

SIMPLE DRIP TAPE DESIGN

Tasks covered in this tutorial:

- Drawing a block of tapes
- Changing symbol size on the screen
- Connecting to multiple zone items quickly
- Snapping to the midpoint of an object

This tutorial shows the steps required for drawing and designing a drip tape irrigation scheme. Read the notes below and then proceed with the exercise. This exercise designs a drip tape block with no pressure regulation within the block.

TAPES - AN OVERVIEW

A drip tape is a thin walled pipe tube with emitters built into the wall of the pipe. Tapes are treated differently in IRRICAD because their hydraulic characteristics are different to a standard pipe with a sprinkler or dripper attached. Reasons for this are primarily because of the low operating pressures and the extent of flow variations down a tape run with varying lengths and input pressures. Some hard wall tubing products are also treated as tapes because of these reasons.

STARTING THE TUTORIAL

1. Double-click on the IRRICAD icon or select *Start|All Programs|IRRICAD|IRRICAD 9 Pro* to start IRRICAD. If IRRICAD is already running select *File|New* to start with a clean design. In *Settings|Irrigation – Design Specific* and *[Browse]* for the DemoDBS.mdb database. Highlight and select *[Open]*. Change the “*Zone Pipes Line Width*” to **2** and the “*Mainline Pipe Line Width*” to **3**.
2. Go to the *Units* tab and click the *[US] ([Metric])* button to restore the default units for this tutorial. Note Metric measurements are displayed in brackets. These settings can be retained for each design by clicking the *[Save As Default]* button.
3. Select the *Misc* tab and click the “*Medium Design Size*”. Change the “*Base Database Symbol Size*” to **10ft (3m)**. This determines the size of the symbols according to the size of the design. When you are finished click *[OK]*.
4. Select *Zone|Tape Block* and select the **Drip tape** from the dropdown list of tapes. Leave the depth as **0**, as the tapes will be at ground level.
5. Leave the default “*Inlet Pressure*” as **12psi (8.5m)** and make sure that “*Regulated*” is unchecked. Checking this option would mean that you have PRVs at the start of each tape, which we do not have in this case.
6. Type in **6ft (2m)** for the “*Lateral Spacing*” and leave the “*Number of Laterals*” as **0**. Make sure the “*Determine Automatically*” option for the “*Lateral Direction*” is selected as in Figure SD 1. Click *[OK]*.

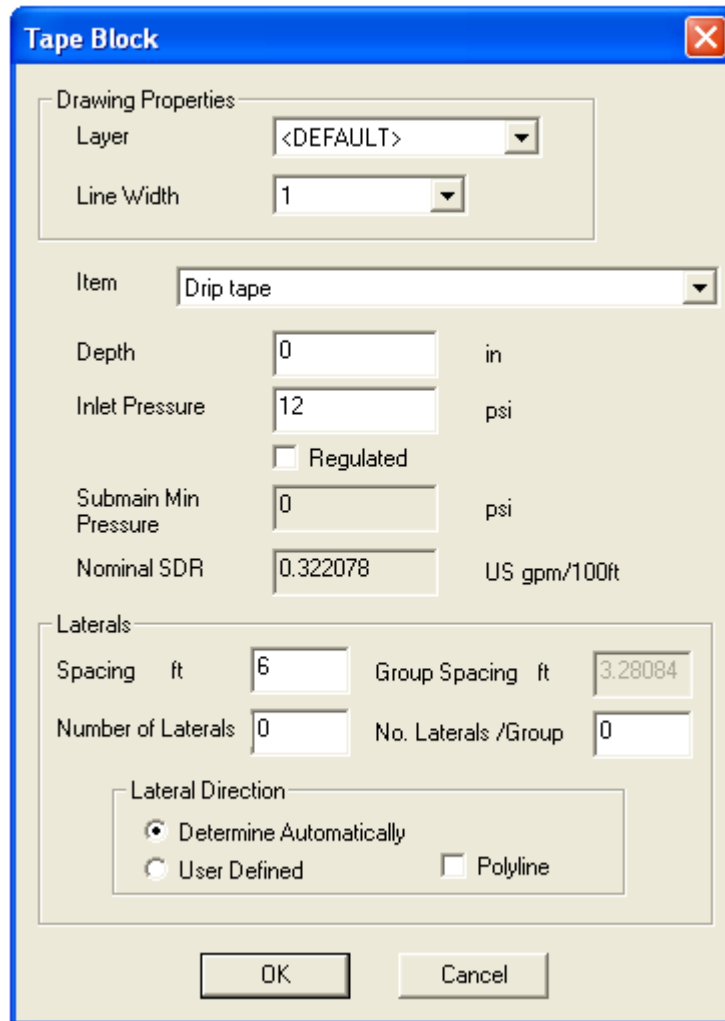


Figure SD 1

7. Now move the cursor to the bottom left of the screen and draw the outline of the block: left-click then draw a line upwards for **165ft (50m)** as seen on the status bar $d=165 (50)$ (approx.). Left-click the mouse to place the line at this point, and then continue drawing the block area by going **200ft (60m)** to the right and left-click. Now proceed downwards for **165ft (50m)** left-click then *Right-click/Close* after the third point has been placed. This will close the lasso, and complete the tape block. The block will automatically fill with tapes **6ft (2m)** apart. Select *View/Zoom All*. The block should look similar to Figure SD 2.

