 for the Design Analysis Report for Ventana Ranch Subdivision Drainage Facilities. There is an existing 42" storm drain stub out from the 84" storm drain to accept the runoff produced by the proposed development. Six inlets are anticipated at the intersection of Ventana Rd. and Ramona Ave. to capture this flow (Appendix C). Plate 2 shows the proposed grading and drainage plan for this tract. The allowable discharge to this system from tract Y-1B is 86 cfs per Addendum 2. The following table shows the on-site calculations for the developed conditions.

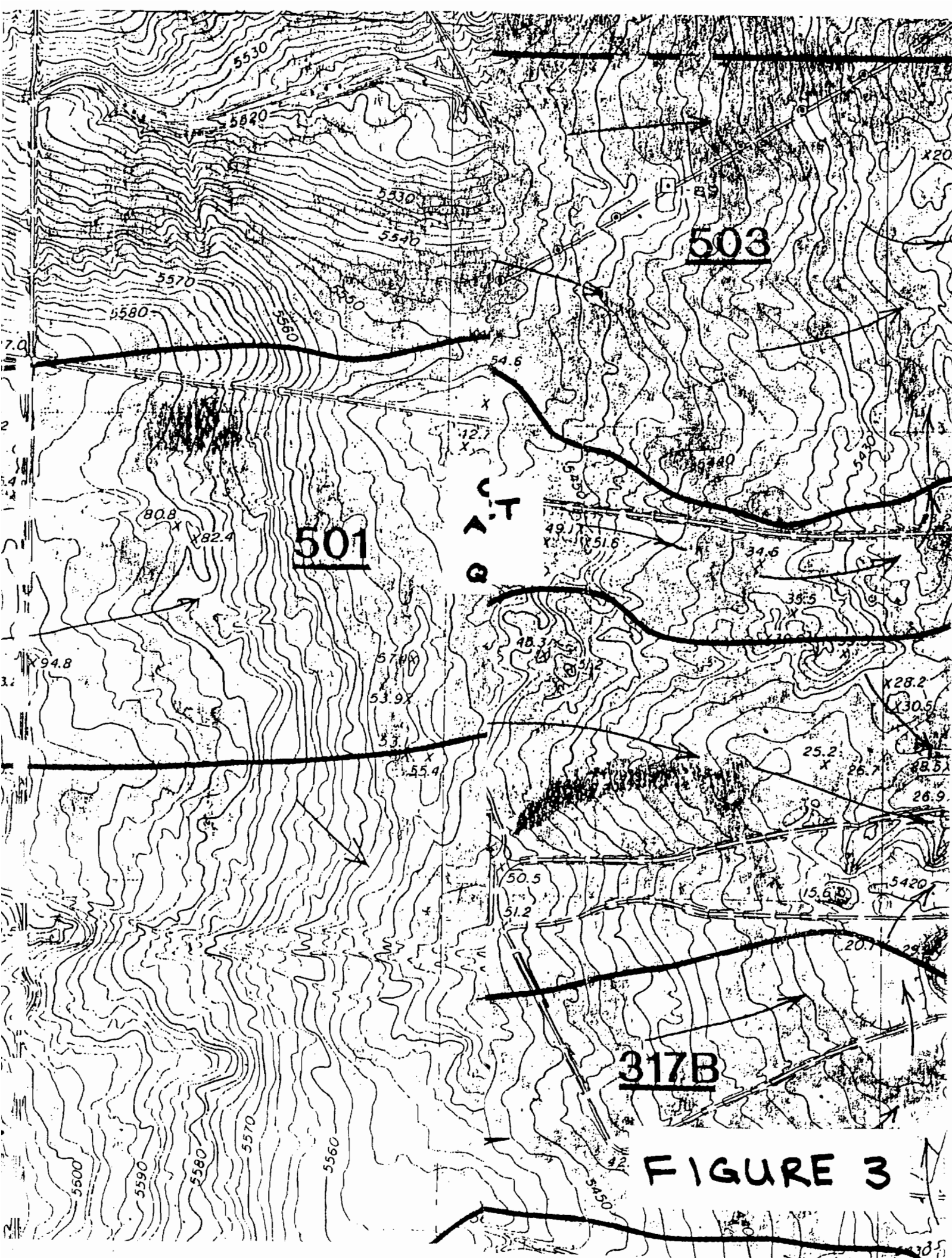


FIGURE 3

<b>Ventana Ranch Tract Y-1B Developed Hydrology</b>									
<b>Basin</b>	<b>Area</b>		<b>Land Treatment Types</b>				<b>Peak Runoff</b>		
			<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>10-yr (cfs)</b>	<b>100-yr (cfs)</b>	<b>100-yr (cfs/acre)</b>
	<b>(acres)</b>								
<b>1</b>	5.1668	<i>Developed Conditions</i>	0%	19.20%	21.30%	59.50%	11.28	18.61	3.60
<b>2</b>	6.1424	<i>Developed Conditions</i>	0%	19.20%	21.30%	59.50%	13.41	22.12	3.60
<b>3</b>	1.4804	<i>Developed Conditions</i>	0%	19.20%	21.30%	59.50%	3.23	5.33	3.60
<b>4</b>	1.1146	<i>Developed Conditions</i>	0%	0.00%	100.00%	0.00%	1.66	3.20	2.87
<b><math>Q_{100} = 49.3 \text{ cfs}</math></b>									

Land treatment calculations for typical lots are shown on Plate 2.

Appendix A contains Flowmaster output for street capacity calculations.

### ***Off-site Developed Conditions***

Similar to Cantabria and Briar Ridge Subdivision to the south (Ventana Ranch), a berm will be constructed on the west side of the property to divert the sheet nuisance (3.46 cfs in 100-yr storm) flows to future Phase II and the 78" inch storm drain.

