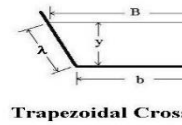


# Manning's Equation

Material	Manning's n
Grass	0.03
Lightly Vegetated	0.05
Densely Vegetated	0.075
Rip rap	0.035
Earth	0.022
Concrete lined	0.012



## South-west swale (Trapezoidal)

Channel Material	Lightly Vegetated	
Manning's n	0.05	
Base width, b	1 m	0 for V channel
Water depth, y	0.2 m	
Side slope, 1:z	1	
Min Longitudinal grade	1 %	
Side width, zy	0.2 m	
Top width, B	1.4 m	
Cross-sectional area	0.240 m <sup>2</sup>	
Wetted perimeter	1.566 m	
Hydraulic radius	0.153	

<b>Velocity</b>	0.573 m/s
<b>Flow capacity</b>	0.137 m <sup>3</sup> /s
	137.48 L/s

Freeboard	100 %
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Design base width, b	1 m
Design top width, B	1.8 m
Design depth, y	0.4 m

Target Q (from rational method)	0.127 m <sup>3</sup> /s	OK
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## Southern Swale (irregular sides)

Channel Material	Lightly Vegetated	
Manning's n	0.05	
Base width, b	1 m	0 for V channel
Water depth, y	0.5 m	
Side 1 slope, 1:z	0.001	
Side 2 slope, 1:z	3	
Min Longitudinal grade	0.3 %	
Side 1 width, zy	0.0005 m	
Side 2 width, zy	1.5 m	

Top width, B	2.50 m
Cross-sectional area	0.875 m <sup>2</sup>
Wetted perimeter	2.000 m
Hydraulic radius	0.438

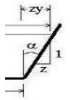
<b>Velocity</b>	0.631 m/s
<b>Flow capacity</b>	0.553 m <sup>3</sup> /s
	552.53 L/s

Freeboard	10 %
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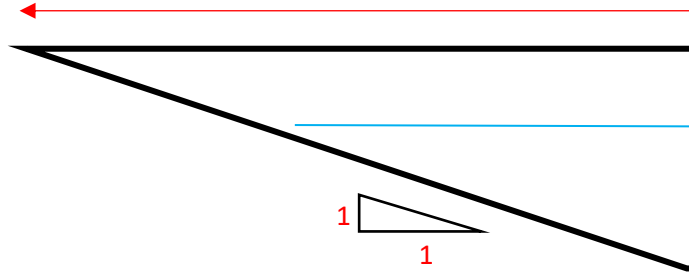
Design base width, b	1 m
Design top width, B	2.75 m
Design depth, y	0.55 m

Target Q (from rational method)	0.436 m <sup>3</sup> /s
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OK



s Section



**TABLE 5.4.9**  
**MANNING ROUGHNESS COEFFICIENT ( $n$ )**

Surface type	Typical values for $n$
Polyethylene (PE)	0.009 to 0.010
Polyvinylchloride (PVC)	0.009 to 0.010
Smooth concrete	0.011 to 0.012
Trowelled concrete	0.012 to 0.015
Asphalt paving	0.013 to 0.015
Brickwork	0.014 to 0.016
Roughly jointed bricks or pitchers	0.016 to 0.020
Sprayed concrete (gunite)	0.016 to 0.020
Earth-lined channels	0.018 to 0.025
Corrugated metal	0.012 to 0.015
Rock lining or rip-rap	0.025 to 0.030
Rock cut	0.035 to 0.040
Grassed or vegetated channels	0.025 to 0.075*

\* Depending on vegetation growth