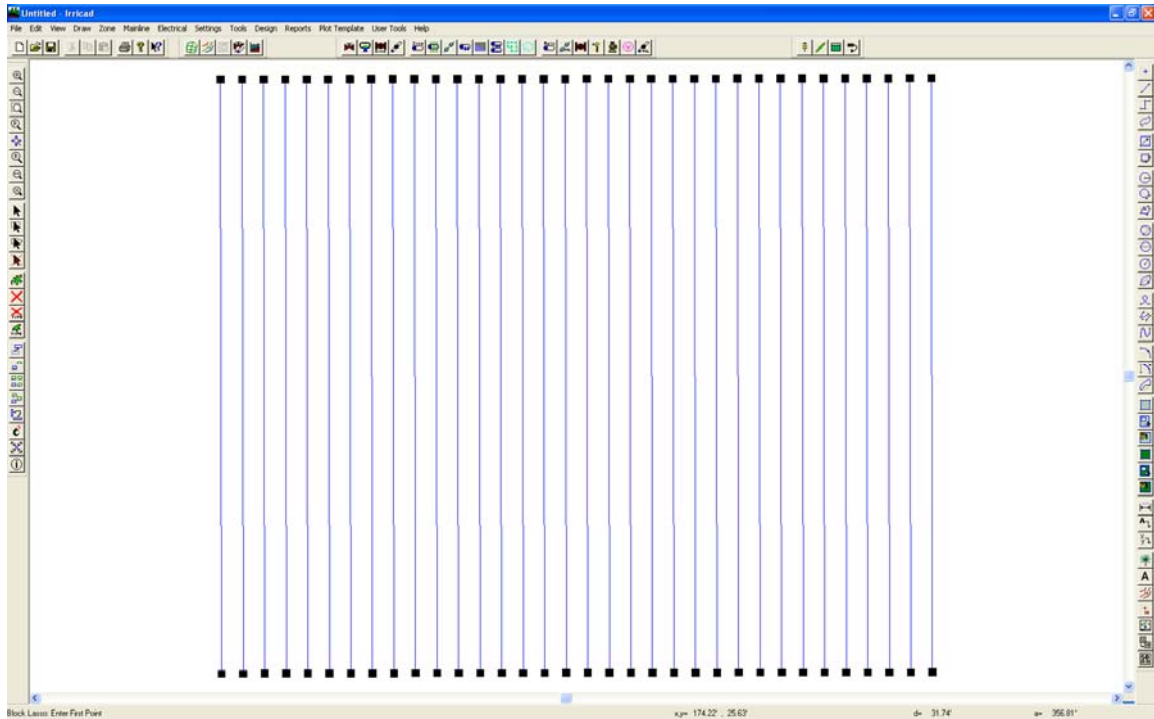


Figure SD 2

8. Now select *Settings/Snap* and then click the *[Running Snaps]* button. Check the "RN Snaps On" option and check the "Show Preview" option. Click the *[Enable All Snaps]* button. Now click *[OK]* and *[OK]* on the *Settings/Snap* dialog to close it.
9. Now select *Zone/Cut Pipe*. We wish to place a submain through the middle of the block. In the "Cut Pipe" dialog leave the "Layer" as **[DEFAULT]**. Make sure the pipe selected is **Computer Selected**. Leave the "Depth" as **0**, and click *[OK]*.
10. Click near the middle of the left outer lateral (the preview of the Running Snaps should show you when you are in the middle). Now click near the middle of the right outer lateral. IRRICAD will draw in the submain and connect to each lateral it crosses. Continue the pipe for approximately **13ft (4m)** past the last lateral. *Right-click/Restart* to finish the pipe.
11. Select *Zone/Control Valve*. From the dropdown list select the **1" (25mm) Electric Valve**, leaving the "Depth" as **0**, and place this on the end of the submain on the right side of the screen. Accept the default zone name.
12. Now select *Mainline/Pipe*. Leave the pipe as **Computer Selected** at **0 "Depth"**. Click *[OK]*. Connect the mainline pipe to the control valve with a left-click and draw upward for approximately **33ft (10m)**. Left-click to place the end then *Right-click/Restart*. Select *Mainline/Water Supply* and place on the end of the mainline pipe with a left-click as in Figure SD 3. Leave the Water supply details as the default; simply click *[OK]*.

