

SIMPLE AUTOMATIC DRIP TAPE DESIGN

Tasks covered in this tutorial:

- Drawing an automatic block of tapes
- Setting a valve pressure
- Automatic Labelling
- Moving an item

This tutorial shows the steps required for drawing and designing a drip tape entity. Read the notes below and then proceed with the exercise.

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 Irrigation 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. Leave the default “Inlet Pressure” as **12psi (8.5m)** and make sure “Regulated” is unchecked. This Regulated option would mean you have PRVs at the start of each tape, which we do not have in this case. Type in **6ft (2m)** for the “Lateral Spacing” and leave the “Number of Laterals” as **0**. Make sure the “User Defined” option for the “Lateral Direction” is selected. Now click on the **Block** tab. Here we can choose to have our submain and valve drawn automatically if required.

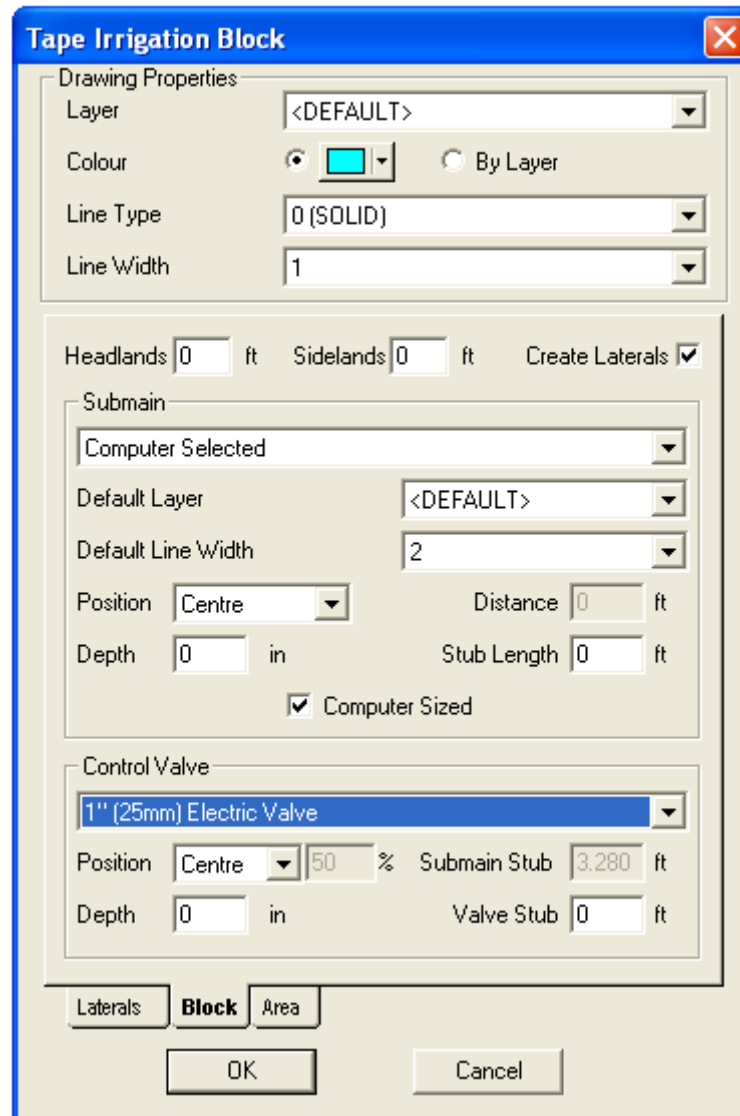


Figure AD 1

5. In the "Submain" area of the dialog box set **Centre** as the "Position" but leave as **Computer Selected**. In the "Valve" area of the dialog box set the "Position" to **Centre** and specify the valve as the **1" (25mm) Electric Valve** (Figure AD 1). Click [OK].