### **Conclusion**

The calculations performed in this report demonstrate the proposed subdivision, as planned, will meet current City of Albuquerque and community design standards. Based on the, "Las Ventanas Drainage Master Plan" prepared by Bohannon Huston (dated October 1995) and "Addendum No. 2 for the Design Analysis Report for Ventana Ranch Subdivision Drainage Facilities", the available discharge to the existing 42" stubout is 86 cfs. The developed flows from this site are 49.3cfs, which is below the allowable discharge to the system. This also leaves additional capacity, for future development of the adjacent properties, in the system.



# HYDROLOGY SUMMARY

PROJECT NAME:		Tract 10																	
JOB NUMBER:		X0218008																	
BASIN	COND.	DESCRIPTION	AREA (acres)	LAND TREATMENTS				2 YEAR				10 YEAR				100 YEAR			
				A	B	C	D	Q (cfs)	VOLUME (cc.ft.)	Q (cfs)	VOLUME (cc.ft.)	Q (cfs)	VOLUME (cc.ft.)	Q (cfs)	VOLUME (cc.ft.)				
1X	UNDEVELOPED		5.1668	100.0%	0.0%	0.0%	0.0%	0.00	0.0000	0.0000	0.0000	1.24	0.0344	0.0344	6.67				
1X	DEVELOPED		5.1668	0.0%	19.2%	21.3%	59.5%	5.74	0.1963	0.2474	0.0000	11.28	0.3762	0.4548	18.61				
2X	UNDEVELOPED		6.1424	100.0%	0.0%	0.0%	0.0%	0.00	0.0000	0.0000	0.0000	1.47	0.0409	0.0409	7.92				
2X	DEVELOPED		6.1424	0.0%	19.2%	21.3%	59.5%	6.83	0.2333	0.2942	0.0000	13.41	0.4472	0.5407	22.12				
3X	UNDEVELOPED		1.4804	100.0%	0.0%	0.0%	0.0%	0.00	0.0000	0.0000	0.0000	0.36	0.0099	0.0099	1.91				
3X	DEVELOPED		1.4804	0.0%	19.2%	21.3%	59.5%	1.65	0.0562	0.0709	0.0000	3.23	0.1078	0.1303	5.33				
4X	UNDEVELOPED		1.1146	0.0%	0.0%	100.0%	0.0%	0.52	0.0111	0.0111	0.0111	1.66	0.0409	0.0409	3.20				
4X	DEVELOPED		1.1146	0.0%	0.0%	100.0%	0.0%	0.52	0.0111	0.0111	0.0111	1.66	0.0409	0.0409	3.20				
			0.0000	0.0%	0.0%	0.0%	0.0%	0.00	0.0000	0.0000	0.0000	0.00	0.0000	0.0000	0.00				
			0.0000	0.0%	0.0%	0.0%	0.0%	0.00	0.0000	0.0000	0.0000	0.00	0.0000	0.0000	0.00				