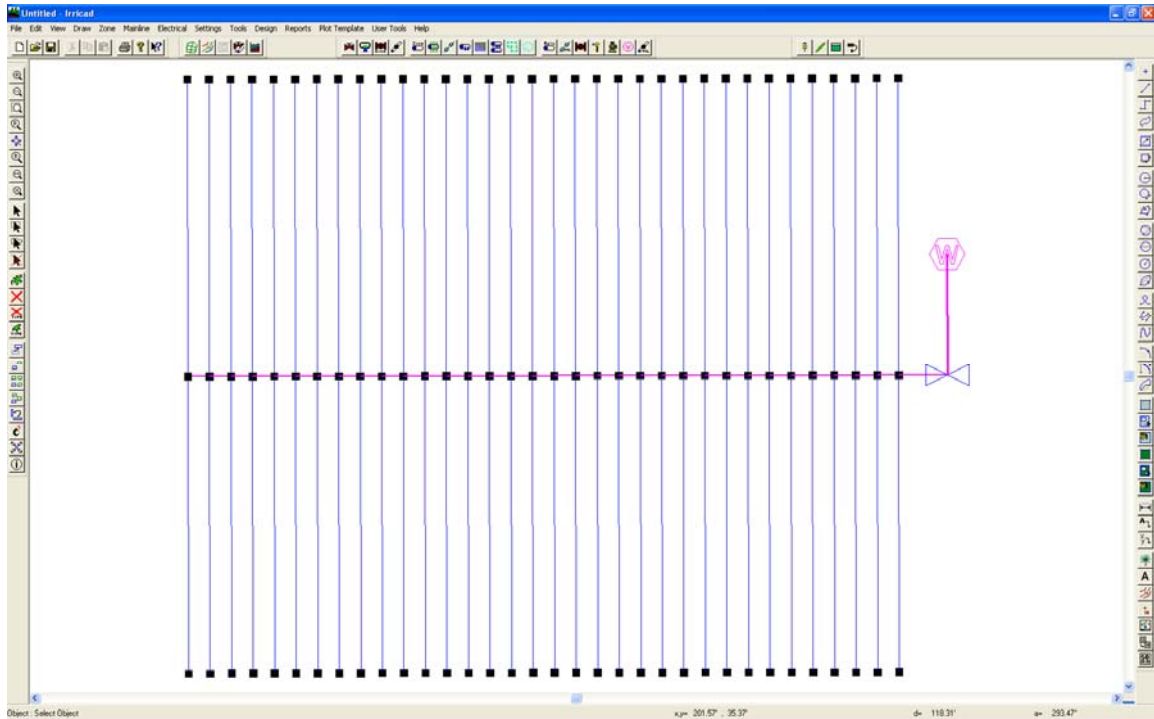


Figure SD 3

MANAGEMENT

Checking Connections

13. First, select *Design|Check Outlet Connectivity*. If everything is connected, proceed with Design. This tool is optional but is recommended for new users and for complex designs. Any unconnected items will be marked with a red cross in a circle. These can be removed by selecting *Design|Clear Connectivity Marks*.
14. If any outlets or control valves are marked as unconnected, check that you cannot see a black junction where the outlet, control valve or water supply connects to the pipes (use *View|Zoom Window* and draw a window where you want to zoom in). If you see a black junction at either of these points, it is because the valve, water supply or outlet is not connected to the pipe. Select the valve, water supply or outlet (*Tools|Select Object* and click on the item) and move the item to the centre of the junction (*Tools|Move* and click on the item). The junction will disappear when the item is connected to a pipe. If you are still having trouble with the connection, check the "Default Snap Mode" in *Settings|Snap* is "Connect". Another reason items might not connect is that you are trying to connect zone items on to mainline items or vice versa. Remember a control valve is required between zone and mainline items.

Assigning Zones

15. Now we wish to assign the zones to system flows. Select *Design|Assign All Zones to One System Flow* as we only have one Zone (control valve or block). You will notice that "Zone no. 1" will operate on **System Flow 1** as in Figure SD 4. Click [OK].

