



HydroTechnic™

Analytical Design Software Program

User Manual

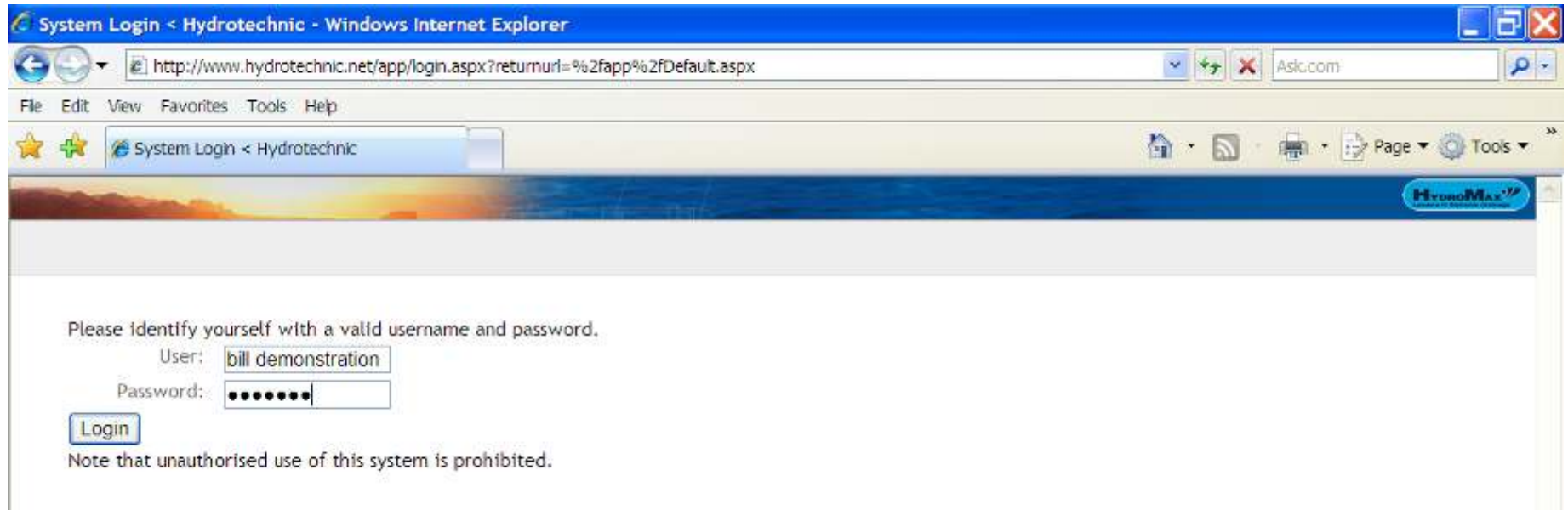
This user manual is provided only as a guide to using the HydroTechnic™ analytical design software program and is not intended as nor is it implied to be comprehensive training for siphonic roof drainage design.

Like all programs, it becomes much easier to use the HydroTechnic™ analytical design software program with practice.

It is the users responsibility to ensure the designs are compliant with local standards, codes and legislation.

GETTING STARTED

First enter www.HydroTechnic.net/login/app into your browser and this screen should be the HydroTechnic login page.



1. Insert User:
2. Insert Password:
3. Click "Login"

This takes you onto the disclaimer sign in page.

Logged in < Hydrotechnic - Windows Internet Explorer

http://www.hydrotechnic.net/app/default.aspx?da=true&returnurl=%2fapp%2fDefault.aspx

File Edit View Favorites Tools Help

W Edinburgh Festival - W... Logged in < Hydrot...

Settings Files Help

HydroMax

Log out

Welcome to HydroTechnic™ 4.1.8.28422
You are logged in as **bill**.

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Logged in < Hydrotechnic - Windows Internet Explorer

http://www.hydrotechnic.net/app/default.aspx?da=true&returnurl=%2fapp%2fDefault.aspx

File Edit View Favorites Tools Help

W Edinburgh Festival - W... Logged in < Hydrot... x

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You cannot use the HydroTechnic™ application if you do not accept the disclaimer.

Please read and accept/decline the disclaimer below then click continue to proceed.

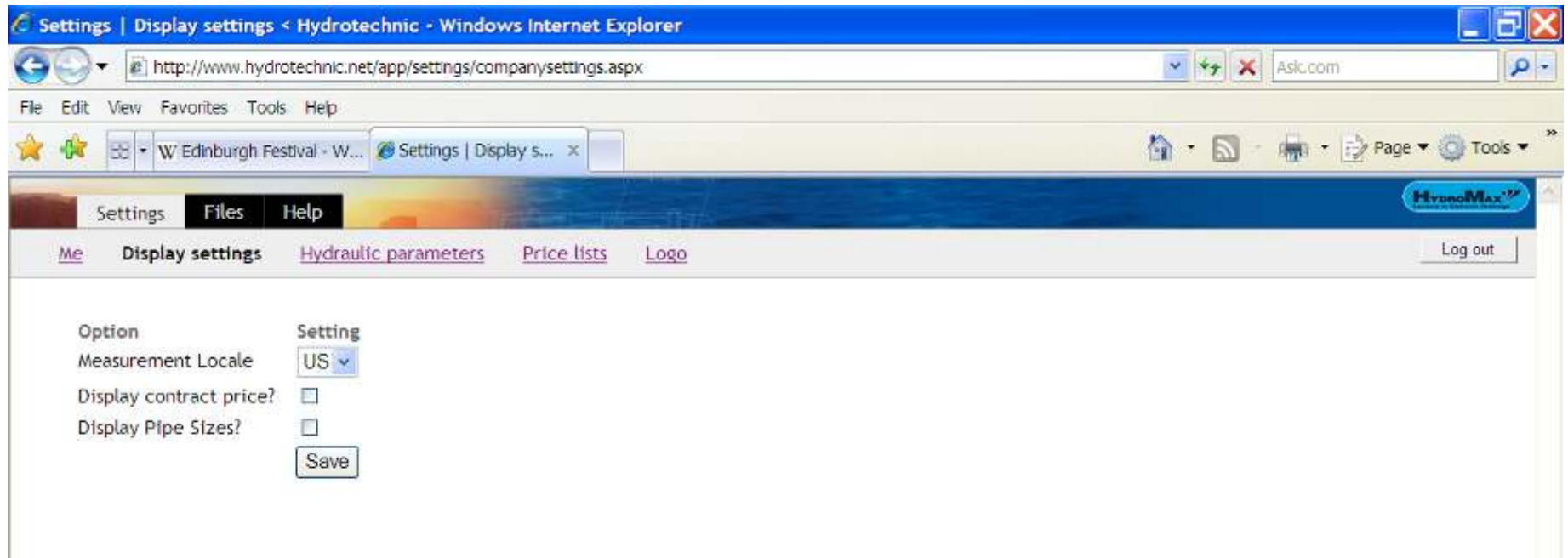
I accept I do not accept

Internet 100%

SETTINGS MENU

Click on "Settings"

DISPLAY SETTINGS



Measurement Locale enables you to select the units of measurement you wish to work with. You can choose metric (SI) or inches (US) and click Save. You can change from one unit to the other at any time by coming back to the settings page and selecting the alternative unit and "save".

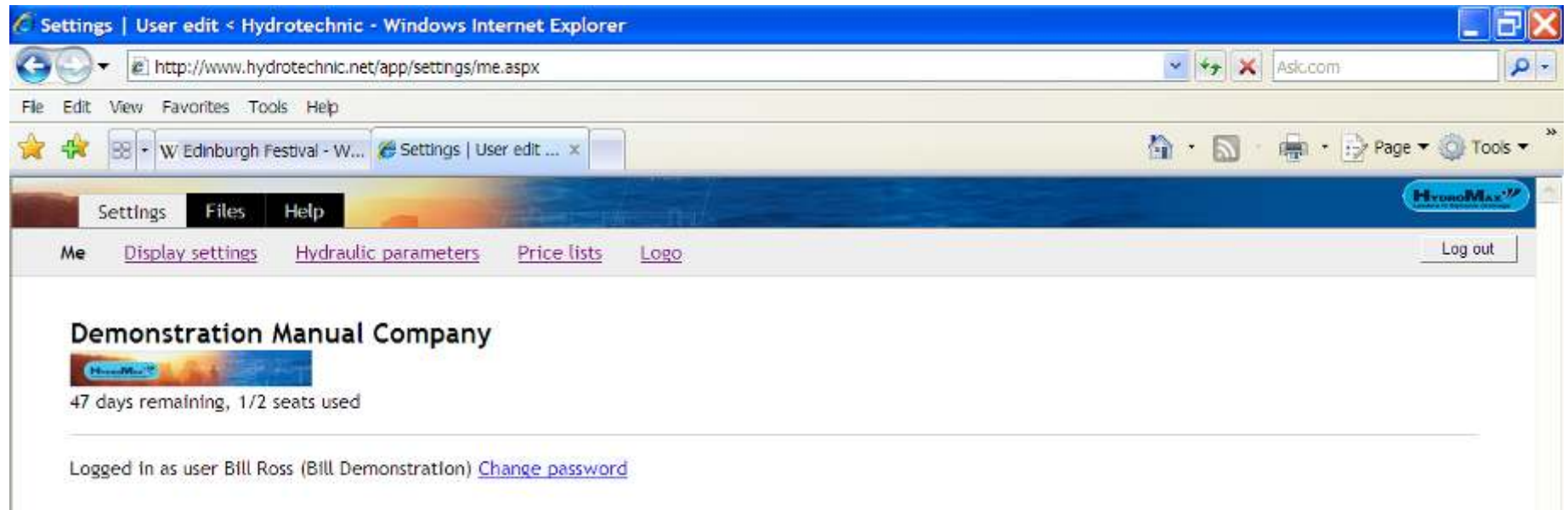
If you have input prices into the "Price Lists" you can select to display the contract price by selecting the above box and click save. As you progress with your designs, the cost of the system will be displayed at the top of the calculation.

Display Pipe Sizes? If checked and saved this will show pipe lengths and diameters in the drawing view. For complex systems, you will find the screen becomes congested.

Me

If you click on “Me”, your company name and Logo (if uploaded) will appear together with notice of how many days to go before you will need to request extension of your license. Also displayed is the number of users on line from your organization and the number of licensed seats registered to your company.

On this screen you can enter “Change Password” to your chosen password. Please take care not to disclose your user name and password to any other person.



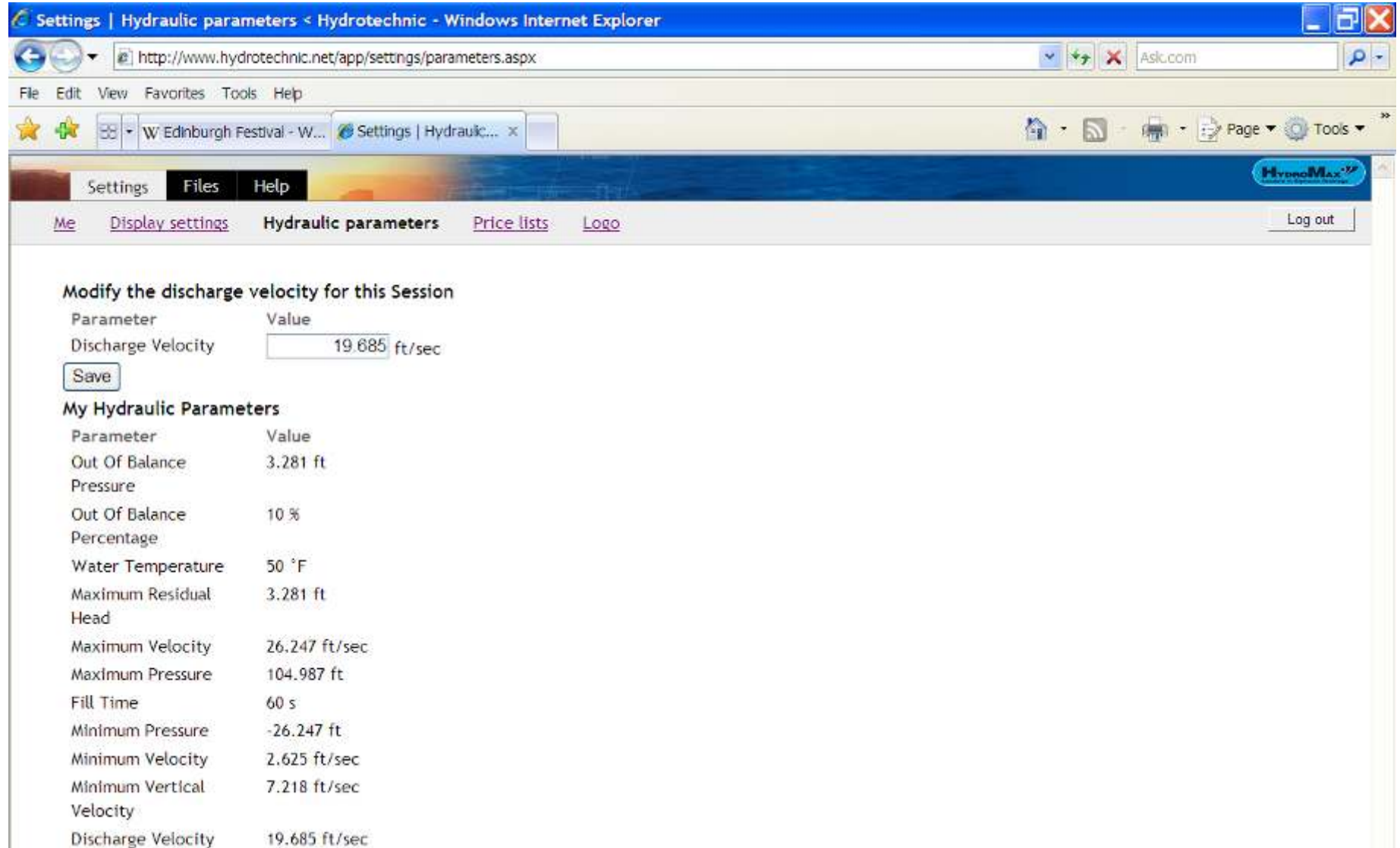
Insert Your Old Password followed by New Password, re-enter new password then press “Save”. This will be your new password for your next log-in.

Hydraulic Parameters

This section lists the pre-set hydraulic parameters which must be met in order to design a system to get the "PASS" result.

There is only one user setting and that is the Discharge Velocity. This should be set by the user to meet the discharge velocity requirements of the project – in other words this setting is to identify the velocity at the point where the siphonic system stops and connects to gravity drainage to ensure the velocities are acceptable to the receiving pipe or chamber/manhole etc.

The settings are displayed in the units of measurement previously set.



The screenshot shows a web browser window displaying the 'Settings | Hydraulic parameters' page. The browser address bar shows the URL 'http://www.hydrotechnic.net/app/settings/parameters.aspx'. The page has a navigation menu with 'Settings', 'Files', and 'Help'. Below the navigation, there are links for 'Me', 'Display settings', 'Hydraulic parameters', 'Price lists', and 'Logo', along with a 'Log out' button. The main content area is titled 'Modify the discharge velocity for this Session' and contains a table with two columns: 'Parameter' and 'Value'. The 'Discharge Velocity' parameter is currently set to '19.685 ft/sec' and has a 'Save' button next to it. Below this, there is a section titled 'My Hydraulic Parameters' which lists various parameters and their values.

Parameter	Value
Discharge Velocity	19.685 ft/sec

Parameter	Value
Out Of Balance Pressure	3.281 ft
Out Of Balance Percentage	10 %
Water Temperature	50 °F
Maximum Residual Head	3.281 ft
Maximum Velocity	26.247 ft/sec
Maximum Pressure	104.987 ft
Fill Time	60 s
Minimum Pressure	-26.247 ft
Minimum Velocity	2.625 ft/sec
Minimum Vertical Velocity	7.218 ft/sec
Discharge Velocity	19.685 ft/sec

Price Lists

The screenshot shows a web browser window with the URL <http://www.hydrotechnic.net/app/settings/materials.aspx>. The page title is "Settings | Material price lists < Hydrotechnic - Windows Internet Explorer". The browser's address bar shows "Ask.com". The page has a navigation menu with "Settings", "Files", and "Help" tabs. Below the navigation menu, there are links for "Me", "Display settings", "Hydraulic parameters", "Price lists", and "Logo". A "Log out" button is also present.

The main content area is divided into two sections: "Components" and "Drains".

Components

Description	Price list
304 Blucher Stainless Steel Prices on applicaton to Hydromax (304 Stainless Steel)	304 St. Steel prices
316 Blucher Stainless Steel Prices on applicaton to Hydromax (316 Stainless Steel)	316 prices
Grooved Joint Copper (Copper)	Copper Grooved prices
Cast Iron EN 877 Prices on application from Hydromax (EN877 Cast Iron)	CI (EU) prices
Grooved Joint Galvanized MS (Galvanised Steel)	Galv. Steel Grooved prices
HDPE - No Prices (High Density Polyethylene)	HDPE prices
PVC Schedule 40 Solid Wall (PVC Schedule 40)	PVC sch 40 solid prices
Tyler No-Hub List 01/02/07 (US Cast Iron)	CI no-hub prices

Drains

Description	Price list
Wade HydroMax Drains	Edit Prices

A red arrow points from the "Edit Prices" link in the "Drains" table to the "Price lists" tab in the navigation menu.

You will have been assigned Drain and Pipe materials to design with and these are listed under the **Price Lists** tab.

By selecting any of the pipe or drains materials in blue font color you will open your selected price list to enable you to input or edit prices.

Settings Files Help HydroMax™

Me Display settings Hydraulic parameters Price lists Logo Log out

Price list for CI no-hub components

Description	Diameters (inches)	Price
45° Y branch 10/10"	10 10	0.00
45° Y branch 10/4"	10 4	0.00
45° Y branch 10/6"	10 6	0.00
45° Y branch 10/8"	10 8	0.00
45° Y Branch 1½"/1½"	1½ 1½	0.00
45° Y branch 12/12"	12 12	0.00
45° Y branch 15/15"	15 15	0.00
45° Y branch 2/2"	2 2	0.00
45° Y Branch 3"/1½"	1½ 3	0.00
45° Y branch 3/2"	3 2	0.00
45° Y branch 3/3"	3 3	0.00
45° Y branch 4/2"	4 2	0.00
45° Y branch 4/3"	4 3	0.00
45° Y branch 4/4"	4 4	0.00
45° Y branch 5/2"	5 2	0.00
45° Y branch 5/3"	5 3	0.00
45° Y branch 5/4"	5 4	0.00

You can enter any price you wish – these price lists are for your use and the prices will be used to calculate totals within the material bill of materials section or for display on the calculation screen.

You can choose your buying price, selling price, list price, price including labor and profit – it really is your own choice.

Please Note: These settings are for your Company – not just you as an individual user.

Reducer 5/3"	5 3	0.00
Reducer 5/4"	5 4	225.00
Reducer 6/2"	6 2	225.00
Reducer 6/3"	6 3	135.00
Reducer 6/4"	6 4	23.00
Reducer 6/5"	6 5	65.00
Reducer 8/2"	8 2	25.00
Reducer 8/3"	8 3	3.14
Reducer 8/4"	8 4	78.25
Reducer 8/5"	8 5	65.23
Reducer 8/6"	8 6	1.25

Save

Once you have input the prices you require, press save. These prices are then in use for your company.

Logo

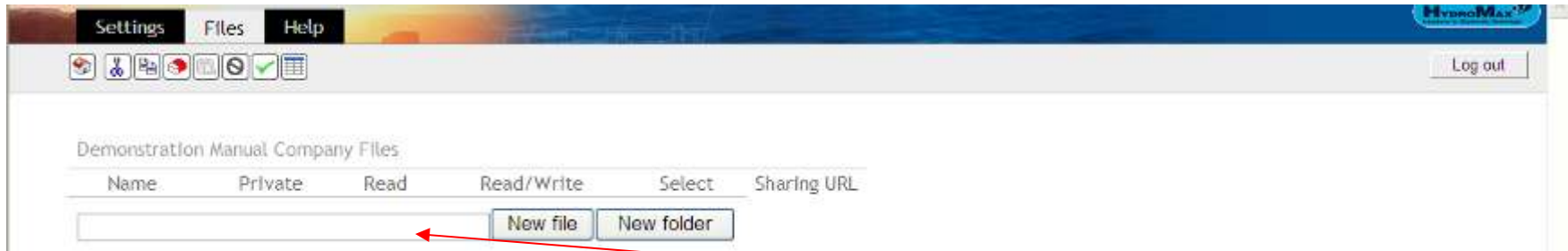
The final part of the Settings menu is "Logo".

This enables you to upload your own company logo for a more professional output to your printed information. Just open the browse button and select the logo you wish to display from your files.

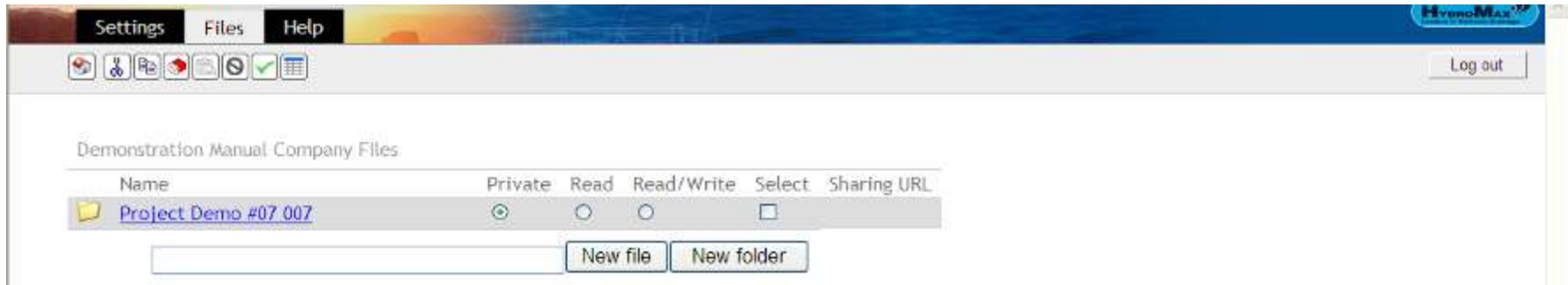
FILES MENU

Click on "Files" tab

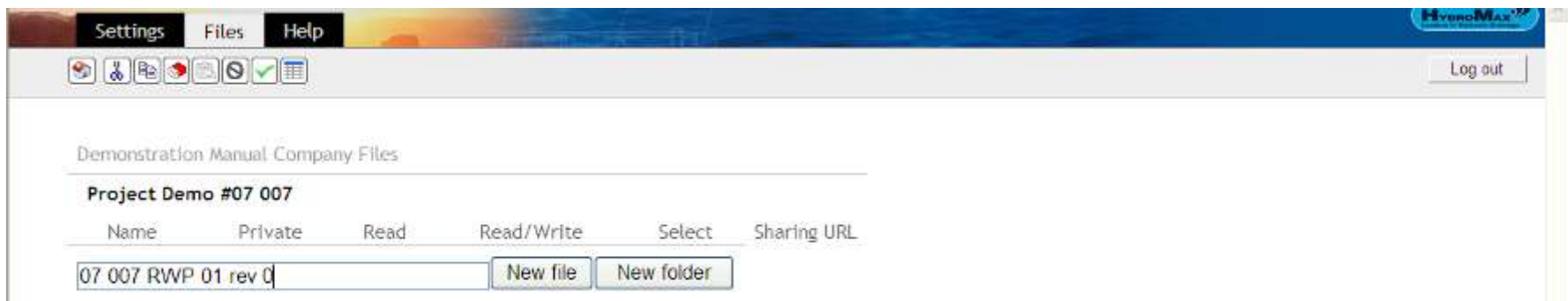
You have the ability to create New File or a New Folder. It is recommended to create and use a directory system to manage your files.



Insert your chosen Folder Name and Select "New Folder". In this case input Project Demo #07 007. After selecting "New Folder" the directory appears on screen.



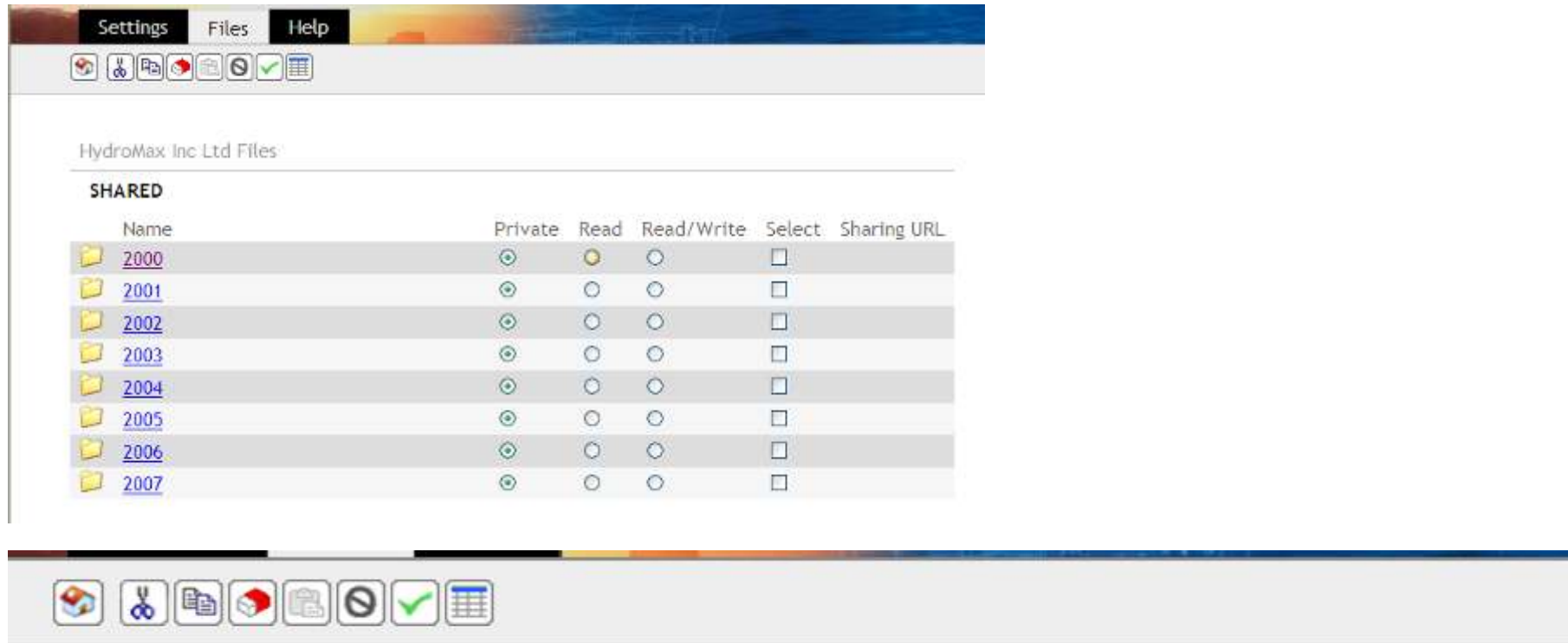
Open "Project Demo Folder #07 007" then Insert your chosen filename (07 007 RWP 01 rev 0) into this box and click "New File"











This opens up the "Drawing window". See page 11

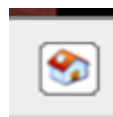
Files Menu

The Files menu section enables you to cut & paste into other directories, copy & paste into other directories Erase files, assign permissions and generate collated bills of materials from several systems designs.