6. 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) (approximately). Left-click the mouse to place a vertex at this point and then continue drawing the block area by moving **200ft (60m)** to the right and then left-clicking. Now proceed downwards for **165ft (50m)** left-click then *Right-click/Close* after the third point has been placed. Because we selected "User Defined" for the "Lateral Direction" we now have to enter two points that define the direction (this will be indicated in the bottom left of the status bar). *Right-click/Snaps/Endpoint* and click on the left top corner of the rectangle. Now you will notice that the status bar is asking for the 2nd point in the block lateral. *Right-click/Snaps/Endpoint* and click on the bottom left corner. Once this is completed the laterals are automatically drawn, with a submain through the centre of the block and with a central valve as in Figure AD 2.

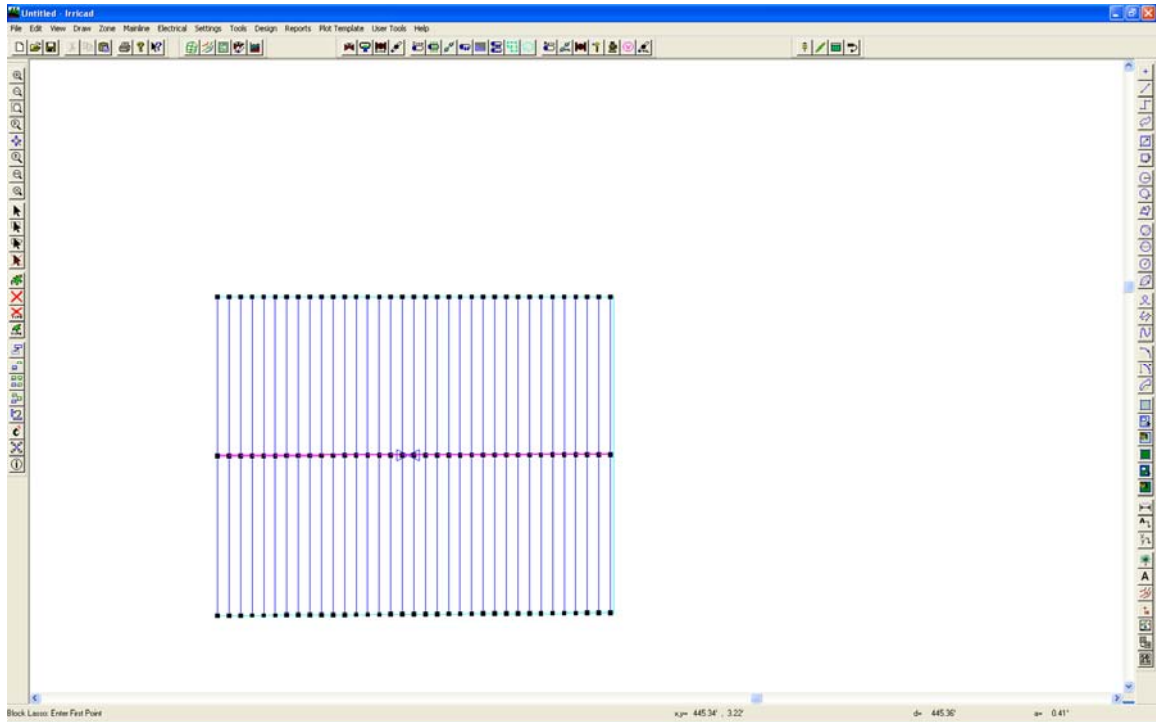


Figure AD 2

7. Now select *Mainline|Pipe*. Leave the pipe as **Computer Selected** and the "Depth" as **0**. Click **[OK]**. Connect the mainline pipe to the control valve with a left-click and draw towards the right for approximately **150ft (50m)**. Left-click to place and then *Right-click|Restart*. Select *Mainline|Water Supply* and place on the end of the mainline pipe with a left-click as in Figure AD 3. Leave the Water supply details as the defaults; simply click **[OK]**. Now select *View|Zoom All*.