INPUT DATA:

PRECIP. ZONE	RAINFALL DEPTHS (INCHES) AT 100-YEAR STORM				
1	1 HOUR	6 HOUR	24 HOUR	4 DAY	10 DAY
	1.87	2.20	2.66	3.12	3.67

MESA VISTA SUBDIVISION  
HYDROLOGY

# HYDROLOGY SUMMARY

PROJECT NAME:		Ventana Ranch Tract 10		AREA		LAND TREATMENTS				2 YEAR		10 YEAR		100 YEAR	
JOB NUMBER:	COND.	DESCRIPTION	(acres)	A	B	C	D	Q (cfs)	VOLUME (ac.ft.)	Q (cfs)	VOLUME (ac.ft.)	Q (cfs)	VOLUME (ac.ft.)	Q (cfs)	VOLUME (ac.ft.)
1	UNDEVELOPED		2.6860	100.0%	0.0%	0.0%	0.0%	0.00	0.00000	0.64	0.0179	3.46	0.0985	0.0985	0.00000
			0.0000	0.0%	0.0%	0.0%	0.0%	0.00	0.00000	0.00	0.00000	0.00	0.00000	0.00	0.00000
			0.0000	0.0%	0.0%	0.0%	0.0%	0.00	0.00000	0.00	0.00000	0.00	0.00000	0.00	0.00000
			0.0000	0.0%	0.0%	0.0%	0.0%	0.00	0.00000	0.00	0.00000	0.00	0.00000	0.00	0.00000
			0.0000	0.0%	0.0%	0.0%	0.0%	0.00	0.00000	0.00	0.00000	0.00	0.00000	0.00	0.00000
			0.0000	0.0%	0.0%	0.0%	0.0%	0.00	0.00000	0.00	0.00000	0.00	0.00000	0.00	0.00000
			0.0000	0.0%	0.0%	0.0%	0.0%	0.00	0.00000	0.00	0.00000	0.00	0.00000	0.00	0.00000
			0.0000	0.0%	0.0%	0.0%	0.0%	0.00	0.00000	0.00	0.00000	0.00	0.00000	0.00	0.00000
			0.0000	0.0%	0.0%	0.0%	0.0%	0.00	0.00000	0.00	0.00000	0.00	0.00000	0.00	0.00000
			0.0000	0.0%	0.0%	0.0%	0.0%	0.00	0.00000	0.00	0.00000	0.00	0.00000	0.00	0.00000
			0.0000	0.0%	0.0%	0.0%	0.0%	0.00	0.00000	0.00	0.00000	0.00	0.00000	0.00	0.00000
			0.0000	0.0%	0.0%	0.0%	0.0%	0.00	0.00000	0.00	0.00000	0.00	0.00000	0.00	0.00000
			0.0000	0.0%	0.0%	0.0%	0.0%	0.00	0.00000	0.00	0.00000	0.00	0.00000	0.00	0.00000