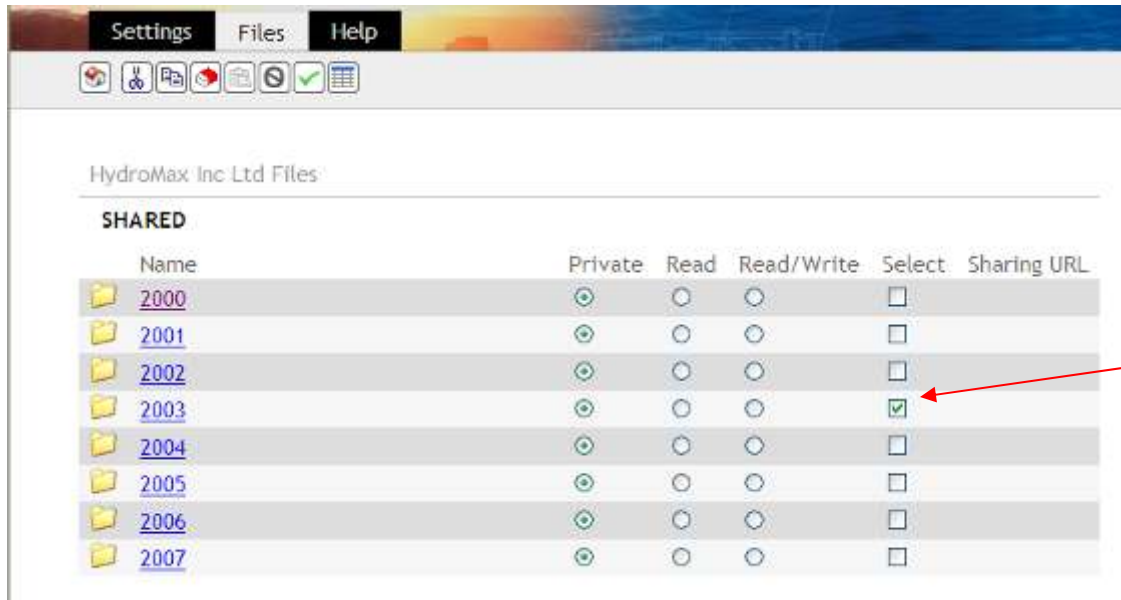
The screenshot shows a software interface with a menu bar containing 'Settings', 'Files', and 'Help'. Below the menu bar is a toolbar with icons for home, cut, copy, paste, delete, check, and a grid. The main area displays 'HydroMax Inc Ltd Files' and a 'SHARED' section with a table of folders.

Name	Private	Read	Read/Write	Select	Sharing URL
 2000	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	
 2001	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	
 2002	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	
 2003	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	
 2004	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	
 2005	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	
 2006	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	
 2007	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	



"Go to Home Folder" takes you to your highest level folder.

To Cut, Copy or Erase Files or Folders you must first check the box under the "Select" title



In this example, we have selected the Folder "2003" by clicking in the box.

You can select multiple files or folders by checking the relevant box.

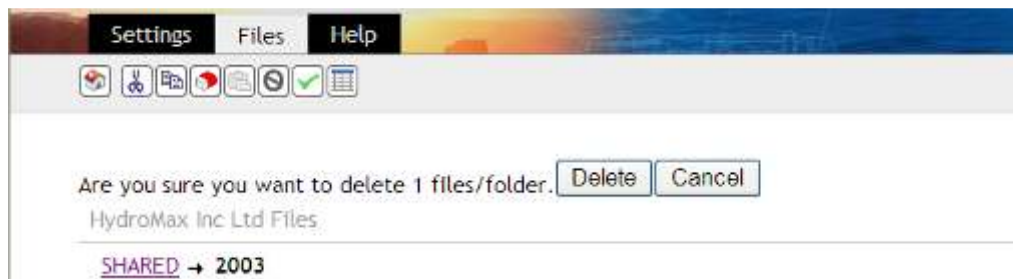
We can now choose Cut, Copy, or Delete. You can choose individual Files, Individual Folders or multiples of Files or Folders.



"Cut" - removes the selected files or folders and places them on the clipboard for "Pasting" into a different location.

"Copy" - retains the files or folders in this location and also places them on the clipboard for "Pasting" into a different location.

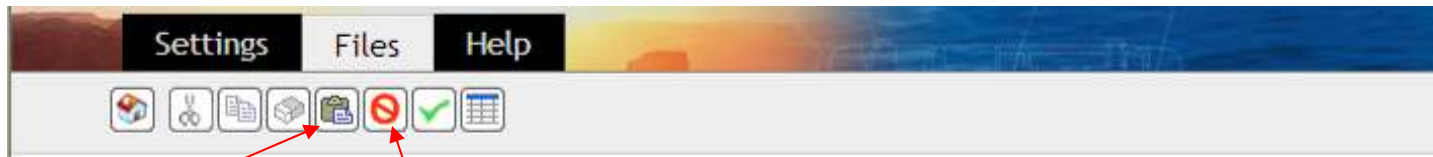
"Delete" - removes the selected files or folders. If selected you are asked the question - Are you sure you want to delete?



If you select "Delete" the file or folder is permanently deleted. If you press "Cancel" the file or folder is reinstated to its location.

Please note: A folder must be empty before the program allows deletion of a Folder.

"Paste" – Once File(s) or Folder(s) have been selected, the Paste icon becomes active. You can then select the directory Folder of your choice and click the "Paste" icon and the files will be taken from the clipboard and entered into your chosen folder.



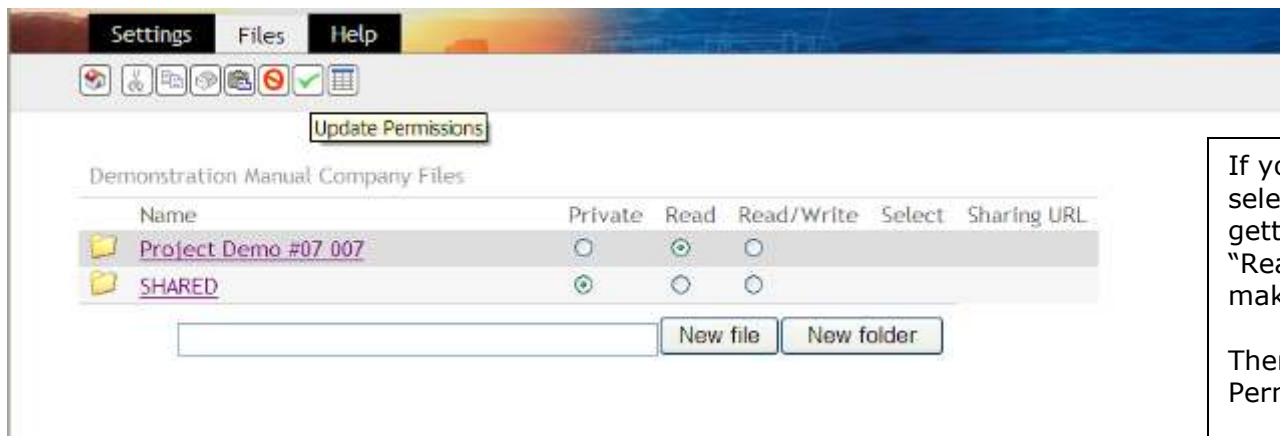
"Paste" icon

"Cancel Action" icon

"Cancel Action" – If any Files or Folders have been copied or cut, clicking the "Cancel Action" icon will cancel the copy or cut and retain the files or folders in their original location.

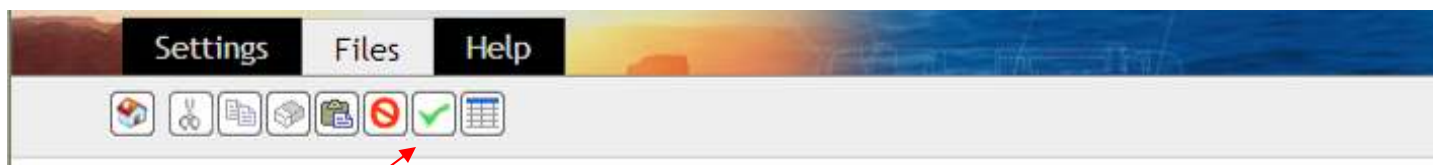
Sharing Files/Folder

HydroTechnic™ offers you the ability to share your files or folders with other registered users from other companies. For example if an architect and engineering firm both wish to review the HydroTechnic™ designs, user from Company A can give permission to a user in Company B to either Read Only or Read & Write.



If you wish to share a file or folder you select "Read" if the Company B user is only getting the ability to see the file and check "Read/Write" if the Company B user can make changes and write / save changes.

Then click the Green Tick icon for "Update Permissions."



"Update Permissions"

The screenshot shows a web interface with a menu bar (Settings, Files, Help) and a toolbar. Below is a table titled "Demonstration Manual Company Files":

Name	Private	Read	Read/Write	Select	Sharing URL
Project Demo #07 007	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>		Read Link
SHARED	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>		

Below the table are input fields and buttons for "New file" and "New folder". A context menu is open over the "Read Link" text, showing options like "Open", "Copy", and "Copy Shortcut" (which is highlighted).

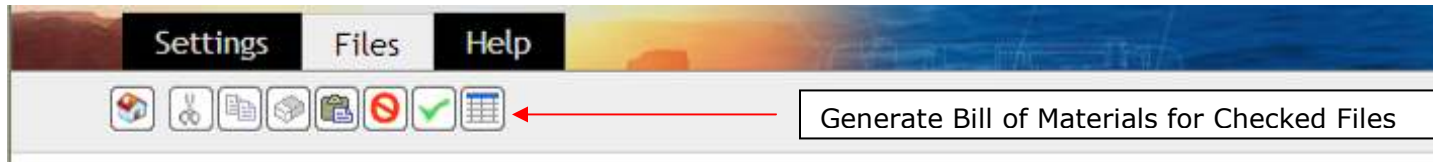
Clicking "Update Permissions" will bring up "[Read Link](#)" under the Sharing URL title.

Right click on "[Read Link](#)" then select "Copy Shortcut"

You can then paste the URL into an e-mail or fax. User from Company B user can then login to use HydroTechnic™ and paste this into their browser address bar which will give them access to the files or folders which they have been given permission to access.

To remove the sharing rights you would select the "Private" button and select the green tick to "Update Permissions"

Collated "Bills of Materials"



To generate a collated bill of materials for several systems, select the files required (in the same way as described above for cut, copy or delete) then click the Generate Bill of Materials for Checked Files Icon. This will automatically produce a collated bill of materials and the files included will appear on the bill of materials.

Parts List

HydroMax™

Project Ref. No System 1, SYSTEM 2, System 3, System 4, System 5
 Project Name New Elkhorn High School
 RWP No System 1, SYSTEM 2, System 3, System 4, System 5

Material	Description	Diameter (inches)	Quantity	Rate	Value
			feet- inches⁺	/foot	
CI no-hub	Hubless Cast Iron Pipe 1½"	1½	414	0.00	0.00
CI no-hub	Hubless Cast Iron Pipe 2"	2	847	0.00	0.00
CI no-hub	Hubless Cast Iron Pipe 3"	3	945	0.00	0.00
CI no-hub	Hubless Cast Iron Pipe 4"	4	689	0.00	0.00
CI no-hub	Hubless Cast Iron Pipe 5"	5	355	0.00	0.00
CI no-hub	Hubless Cast Iron Pipe 6"	6	197	0.00	0.00
CI no-hub	Hubless Cast Iron Pipe 8"	8	79	0.00	0.00
CI no-hub	Hubless Cast Iron Pipe 10"	10	315	0.00	0.00
			each	/item	
CI no-hub	Eigth bend 1½"	1½	14	0.00	0.00
CI no-hub	eigth bend 2"	2	17	0.00	0.00
CI no-hub	eigth bend 3"	3	16	0.00	0.00
CI no-hub	eigth bend 4"	4	10	0.00	0.00
CI no-hub	eigth bend 5"	5	4	0.00	0.00
CI no-hub	eigth bend 6"	6	3	0.00	0.00
CI no-hub	eigth bend 8"	8	3	0.00	0.00
CI no-hub	Quarter bend - short sweep 1½"	1½	49	0.00	0.00
CI no-hub	Quarter bend - short sweep 2"	2	43	0.00	0.00
CI no-hub	Quarter bend - short sweep 3"	3	38	0.00	0.00
CI no-hub	Quarter bend - short sweep 4"	4	17	0.00	0.00
CI no-hub	Quarter bend - short sweep 5"	5	11	0.00	0.00

DRAWING

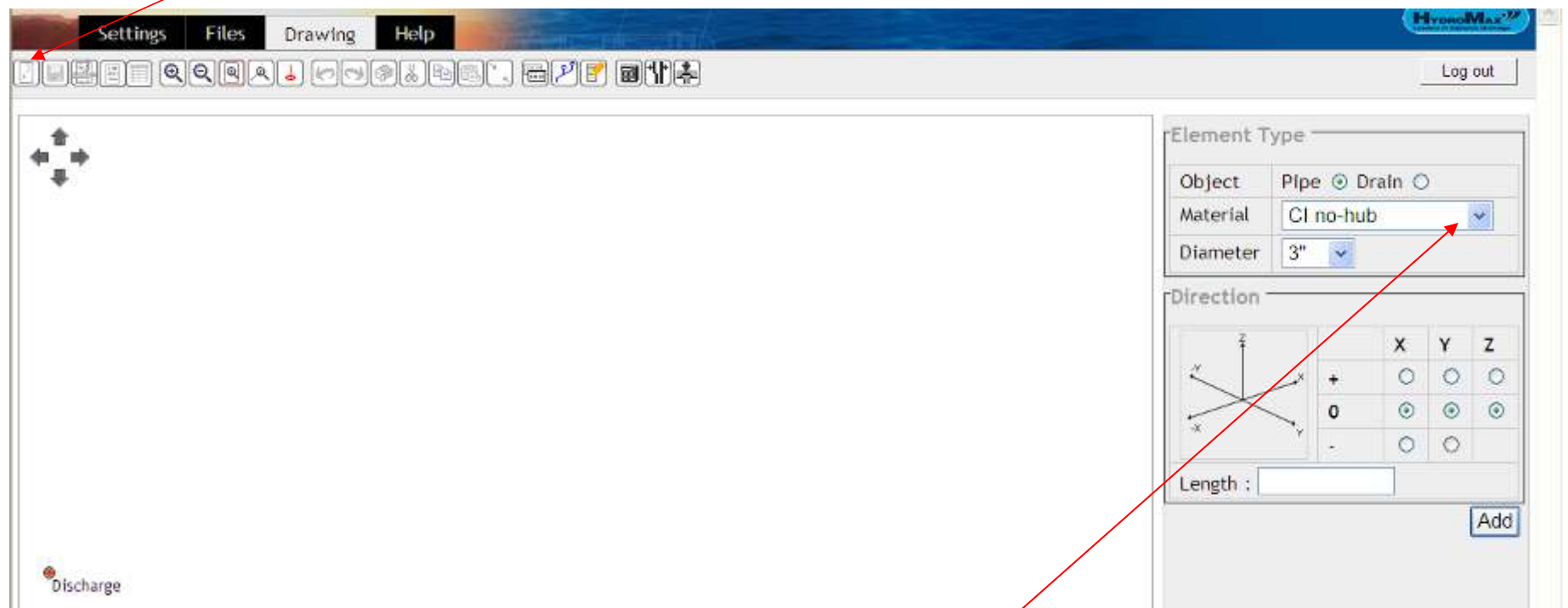
Inputting Drawing

As with any program which is new to you, you may find that you can do something wrong.

We would therefore recommend that you save at regular intervals.

Please note that if you click on the 'Clear Drawing' icon at any time, you can click 'Undo' to bring the drawing back.

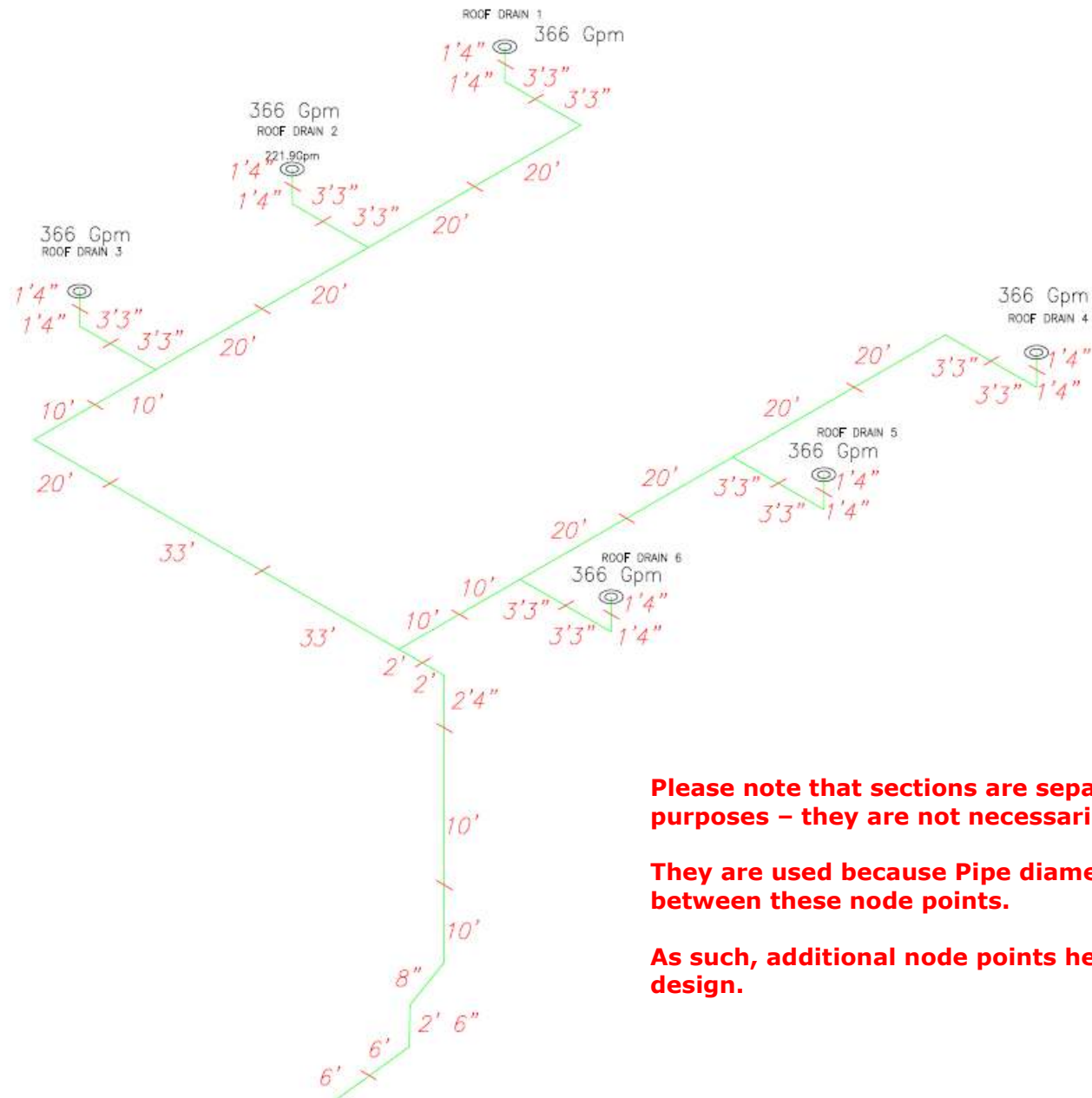
We will input the data as shown on schematic drawing on page 17 below. To start inputting any section of pipe you need to click on the node point from where you want to start adding pipe. With a new system this will be the discharge. Click on the Discharge node to make it red and "active".



The Default pipe material and diameter will be set to CI no-hub 3" or HDPE 75mm depending on your supply company location.

If you want to build with an alternative pipe material select using the drop down menu. If you select an alternative material, you will need to input a diameter – we suggest using 3" or 75mm because we will use the program to "First-Size" the system after the drawing is complete.

Worked Example – (US Customary Units of Measurement)



Please note that sections are separated only for design purposes – they are not necessarily pipe joints.

They are used because Pipe diameters can only change between these node points.

As such, additional node points helps with the hydraulic design.

Drawing Screen

This is the main operational area of the program. It has two main regions:



Graphics screen in which the system is built and edited



Data screen in which system components are listed and can be edited.

Frames will pop-up to the right of this window giving warning messages or information relevant to the operation being performed.

When using the Graphics screen

The pipe system is shown as a series of pipes and nodes.

Build and edit functions can be performed by clicking on the nodes or pipes with the mouse.

X Y Z

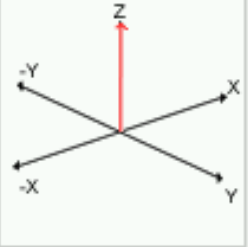
With a new screen a single node representing the discharge is displayed. The system is built away from this node with pipes running in x, y and z directions as shown by the image on the screen.

When using the SI metric units of measurement, we use metres as the unit of measurement. Therefore 1 metre and 250 millimetres is entered as 1.25.

When using US customary units of measurement (feet/inches), insert pipe lengths using the feet (') symbol. There is no need to insert the inches (") symbol. E.g. input 6' 6 for a length of 6 feet, 6 inches.

If your input length is less than one foot you may enter only the inches e.g. 8 will enter 8 inches.

Direction



	X	Y	Z
+	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
0	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
-	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Length : feet-inches

Add

The information is input into the program in an isometric schematic format.

Select '+', '0' or '-' for X and Y direction and either '0' or '+' for the Z direction.

The drawing starts at the discharge point and builds up to the furthest roof drain.

The Direction Arrow Changes **Red** indicating the direction selected.

+ X is drawing towards the top right of the screen. - X is drawing towards the bottom left of the screen.

+ Y is drawing towards the bottom right of the screen. - Y is drawing towards the top left of the screen.

+ Z is drawing vertically upwards

Moving about the screen

The network can be moved across the screen by clicking on one of four arrows



Zooming into the drawing



Zoom in

Zooms in to the middle of the screen



Zoom out

Zooms out from the middle of the screen



Zoom to node

If a node is clicked it will turn red. The zoom to node button will then zoom in to this node. The button can be used repeatedly to obtain a closer view.



Fit to page

The whole system will be displayed on the screen

Project Data



The Project Data icon opens a frame to the right of the screen in which information about the project should be entered. Information entered on this screen appears on the output, the project and system being on the header for every sheet.

Data fields are:

1. Client
2. Project
3. System
4. Downpipe Location
5. Reference No.
6. Date (defaults to today)
7. Designer

PLEASE NOTE: These Fields need to be completed and saved to make the Overview Report, Bills of Materials and Fabrication Sheets become active (Fabrication Sheets only for HydroMax™ HDPE pipework)

Worked Example

Cast iron (CI no-hub) pipework will be used for this example.

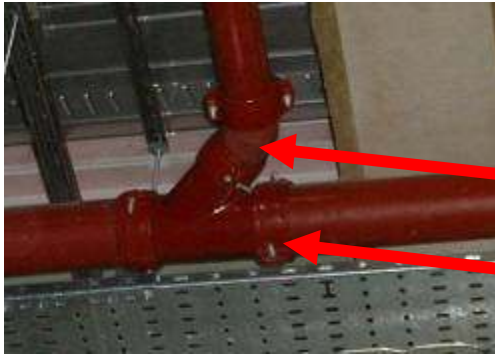
The designer “draws” the pipe routing required to collect the water from the roof drains and run through the building to the discharge point which is the termination or break of the siphonic action.

As noted above, the drawing starts at the Discharge point and we recommend working towards the farthest roof drain. In this example scheme above this is Roof Drain 1.

Positioning of Node Points

It is important to know that pipe diameters can only be changed between two or more node points.

Every change of direction and branch/junction is assigned a node point.



Please note: the program differentiates the straight through section of the branch from the 45 degree 'Wye' section to enable easy recognition for the user to determine orientation at branch connection.

The 'Wye' section is designated 'branch'

The straight through section is designated 'junction'

To enable the designer more flexibility in system sizing, we recommend building 'extra' node points into the following areas:

The vertical downpipe (stack) – use at least 2 node points.

The section of pipe connecting the roof drain into the horizontal carrier pipe is called the tail-pipe. It is significantly beneficial to have 2 node points on both vertical and horizontal sections of the tail-pipe.

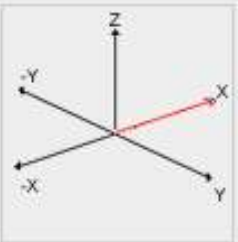
Split every horizontal section into 2 sections (between any change of direction or between branches).

The active node is always red.

There is an unlimited 'Undo' function. If you use the 'Undo' there will be no active node.

To restart building the drawing after an undo function, click on the node from which you wish to build from. It will become **RED** and active.