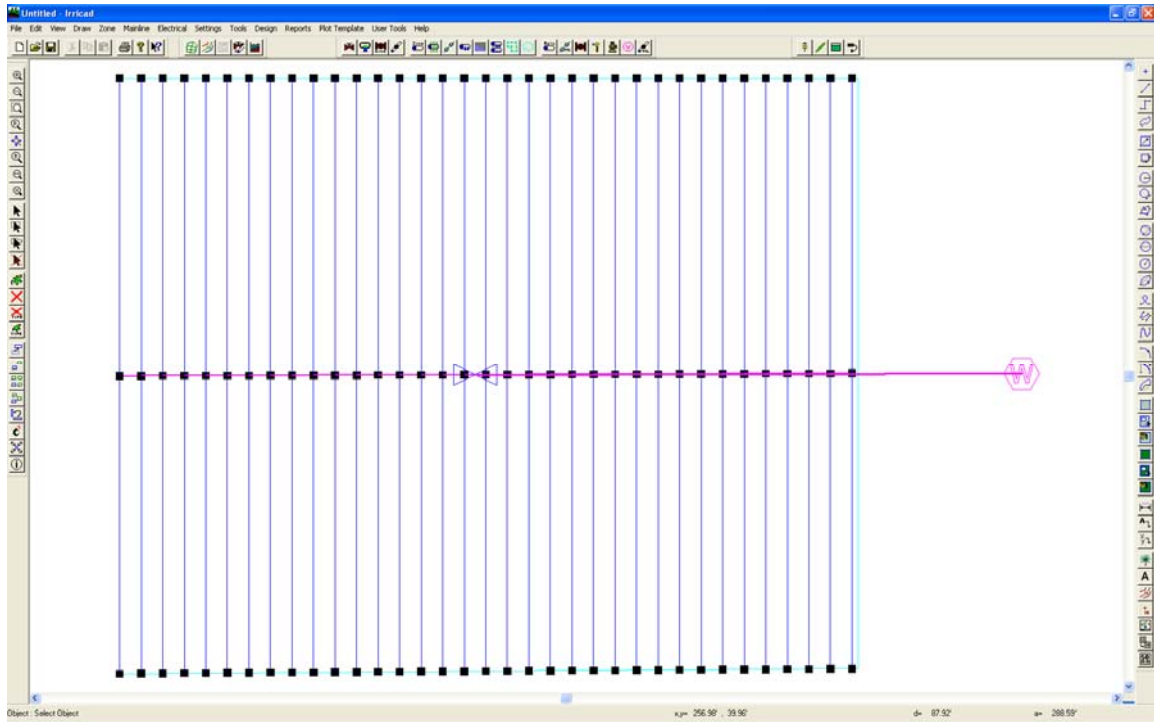


Figure AD 3

MANAGEMENT

Checking Connections

8. 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*.
9. 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

10. 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 "Area no. 1" will operate on **System Flow 1** as indicated Figure AD 4. Click [OK].