## INPUT DATA:

PRECIP. ZONE	RAINFALL DEPTHS (INCHES) AT 100-YEAR STORM				
	1 HOUR	6 HOUR	24 HOUR	4 DAY	10 DAY
1	1.87	2.20	2.66	3.12	3.67

MESA VISTA OFF-SITE  
HYDROLOGY

# Worksheet Worksheet for Irregular Channel

AP-1

Project Description	
Worksheet	standup32FF
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Slope	0.035000 ft/ft
Discharge	21.60 cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results	
Mannings Coefficient	0.014
Water Surface Elevation	4.33 in
Elevation Range	0.00 to 0.87
Flow Area	4.0 ft²
Wetted Perimeter	339.76 in
Top Width	332.86 in
Actual Depth	0.36 ft
Critical Elevation	0.48 ft
Critical Slope	0.004737 ft/ft
Velocity	5.3917 ft/s
Velocity Head	0.45 ft
Specific Energy	9.75 in
Froude Number	2.5012
Flow Type	Supercritical

Calculation Messages:  
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+31.50	0.013
0+31.50	3+67.00	0.017
3+67.00	3+99.00	0.013

Natural Channel Points	
Station (in)	Elevation (in)
0+00.00	10.40
0+00.00	8.00
0+05.50	8.00
0+07.50	0.00
0+31.50	1.50
1+99.50	4.86
3+67.00	1.50
3+91.50	0.00

# Worksheet

## Worksheet for Irregular Channel

Natural Channel Points	
Station (in)	Elevation (in)
3+93.50	8.00
3+99.00	8.00
3+99.00	10.40

# Worksheet Worksheet for Irregular Channel

AP-2

Project Description	
Worksheet	standup32FF
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Slope	0.006000 ft/ft
Discharge	23.90 cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results	
Mannings Coefficient	0.015
Water Surface Elevation	5.90 in
Elevation Range	0.00 to 0.87
Flow Area	8.1 ft²
Wetted Perimeter	396.32 in
Top Width	386.95 in
Actual Depth	0.49 ft
Critical Elevation	0.50 ft
Critical Slope	0.005595 ft/ft
Velocity	2.9397 ft/s
Velocity Head	0.13 ft
Specific Energy	7.51 in
Froude Number	1.0321
Flow Type	Supercritical

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+31.50	0.013
0+31.50	3+67.00	0.017
3+67.00	3+99.00	0.013

Natural Channel Points	
Station (in)	Elevation (in)
0+00.00	10.40
0+00.00	8.00
0+05.50	8.00
0+07.50	0.00
0+31.50	1.50
1+99.50	4.86
3+67.00	1.50
3+91.50	0.00
3+93.50	8.00
3+99.00	8.00
3+99.00	10.40

# Worksheet

## Worksheet for Irregular Channel

Project Description	
Worksheet	standup32FF
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Slope	0.006000 ft/ft
Discharge	27.10 cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results	
Mannings Coefficient	0.016
Water Surface Elevation	6.15 in
Elevation Range	0.00 to 0.87
Flow Area	8.8 ft <sup>2</sup>
Wetted Perimeter	396.85 in
Top Width	387.08 in
Actual Depth	0.51 ft
Critical Elevation	0.52 ft
Critical Slope	0.005539 ft/ft
Velocity	3.0745 ft/s
Velocity Head	0.15 ft
Specific Energy	7.92 in
Froude Number	1.0369
Flow Type	Supercritical

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+31.50	0.013
0+31.50	3+67.00	0.017
3+67.00	3+99.00	0.013

Natural Channel Points	
Station (in)	Elevation (in)
0+00.00	10.40
0+00.00	8.00
0+05.50	8.00
0+07.50	0.00
0+31.50	1.50
1+99.50	4.86
3+67.00	1.50
3+91.50	0.00
3+93.50	8.00
3+99.00	8.00
3+99.00	10.40