Direction



	X	Y	Z
+	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
0	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
-	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Length :

Add

NOTE:

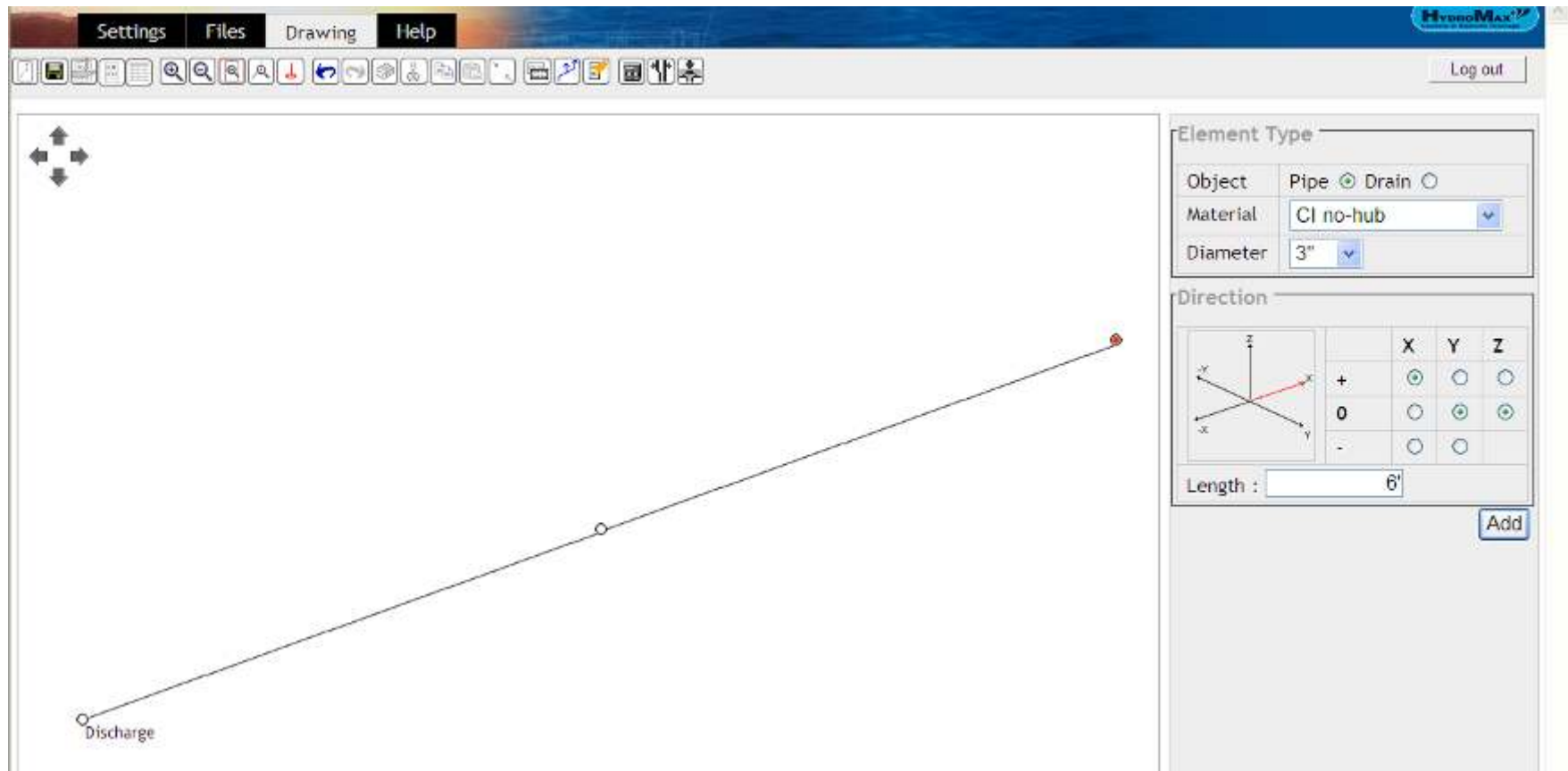
At the start of the drawing, the object type will default to Pipe as you cannot have a Drain at the Discharge

We need to input a length of 12 feet in the + X direction.

Start by selecting +X.

For the 12' length required, we will use 2 sections of 6'. This meets the design help of 2 sections per horizontal length.

Click 'Add' or press the Return/Enter key to enter this length.



Settings Files Drawing Help

Log out


Element Type

Object Pipe Drain

Material CI no-hub

Diameter 3"

Direction



	X	Y	Z
+	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
0	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
-	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Length :

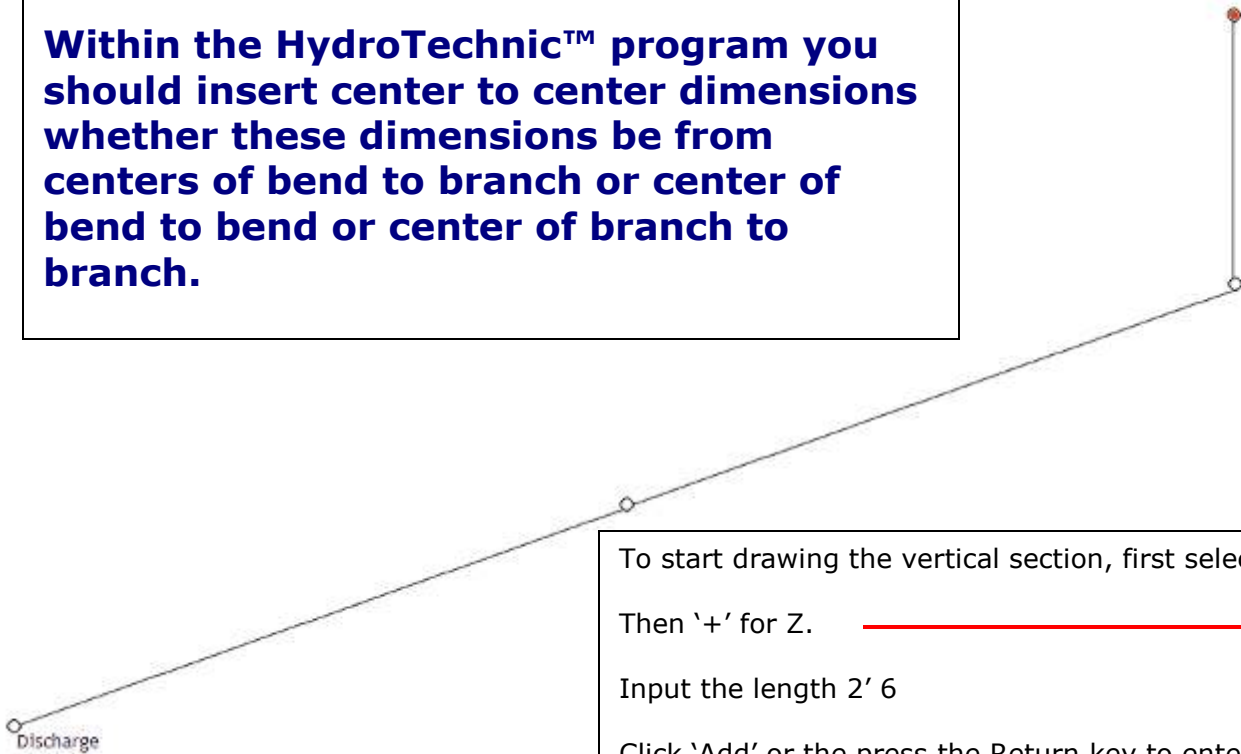
Add

Discharge



Center to Center Dimensions

Within the HydroTechnic™ program you should insert center to center dimensions whether these dimensions be from centers of bend to branch or center of bend to bend or center of branch to branch.



Element Type

Object: Pipe Drain

Material: CI no-hub

Diameter: 3"

Direction

	X	Y	Z
+	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
0	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
-	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Length: 2' 6"

Add

To start drawing the vertical section, first select '0' for X

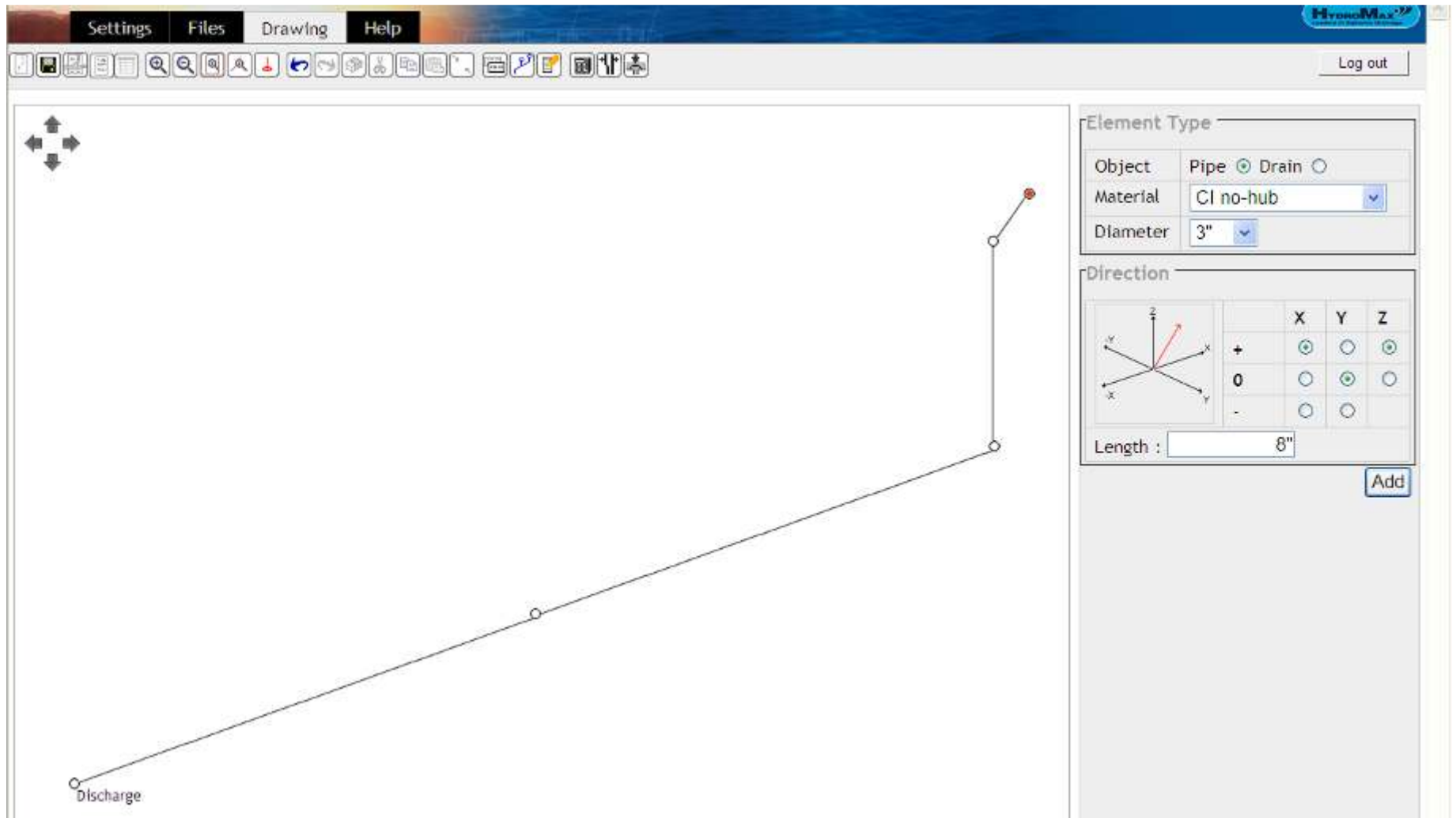
Then '+' for Z.

Input the length 2' 6

Click 'Add' or the press the Return key to enter this length.

When a 45 degree angle is required (e.g. for an off-set), two directions will be selected. In this case + X and + Z.

Enter 8 (for 8 inches) and 'Add' or press the Return key.



By selecting only '+' Z, complete the input of the vertical section with two sections of 10' 0" and one section of 2' 4".

The screenshot displays the HydroMax software interface. The main workspace shows a vertical pipe layout starting from a 'Discharge' point at the bottom left, moving up and right, then up and right again, then up and right again, and finally up and right again to a red dot at the top. The right-hand panel is titled 'Element Type' and 'Direction'. The 'Element Type' section has 'Pipe' selected with a radio button, 'Material' set to 'CI no-hub', and 'Diameter' set to '3"'. The 'Direction' section shows a 3D coordinate system with X, Y, and Z axes. The 'Direction' table is as follows:

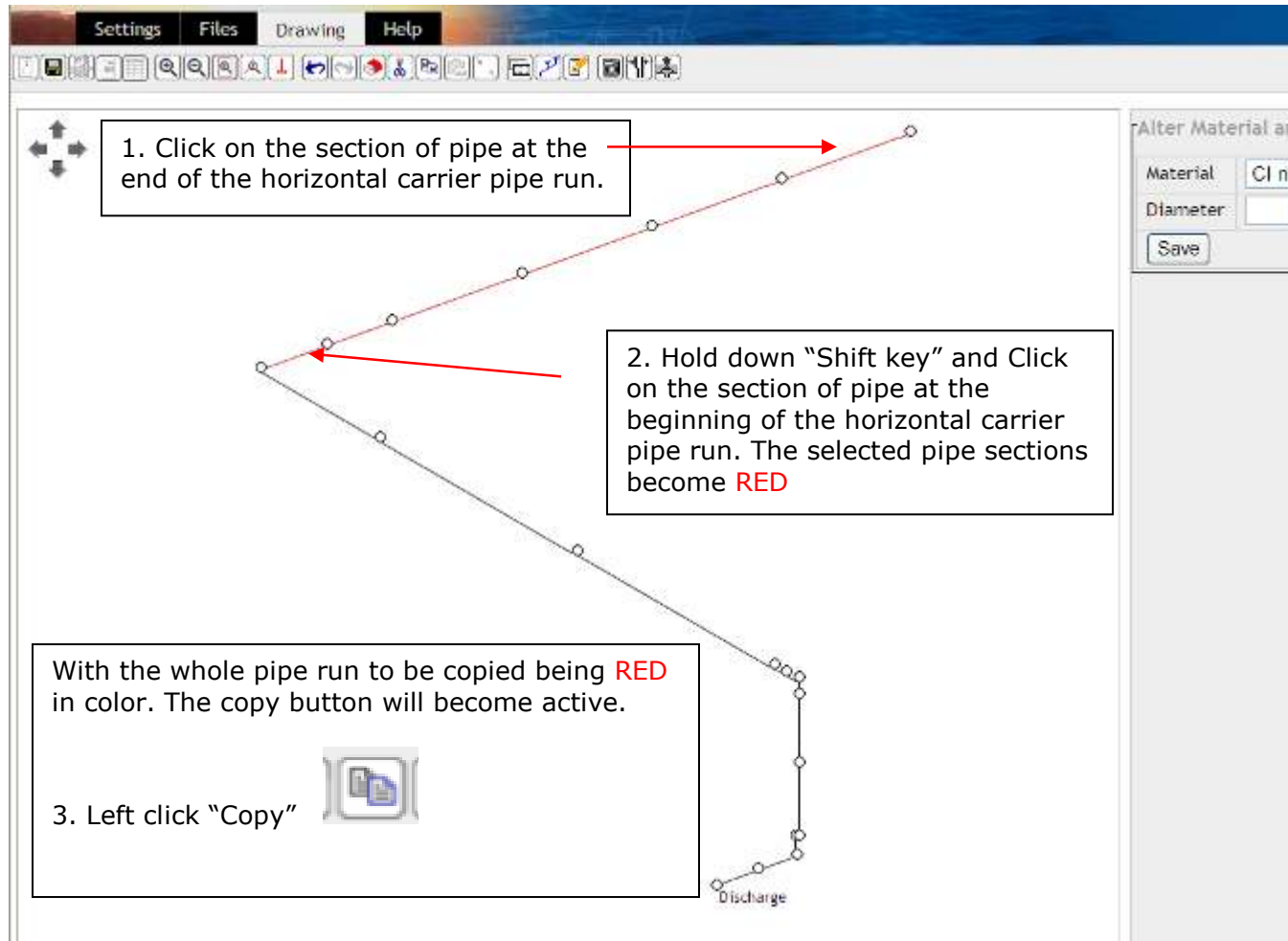
	X	Y	Z
+	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
0	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
-	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Below the table, the 'Length' is set to '2' 4"'. An 'Add' button is located at the bottom right of the panel.

To draw in the horizontal sections, change direction to -Y and build two sections at 2' 0". Then continue in same direction with two sections at 33' and one at 20'.

Change direction to +X and build two sections at 10' and four sections at 20'.

As this pipe run is the same as the pipe at the other side, we can copy this section to save time.



The screenshot displays the HydroMax software interface. At the top, there is a menu bar with 'Settings', 'Files', 'Drawing', and 'Help'. Below the menu is a toolbar with various icons. A red arrow points from the 'Live Paste' icon in the toolbar to a callout box labeled 'Live Paste Button' which contains a clipboard icon. Another red arrow points from a callout box to a specific node in a pipe network diagram. The diagram shows a network of pipes and nodes, with one node at the bottom labeled 'Discharge'. A third callout box points to the 'Discharge' node.

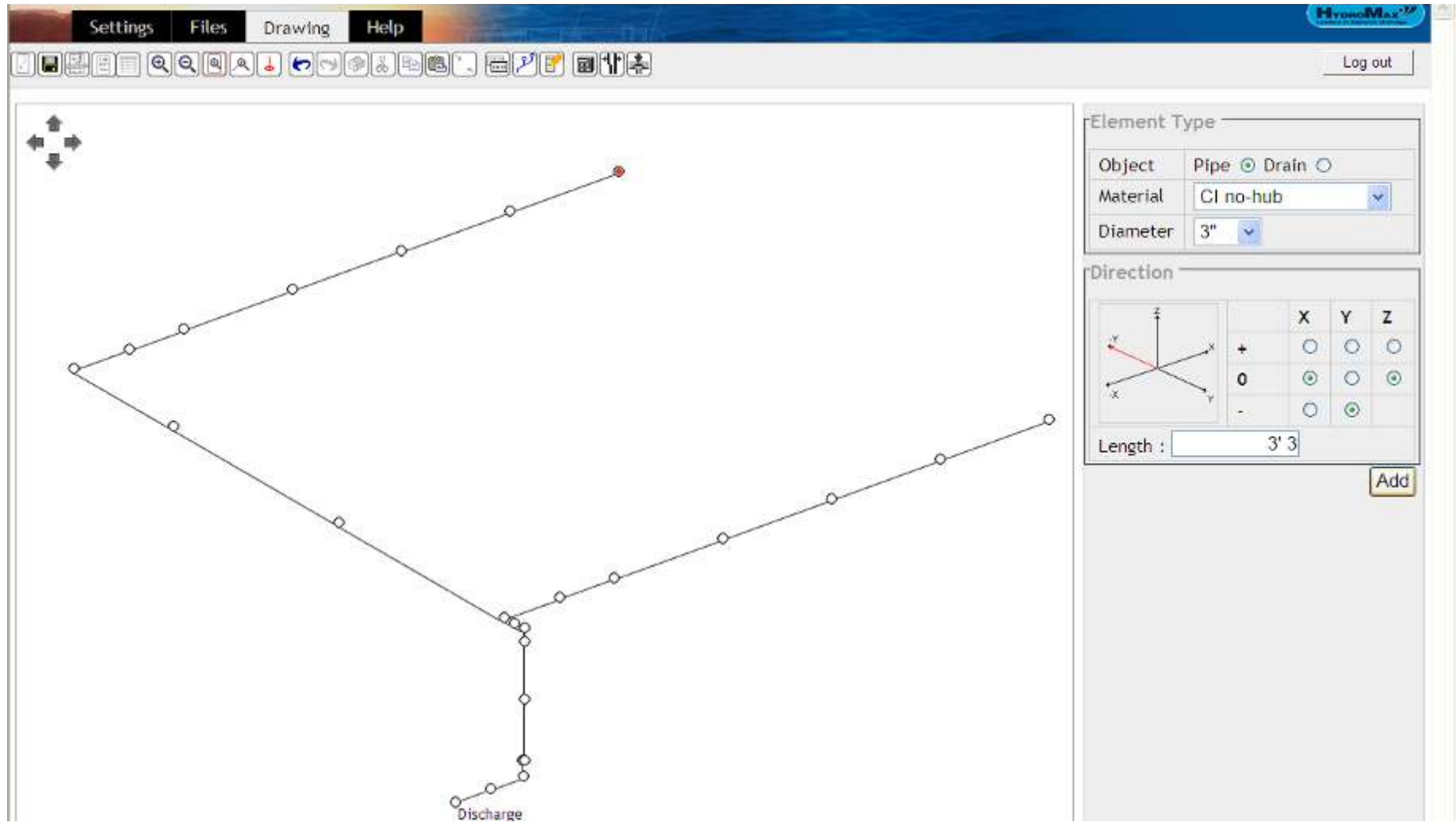
4. Next, click on the branch node point where you wish to paste the copied pipe run.
As the active node, this will become **RED** and the Paste button will become live.

5. Click paste button to paste a replica pipe run.

If necessary, click "Fit to Page" icon to show the full drawing.

We should now input the tail-pipes and roof drains. Click on the end of the first drawn horizontal run to make the node active.

The node becomes **RED** active and the data input area reappears as shown below.



Choose the -Y direction and input two sections of 3' 3".

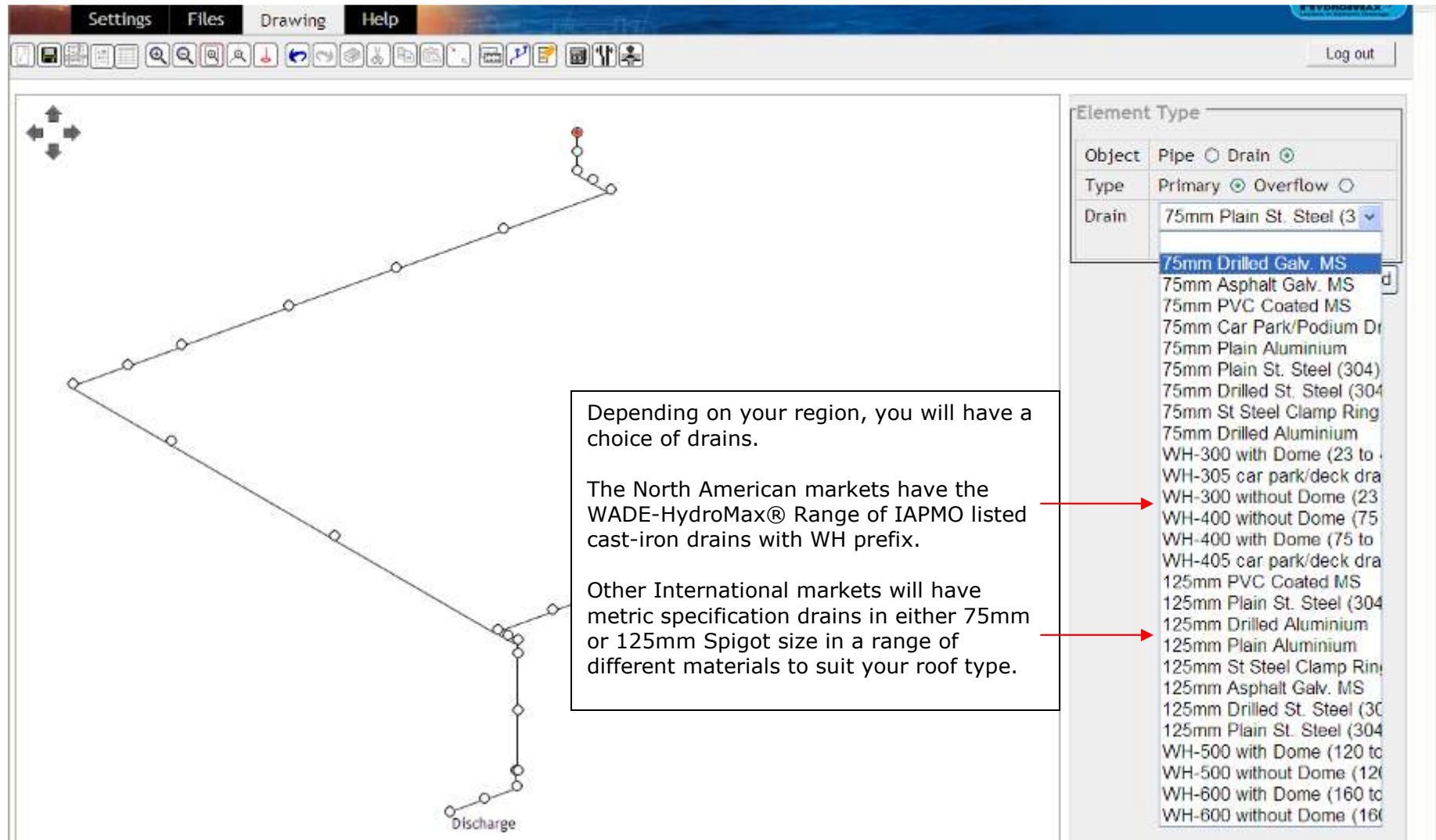
Then Select + Z direction and input two sections of 1' 4".

We are now ready to input the first roof drain. Click on the Object button "Drain"

SEE DRAIN SELECTION ON PAGE 30

This is just an example, therefore the choice of drain is not important. We will use the WADE-HydroMax® WH-300 without dome.

Once selected, click "Add".



The screenshot shows a software interface with a menu bar (Settings, Files, Drawing, Help) and a toolbar. The main drawing area displays a schematic of a roof drain system with a 'Discharge' point. A text box explains that drain choices vary by region, highlighting the WADE-HydroMax® range for North America and metric specifications for other markets. A dropdown menu on the right, titled 'Element Type', shows 'Object' set to 'Drain' and 'Type' set to 'Primary'. The 'Drain' dropdown is open, listing various options such as '75mm Plain St. Steel (304)', '75mm Drilled Galv. MS', and '125mm Plain St. Steel (304)'. Red arrows point from the text box to the '75mm Drilled Galv. MS' and '125mm Plain St. Steel (304)' options in the dropdown.

Depending on your region, you will have a choice of drains.

The North American markets have the WADE-HydroMax® Range of IAPMO listed cast-iron drains with WH prefix.

Other International markets will have metric specification drains in either 75mm or 125mm Spigot size in a range of different materials to suit your roof type.

Element Type

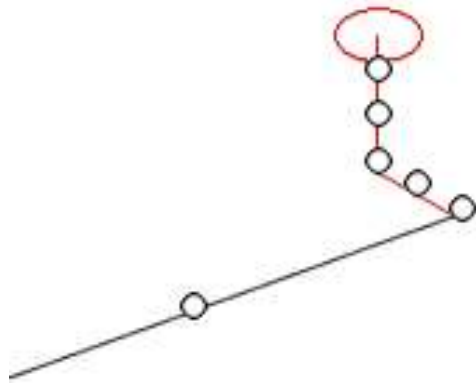
Object	Pipe <input type="radio"/> Drain <input checked="" type="radio"/>
Type	Primary <input checked="" type="radio"/> Overflow <input type="radio"/>
Drain	75mm Plain St. Steel (304) <input type="text"/>
	75mm Drilled Galv. MS
	75mm Asphalt Galv. MS
	75mm PVC Coated MS
	75mm Car Park/Podium Drain
	75mm Plain Aluminium
	75mm Plain St. Steel (304)
	75mm Drilled St. Steel (304)
	75mm St Steel Clamp Ring
	75mm Drilled Aluminium
	WH-300 with Dome (23 to 25)
	WH-305 car park/deck drain
	WH-300 without Dome (23 to 25)
	WH-400 without Dome (75 to 100)
	WH-400 with Dome (75 to 100)
	WH-405 car park/deck drain
	125mm PVC Coated MS
	125mm Plain St. Steel (304)
	125mm Drilled Aluminium
	125mm Plain Aluminium
	125mm St Steel Clamp Ring
	125mm Asphalt Galv. MS
	125mm Drilled St. Steel (304)
	125mm Plain St. Steel (304)
	WH-500 with Dome (120 to 150)
	WH-500 without Dome (120 to 150)
	WH-600 with Dome (160 to 200)
	WH-600 without Dome (160 to 200)

Select the required roof drain and click "Add". The drain is added to the drawing.

We can now copy this tail pipe and roof drain for the other 2 drains connecting to the first carrier pipe run which have the same configuration.

If you wish to zoom in, Click on any node within the tail-pipe (the bottom bend is best selection). Click "Zoom to node".

Select the sections of pipe required to be copied by clicking on the roof drain, hold down shift key and select the first section of horizontal tail pipe.