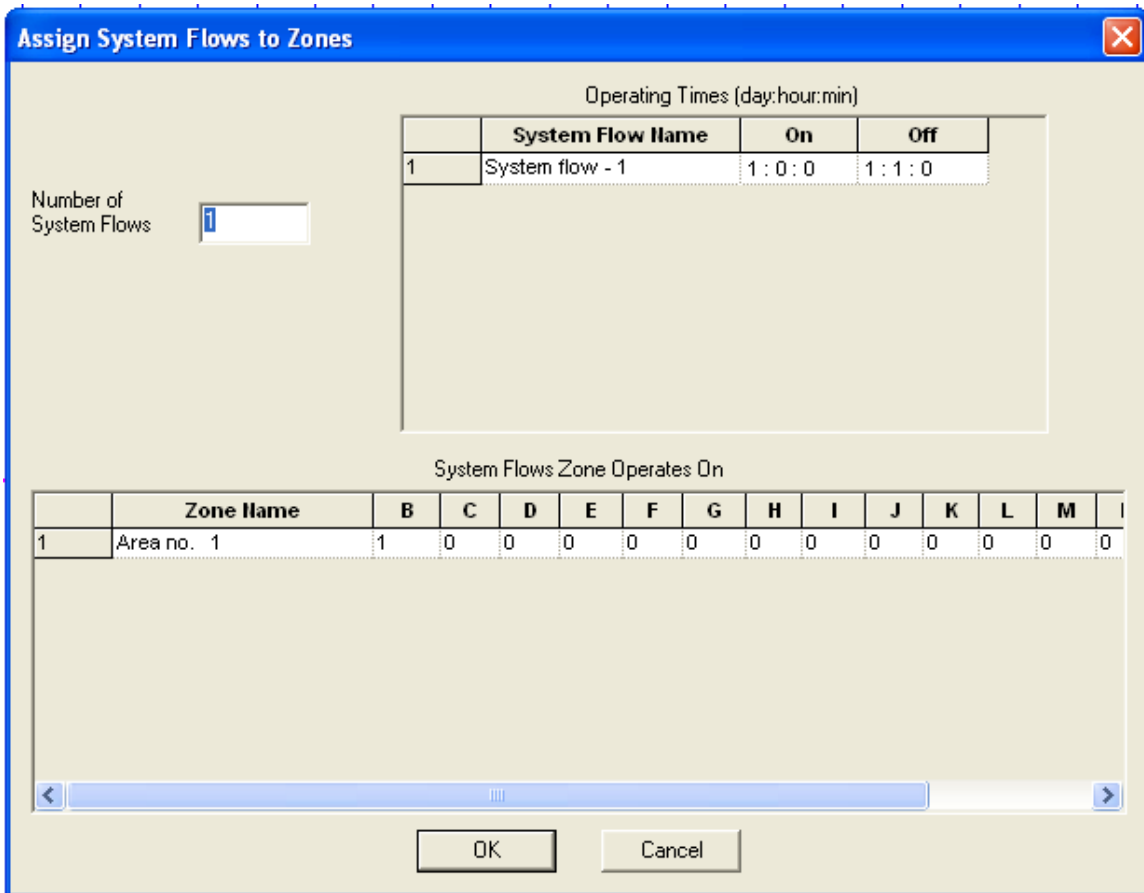


Figure AD 4

DESIGN

11. Select *Design|Design Parameters|Hydraulic Parameters* and enter the "Maximum Zone Pipe Velocity" as **5ft/s (1.5m/s)**. Click [OK].
12. 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 zones. It should look something similar to Figure AD 5. The present maximum dripper pressure is 16.14psi (11.4m) and the minimum is 14.40psi (10.12m). 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 10.80%. 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 :	Area no. 1	Valve Description :	1" (25mm) Electric Valve	
Zone Head (D/S) :	16.35 (psi)	Zone Head (U/S) :	16.35	(psi)
Total Zone Flow :	18.86 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	14.40
Maximum Outlet	0.32	0.32	18.00	16.14
Outlet Variation (%)	0.00	0.00	33.33	10.80
Outlet Locations (X,Y)	Minimum:	55.4 , 12.6	Maximum:	22.4 , 37.5

Figure AD 5

13. When this block is installed the control valve is going to be pressure-reducing and the downstream pressure will be set to **15psi (10.5m)**. To specify this go to *Design|Zone Design Configuration* and enter **15.00 (10.50)** in the "D/S Valve Pressure" column for Area no. 1. Click [OK] and run *Design|Zone|Analyse*. Open the *Reports|Zone Design Reports|Zone Design Summary* and notice that the valve pressure has been set to **15 (10.5)** and the resultant pressures throughout the zone have been recalculated from that. See Figure AD 6.
14. Run Design|Valve Analysis. Now we wish to size the mainline, select Design|Mainline Design|LP Design.
15. Look at the *Reports|Mainline Design Reports|System Duty* reports to see the required demand on the water supply. This is the pressure and flow that is required downstream of the headworks to operate the system you have designed. Save the design as demo.des.