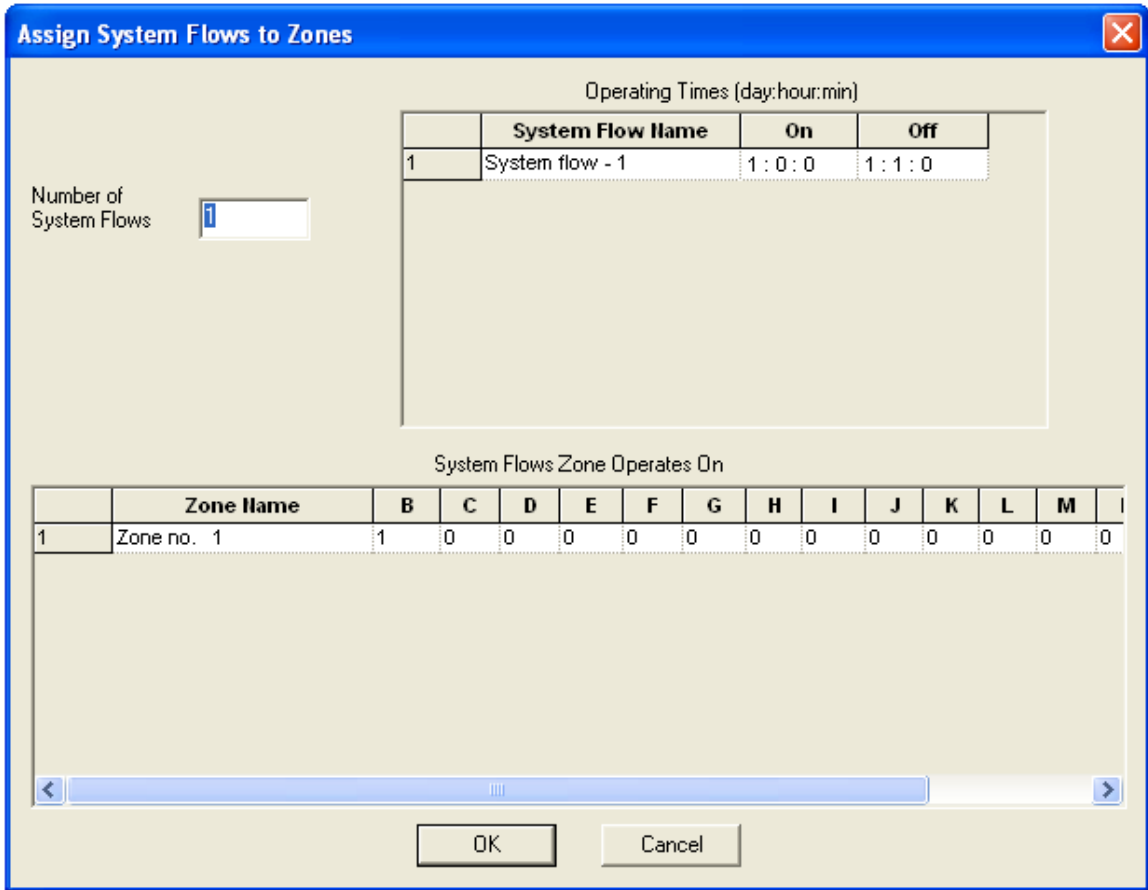


Figure SD 4

DESIGN

16. Select *Design|Design Parameters|Hydraulic Parameters* and enter the "Maximum Zone Pipe Velocity" as **5ft/s (1.5m/s)**. Click [OK].
17. The first step is to size the submain pipes. Select *Design|Zone Design|LP Design*. It is always useful to view some reports before continuing. Look at the *Reports|Zone Design Reports|Zone Design Summary* this report gives a good indication of what is happening in the zone. It should look similar to Figure SD 5. The present maximum dripper pressure is 13.22psi (9.3m) and the minimum is 12psi (8.5m). The actual pressure variation in the zone is calculated from the difference between the actual maximum and minimum outlet pressures relative to the actual maximum outlet pressure and is 9.28%. This pressure variation includes the submain friction loss as well as the loss in the tapes. Close the report window by clicking the [X].

Zone Name :	Zone no. 1	Valve Description :	1" (25mm) Electric Valve	
Zone Head (D/S) :	13.39 (psi)	Zone Head (U/S) :	13.39	(psi)
Total Zone Flow :	18.32 US gpm	Valve Headloss :	0.00	(psi)
	Allowable Flow	Actual Flow	Allowable Pressure	Actual Pressure
	US gph	US gph	(psi)	(psi)
Minimum Outlet	0.32	0.32	12.00	12.00
Maximum Outlet	0.32	0.32	13.80	13.22
Outlet Variation (%)	0.00	0.00	13.04	9.28
Outlet Locations (X,Y)	Minimum :	-17.3 , 8.2	Maximum :	43.0 , 33.5

Figure SD 5

18. Run *Design|Valve Analysis*, this normally is very fast.
19. Now we wish to size the mainline. Run *Design|Mainline Design|LP Design*.
20. Look at the *Reports|Mainline Design Reports|System Duty* reports to see the water supply requirements for each system flow. Save the design as demo.des.