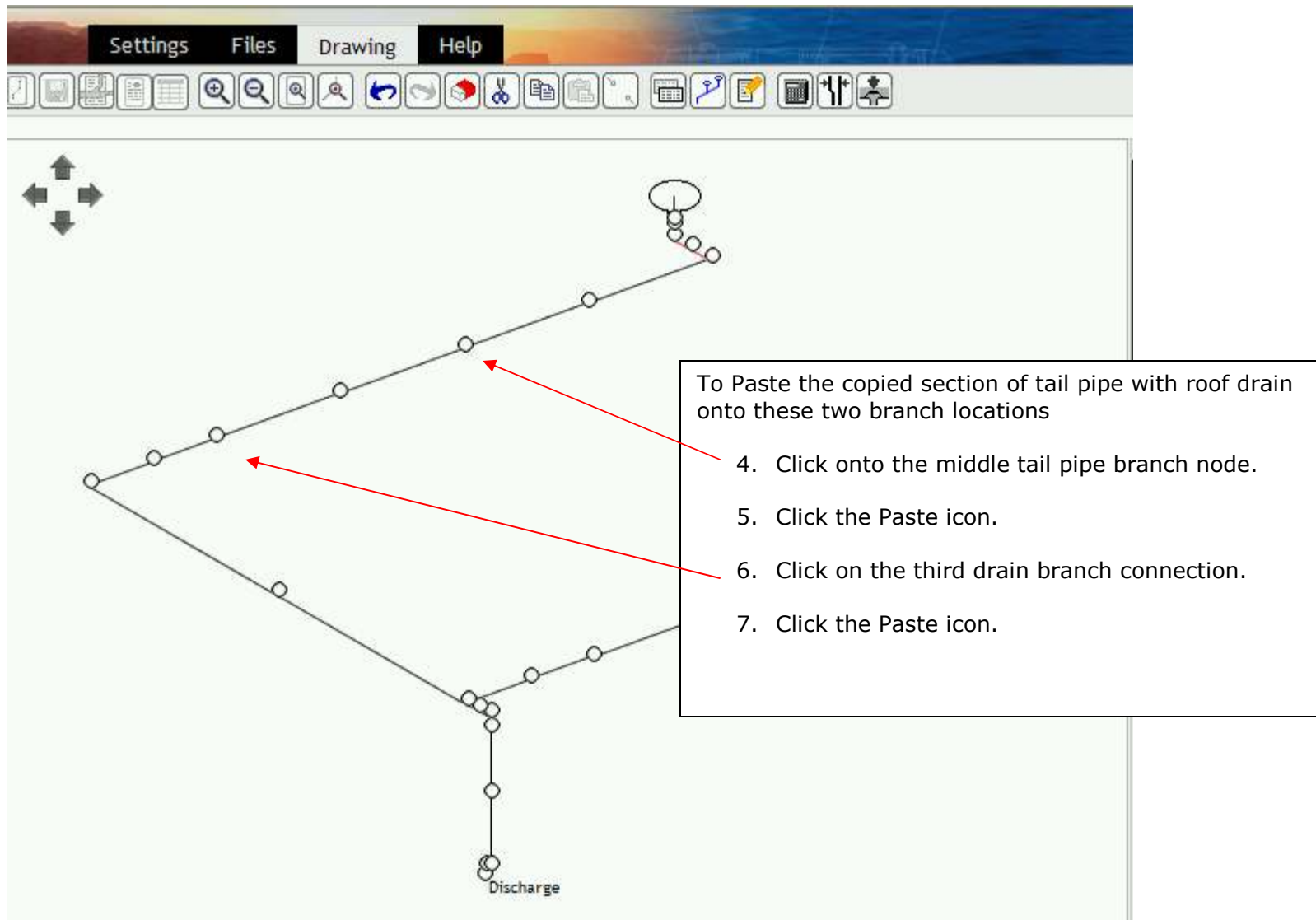


Select the sections of pipe required to be copied by

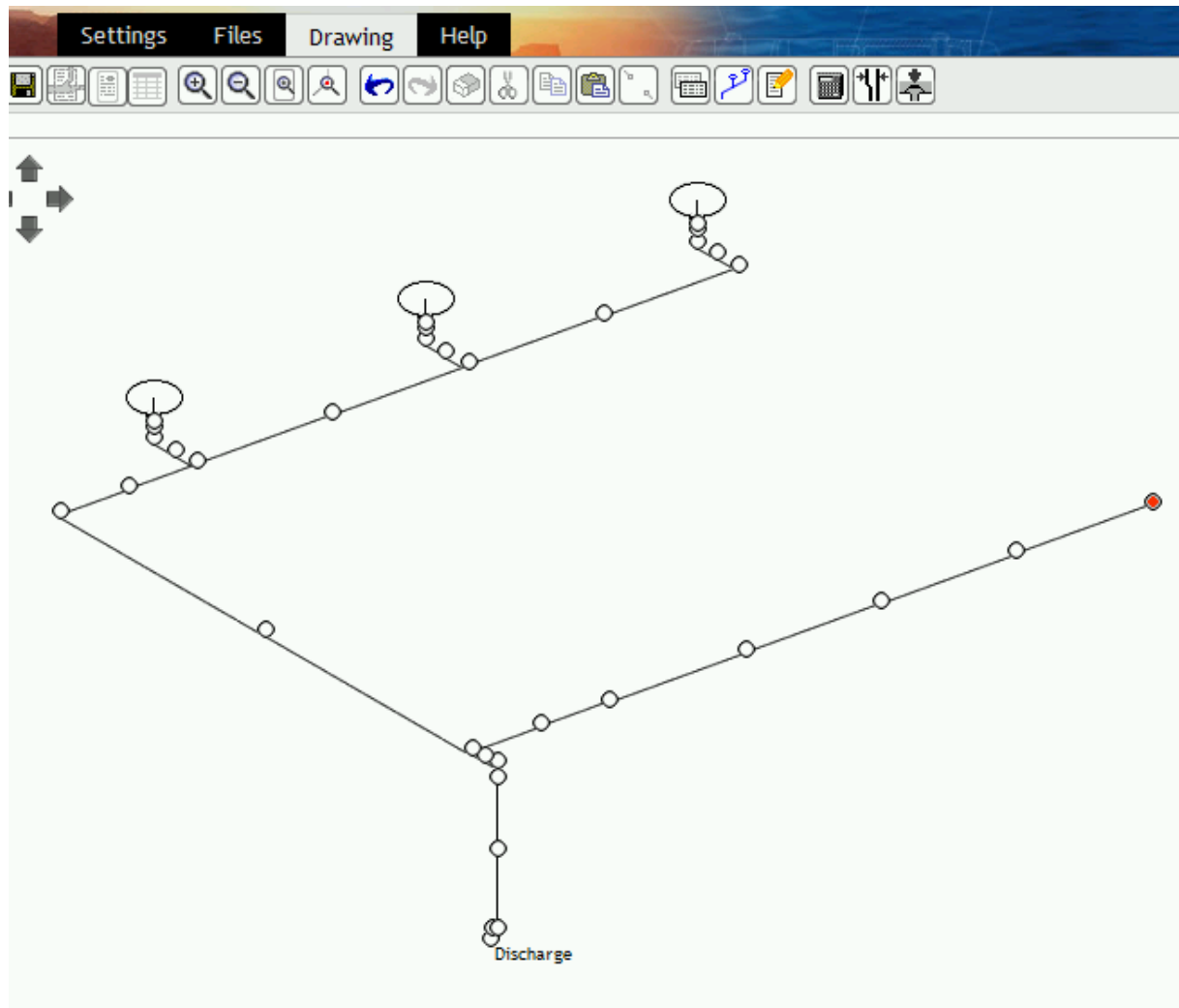
1. Click on the roof drain.
2. Hold down shift key and Click on the first section of horizontal tail pipe. The section selected becomes highlighted **RED**.
3. Click the "Copy" icon to copy all the components highlighted.

If you have zoomed in, click the "Fit to Page" icon.

You can now Paste the copied section to the branch positions required.



The copied items remain on the clipboard until something else has been selected for the Cut, Copy or Delete function.



We now need to input the final three roof drains.

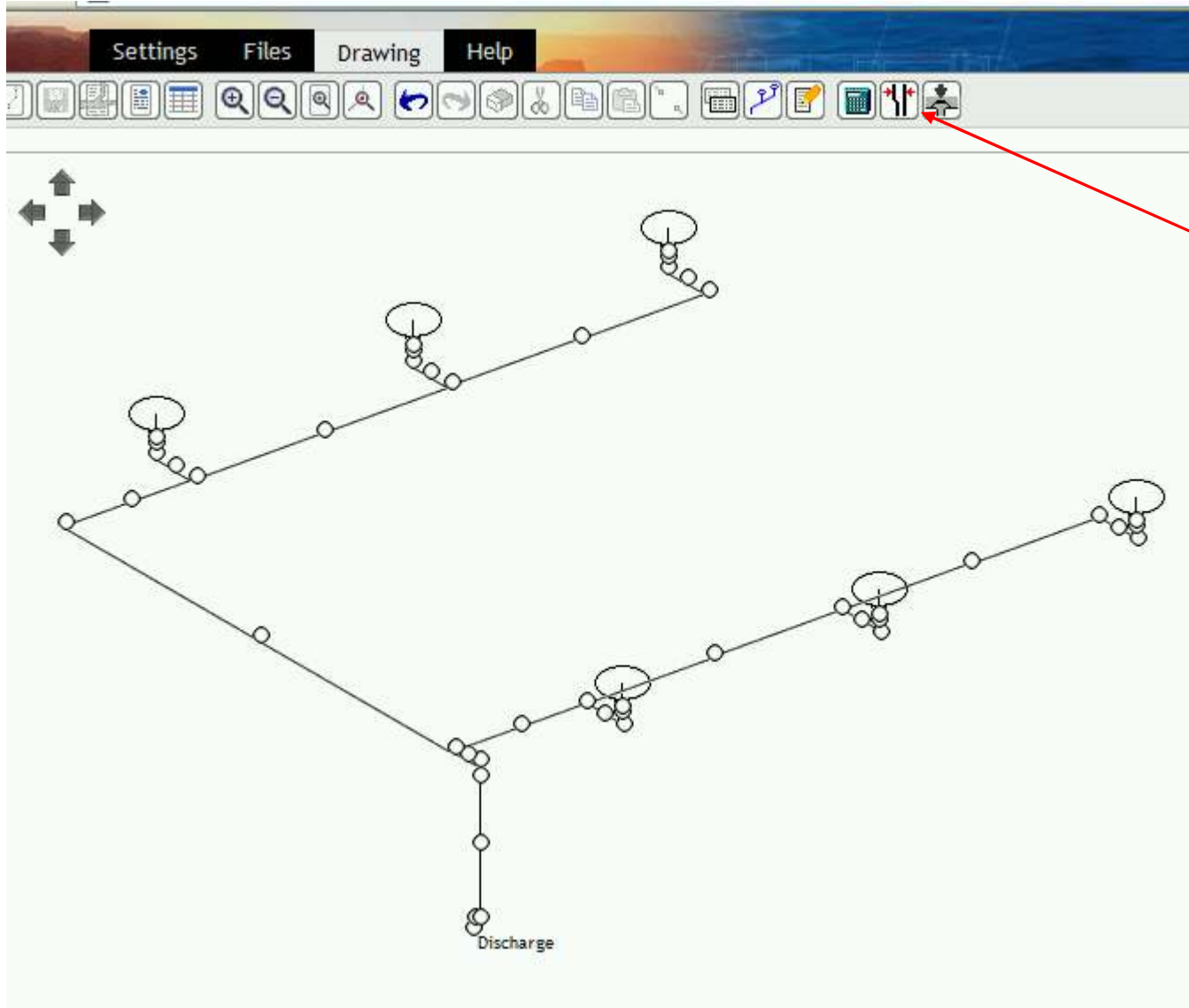
First, make the end of the second carrier pipe run active by clicking the end node.

To input the tail pipes required we will have to ensure the Object selected is 'Pipe' by selecting the 'Pipe' button.

Select the required pipe material (in this case CI no-hub) followed by selecting the diameter as 3".

We will now input the tail-pipe by selecting the +Y direction and input two sections of 3' 3". Select the + Z direction and input two sections of 1' 4".

Finally, we then input a roof drain as described in page 33 above. After this drain is added the tail-pipe and roof drain can again be copied and pasted at the two final branches to complete the drawing.



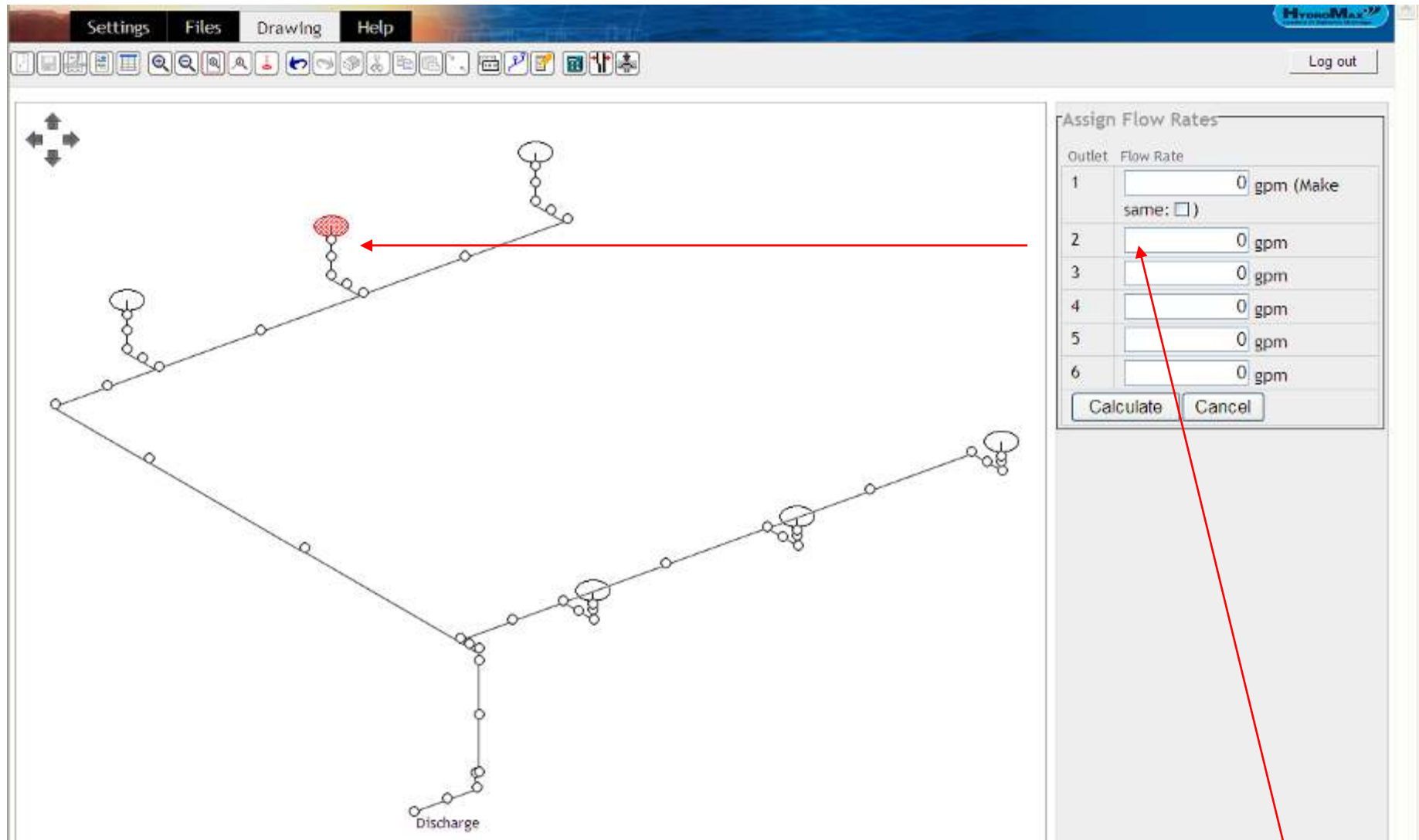
A feature of the HydroTechnic™ analytical design program is the First-Size function.

This assigns pipe diameters and performs the hydraulic calculation.

The program attempts to find pipe diameters which will be close to those required to make the system operate within its necessary parameters.

The larger the system and associated diameters become, the more complex this becomes and you will need to revert to manual calculations.

Click on the First-Size icon.

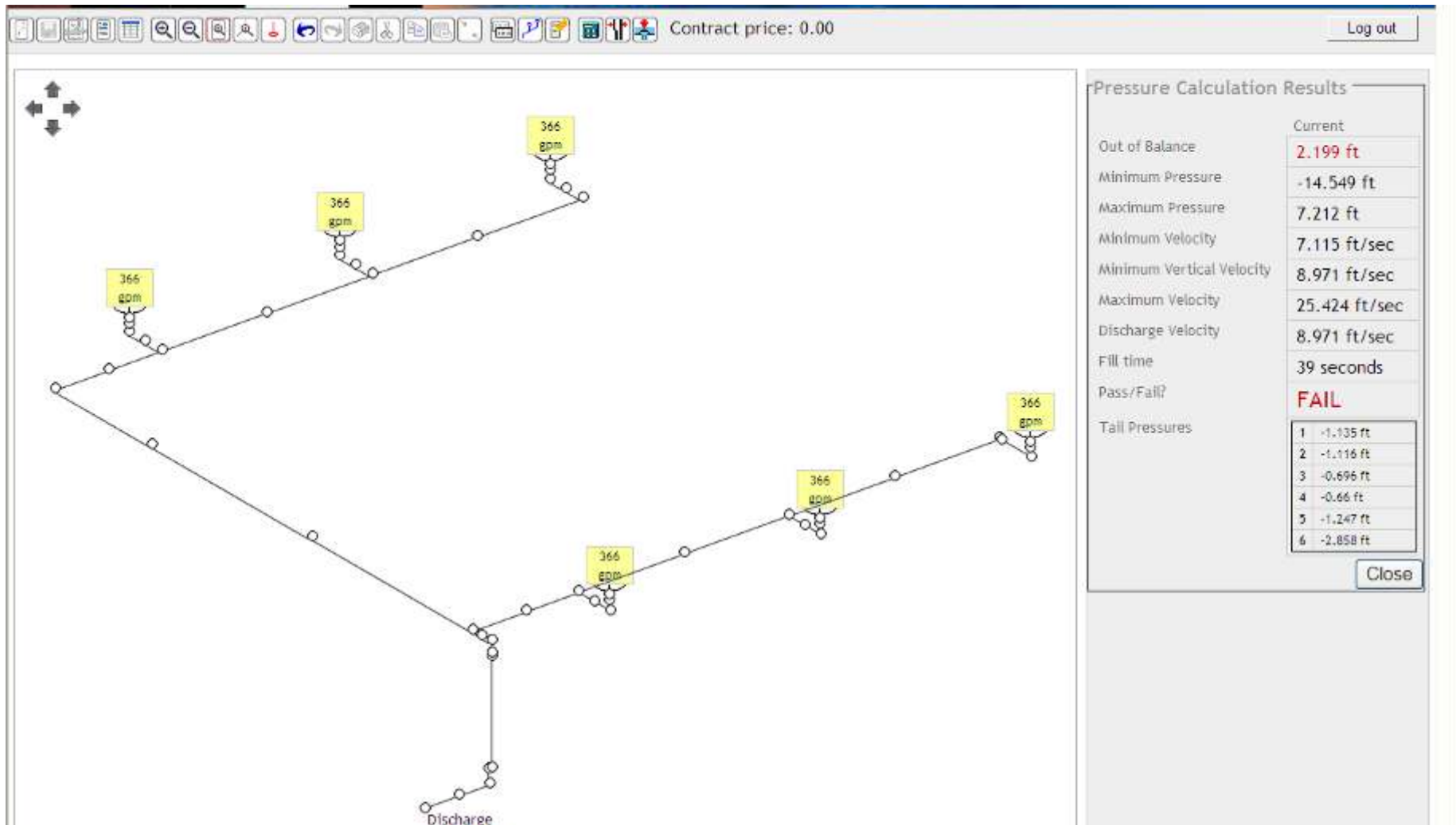


The Roof Drain 'Assign Flow Rates' box appears. There are 6 drains on this system and so 6 numbered boxes appear. If you move the cursor over the numbered outlet (drains) the display will turn the corresponding roof drain red (this is of great benefit when you have complex systems with multiple roof drains and different flow rates to ensure you input the correctly assigned flow.)

We will input the assigned flow of 366 gpm (Gallons per minute) in the Outlet (roof drain) #1 box. Then check the '(Make same:)' box because all roof drains on this system have the same flow rates and this saves repeatedly entering the same data.

All drains will now have their assigned flow of 366 gpm and we click "Calculate".

If you make a mistake and want to go back you can use the Cancel button.



Most calculations which are complex will require the system designer to edit pipe sizes to achieve the optimum solution.

With this example, we achieve all the necessary parameters EXCEPT – tail pressures out of balance setting (1.509 ft) and therefore obtain a **FAIL**.

With this calculation result we need to edit the tail pipes and there may be a means to achieve the necessary solution using smaller pipe diameters.

We shall therefore click on the tabular view window to edit the pipework.

The screenshot shows a software interface with a toolbar at the top. A red arrow points to the 'Table View' icon. Below the toolbar is a table titled 'Edit Selection' with the following data:

No.	Type	Material	Diameter (inches)	Length (feet-inches)	Height (feet-inches)	XYZ	Flowrate (gpm)	Velocity (ft/sec)	Headloss (ft)	Pressure (ft)
0	Discharge		10				2196	8.971	1.25	0
1	Pipe	CI no-hub	10	6'		-X	2196	8.971	0.181	0.181
2	Pipe	CI no-hub	10	6'		-X	2196	8.971	0.181	0.362
3	90° radius bend	CI no-hub	10				2196	8.971	0.375	0.737
4	Expansion	CI no-hub	6				2196	25.424	4.206	-3.849
5	Pipe	CI no-hub	6	2' 6"	2.6	+Z	2196	25.424	1.142	-5.207
6	Reducer	CI no-hub	6				2196	25.424	3.276	-1.93
7	45° elbow	CI no-hub	10				2196	8.971	0.35	7.212
8	Pipe	CI no-hub	10	8"	5 1/2	-X +Z	2196	8.971	0.02	6.76
9	45° elbow	CI no-hub	10				2196	8.971	0.35	7.11
10	Pipe	CI no-hub	10	19' 4"	19.4	-Z	2196	8.971	0.583	-11.624
11	Pipe	CI no-hub	10	8"	8	-Z	2196	8.971	0.021	-12.286
12	Pipe	CI no-hub	10	2' 4"	2.4	-Z	2196	8.971	0.07	-14.549
13	90° radius bend	CI no-hub	10				2196	8.971	0.375	-14.174
14	Pipe	CI no-hub	10	2'		-Y	2196	8.971	0.06	-14.113
15	Pipe	CI no-hub	10	2'		-Y	2196	8.971	0.06	-14.053
16	Junction	CI no-	10				1098	4.485	0.239	-12.877

On the right side, there is a 'Pressure Calculation Results' panel. It shows the following values:

- Out of Balance: **2.199 ft** (Current)
- Minimum Pressure: -14.549 ft
- Maximum Pressure: 7.212 ft
- Minimum Velocity: 7.115 ft/sec
- Minimum Vertical Velocity: 8.971 ft/sec
- Maximum Velocity: 25.424 ft/sec
- Discharge Velocity: 8.971 ft/sec
- Fill time: 39 seconds
- Pass/Fail?: **FAIL**
- Tail Pressures:

1	-1.135 ft
2	-1.116 ft
3	-0.696 ft
4	-0.66 ft
5	-1.247 ft
6	-2.858 ft

A 'Close' button is located at the bottom of the pressure calculation results panel.

We can see the tabular view has the discharge point at the top of the list.

The Parameters to be met are can be viewed if you go to >Settings>Hydraulic Parameters.

Please Note: If you ever require a change to any of the pre-set parameters please contact technical@hydromax.com :

Tabular View

Column 1 numbers each item within the system

Column 2 describes each item.

The items types are as follows:

Discharge: This is the point where siphonic action is broken through introduction of air. This can be connection to a ventilated gravity drain, a catchpit / chamber or to Air (atmosphere).

Pipe:

45° bend (1/8 bend);

90° radius bend (1/4 bend);

90° elbow (1/4 bend with tighter but still swept radius);

Junction: this is the connection from the straight run into a 45° 'WYE' Branch;

Branch: this is the connection from the 45° connection into a 45° 'WYE' Branch;

Expansion: This is an increaser to change the pipe to a greater diameter;

Reducer: This is a reducer to change the pipe to a smaller diameter;

Roof Drain: Details the selected drain in each location.

Column 3 denotes the pipe material type

Column 4 details the selected diameter for each given element.

Column 5 gives the overall length of the pipe sections

Column 6 notes any vertical height within the pipe section.

Column 7 headed xyz denotes the pipe direction as drawn within the Graphics screen.

Column 8 is the total flow rate within each pipe section.

Column 9 notes the velocity with the element

Column 10 is the calculated pressure headloss for the element

Column 11 is the actual pressure in that section.

An additional feature is the noting of the velocity at the discharge point denoted **Discharge velocity:** This is set at a maximum of 18.045 feet per second. This is variable user-setting chosen by the user (within the maximum and minimum velocity settings) enabling the user to set an appropriate and compatible velocity for the connection from siphonic flow to gravity drain, catchpit or air (atmosphere).

Tabular View

As shown on page 39, the data contained in the tabular view is initially displayed with item 0 being the discharge point and each component being consecutively numbered initially to the Roof Drain Outlet 1. Then carrying on with numbering from the branch connection to roof drain 2, then roof drain 3 and so on until the last roof drain, in this case roof drain 6.

However, if you choose to view only the path of a single roof drain, move your cursor over the list of tails and the tail which the cursor is over goes **YELLOW**. Click on the tail section you wish to view and the view will display a full list of all components from the selected roof drain down to the discharge point.

Select Tail # 2.

If you want to revert to the full list of components, select the "Show All Elements" button.

The screenshot displays the HydroMax software interface. The main window has a menu bar with 'Settings', 'Files', 'Drawing', and 'Help'. Below the menu is a toolbar with various icons. The main area is divided into two panes. The left pane, titled 'Edit Selection' and 'Show All Elements', contains a table of components. The right pane, titled 'Pressure Calculation Results', shows various metrics and a 'Tail Pressures' list.