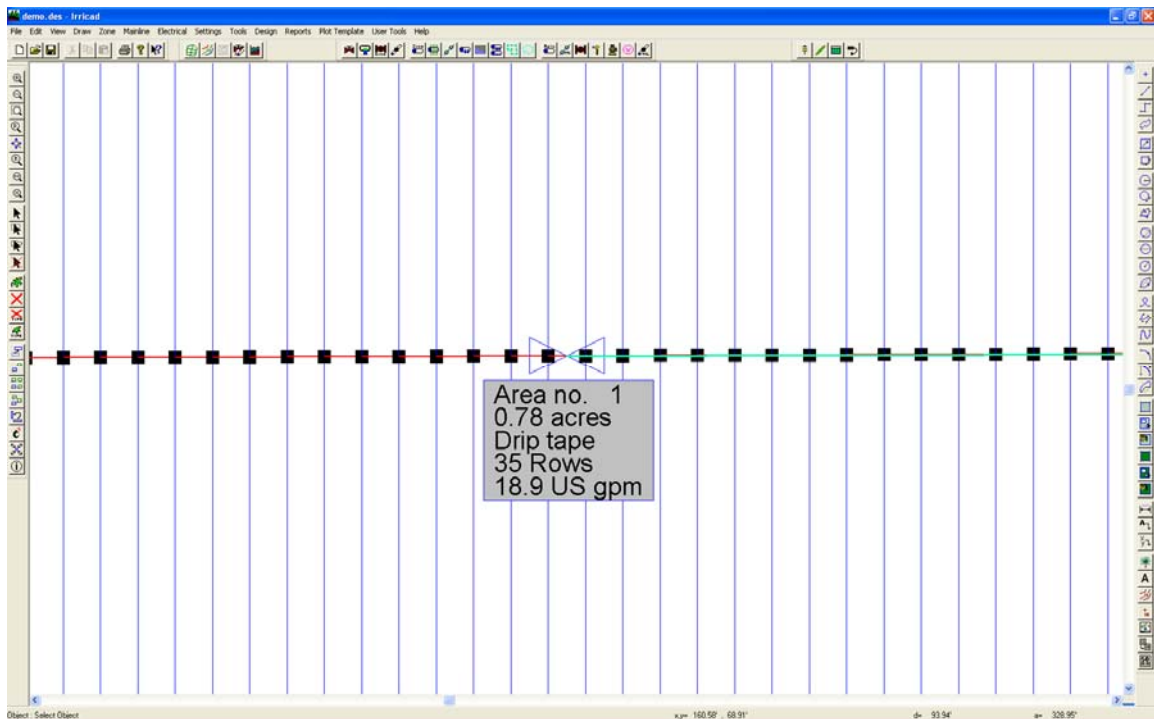


Figure AD 6

AUTOMATIC LABELING

16. Now select *Settings/Labels* to open the labelling settings. In this dialog you can select which types of items you want labelled by checking the appropriate check boxes. Check the “*Irr. Blocks*” option and then click the *[Text]* button. We can add other key words into the text boxes so that the automatic label can say as much as we want. The text box is loaded with the default of the area name. We want to add the area size, the name of the tape, the number of rows and the flow with the correct units. To do this, we need to use the appropriate keywords:

#NAME# The name of the Block/Area.

#AREA# #AREAUNIT# The area of block including units.

#DESC# The Tape description

#NUMROW# Rows The number of rows (remember to add a space and then the word ‘Rows’ after the key word.

#ACTFLOW# #FLOWUNIT# The actual flow, as calculated during the design process, including the units.

See Figure AD 7.