No.	Type	Material	Diameter (inches)	Length (feet-inches)	Height (feet-inches)	XYZ	Flowrate (gpm)	Velocity (ft/sec)	Headloss (ft)	Pressure (ft)
48	WH-300 without Dome (23 to 415 GPM)	CI no-hub	3				366		0.543	-1.116
47	Pipe	CI no-hub	3	8"	8	-Z	366	17.064	0.341	-6.053
46	Pipe	CI no-hub	3	1' 8½"	1 8½"	-Z	366	17.064	0.866	-5.714
45	90° radius bend	CI no-hub	3				366	17.064	1.357	-4.853
44	Pipe	CI no-hub	3	3' 3"		-Y	366	17.064	1.63	-6.21
43	Pipe	CI no-hub	3	3' 3"		-Y	366	17.064	1.63	-7.84
42	45° elbow	CI no-hub	3				366	17.064	1.267	-9.47
41	Expansion	CI no-hub	3				366	17.064	0.858	-10.737
40	Branch	CI no-hub	4				366	9.631	0.608	-8.513
27	Pipe	CI no-hub	6	20'		-X	732	8.475	1.036	-8.795
26	Pipe	CI no-hub	6	20'		-X	732	8.475	1.036	-9.831

The 'Pressure Calculation Results' panel shows the following values:

- Out of Balance: 2.199 ft
- Minimum Pressure: -14.549 ft
- Maximum Pressure: 7.212 ft
- Minimum Velocity: 7.115 ft/sec
- Minimum Vertical Velocity: 7.115 ft/sec
- Maximum Velocity: 25.424 ft/sec
- Stack Velocity: 8.971 ft/sec
- Fill time: 39 seconds
- Pass/Fail?: PASS
- Tail Pressures:
 - 1: -1.135 ft
 - 2: -1.116 ft (highlighted in yellow)
 - 3: -0.696 ft
 - 4: -0.66 ft
 - 5: -1.247 ft
 - 6: -2.858 ft

Within the tabular view, you can move your cursor over any element and it will highlight in a gray color. If you left click it will change to a pink color denoting it has been selected for editing. Holding the left mouse button down, you can scroll up or down to select multiple elements for editing. If you highlight an element you want to deselect, just move your cursor over the element and left-click to de-select.

Similarly if you want to de-select a group of elements, hold down your left click button whilst running your cursor over the elements.

The screenshot displays the HydroMax software interface. At the top, there is a menu bar with 'Settings', 'Files', 'Drawing', and 'Help'. Below the menu is a toolbar with various icons. The main window is divided into two sections. On the left is a table with columns: No., Type, Material, Diameter (inches), Length (feet-inches), Height (feet-inches), XYZ, Flowrate (gpm), Velocity (ft/sec), Headloss (ft), and Pressure (ft). The table contains 13 rows of data, with row 46 highlighted in red. On the right is a 'Pressure Calculation Results' panel. This panel shows 'Current' results for various metrics: Out of Balance (2.199 ft), Minimum Pressure (-14.549 ft), Maximum Pressure (7.212 ft), Minimum Velocity (7.115 ft/sec), Minimum Vertical Velocity (7.115 ft/sec), Maximum Velocity (25.424 ft/sec), Stack Velocity (8.971 ft/sec), Fill time (39 seconds), Pass/Fail? (PASS), and Tail Pressures (a list of 6 values, with the second value, -1.116 ft, highlighted in yellow). A 'Close' button is located at the bottom right of the panel.

No.	Type	Material	Diameter (inches)	Length (feet-inches)	Height (feet-inches)	XYZ	Flowrate (gpm)	Velocity (ft/sec)	Headloss (ft)	Pressure (ft)
48	WH-300 without Dome (23 to 415 GPM)	CI no-hub	3				366		0.543	-1.116
47	Pipe	CI no-hub	3	8"	8	-Z	366	17.064	0.341	-6.053
46	Pipe	CI no-hub	3	1' 8 1/4"	1' 8 1/4"	-Z	366	17.064	0.866	-5.714
45	90° radius bend	CI no-hub	3				366	17.064	1.357	-4.853
44	Pipe	CI no-hub	3	3' 3"		-Y	366	17.064	1.63	-6.21
43	Pipe	CI no-hub	3	3' 3"		-Y	366	17.064	1.63	-7.84
42	45° elbow	CI no-hub	3				366	17.064	1.267	-9.47
41	Expansion	CI no-hub	3				366	17.064	0.858	-10.737
40	Branch	CI no-hub	4				366	9.631	0.608	-8.513
27	Pipe	CI no-hub	6	20'		-X	732	8.475	1.036	-8.795
26	Pipe	CI no-hub	6	20'		-X	732	8.475	1.036	-9.831

Pressure Calculation Results													
	Current												
Out of Balance	2.199 ft												
Minimum Pressure	-14.549 ft												
Maximum Pressure	7.212 ft												
Minimum Velocity	7.115 ft/sec												
Minimum Vertical Velocity	7.115 ft/sec												
Maximum Velocity	25.424 ft/sec												
Stack Velocity	8.971 ft/sec												
Fill time	39 seconds												
Pass/Fail?	PASS												
Tail Pressures	<table border="1"> <tbody> <tr><td>1</td><td>-1.135 ft</td></tr> <tr style="background-color: #fff3cd;"><td>2</td><td>-1.116 ft</td></tr> <tr><td>3</td><td>-0.696 ft</td></tr> <tr><td>4</td><td>-0.66 ft</td></tr> <tr><td>5</td><td>-1.247 ft</td></tr> <tr><td>6</td><td>-2.858 ft</td></tr> </tbody> </table>	1	-1.135 ft	2	-1.116 ft	3	-0.696 ft	4	-0.66 ft	5	-1.247 ft	6	-2.858 ft
1	-1.135 ft												
2	-1.116 ft												
3	-0.696 ft												
4	-0.66 ft												
5	-1.247 ft												
6	-2.858 ft												

Once you have edited any section you will have two calculation results displayed – Previous and Current.

The reason for displaying the Previous is so that you can compare the results to see if the edit has achieved your objective. If it has not obtained the result you were looking for, you can use the "undo" function to revert to the previous position.

You will notice that the some combined pipe lengths are adjusted by the program by moving node points – the program does not alter the total length or height- it only moves node points to help with the design. The exception to this is at the roof drain. The program takes off the vertical height of the actual drain which is encoded into the software.

Editing a Single Section.

Velocity (ft/sec)	Headloss (ft)	Pressure (ft)
17.064	0.543	-1.116
17.064	0.341	-6.053
17.064	0.866	-5.714
17.064	1.357	-4.853
17.064	1.63	-6.21
17.064	1.63	-7.84
17.064	1.267	-9.47
17.064	0.858	-10.737
9.631	0.608	-8.513

Downstream Pipe 194186	
Material	CI no-hub
Diameter	3"
Length	1' 8.724"
Retain Overall Length	<input checked="" type="checkbox"/>
Flow Rate	366 gpm
Velocity	17.064 ft/sec
Pressure	-5.714 ft
<input type="button" value="Save"/> <input type="button" value="Cancel"/>	

Pressure Calculation Results	
Current	

When editing a single section you have the following Edit options:

1. Change Pipe Material (or drain type)
(Note: If you change a roof drain you need to re-enter the gpm inflow at the calculate section)
2. Change Diameter
3. Change Length (only if a pipe is the selected object) –
This feature is normally used for fine balancing of tail pipes. You can 'move' a node point where there is a change in pipe diameter within a length which is in two or more sections. For this, you leave the "Retain Overall Length" box checked.

If you are looking to change the actual overall length, you need to uncheck the "Retain Overall Length" box and this will change the section length without changing any other section.

Editing Multiple Sections

Show All Elements										
46	Pipe	CI no-hub	3	1' 8 1/2"	1' 8 1/2"	+Z	366	17.064	0.866	-5.714
45	90° radius bend	CI no-hub	3				366	17.064	1.357	-4.853
44	Pipe	CI no-hub	3	3' 3"		-Y	366	17.064	1.63	-6.21
43	Pipe	CI no-hub	3	3' 3"		-Y	366	17.064	1.63	-7.84
42	45° elbow	CI no-hub	3				366	17.064	1.267	-9.47
41	Expansion	CI no-hub	3				366	17.064	0.858	-10.737
40	Branch	CI no-hub	4				366	9.631	0.608	-8.513
27	Pipe	CI no-hub	6	20'		+X	732	8.475	1.036	-8.795
26	Pipe	CI no-hub	6	20'		+X	732	8.475	1.036	-9.831

Alter Material and Diameter	
Material	CI no-hub
Diameter	1 1/2"
<input type="button" value="Save"/> <input type="button" value="Cancel"/>	

Pressure Calculation Results	
Current	
Out of Balance	2.199 ft
Minimum Pressure	-14.549 ft
Maximum Pressure	7.212 ft
Minimum Velocity	7.115 ft/sec
Minimum Vertical Velocity	7.115 ft/sec
Maximum Velocity	25.424 ft/sec
Stack Velocity	8.971 ft/sec
Fill time	39 seconds

When editing a multiple sections you can only change the material and/or the diameter.

Editing this Worked Example.

Although the First-size resulted in a 'PASS', we shall seek an alternative solution without warnings and using smaller pipe diameters.

Contract price: 0.00 Log out

No.	Type	Material	Diameter (Inches)	Length (feet-Inches)	Height (feet-Inches)	XYZ	Flowrate (gpm)	Velocity (ft/sec)	Headloss (ft)	Pressure (ft)
0	Discharge		10				2196	8.971	1.25	0
1	Pipe	CI no-hub	10	6'		+X	2196	8.971	0.181	0.181
2	Pipe	CI no-hub	10	6'		+X	2196	8.971	0.181	0.362
3	90° radius bend	CI no-hub	10				2196	8.971	0.375	0.737
4	Expansion	CI no-hub	6				2196	25.424	4.206	-3.849
5	Pipe	CI no-hub	6	2' 6"	2' 6"	-Z	2196	25.424	1.142	-5.207
6	Reducer	CI no-hub	6				2196	25.424	3.276	-1.93
7	45° elbow	CI no-hub	10				2196	8.971	0.35	7.212
8	Pipe	CI no-hub	10	8"	5' 6"	+X -Z	2196	8.971	0.02	6.76
9	45° elbow	CI no-hub	10				2196	8.971	0.35	7.11
10	Pipe	CI no-hub	10	19' 4"	19' 4"	+Z	2196	8.971	0.583	-11.624
11	Pipe	CI no-hub	10	8"	8'	+Z	2196	8.971	0.021	-12.286
12	Pipe	CI no-hub	10	2' 4"	2' 4"	+Z	2196	8.971	0.07	-14.549
13	90° radius bend	CI no-hub	10				2196	8.971	0.375	-14.174
14	Pipe	CI no-hub	10	2'		-Y	2196	8.971	0.06	-14.113
15	Pipe	CI no-hub	10	2'		-Y	2196	8.971	0.06	-14.053
16	Junction	CI no-hub	10				1098	4.485	0.239	-12.877
17	Expansion	CI no-hub	8				1098	7.115	0.107	-13.243

Pressure Calculation Results

Current

Out of Balance	2.199 ft
Minimum Pressure	-14.549 ft
Maximum Pressure	7.212 ft
Minimum Velocity	7.115 ft/sec
Minimum Vertical Velocity	8.971 ft/sec
Maximum Velocity	25.424 ft/sec
Discharge Velocity	8.971 ft/sec
Fill time	39 seconds
Pass/Fail?	FAIL

Tail Pressures

1	-1.135 ft
2	-1.116 ft
3	-0.696 ft
4	-0.66 ft
5	-1.247 ft
6	-2.858 ft

Close

We will try to reduce the amount of 10" pipe required. Click on item 0 (Discharge), Hold left mouse button and Scroll through to item 16 (Junction). This will highlight all sections from 0 through to 16. Click **Edit Selection**. Choose 8" diameter from the drop down list and click "Save". All items from 0 to 16 are now 8" diameter.

The screenshot shows a software interface with a table of pipe sections and a 'Pressure Calculation Results' panel. A red arrow points to item 5 in the table. The results panel shows 'FAIL' for Pass/Fail? and Tail Pressures.

No.	Type	Material	Diameter (Inches)	Length (feet-Inches)	Height (feet-Inches)	XYZ	Flowrate (gpm)	Velocity (ft/sec)	Headloss (ft)	Pressure (ft)
0	Discharge		8				2196	14.229	3.145	0
1	Pipe	CI no-hub	8	6'		+X	2196	14.229	0.601	0.601
2	Pipe	CI no-hub	8	6'		+X	2196	14.229	0.601	1.203
3	90° radius bend	CI no-hub	8				2196	14.229	0.944	2.146
4	Pipe	CI no-hub	8	2' 6"	2.6	-Z	2196	14.229	0.251	-0.103
5	45° elbow	CI no-hub	8				2196	14.229	0.881	0.778
6	Pipe	CI no-hub	8	8"	5 1/4	-X -Z	2196	14.229	0.067	0.373
7	45° elbow	CI no-hub	8				2196	14.229	0.881	1.254
8	Pipe	CI no-hub	8	19' 4"	19.4	-Z	2196	14.229	1.936	-16.127
9	Pipe	CI no-hub	8	8"	8	+Z	2196	14.229	0.068	-16.741
10	Pipe	CI no-hub	8	2' 4"	2.4	+Z	2196	14.229	0.234	-18.841
11	90° radius bend	CI no-hub	8				2196	14.229	0.944	-17.897
12	Pipe	CI no-hub	8	2'		-Y	2196	14.229	0.2	-17.697
13	Pipe	CI no-hub	8	2'		-Y	2196	14.229	0.2	-17.496
14	Junction	CI no-hub	8				1098	7.115	1.25	-13.887
15	Pipe	CI no-hub	8	33'		-Y	1098	7.115	0.841	-13.046
16	Pipe	CI no-hub	8	33'		-Y	1098	7.115	0.841	-12.204

	Previous	Current
Out of Balance	2.199 ft	2.771 ft
Minimum Pressure	-14.549 ft	-18.841 ft
Maximum Pressure	7.212 ft	2.146 ft
Minimum Velocity	7.115 ft/sec	7.115 ft/sec
Minimum Vertical Velocity	8.971 ft/sec	14.229 ft/sec
Maximum Velocity	25.424 ft/sec	17.064 ft/sec
Discharge Velocity	8.971 ft/sec	14.229 ft/sec
Fill time	39 seconds	35 seconds
Pass/Fail?	FAIL	FAIL
Tail Pressures:		
1	-1.135 ft	1 -1.779 ft
2	-1.116 ft	2 -1.76 ft
3	-0.696 ft	3 -1.339 ft
4	-0.66 ft	4 -1.912 ft
5	-1.247 ft	5 -2.499 ft
6	-2.858 ft	6 -4.111 ft

You will now see two sets of results - Previous and Current. We have a **RED "FAIL"** and the section(s) failing are in highlighted **RED**.

There is still an Out of Balance Fail and Tail Pressure Fail. Tail 6 has a pressure reserve of **-4.111 feet**. A negative pressure reserve of between 0 and -3.281ft is required. A negative value greater than -3.281 ft means the tail pipe has too much capacity and is oversized.

A positive tail pipe reserve pressure means that the tail pipe is undersized.

There are several ways to edit systems. With this example we are going to deliberately demonstrate various ways of editing with moves to highlight the flexibility in use. We will therefore create "FAILS" to show how to edit and undo when results are not as required.

Some General Rules of Thumb for designing are as follows:

Overcapacity (a negative pressure reserve greater than -3.281ft) means your diameters are too big. However, due to some piping materials only being available in limited diameters, reducing a diameter may cause too much of a restriction or too high velocity.

Under capacity (a positive pressure reserve) means your diameters are too small. However, increasing a diameter may result in too low a velocity or may result in increased negative pressure (especially on the vertical stack).

If you have over capacity, another means to add restriction is through rerouting the pipework to give added frictional losses from the extra pipework length and/or additional bends.

For this example we will also demonstrate editing of this system in both tabular view and the drawing view.

The first attempt to add a restriction would normally be through choosing one pipe diameter smaller for a section of pipework. In this case, we only need a small restriction so we will attempt to reduce a section of the tailpipe from 3" to 2".

We cannot reduce diameter in the direction of flow on a horizontal section of pipe. We cannot increase diameter in the direction of flow in the vertical section of pipe.

In this case we only have two options. Reduce all of the vertical tailpipe section or reduce only the bottom part of the vertical section (this is why we split the tailpipe sections into two parts on both vertical and horizontal plains.)

As we only need a small restriction, we shall try to edit the bottom section of the vertical tail pipe by one diameter from 3" to 2".

At the same time ,we shall also reduce the length of this section to 6" to limit the restriction. To do so while keeping the overall length intact, we need to leave the "Retain Overall Length" box ticked.

Select drain #6. The tabular view will show only the elements from roof drain 6 down to discharge point.

17.064	0.669	-8.513
17.064	1.357	-7.848
17.064	2.050	-9.205
17.064	0.692	-11.773
17.064	1.267	-12.466
17.064	3.723	-13.732
7.115	0.255	-13.719
7.115	0.255	-13.974
7.115	0.22	-14.229

Downstream Pipe 201228

Material: CI no-hub

Diameter: 2"

Length: 6"

Retain Overall Length:

Flow Rate: 366 gpm

Velocity: 17.064 ft/sec

Pressure: -8.513 ft

Save Cancel

Click line item 87 to highlight it pink. Click "Edit Selection".

Change Diameter to 2"

Change Length to 6"

Click Save

The result is such that 2" pipe is too small for the volume of water flow and results in the pipe being under capacity. Additionally, the velocities are too high.

The whole effect is the system fails in three areas:

1. Out of balance
2. Velocities too high and
3. the pressure reserves noted for tail #6 show a positive residual head which means the drain is not taking the target inflow.

Settings Files Drawing Help

Contract price: 0.00 Log out

Edit Selection		Show All Elements								
No.	Type	Material	Diameter (inches)	Length (feet-inches)	Height (feet-inches)	XYZ	Flowrate (gpm)	Velocity (ft/sec)	Headloss (ft)	Pressure (ft)
91	WH-300 with Dome (23 to 415 GPM)	CI no-hub	3				366		0.543	11.738
90	Pipe	CI no-hub	3	1' 11"	1 11	-Z	366	17.064	0.957	6.8
89	Reducer	CI no-hub	2				366	38.919	6.475	-11.256
88	Pipe	CI no-hub	2	6"	6	-Z	366	38.919	2.204	-17.731
87	Expansion	CI no-hub	2				366	38.919	7.42	-19.435
86	90° radius bend	CI no-hub	3				366	17.064	1.357	-7.848
85	Pipe	CI no-hub	3	3' 3"		+Y	366	17.064	1.63	-9.205
84	Pipe	CI no-hub	3	3' 3"		+Y	366	17.064	1.63	-10.835
83	45° elbow	CI no-hub	3				366	17.064	1.267	-12.466
82	Branch	CI no-hub	3				366	17.064	3.725	-13.732
57	Pipe	CI no-hub	8	10'		-X	1098	7.115	0.255	-13.719
56	Pipe	CI no-hub	8	10'		-X	1098	7.115	0.255	-13.974
55	45° elbow	CI no-hub	8				1098	7.115	0.22	-14.229
54	Branch	CI no-hub	8				1098	7.115	0.688	-14.45

Pressure Calculation Results


	Previous	Current																								
Out of Balance	2.771 ft	14.237 ft																								
Minimum Pressure	-18.841 ft	-19.435 ft																								
Maximum Pressure	2.146 ft	11.738 ft																								
Minimum Velocity	7.115 ft/sec	7.115 ft/sec																								
Minimum Vertical Velocity	14.229 ft/sec	14.229 ft/sec																								
Maximum Velocity	17.064 ft/sec	38.919 ft/sec																								
Discharge Velocity	14.229 ft/sec	14.229 ft/sec																								
Fill time	35 seconds	37 seconds																								
Pass/Fail?	FAIL	FAIL																								
Tail Pressures	<table border="1"> <tr><td>1</td><td>-1.779 ft</td></tr> <tr><td>2</td><td>-1.76 ft</td></tr> <tr><td>3</td><td>-1.339 ft</td></tr> <tr><td>4</td><td>-1.912 ft</td></tr> <tr><td>5</td><td>-2.499 ft</td></tr> <tr><td>6</td><td>-4.111 ft</td></tr> </table>	1	-1.779 ft	2	-1.76 ft	3	-1.339 ft	4	-1.912 ft	5	-2.499 ft	6	-4.111 ft	<table border="1"> <tr><td>1</td><td>-1.779 ft</td></tr> <tr><td>2</td><td>-1.76 ft</td></tr> <tr><td>3</td><td>-1.339 ft</td></tr> <tr><td>4</td><td>-1.912 ft</td></tr> <tr><td>5</td><td>-2.499 ft</td></tr> <tr><td>6</td><td>11.738 ft</td></tr> </table>	1	-1.779 ft	2	-1.76 ft	3	-1.339 ft	4	-1.912 ft	5	-2.499 ft	6	11.738 ft
1	-1.779 ft																									
2	-1.76 ft																									
3	-1.339 ft																									
4	-1.912 ft																									
5	-2.499 ft																									
6	-4.111 ft																									
1	-1.779 ft																									
2	-1.76 ft																									
3	-1.339 ft																									
4	-1.912 ft																									
5	-2.499 ft																									
6	11.738 ft																									

Close

This edit is not what we want so we click "undo".

Our next best option to edit this design is to create a restriction to tail #6 through adding some pipework and bends to the tail section.

We do this in the drawing (graphic) View .

Click on the drawing view  then click the node at the bottom of the vertical tail for roof drain #6 then click "Zoom to Node".

Settings Files Drawing Help

Log out

Click on the node midpoint of the horizontal leg. Select 3", select + X, input 1' and select Insert (selecting Add would create a new pipe branch).

Element Type

Object Pipe Drain

Material CI no-hub

Diameter 3"

Direction

	X	Y	Z
+	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
0	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
-	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Length : 1'

Insert Add

Pressure Calculation Results

Previous Current

Settings Files Drawing Help

Log out

Click on the node at the bottom of the vertical section. Select 3", select - X, input 1' and select Insert to bring the roof drain back into position.

Element Type

Object Pipe Drain

Material CI no-hub

Diameter 3"

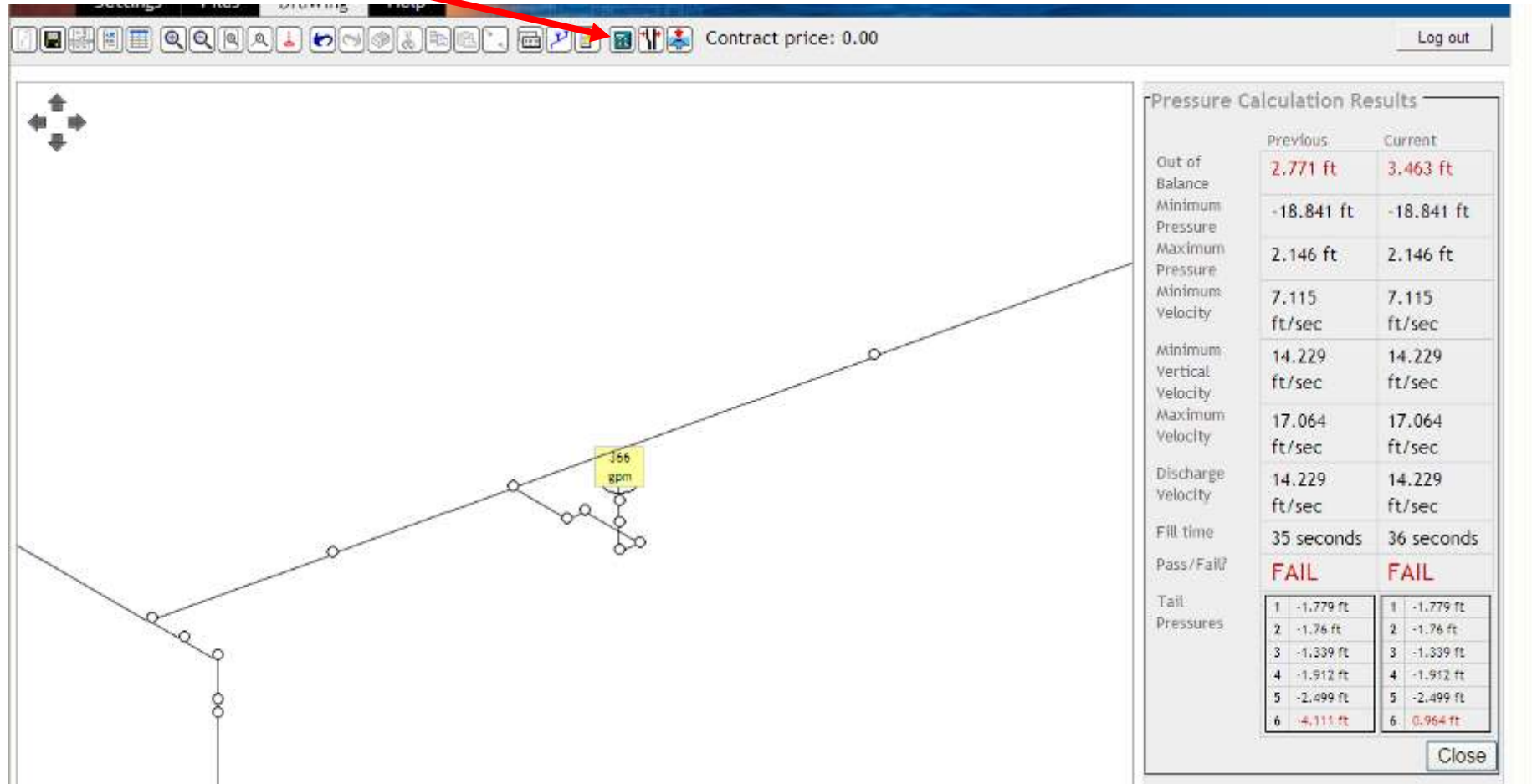
Direction

	X	Y	Z
+	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
-	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Length : 1'

Insert Add

Then select "Calculate" (**IMPORTANT – DO NOT CHOOSE FIRST SIZE**).



This has resulted in too much of a restriction as we now have undercapacity indicated by a positive figure for the tail pressure reserve.

We will alleviate this by changing the section of branch pipe from the carrier pipe to 4".

In the graphic view, left click on the pipe section and it will turn RED. (You can also edit this change in the Tabular View)

Change diameter to 4" and press Save.

This results in the tailpipe again being oversized.

There is also a Warning:

- A reduction in size of the lateral at 85 is not recommended because it may cause a blockage.

This is because the pipe has been increased but the wye branch and 45 degree bend are still 3"

Select Undo

Revert to the tabular view and select tail pipe #6.

Downstream Pipe 208297		
Material	CI no-hub	
Diameter	4"	
Length	1½"	4.559"
Flow Rate	2"	
	3"	
Velocity	4" sec	
	5"	
Pressure	6"	
	8"	
	10"	
	12"	
	15"	
Save		

Pressure Calculation Results		
	Previous	Current
Out of Balance	3.463 ft	2.914 ft
Minimum Pressure	-18.841 ft	-18.841 ft
Maximum Pressure	2.146 ft	2.146 ft
Minimum Velocity	7.115 ft/sec	7.115 ft/sec
Minimum Vertical Velocity	7.115 ft/sec	7.115 ft/sec
Maximum Velocity	17.064 ft/sec	17.064 ft/sec
Stack Velocity	14.229 ft/sec	14.229 ft/sec
Fill time	36 seconds	36 seconds
Pass/Fail?	FAIL	FAIL

The screenshot displays the HydroMax software interface. At the top, there is a menu bar with 'Settings', 'Files', 'Drawing', and 'Help'. Below the menu is a toolbar with various icons. The main area contains a table of system elements, with rows 82 and 83 highlighted in red. To the right, there is a 'Pressure Calculation Results' panel showing a comparison between 'Previous' and 'Current' values for various parameters.