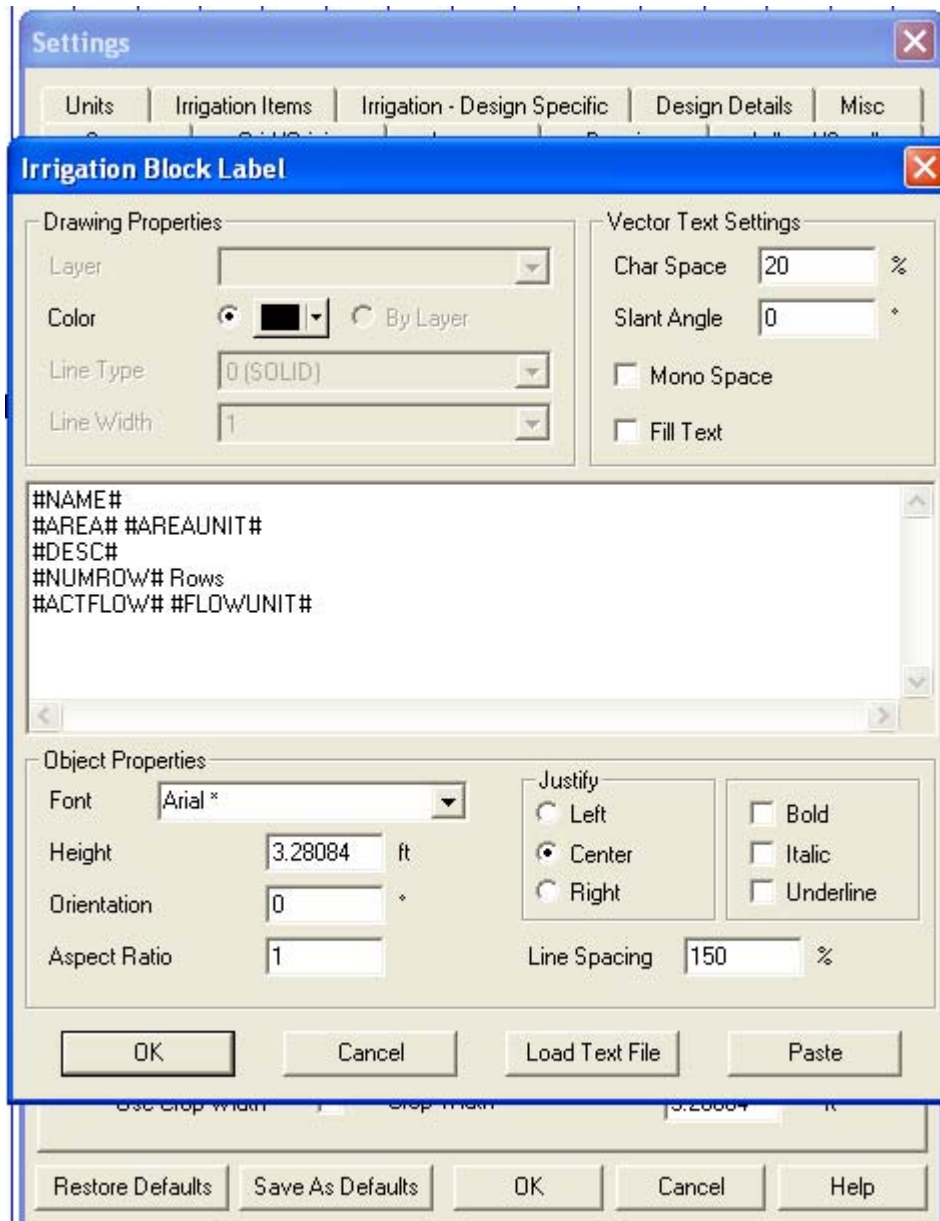


Figure AD 7

17. Click **[OK]** on the text box. Now we can set the **[Background]** options. We can specify a fill behind the label in a colour of our choice and a border. Select a colour for the fill and a colour and line thickness for the border. Click **[OK]**. Leave the **"Layer"** set to **[DEFAULT]** – this means that the labels will automatically be placed on the IRRICAD Layer. The next option determines where the label will be placed. It can be BELOW the object (in this case below the Block), ABOVE, INLINE, to the LEFT or to the RIGHT. Select **INLINE**. Click **[OK]**.
18. Now select **Tools>Select All** and then **Tools>Create Labels**. The label will be placed in the centre of the Block.