Show All Elements										
85	90° radius bend	CI no-hub	3				366	-17.064	1.357	-10.416
84	Pipe	CI no-hub	3	1" 45°	Y		366	-17.064	0.692	-11.773
83	45° elbow	CI no-hub	3				366	17.064	1.267	-12.466
82	Branch	CI no-hub	3				366	17.064	3.725	-13.732
57	Pipe	CI no-hub	8	10'	+X		1098	7.115	0.255	-13.719
56	Pipe	CI no-hub	8	10'	+X		1098	7.115	0.255	-13.974
55	45° elbow	CI no-hub	8				1098	7.115	0.22	-14.229
54	Branch	CI no-hub	8				1098	7.115	0.688	-14.45
13	Pipe	CI no-hub	8	2'	-Y		2196	14.229	0.2	-17.496
12	Pipe	CI no-hub	8	2'	-Y		2196	14.229	0.2	-17.697
11	90° radius bend	CI no-hub	8				2196	14.229	0.944	-17.897
10	Pipe	CI no-hub	8	2" 4"	-Z	2.4	2196	14.229	0.234	-18.841

Alter Material and Diameter		
Material	CI no-hub	
Diameter	4"	
<input type="button" value="Save"/> <input type="button" value="Cancel"/>		

Pressure Calculation Results		
	Previous	Current
Out of Balance	2.914 ft	3.463 ft
Minimum Pressure	-18.841 ft	-18.841 ft
Maximum Pressure	2.146 ft	2.146 ft
Minimum Velocity	7.115 ft/sec	7.115 ft/sec
Minimum Vertical Velocity	7.115 ft/sec	7.115 ft/sec
Maximum Velocity	17.064 ft/sec	17.064 ft/sec
Stack Velocity	14.229	14.229

Select line items 82 and 83. This is the Wye branch from the main carrier pipe and the 45 degree bend connecting to the branch. We will give the system just a little bit less restriction by increasing the diameter of these two components to 4" diameter.

Select 4" from the diameter drop down menu and click "Save".

Settings Files Drawing Help HydroMax² Log out

Edit Selection		Show All Elements										
82	Branch	CI no-hub	4									
57	Pipe	CI no-hub	8	10'	+X	1098	7.115	0.255	-13.719			
56	Pipe	CI no-hub	8	10'	+X	1098	7.115	0.255	-13.974			
55	45° elbow	CI no-hub	8			1098	7.115	0.22	-14.229			
54	Branch	CI no-hub	8			1098	7.115	0.688	-14.45			
13	Pipe	CI no-hub	8	2'	-Y	2196	14.229	0.2	-17.496			
12	Pipe	CI no-hub	8	2'	-Y	2196	14.229	0.2	-17.697			
11	90° radius bend	CI no-hub	8			2196	14.229	0.944	-17.897			
10	Pipe	CI no-hub	8	2' 4"		2 4	-Z	2196	14.229	0.234	-18.841	
9	Pipe	CI no-hub	8	8"		8	-Z	2196	14.229	0.068	-16.741	
8	Pipe	CI no-hub	8	19' 4"		19 4	-Z	2196	14.229	1.936	-16.127	
7	45° elbow	CI no-hub	8					2196	14.229	0.881	1.254	
6	Pipe	CI no-hub	8	8"		5 1/2	+X +Z	2196	14.229	0.067	0.373	
5	45° elbow	CI no-hub	8					2196	14.229	0.881	0.778	
4	Pipe	CI no-hub	8	2' 6"		2 6	+Z	2196	14.229	0.251	-0.103	
3	90° radius bend	CI no-hub	8					2196	14.229	0.944	2.146	
2	Pipe	CI no-hub	8	6'	+X	2196	14.229	0.601	1.203			
1	Pipe	CI no-hub	8	6'	+X	2196	14.229	0.601	0.601			

Pressure Calculation Results

	Previous	Current																								
Out of Balance	3.463 ft	0.774 ft																								
Minimum Pressure	-18.841 ft	-18.841 ft																								
Maximum Pressure	2.146 ft	2.146 ft																								
Minimum Velocity	7.115 ft/sec	7.115 ft/sec																								
Minimum Vertical Velocity	7.115 ft/sec	7.115 ft/sec																								
Maximum Velocity	17.064 ft/sec	17.064 ft/sec																								
Stack Velocity	14.229 ft/sec	14.229 ft/sec																								
Fill time	36 seconds	36 seconds																								
Pass/Fail?	FAIL	PASS																								
Tail Pressures	<table border="1" style="font-size: small;"> <tr><td>1</td><td>-1.779 ft</td></tr> <tr><td>2</td><td>-1.76 ft</td></tr> <tr><td>3</td><td>-1.339 ft</td></tr> <tr><td>4</td><td>-1.912 ft</td></tr> <tr><td>5</td><td>-2.499 ft</td></tr> <tr><td>6</td><td>0.964 ft</td></tr> </table>	1	-1.779 ft	2	-1.76 ft	3	-1.339 ft	4	-1.912 ft	5	-2.499 ft	6	0.964 ft	<table border="1" style="font-size: small;"> <tr><td>1</td><td>-1.779 ft</td></tr> <tr><td>2</td><td>-1.76 ft</td></tr> <tr><td>3</td><td>-1.339 ft</td></tr> <tr><td>4</td><td>-1.526 ft</td></tr> <tr><td>5</td><td>-2.113 ft</td></tr> <tr><td>6</td><td>-1.738 ft</td></tr> </table>	1	-1.779 ft	2	-1.76 ft	3	-1.339 ft	4	-1.526 ft	5	-2.113 ft	6	-1.738 ft
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5	-2.499 ft																									
6	0.964 ft																									
1	-1.779 ft																									
2	-1.76 ft																									
3	-1.339 ft																									
4	-1.526 ft																									
5	-2.113 ft																									
6	-1.738 ft																									

[Close](#)

All Parameters are now met and we have a satisfactory "PASS" without any Warnings.

Show the Drawing Information icon



Prior to printing out any of the System Design data, ensure that the project and client information is completed.

Open the dialogue box by clicking on "Show the drawing information" icon. Complete the information and click "Save".

Settings Files Drawing Help

Log out

Show the drawing information

366 gpm

366 gpm

366 gpm

366 gpm

Project Information

Client Name	Valuable Client
Project Name	Project 'X'
System Name	Demo Project RWP 01
Downpipe Location	Grid A:1
Drawing Ref.	RWP 01 r 0
Drawing Date	12 August 2007
Designer Name	Demo Designer

Save

Pressure Calculation Results

After saving, The Overview Report and Bill of Materials icons now become live.

Settings Files Drawing Help

Log out

Overview report

366 gpm

366 gpm

Project Information

Client Name	Valuable Client
Project Name	Project 'X'
System	Demo Project RWP 01

Overview Report – Summary of Hydraulic Calculations

Click on Overview Report and you obtain a Summary detailing the Project Information (which the user has input) and the hydraulic calculations.

Project Information


Project: Project 'X'
System: Demo Project RWP 01
Client: Valuable Client
Reference: RWP 01 r 0
Designer: Demo Designer
Date: 12 August 2007

System Designed By

HydroMax Inc Ltd
Balnagowan
Eassie, Glamis
Forfar
Angus
DD8 15G
Scotland, UK
+44 1307 840 434
info@hydromax.com

Design Software Supplied By

HydroMax Inc Ltd
Balnagowan
Eassie, Glamis
Forfar
Angus
DD8 15G
Scotland, UK
+44 1307 840 434
info@hydromax.com



Pressure Calculation Results

Pressure Calculation Results

Current
 Out of Balance **0.774 ft**
 Minimum Pressure **-18.841 ft**
 Maximum Pressure **2.146 ft**
 Minimum Velocity **7.115 ft/sec**
 Minimum Vertical Velocity **14.229 ft/sec**
 Maximum Velocity **17.064 ft/sec**
 Discharge Velocity **14.229 ft/sec**
 Fill time **36 seconds**
 Pass/Fail? **PASS**

Tail Pressures	
1	-1.779 ft
2	-1.76 ft
3	-1.339 ft
4	-1.526 ft
5	-2.113 ft
6	-1.738 ft

Material Parameters

Material	Actual Diameter	Nominal Diameter	K/Roughness
CI no-hub	3"	3"	0.25
CI no-hub	8"	8"	0.25
CI no-hub	4"	4"	0.25
CI no-hub	6"	6"	0.25

Overall Parameters

No.	Type	Diameter	Length	Height	Direction	Flowrate	Velocity	Headloss	Pressure	Loading
1	Discharge	8"		0		2196 gpm	14.23 ft/sec	3' 1 1/2"	0 ft	0 lb/ft
2	Pipe	8"	6'	0	+X	2196 gpm	14.23 ft/sec	7"	0.601 ft	37.6 lb/ft
3	Pipe	8"	6'	0	+X	2196 gpm	14.23 ft/sec	7"	1.203 ft	37.6 lb/ft
4	90° radius bend	8"		0		2196 gpm	14.23 ft/sec	11 1/2"	2.146 ft	37.6 lb/ft
5	Pipe	8"	2' 6"	2' 6"	+Z	2196 gpm	14.23 ft/sec	3"	-0.103 ft	37.6 lb/ft
6	45° elbow	8"		0		2196 gpm	14.23 ft/sec	10 1/2"	0.778 ft	37.6 lb/ft
7	Pipe	8"	8"	5 1/2"	+X +Z	2196 gpm	14.23 ft/sec	1"	0.373 ft	37.6 lb/ft
8	45° elbow	8"		0		2196 gpm	14.23 ft/sec	10 1/2"	1.254 ft	37.6 lb/ft

The Summary can be printed to your local printer or printed to create a PDF file (if you have a PDF writer).

Alternatively, as the program uses HTML format, you can right click, choose select all, right click again and choose copy and the Summary can then be pasted into any program such as Word, excel, etc.

Bill of Materials icon  – Parts List

If you choose the "Drawing" tab, you can then select Bill of Materials icon to give you a full list of the materials required for the system.

Material		Description	Diameter (inches)	Quantity	Rate	Value
<div style="display: flex; justify-content: space-between;"> <div style="background-color: cyan; padding: 5px;">HydroMax™</div> <div> Project Ref. No RWP 01 r 0 Project Name Project 'X' RWP No Demo Project RWP.01 </div> </div>						
				feet- inches^A	/foot	
CI no-hub		Hubless Cast Iron Pipe 3"	3	60	0.00	0.00
CI no-hub		Hubless Cast Iron Pipe 4"	4	99	0.00	0.00
CI no-hub		Hubless Cast Iron Pipe 6"	6	99	0.00	0.00
CI no-hub		Hubless Cast Iron Pipe 8"	8	178	0.00	0.00
				each	/item	
CI no-hub		eighth bend 3"	3	3	0.00	0.00
CI no-hub		eighth bend 4"	4	1	0.00	0.00
CI no-hub		eighth bend 8"	8	3	0.00	0.00
CI no-hub		Quarter bend - short sweep 3"	3	8	0.00	0.00
CI no-hub		Quarter bend - short sweep 4"	4	3	0.00	0.00
CI no-hub		Quarter bend - short sweep 8"	8	3	0.00	0.00
CI no-hub		Coupling 3"	3	48	0.00	0.00
CI no-hub		Coupling 4"	4	24	0.00	0.00
CI no-hub		Coupling 6"	6	16	0.00	0.00
CI no-hub		Coupling 8"	8	42	0.00	0.00
CI no-hub		Reducer 4/3"		4	0.00	0.00
CI no-hub		Reducer 6/4"		2	0.00	0.00
CI no-hub		Reducer 8/6"		2	0.00	0.00
CI no-hub		45° Y branch 6/3"		1	0.00	0.00
CI no-hub		45° Y branch 6/4"		1	0.00	0.00
CI no-hub		45° Y branch 8/3"		1	0.00	0.00
CI no-hub		45° Y branch 8/4"		1	0.00	0.00

Please note: If you have input prices into your price lists as noted in Page 55, your bill of materials will provide a total value.

Export Fabsheet icon



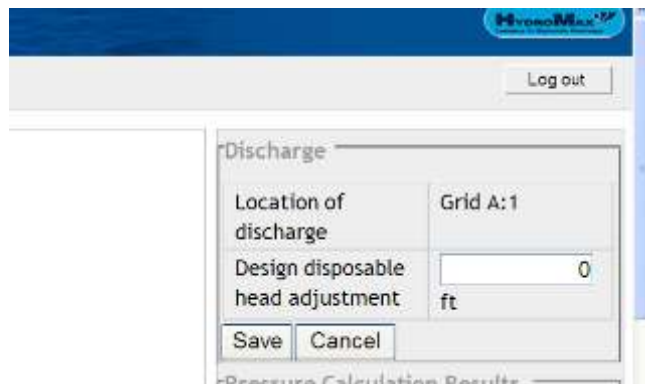
There is an icon to Export Fabsheet but this function is only for use with HydroMax™ HDPE pipe designs. If the design is with HDPE, you select the icon and a PDF file is written to your directory which can be downloaded and shows pre-fabrication drawings in metric 6 metre lengths.

Design Disposable Head Adjustment

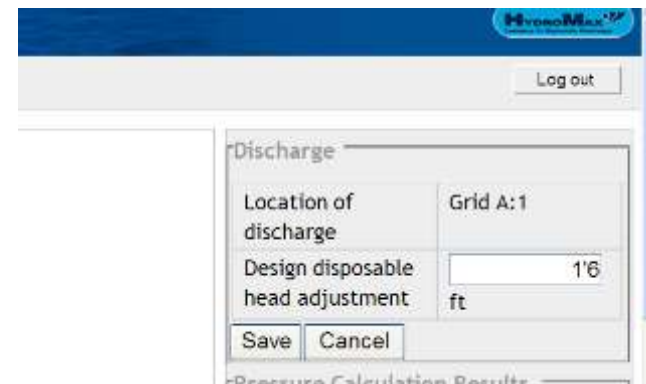


If the discharge pipe may be submerged (refer to ASPE Plumbing and Engineering Design Standard 45 – Siphonic Roof Drainage 4.7) it may be necessary to make an adjustment to account for a restricted (submerged discharge).

We have made the function simple within HydroTechnic™ with the Design Disposable Head Adjustment tool. Click on the icon and the following tool becomes available.



The screenshot shows the 'Discharge' dialog box in the HydroMax™ software. The 'Location of discharge' is set to 'Grid A:1'. The 'Design disposable head adjustment' is set to '0' feet. There are 'Save' and 'Cancel' buttons at the bottom of the dialog box.



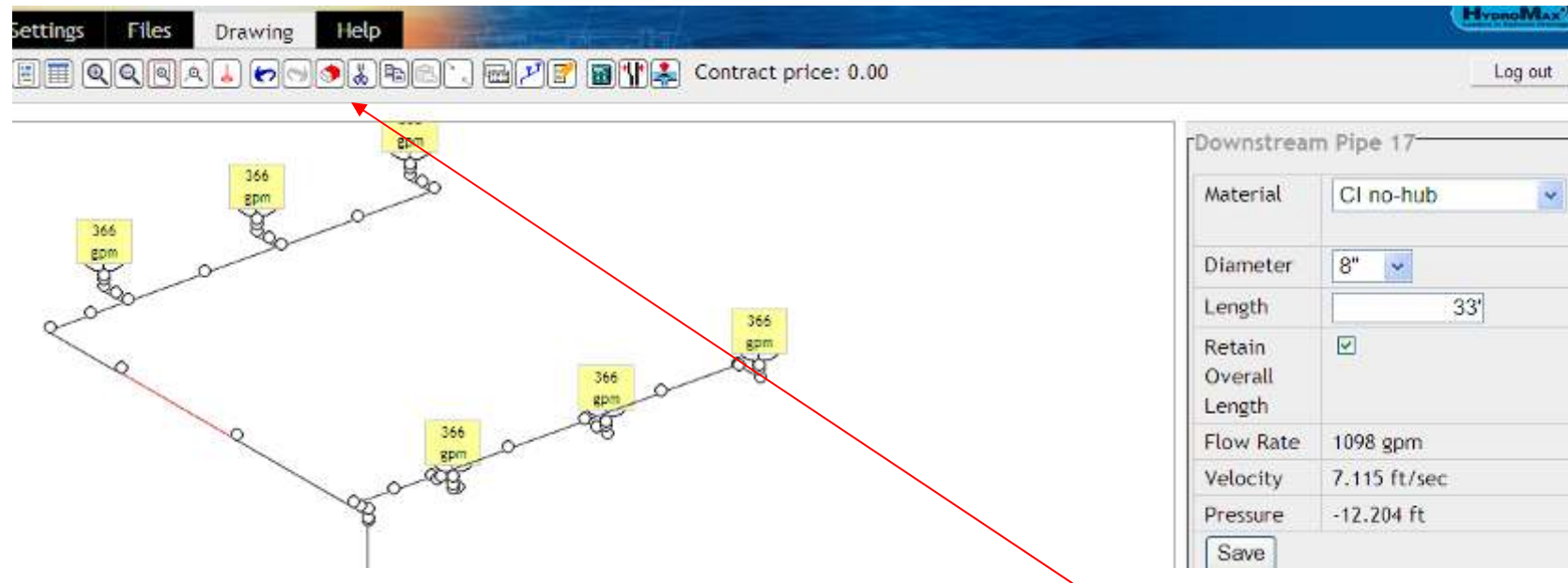
The screenshot shows the 'Discharge' dialog box in the HydroMax™ software. The 'Location of discharge' is set to 'Grid A:1'. The 'Design disposable head adjustment' is set to '1'6' feet. There are 'Save' and 'Cancel' buttons at the bottom of the dialog box.

Input the height of restrictive discharge then 'save'

Adjust pipe diameters if necessary to meet a '**PASS**' under the new Disposable Head height.

Amending Designs.

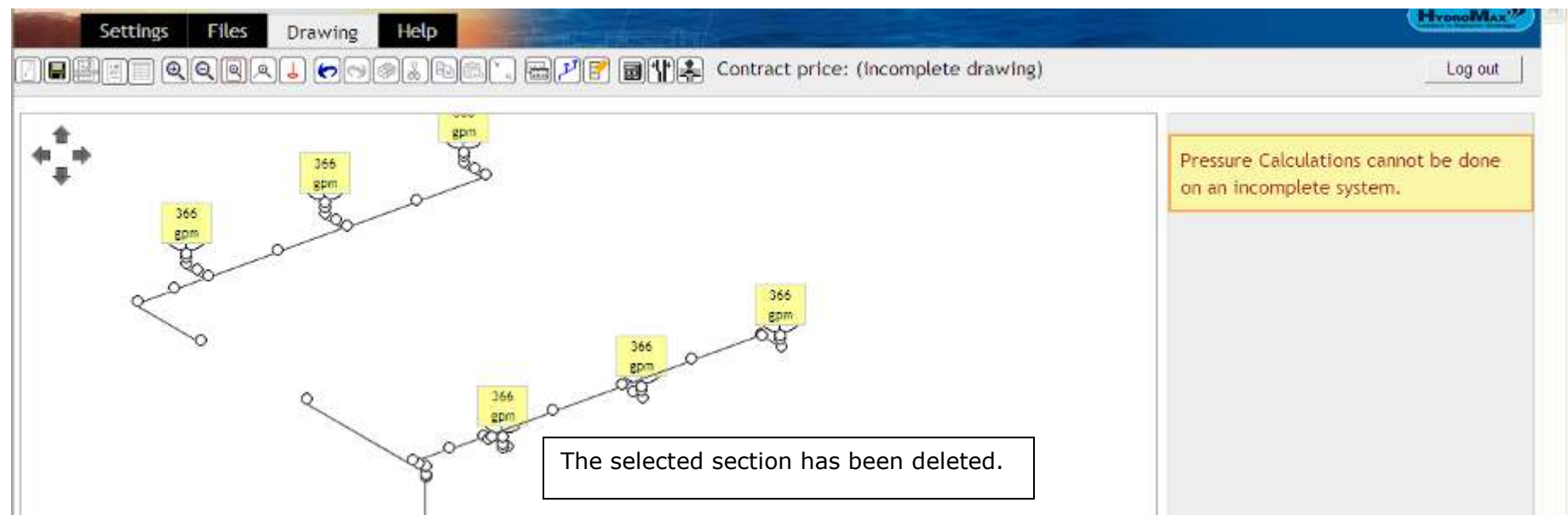
Adding a pipe offset around an obstruction.



The screenshot shows the HydroMax software interface. The top menu bar includes 'Settings', 'Files', 'Drawing', and 'Help'. Below the menu is a toolbar with various icons and a 'Contract price: 0.00' label. The main workspace displays a pipe network with several nodes labeled '366 gpm'. A red arrow points to a specific section of the pipe network. On the right side, a properties panel for 'Downstream Pipe 17' is visible, showing the following details:

Downstream Pipe 17	
Material	CI no-hub
Diameter	8"
Length	33'
Retain Overall Length	<input checked="" type="checkbox"/>
Flow Rate	1098 gpm
Velocity	7.115 ft/sec
Pressure	-12.204 ft
<input type="button" value="Save"/>	

Highlight the section where offset is required by clicking on the pipe. Then select 'Delete the selected pipes' icon.



The screenshot shows the HydroMax software interface after a pipe section has been deleted. The top menu bar and toolbar are the same as in the previous screenshot. The main workspace displays the pipe network with the selected section removed. A text box at the bottom of the workspace contains the text: "The selected section has been deleted." On the right side, a yellow warning message is displayed: "Pressure Calculations cannot be done on an incomplete system." The 'Contract price' is now "(Incomplete drawing)".

Settings Files Drawing Help HydroMax

Contract price: (incomplete drawing) Log out

Click on node to make it active.
 Select pipe material (CI no-hub for this example).
 Select diameter (8" as per section removed)
 Select direction and input length.
 Select 'Add'.

Element Type

Object: Pipe Drain

Material: CI no-hub

Diameter: 8"

Direction

	X	Y	Z
+	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
-	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

Length: 2'

Add

Settings Files Drawing Help Contract price: (incomplete drawing) Log out

The 2' long section of 8" CI no-hub pipe is added.
Now add 5' of + Y then offset 2' back in the +X, -Y direction.

Element Type

Object Pipe Drain

Material CI no-hub

Diameter 8"

Direction

	X	Y	Z
+	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
-	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

Length : 2'

Add

Contract price: (incomplete drawing) Log out

Element Type

Object Pipe Drain

Material CI no-hub

Diameter 8"

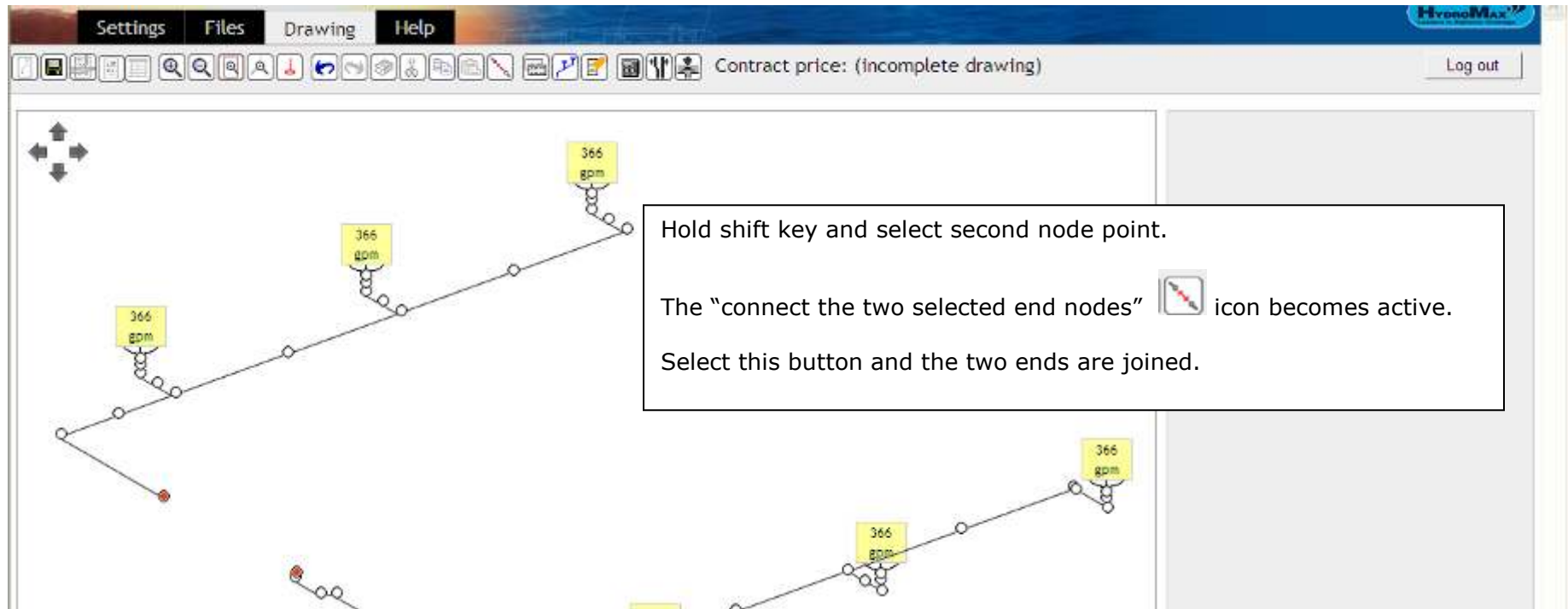
Direction

	X	Y	Z
+	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
0	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
-	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>


Length : 2'


Add

Linking Sections together

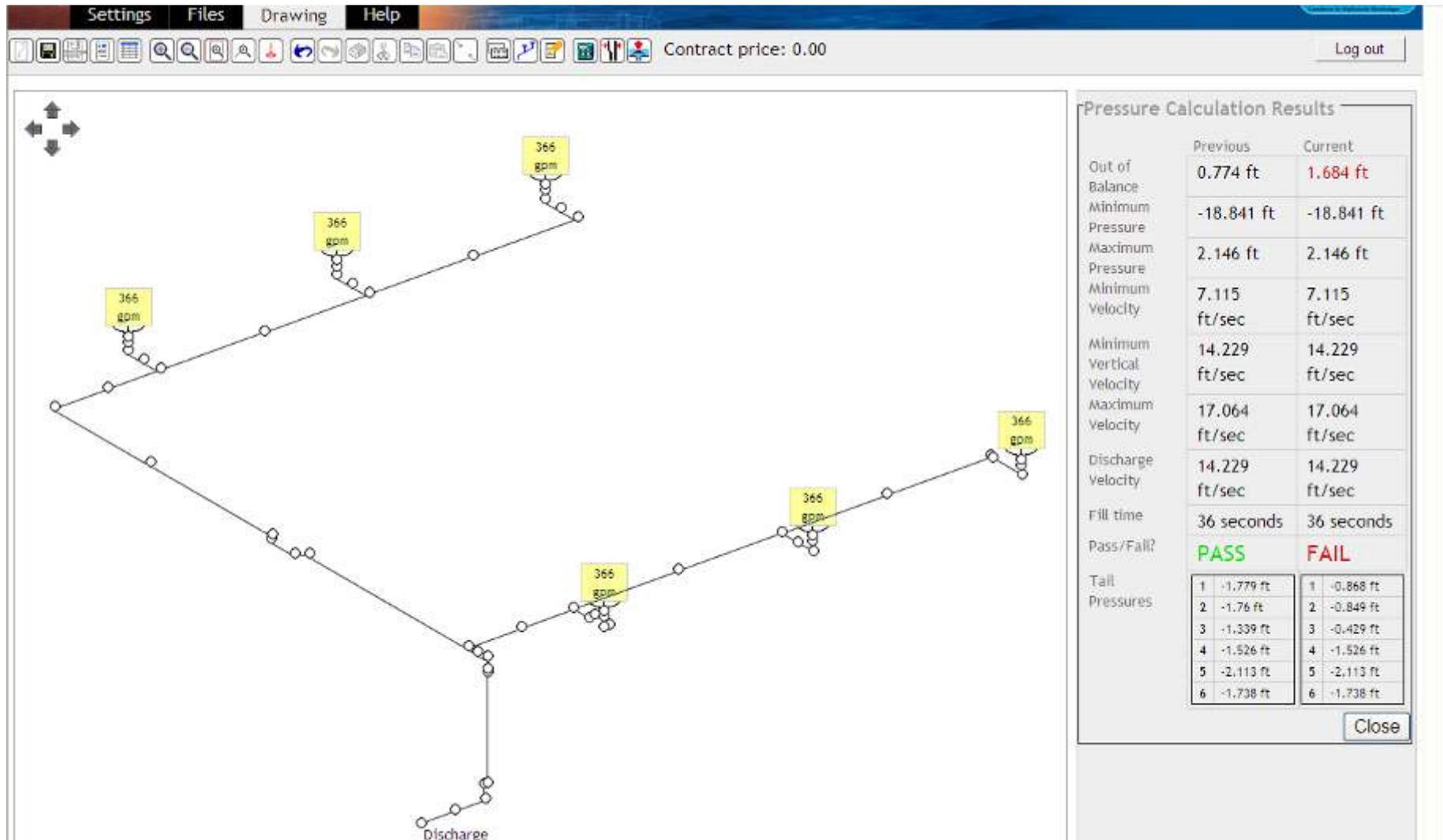


The screenshot shows the HydrMax software interface. The top menu bar includes 'Settings', 'Files', 'Drawing', and 'Help'. Below the menu is a toolbar with various icons. The main workspace displays a hydraulic network diagram with several nodes and pipes. A callout box with a black border contains the following text:

Hold shift key and select second node point.
The "connect the two selected end nodes"  icon becomes active.
Select this button and the two ends are joined.