19. If you wish to change the style of existing labels, go to **Settings/Labels** and make the changes required. For example, select the **[Text]** button for **"Irri. Blocks"** and change **"Justify"** to **"Left"** instead of **"Center"**. Click **[OK]** on both dialogs and then select

Tools/Update Labels. All existing labels on the design will be updated to reflect the changes made in the settings. Note: if the fill behind the label does not appear large enough for the label, zoom in and then select *Tools/Update Labels.*

20. Now select *Tools/Select Object* and click on the label. Select *Tools/Move* and move the label to below the valve. See Figure AD 8.

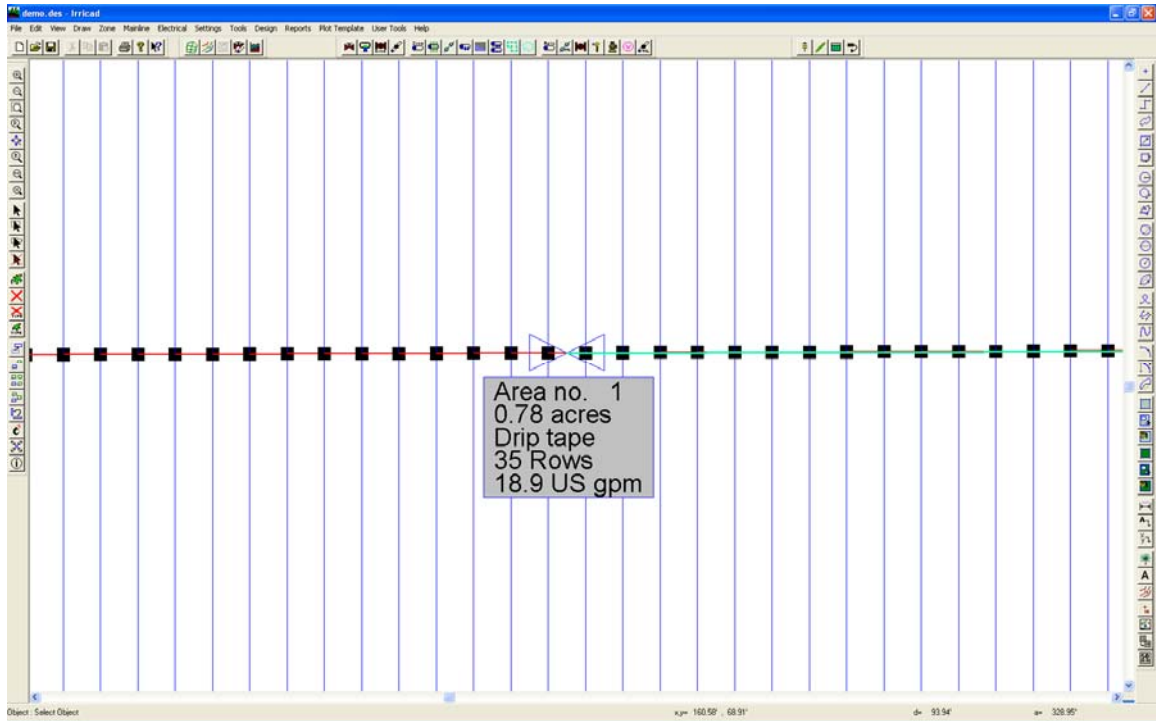


Figure AD 8