Once the sections are joined, press calculate  (not First size). The new hydraulic results are now displayed. In this case the result is still a **PASS**.

If a **FAIL** is obtained, you will have to edit the diameters to meet all the hydraulic parameters.



The additional bends create frictional losses which have sent the tail pressures outside of the balance permitted (1.509 ft).

When looking at the two extremes in the tail pressures summary, we can see that tail 3 is closest to zero and tail 5 is farthest.

We need to bring these two pressures closer together and therefore will look at tail 5 first. Click on tabular view than click on tail 5.

Settings Files Drawing Help Contract price: 0.00 Log out

Edit Selection		Show All Elements								
No.	Type	Material	Diameter (Inches)	Length (feet-inches)	Height (feet-inches)	XYZ	Flowrate (gpm)	Velocity (ft/sec)	Headloss (ft)	Pressure (ft)
88	WH-300 with Dome (23 to 415 GPM)	CI no-hub	3				366		0.543	-2.113
87	Pipe	CI no-hub	3	1' 1"	1.1	-Z	366	17.064	0.539	-7.05
86	Pipe	CI no-hub	3	1' 4"	1.4	-Z	366	17.064	0.669	-6.515
85	90° radius bend	CI no-hub	3				366	17.064	1.357	-5.851
84	Pipe	CI no-hub	3	3' 3"		+Y	366	17.064	1.63	-7.208
83	Pipe	CI no-hub	3	3' 3"		-Y	366	17.064	1.63	-8.838
82	45° elbow	CI no-hub	3				366	17.064	1.267	-10.468
81	Branch	CI no-hub	3				366	17.064	3.498	-11.735
68	Pipe	CI no-hub	6	20'		-X	732	8.475	1.036	-11.824
67	Pipe	CI no-hub	6	20'		-X	732	8.475	1.036	-12.86
66	Expansion	CI no-hub	6				732	8.475	0.216	-13.896
65	Junction	CI no-hub	8				732	4.743	-0.063	-13.346
64	Pipe	CI no-hub	8	10'		+X	1098	7.115	0.255	-13.719
63	Pipe	CI no-hub	8	10'		-X	1098	7.115	0.255	-13.974
62	45° elbow	CI no-hub	8				1098	7.115	0.22	-14.229

Pressure Calculation Results

	Previous	Current																								
Out of Balance	0.774 ft	1.684 ft																								
Minimum Pressure	-18.841 ft	-18.841 ft																								
Maximum Pressure	2.146 ft	2.146 ft																								
Minimum Velocity	7.115 ft/sec	7.115 ft/sec																								
Minimum Vertical Velocity	14.229 ft/sec	14.229 ft/sec																								
Maximum Velocity	17.064 ft/sec	17.064 ft/sec																								
Discharge Velocity	14.229 ft/sec	14.229 ft/sec																								
Fill time	36 seconds	36 seconds																								
Pass/Fail?	PASS	FAIL																								
Tail Pressures	<table border="1"> <tr><td>1</td><td>-1.779 ft</td></tr> <tr><td>2</td><td>-1.76 ft</td></tr> <tr><td>3</td><td>-1.339 ft</td></tr> <tr><td>4</td><td>-1.526 ft</td></tr> <tr><td>5</td><td>-2.113 ft</td></tr> <tr><td>6</td><td>-1.738 ft</td></tr> </table>	1	-1.779 ft	2	-1.76 ft	3	-1.339 ft	4	-1.526 ft	5	-2.113 ft	6	-1.738 ft	<table border="1"> <tr><td>1</td><td>-0.868 ft</td></tr> <tr><td>2</td><td>-0.849 ft</td></tr> <tr><td>3</td><td>-0.429 ft</td></tr> <tr><td>4</td><td>-1.526 ft</td></tr> <tr><td>5</td><td>-2.113 ft</td></tr> <tr><td>6</td><td>-1.738 ft</td></tr> </table>	1	-0.868 ft	2	-0.849 ft	3	-0.429 ft	4	-1.526 ft	5	-2.113 ft	6	-1.738 ft
1	-1.779 ft																									
2	-1.76 ft																									
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1	-0.868 ft																									
2	-0.849 ft																									
3	-0.429 ft																									
4	-1.526 ft																									
5	-2.113 ft																									
6	-1.738 ft																									

Close

Tail 5 would need reduced in capacity to bring it closer to zero.

As this tail is using 3" pipe and we already know that 2" pipe puts the velocity too high, we should look at Tail 3 to see if this would be better to edit.

Tail 3 has all 3" and requires a little bit more capacity to bring the tail pressure closer to Tail 5.

We will change the reducing Wye from an 8" by 3" Wye to an 8" by 4" Wye. Change section 53 to 4"

Edit Selection		Show All Elements								
60	Pipe	CI no-hub	3	1' 1"	1 1	-Z	366	17.064	0.539	-7.204
59	Pipe	CI no-hub	3	1' 4"	1 4	+Z	366	17.064	0.669	-6.669
58	90° radius bend	CI no-hub	3				366	17.064	1.357	-6.004
57	Pipe	CI no-hub	3	3' 3"		-Y	366	17.064	1.63	-7.362
56	Pipe	CI no-hub	3	3' 3"		-Y	366	17.064	1.63	-8.992
55	45° elbow	CI no-hub	3				366	17.064	1.267	-10.622
54	Expansion	CI no-hub	3				366	17.064	0.858	-11.888
53	Branch	CI no-hub	4				366	9.631	1.028	-9.664
27	Pipe	CI no-hub	8	10'		+X	1098	7.115	0.255	-10.038
26	Pipe	CI no-hub	8	10'		-X	1098	7.115	0.255	-10.293
25	90° radius bend	CI no-hub	8				1098	7.115	0.236	-10.548
24	Pipe	CI no-hub	8	20'		-Y	1098	7.115	0.51	-10.783
23	Pipe	CI no-hub	8	25' 2"		-Y	1098	7.115	0.642	-11.293
22	45° elbow	CI no-hub	8				1098	7.115	0.22	-11.935
21	Pipe	CI no-hub	8	2'		+X	1098	7.115	0.051	-12.155

Pressure Calculation Results																										
	Previous	Current																								
Out of Balance	1.684 ft	1.804 ft																								
Minimum Pressure	-18.841 ft	-18.841 ft																								
Maximum Pressure	2.146 ft	2.146 ft																								
Minimum Velocity	7.115 ft/sec	7.115 ft/sec																								
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Pass/Fail?	FAIL	FAIL																								
Tail Pressures	<table border="1"> <tr><td>1</td><td>-0.868 ft</td></tr> <tr><td>2</td><td>-0.849 ft</td></tr> <tr><td>3</td><td>-0.429 ft</td></tr> <tr><td>4</td><td>-1.526 ft</td></tr> <tr><td>5</td><td>-2.113 ft</td></tr> <tr><td>6</td><td>-1.738 ft</td></tr> </table>	1	-0.868 ft	2	-0.849 ft	3	-0.429 ft	4	-1.526 ft	5	-2.113 ft	6	-1.738 ft	<table border="1"> <tr><td>1</td><td>-0.482 ft</td></tr> <tr><td>2</td><td>-0.463 ft</td></tr> <tr><td>3</td><td>-2.267 ft</td></tr> <tr><td>4</td><td>-1.526 ft</td></tr> <tr><td>5</td><td>-2.113 ft</td></tr> <tr><td>6</td><td>-1.738 ft</td></tr> </table>	1	-0.482 ft	2	-0.463 ft	3	-2.267 ft	4	-1.526 ft	5	-2.113 ft	6	-1.738 ft
1	-0.868 ft																									
2	-0.849 ft																									
3	-0.429 ft																									
4	-1.526 ft																									
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6	-1.738 ft																									
1	-0.482 ft																									
2	-0.463 ft																									
3	-2.267 ft																									
4	-1.526 ft																									
5	-2.113 ft																									
6	-1.738 ft																									

This has increased the capacity but now tails 1 and 2 have been affected and have both gone closer to zero.

We shall edit both these tails to bring them closer to tail 3.

Click on Tail 2.

Highlight the 3" 45° elbow at section 46 and change to 4".

The screenshot shows a software interface with a menu bar (Settings, Files, Drawing, Help) and a toolbar. Below the toolbar is a table of pipe elements. The table has columns for No., Type, Material, Diameter (inches), Length (feet-inches), Height (feet-inches), XYZ, Flowrate (gpm), Velocity (ft/sec), Headloss (ft), and Pressure (ft). Row 46 is highlighted in red, showing a 45° elbow with a diameter of 3 inches and a pressure of -8.818 ft. To the right of the table is a 'Pressure Calculation Results' panel. This panel has two columns: 'Previous' and 'Current'. It lists various metrics such as 'Out of Balance', 'Minimum Pressure', 'Maximum Pressure', 'Minimum Velocity', 'Minimum Vertical Velocity', 'Maximum Velocity', 'Discharge Velocity', 'Fill time', 'Pass/Fail?', and 'Tail Pressures'. The 'Tail Pressures' section shows a table with 6 rows and 2 columns, with the second row highlighted in yellow, showing a change from -1.326 ft to -0.463 ft. A 'Close' button is located at the bottom right of the panel.

No.	Type	Material	Diameter (inches)	Length (feet-inches)	Height (feet-inches)	XYZ	Flowrate (gpm)	Velocity (ft/sec)	Headloss (ft)	Pressure (ft)
52	WH-300 with Dome (23 to 415 GPM)	CI no-hub	3				366		0.543	-0.463
51	Pipe	CI no-hub	3	1' 1"	1.1	-Z	366	17.064	0.539	-5.4
50	Pipe	CI no-hub	3	1' 4"	1.4	-Z	366	17.064	0.669	-4.865
49	90° radius bend	CI no-hub	3				366	17.064	1.357	-4.2
48	Pipe	CI no-hub	3	3' 3"		-Y	366	17.064	1.63	-5.557
47	Pipe	CI no-hub	3	3' 3"		-Y	366	17.064	1.63	-7.187
46	45° elbow	CI no-hub	3				366	17.064	1.267	-8.818
45	Expansion	CI no-hub	3				366	17.064	0.858	-10.084
44	Branch	CI no-hub	4				366	9.631	0.608	-7.86
31	Pipe	CI no-hub	6	20'		-X	732	8.475	1.036	-8.142
30	Pipe	CI no-hub	6	20'		-X	732	8.475	1.036	-9.178
29	Expansion	CI no-hub	6				732	8.475	0.216	-10.214
28	Junction	CI no-hub	8				732	4.743	-0.063	-9.664
27	Pipe	CI no-hub	8	10'		+X	1098	7.115	0.255	-10.038

	Previous	Current																								
Out of Balance	1.785 ft	1.804 ft																								
Minimum Pressure	-18.841 ft	-18.841 ft																								
Maximum Pressure	2.146 ft	2.146 ft																								
Minimum Velocity	7.115 ft/sec	7.115 ft/sec																								
Minimum Vertical Velocity	14.229 ft/sec	14.229 ft/sec																								
Maximum Velocity	17.064 ft/sec	17.064 ft/sec																								
Discharge Velocity	14.229 ft/sec	14.229 ft/sec																								
Fill time	35 seconds	36 seconds																								
Pass/Fail?	FAIL	FAIL																								
Tail Pressures	<table border="1"> <tr><td>1</td><td>-0.482 ft</td></tr> <tr style="background-color: #fff3cd;"><td>2</td><td>-1.326 ft</td></tr> <tr><td>3</td><td>-2.267 ft</td></tr> <tr><td>4</td><td>-1.526 ft</td></tr> <tr><td>5</td><td>-2.113 ft</td></tr> <tr><td>6</td><td>-1.738 ft</td></tr> </table>	1	-0.482 ft	2	-1.326 ft	3	-2.267 ft	4	-1.526 ft	5	-2.113 ft	6	-1.738 ft	<table border="1"> <tr><td>1</td><td>-0.482 ft</td></tr> <tr style="background-color: #fff3cd;"><td>2</td><td>-0.463 ft</td></tr> <tr><td>3</td><td>-2.267 ft</td></tr> <tr><td>4</td><td>-1.526 ft</td></tr> <tr><td>5</td><td>-2.113 ft</td></tr> <tr><td>6</td><td>-1.738 ft</td></tr> </table>	1	-0.482 ft	2	-0.463 ft	3	-2.267 ft	4	-1.526 ft	5	-2.113 ft	6	-1.738 ft
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This results in tail 2 being within the permitted balance.

Edit Selection		Show All Elements							
46	Expansion	CI no-hub	3			366	17.064	0.858	-9.681
45	45° elbow	CI no-hub	4			366	9.631	0.403	-7.456
44	Branch	CI no-hub	4			366	9.631	0.608	-7.86
31	Pipe	CI no-hub	6	20'	-X	732	8.475	1.036	-8.142
30	Pipe	CI no-hub	6	20'	-X	732	8.475	1.036	-9.178
29	Expansion	CI no-hub	6			732	8.475	0.216	-10.214
28	Junction	CI no-hub	8			732	4.743	-0.063	-9.664
27	Pipe	CI no-hub	8	10'	-X	1098	7.115	0.255	-10.038
26	Pipe	CI no-hub	8	10'	-X	1098	7.115	0.255	-10.293
25	90° radius bend	CI no-hub	8			1098	7.115	0.236	-10.548
24	Pipe	CI no-hub	8	20'	-Y	1098	7.115	0.51	-10.783
23	Pipe	CI no-hub	8	25' 2"	-Y	1098	7.115	0.642	-11.293
22	45° elbow	CI no-hub	8			1098	7.115	0.22	-11.935
21	Pipe	CI no-hub	8	2'	+X - Y	1098	7.115	0.051	-12.155
20	45° elbow	CI no-	8			1098	7.115	0.22	-12.206

Pressure Calculation Results																										
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We now need to edit tail 1 to bring this within the set parameter.

Click on tail 1 and select section 34 to edit. Change diameter to 6"

This results in a **PASS** with all parameters being met and the system is within the permitted 1.509 feet out of balance.

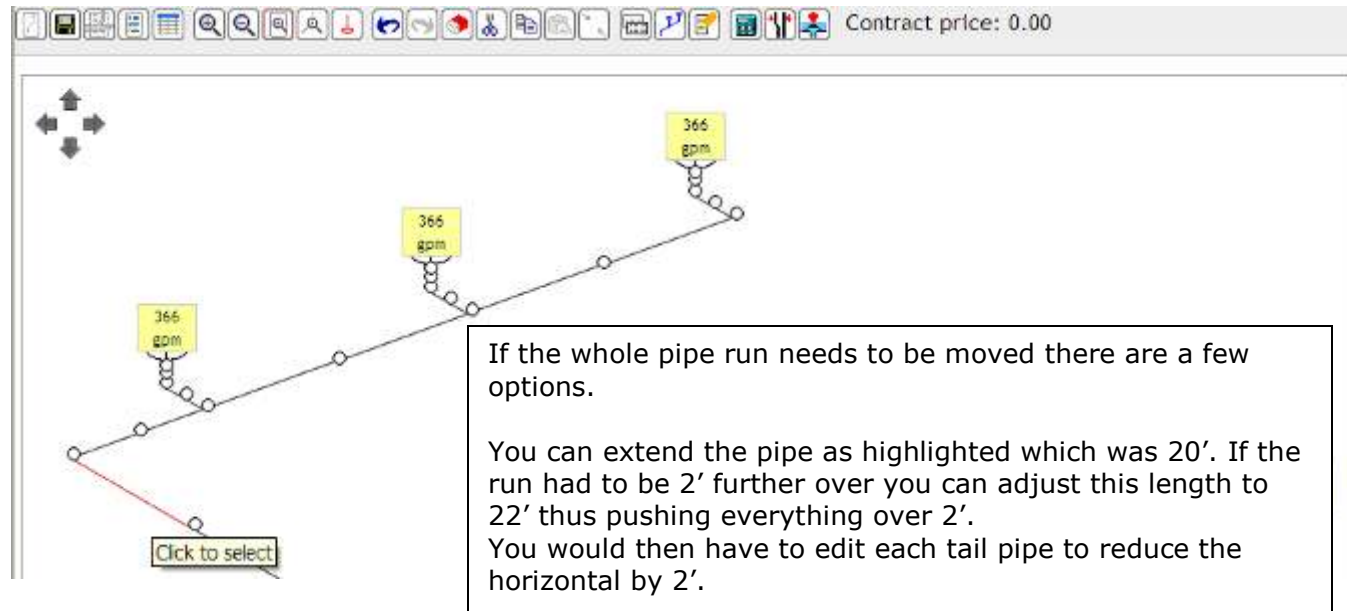
The screenshot displays a software interface with a menu bar (Settings, Files, Drawing, Help) and a toolbar. The main window shows a table of pipe elements and a 'Pressure Calculation Results' panel on the right.

No.	Type	Material	Diameter (Inches)	Length (feet-Inches)	Height (feet-Inches)	XYZ	Flowrate (gpm)	Velocity (ft/sec)	Headloss (ft)	Pressure (ft)
43	WH-300 with Dome (23 to 415 GPM)	CI no-hub	3				366		0.543	-2.458
42	Pipe	CI no-hub	3	1' 1"	1 1	+Z	366	17.064	0.539	-7.395
41	Pipe	CI no-hub	3	1' 4"	1 4	+Z	366	17.064	0.669	-6.86
40	Expansion	CI no-hub	3				366	17.064	0.858	-6.195
39	90° radius bend	CI no-hub	4				366	9.631	0.432	-3.971
38	Pipe	CI no-hub	4	3' 3"		-Y	366	9.631	0.364	-4.403
37	Pipe	CI no-hub	4	3' 3"		-Y	366	9.631	0.364	-4.768
36	90° radius bend	CI no-hub	4				366	9.631	0.432	-5.132
35	Pipe	CI no-hub	4	20'		-X	366	9.631	2.242	-5.564
34	Expansion	CI no-hub	4				366	9.631	0.452	-7.807
33	Pipe	CI no-hub	6	20'		-X	366	4.237	0.266	-7.097
32	Junction	CI no-hub	6				366	4.237	-0.057	-7.363
31	Pipe	CI no-hub	6	20'		-X	732	8.475	1.036	-8.142
30	Pipe	CI no-hub	6	20'		-X	732	8.475	1.036	-9.178
29	Expansion	CI no-hub	6				732	8.475	0.216	-10.214
28	Junction	CI no-hub	8				732	4.743	-0.063	-9.664
27	Pipe	CI no-hub	8	10'		+X	1098	7.115	0.255	-10.038

	Previous	Current																								
Out of Balance	1.785 ft	1.132 ft																								
Minimum Pressure	-18.841 ft	-18.841 ft																								
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Close

Offsetting a Complete Pipe Run



Contract price: 0.00 Log out

Downstream Pipe 18

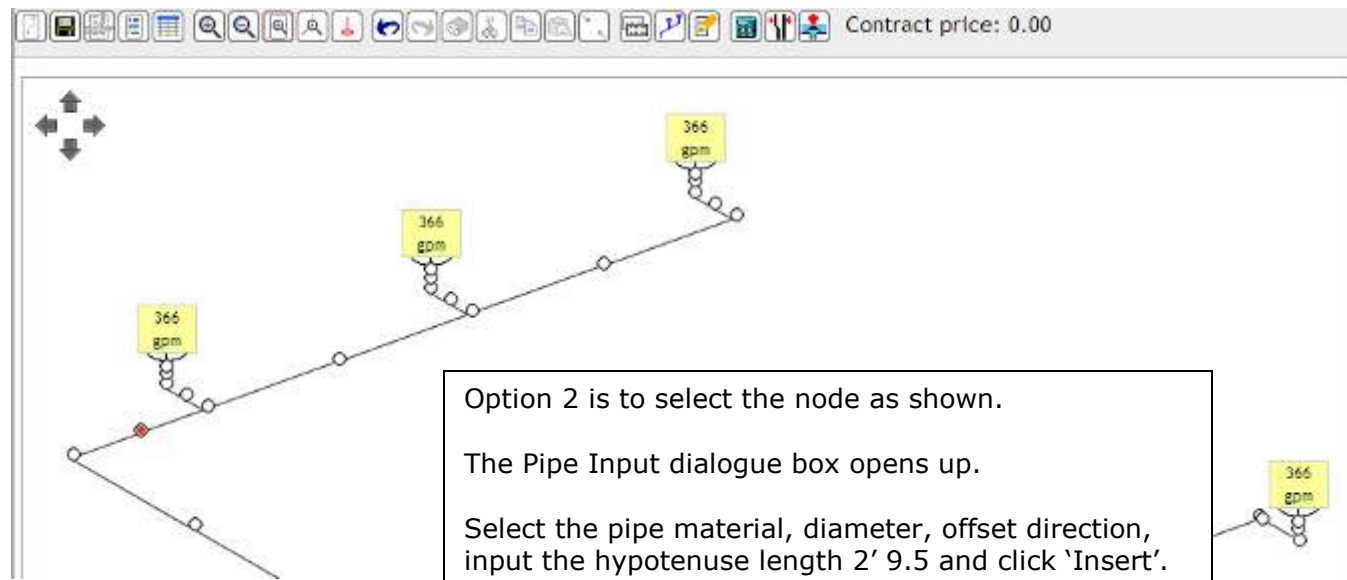
Material	CI no-hub
Diameter	8"
Length	20'
Retain	<input checked="" type="checkbox"/>
Overall Length	
Flow Rate	1098 gpm
Velocity	7.115 ft/sec
Pressure	-10.783 ft

Save

If the whole pipe run needs to be moved there are a few options.

You can extend the pipe as highlighted which was 20'. If the run had to be 2' further over you can adjust this length to 22' thus pushing everything over 2'. You would then have to edit each tail pipe to reduce the horizontal by 2'.

Alternative Offset



Contract price: 0.00 Log out

Element Type

Object	Pipe <input checked="" type="radio"/> Drain <input type="radio"/>
Material	CI no-hub
Diameter	8"

Direction

	X	Y	Z
+	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
0	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
-	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

Length : 2' 9.5

Insert Add

Option 2 is to select the node as shown.

The Pipe Input dialogue box opens up.

Select the pipe material, diameter, offset direction, input the hypotenuse length 2' 9.5 and click 'Insert'.

Contract price: 0.00 Log out

The offset is input. You now need to adjust the tail-pipe length. The tail pipe horizontal section was 3' 3". We have offset 2' so click on the tail pipe section and change length to 1' 3".

IMPORTANT: You must uncheck the "Retain Overall Length" to make the adjustment.

Downstream Pipe 1580

Material: CI no-hub

Diameter: 3"

Length: 1' 3"

Retain Overall Length:

Flow Rate: 366 gpm

Velocity: 17.064 ft/sec

Pressure: -7.154 ft

Save

After the tail lengths are adjusted you need to press calculate

Again, we have a **PASS**.

If a **FAIL** is obtained, you will have to edit the diameters to meet all the hydraulic parameters.


Pressure Calculation Results

	Previous	Current																								
Out of Balance	1.132 ft	1.233 ft																								
Minimum Pressure	-18.841 ft	-18.841 ft																								
Maximum Pressure	2.146 ft	2.146 ft																								
Minimum Velocity	4.237 ft/sec	4.237 ft/sec																								
Minimum Vertical Velocity	14.229 ft/sec	14.229 ft/sec																								
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6	-1.738 ft																									

Flow Balancing

Many designs are completed with assigned flows and the heads at the roof drains are allowed to be out of balance within an allowable range. In a completely Flat roof or Level Gutter this will not occur, the flows will adjust themselves so that the out of balance head at each roof drains is zero.

Clicking this button will adjust the flows until the heads at each roof drains are as close to zero as possible, if this is not achieved first time the button is clicked repeated clicking may produce better results. Once the flow balance is complete the implications of the required flow re-distribution can then be evaluated by the user to see if they are realistically possible. Pressures in the pipework will also be recalculated and for systems that are close to the design limit this may highlight the risk of unacceptable negative pressures.

After this check the regularly assigned design flow condition can be restored using the undo button if desired. 

Drain Selection

For drain selection in the North American market, the Cast Iron WADE-HydroMax® drains are the available options.

There are 4 drain sizes available – 3", 4", 5" and 6". All sizes are available as Primary or Overflow Roof Drains.

The 3" and 4" Drains are also available as Deck Drains.

Resistance 'K' Factors and Recommended Flows are as follows:

C.I. No-Hub Outlet	K factor	Minimum GPM Inflow	Maximum GPM Inflow
3"	0.12	23	415
4"	0.08	75	750
5"	0.04	120	1300
6"	0.04	160	180

The following accessories are available for each drain:

- Leafguard
- Debris Guard
- Underdeck Clamps
- Bearing Pans

Bespoke accessories can be made to order such as gravel guards, etc.

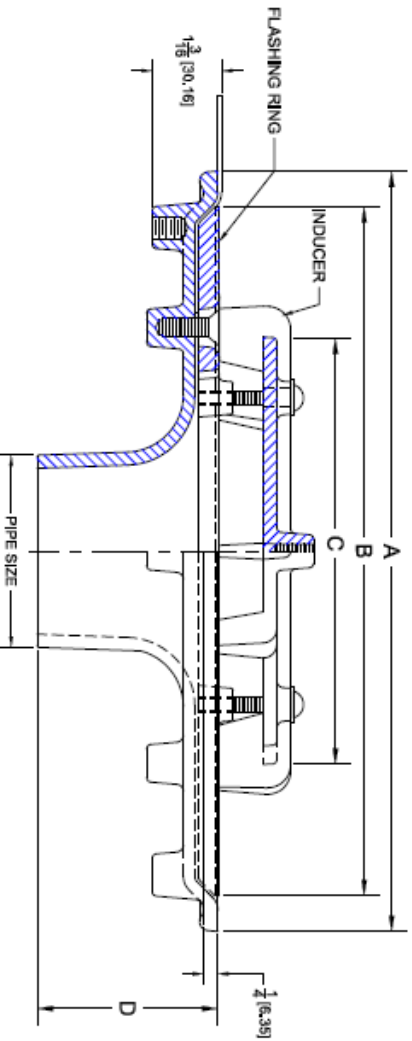
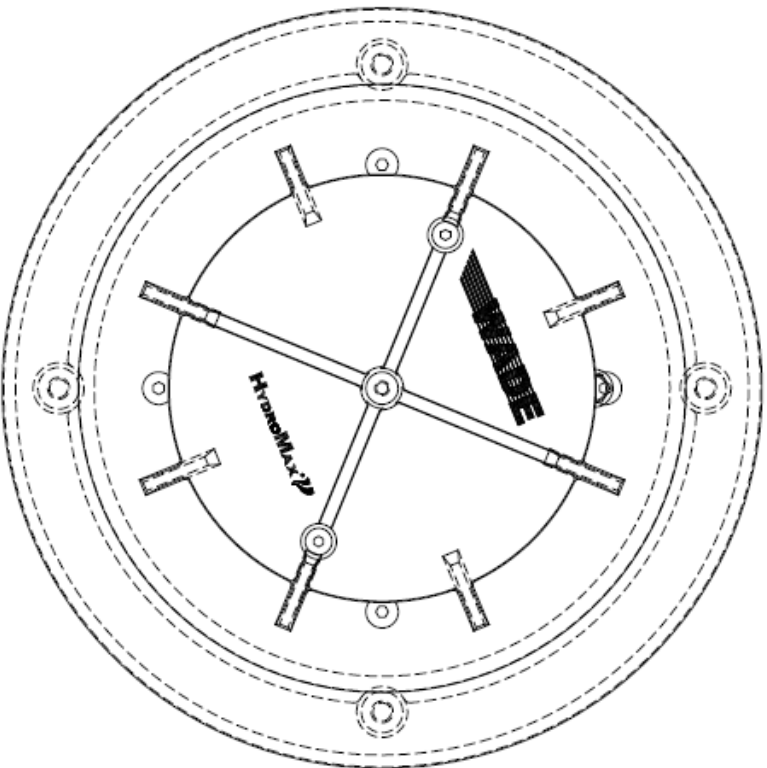
SIPHONIC ROOF DRAIN



HydroMax[®]

WH-300, WH-400, WH-500, WH-600

FOR USE IN ENGINEERED SIPHONIC ROOF DRAINAGE SYSTEMS, FURNISHED STANDARD WITH EPOXY COATED CAST IRON BODY, MEMBRANE CLAMP DEVICE AND AIR BAFFLE / INDUCER, 304 STAINLESS STEEL HARDWARE AND NO-HUB BOTTOM OUTLET



CATALOG NUMBER	PIPE SIZE	A	B	C	D
WH-300	3 (75)	13 (330)	11-3/4 (299)	7-1/4 (188)	3-1/8 (79)
WH-400	4 (100)	19-3/8 (492)	17-7/8 (453)	10-5/8 (271)	3-1/2 (90)
WH-500	5 (125)	19-3/8 (492)	17-7/8 (453)	12-1/4 (310)	4-3/8 (110)
WH-600	6 (150)	25-1/4 (640)	22-1/4 (566)	15-1/2 (395)	4-3/4 (120)

OPTIONS

LEAF/GRAVEL GUARD	UNDERDECK CLAMP	BEARING PAN	DEBRIS GUARD
<input checked="" type="checkbox"/> WH-302	<input checked="" type="checkbox"/> WH-303	<input checked="" type="checkbox"/> WH-304	<input checked="" type="checkbox"/> WH-306
<input checked="" type="checkbox"/> WH-402	<input checked="" type="checkbox"/> WH-403	<input checked="" type="checkbox"/> WH-404	<input checked="" type="checkbox"/> WH-406
<input checked="" type="checkbox"/> WH-502	<input checked="" type="checkbox"/> WH-503	<input checked="" type="checkbox"/> WH-504	<input checked="" type="checkbox"/> WH-506
<input checked="" type="checkbox"/> WH-602	<input checked="" type="checkbox"/> WH-603	<input checked="" type="checkbox"/> WH-604	<input checked="" type="checkbox"/> WH-606

AutoCaddmg

Job Name	Job Location	Customer Approval	Approval Date
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Dimensional Data (Inches/mm) are Subject to Manufacturers Tolerance and Change Without Notice.

Wade Division / Tyler Pipe Assumes No Responsibility For Superseded or Voided Data

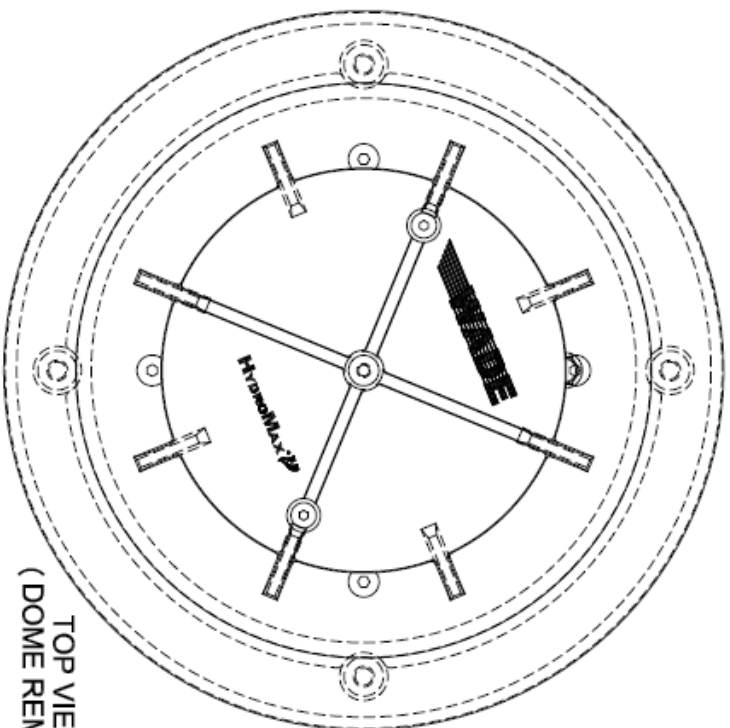
6-21-07 Tyler Pipe / Wade Division * P.O. Box 2027 * Tyler, TX 75710-2027 * (903) 882-5511 * FAX (889) 879-9233 WH1-A

SIPHONIC ROOF DRAIN

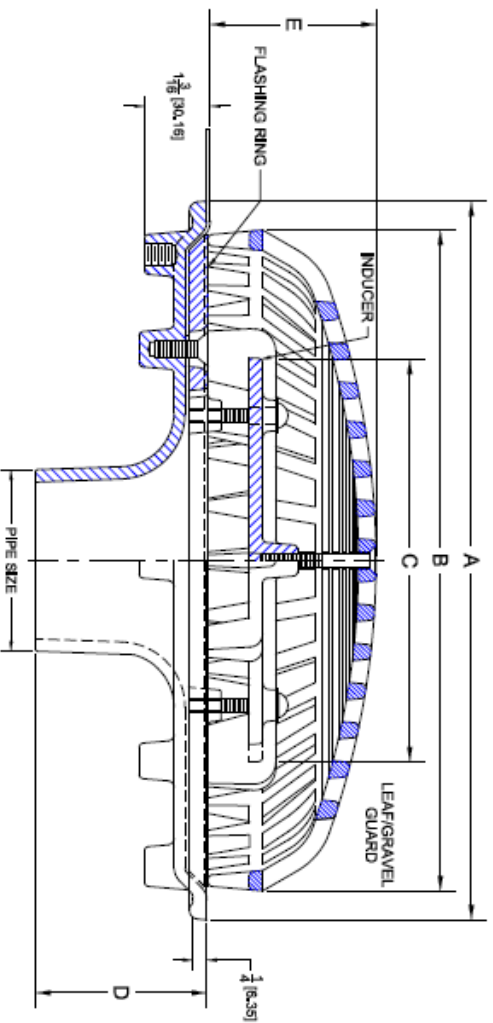


HydroMax[®]

WH-300, WH-400, WH-500, WH-600 W/ WH-__02 DOME
 FOR USE IN ENGINEERED SIPHONIC ROOF DRAINAGE SYSTEMS. FURNISHED STANDARD WITH EPOXY COATED CAST IRON BODY, MEMBRANE CLAMP DEVICE AND AIR BAFFLE / INDUCER, 304 STAINLESS STEEL HARDWARE, MUSHROOM DOME AND 3" NO-HUB BOTTOM OUTLET



TOP VIEW
(DOME REMOVED)



CATALOG NUMBER	LEAF/RAVEL GUARD	PIPE SIZE	A	B	C	D	E
WH-300	WH-302	3 (75)	13 (330)	11-3/4 (299)	7-1/4 (185)	3-1/8 (79)	3 (77)
WH-400	WH-402	4 (100)	19-3/8 (492)	17-7/8 (453)	10-5/8 (271)	3-1/2 (90)	3-15/16 (100)
WH-500	WH-502	5 (125)	19-3/8 (492)	17-7/8 (453)	12-1/4 (310)	4-3/8 (110)	3-15/16 (100)
WH-600	WH-602	6 (150)	25-1/4 (640)	22-1/4 (566)	15-1/2 (395)	4-3/4 (120)	4-3/4 (120)

OPTIONS

UNDERDECK CLAMP	BEARING PANN
<input checked="" type="checkbox"/> WH-303	<input checked="" type="checkbox"/> WH-304
<input checked="" type="checkbox"/> WH-403	<input checked="" type="checkbox"/> WH-404
<input checked="" type="checkbox"/> WH-503	<input checked="" type="checkbox"/> WH-504
<input checked="" type="checkbox"/> WH-603	<input checked="" type="checkbox"/> WH-604

AutoCad.dwg

Approval Date

Customer Approval

Job Location

Job Name

Wade Division / Tyler Pipe Assumes No Responsibility For Superseded or Voided Data

Dimensional Data (Inches/mm) are Subject to Manufacturers Tolerance and Change Without Notice.

6-21-07

Tyler Pipe / Wade Division * P.O. Box 2027 * Tyler, TX 75710-2027 * (903) 882-5511 * FAX (889) 879-9233 WH11-B

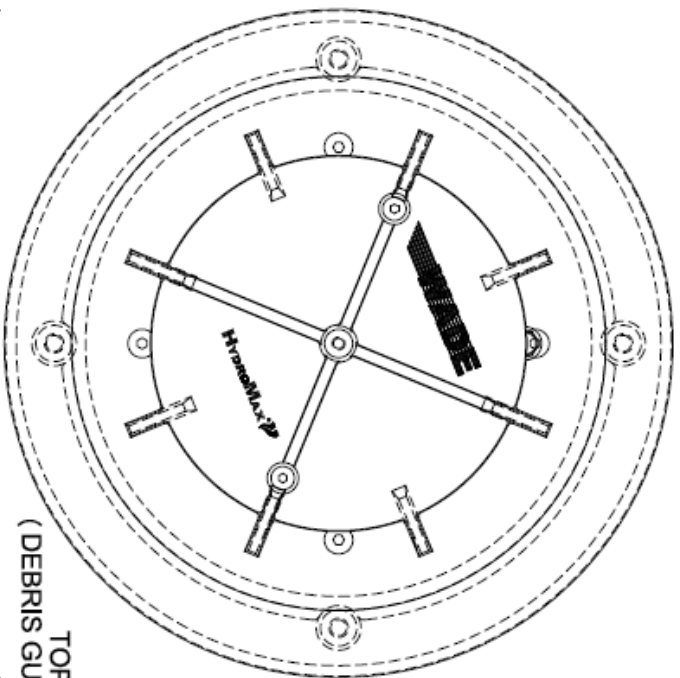
SIPHONIC ROOF DRAIN



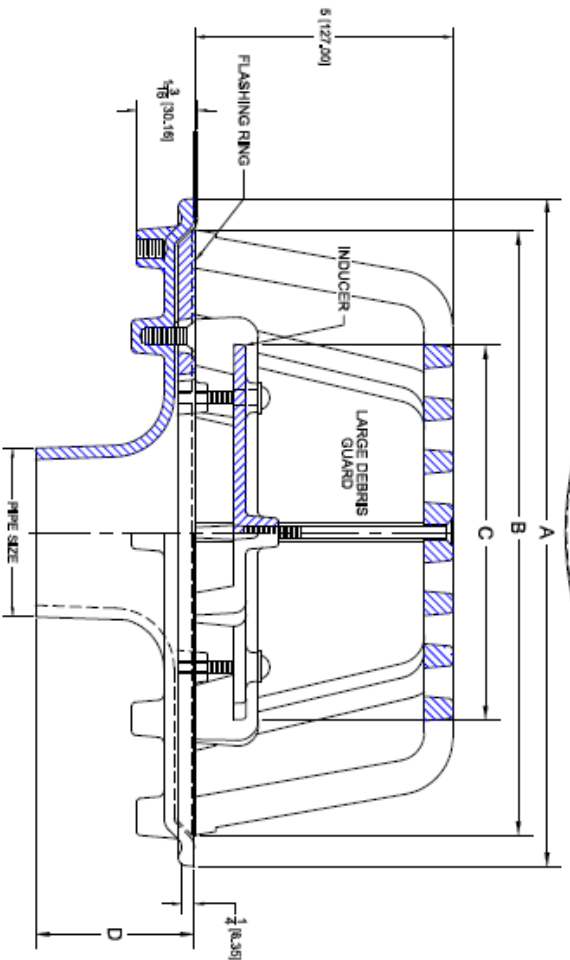
WH-300, WH-400, WH-500, WH-600 W/ WH-__06 DOME

HydroMax

FOR USE IN ENGINEERED SIPHONIC ROOF DRAINAGE SYSTEMS, FURNISHED STANDARD WITH EPOXY COATED CAST IRON BODY, MEMBRANE CLAMP DEVICE AND AIR BAFFLE / INDUCER, 304 STAINLESS STEEL HARDWARE, MUSHROOM DOME AND 3" NO-HUB BOTTOM OUTLET



TOP VIEW
(DEBRIS GUARD REMOVED)



CATALOG NUMBER	LEAF/GRAVEL GUARD	PIPE SIZE	A	B	C	D	E
WH-300	WH-306	3 (75)	13 (330)	14-3/4 (298)	7-1/4 (185)	3-1/8 (78)	3 (77)
WH-400	WH-406	4 (100)	18-3/8 (462)	17-7/8 (453)	10-5/8 (271)	3-1/2 (90)	3-15/16 (100)
WH-500	WH-506	5 (125)	19-3/8 (492)	17-7/8 (453)	12-1/4 (310)	4-3/8 (110)	3-15/16 (100)
WH-600	WH-606	6 (150)	25-1/4 (640)	22-1/4 (566)	15-1/2 (395)	4-3/4 (120)	4-3/4 (120)

OPTIONS	
<input checked="" type="checkbox"/> UNDERDECK CLAMP	<input checked="" type="checkbox"/> BEARING PAN
WH-303	WH-304
WH-403	WH-404
WH-503	WH-504
WH-603	WH-604

Job Name	Job Location	Customer Approval	Approval Date
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Dimensional Data (Inches/mm) are Subject to Manufacturers Tolerance and Change Without Notice. Wade Division / Tyler Pipe Assumes No Responsibility For Superseded or Voided Data

6-21-07 Tyler Pipe / Wade Division * P.O. Box 2027 * Tyler, TX 75710-2027 * (903) 882-5511 * FAX (888) 879-9233 WH1-C

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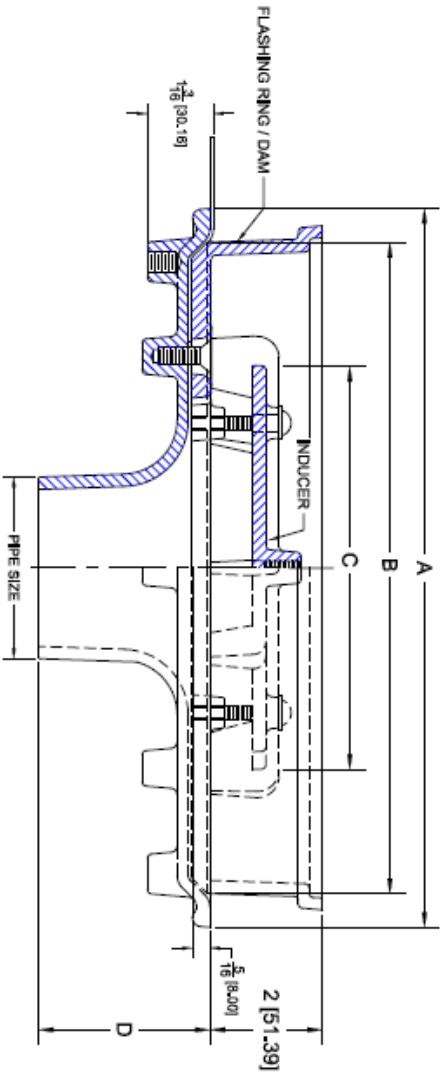
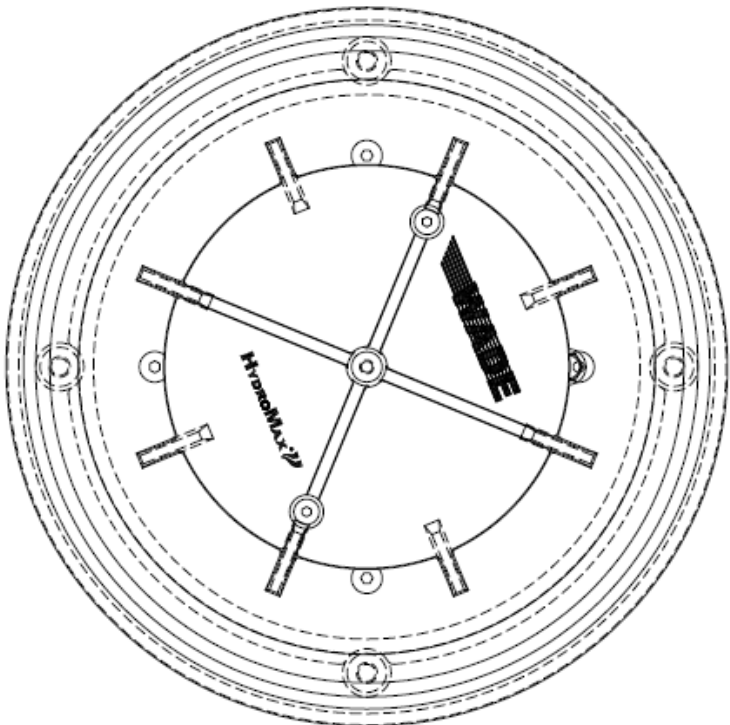
SIPHONIC ROOF DRAIN



WH-301, WH-401, WH-501, WH-601 (OVERFLOW)

HydroMax[®]

FOR USE IN ENGINEERED SIPHONIC ROOF DRAINAGE SYSTEMS, FURNISHED STANDARD WITH EPOXY COATED CAST IRON BODY, MEMBRANE CLAMP DEVICE INTEGRAL WITH DAM AND AIR BAFFLE / INDUCER STAINLESS STEEL HARDWARE AND NO-HUB BOTTOM OUTLET



CATALOG NUMBER	PIPE SIZE	A	B	C	D
WH-301	3 (75)	13 (330)	11-3/4 (299)	7-1/4 (188)	3-1/8 (79)
WH-401	4 (100)	18-3/8 (482)	17-7/8 (453)	10-5/8 (271)	3-1/2 (90)
WH-501	5 (125)	18-3/8 (482)	17-7/8 (453)	12-1/4 (310)	4-3/8 (110)
WH-601	6 (150)	25-1/4 (640)	22-1/4 (569)	15-1/2 (395)	4-3/4 (120)

OPTIONS

<input checked="" type="checkbox"/> LEAF/RAVEL GUARD	<input checked="" type="checkbox"/> UNDERDECK CLAMP	<input checked="" type="checkbox"/> BEARING PAN	<input checked="" type="checkbox"/> DEBRIS GUARD
WH-402	WH-303	WH-304	WH-306
WH-502	WH-403	WH-404	WH-406
WH-602	WH-503	WH-504	WH-506
	WH-603	WH-604	WH-606

Job Name	Job Location	Customer Approval	Approval Date
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Dimensional Data (Inches/mm) are Subject to Manufacturers Tolerance and Change Without Notice. Wade Division / Tyler Pipe Assumes No Responsibility For Superseded or Voided Data

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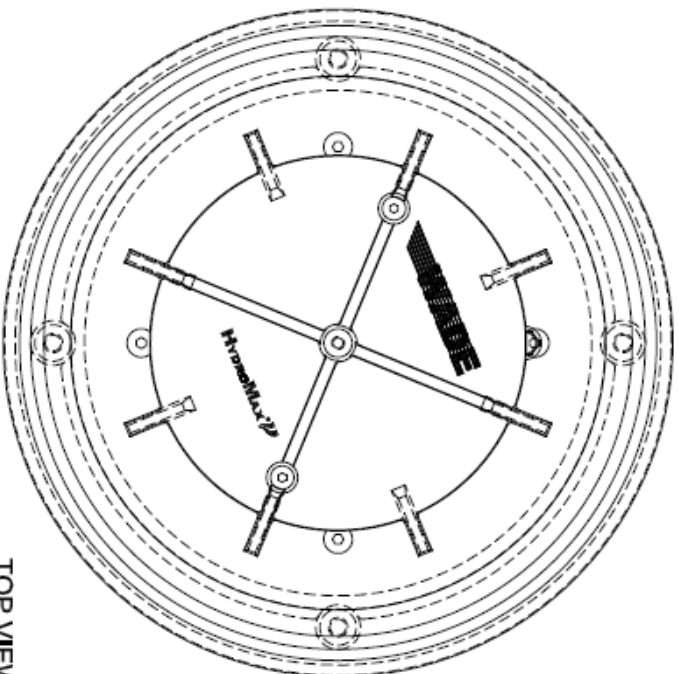
SIPHONIC ROOF DRAIN



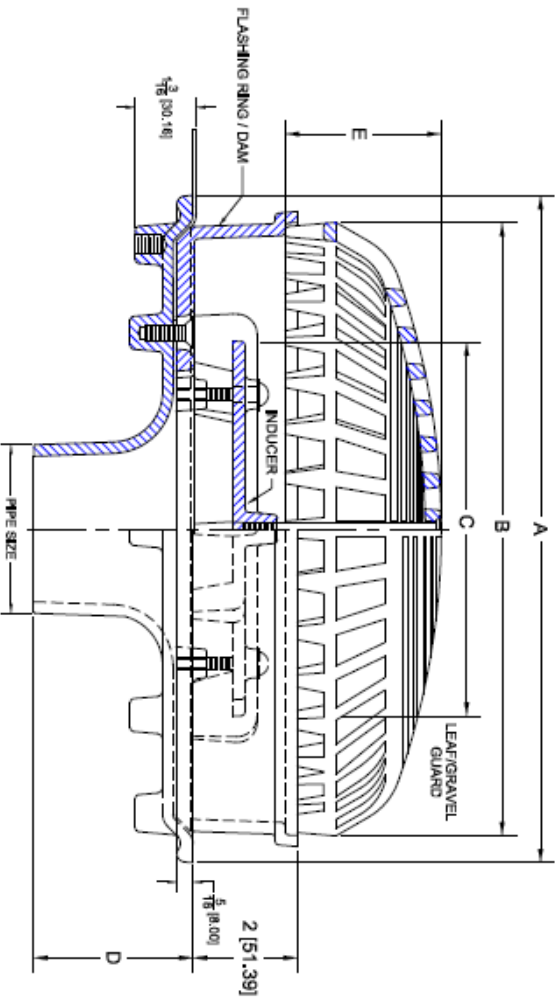
WH-301, WH-401, WH-501, WH-601 (OVERFLOW)

HydroMax[®]

FOR USE IN ENGINEERED SIPHONIC ROOF DRAINAGE SYSTEMS, FURNISHED STANDARD WITH EPOXY COATED CAST IRON BODY, MEMBRANE CLAMP DEVICE INTEGRAL WITH DAM AND AIR BAFFLE / INDUCER STAINLESS STEEL HARDWARE AND NO-HUB BOTTOM OUTLET



TOP VIEW
(DOME REMOVED)



✓ CATALOG NUMBER	LEAF GAURD	PIPE SIZE	A	B	C	D	E
✓ WH-301	WH-302	3 (77)	13 (330)	11-3/4 (299)	7-1/4 (188)	3-1/8 (79)	3 (77)
✓ WH-401	WH-402	4 (102)	19-3/8 (492)	17-7/8 (453)	10-5/8 (271)	3-1/2 (90)	3-15/16 (100)
✓ WH-501	WH-502	5 (128)	19-3/8 (492)	17-7/8 (453)	12-1/4 (310)	4-3/8 (110)	3-15/16 (100)
✓ WH-601	WH-602	6 (150)	25-1/4 (640)	22-1/4 (569)	15-1/2 (395)	4-3/4 (120)	4-3/4 (120)

OPTIONS

✓ UNDERDECK CLAMP	✓ BEARING PAN
WH-403	WH-304
WH-403	WH-404
WH-403	WH-604

Job Name	Job Location	Customer Approval	Approval Date
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Dimensional Data (Inches/mm) are Subject to Manufacturers Tolerance and Change Without Notice. Wade Division / Tyler Pipe Assumes No Responsibility For Superseded or Voided Data

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AutoCAD.dwg

WADE-HYDROMAX® Flow Performance WH-600 (Primary Roof Drain) & WH-601 (Overflow Roof Drain)

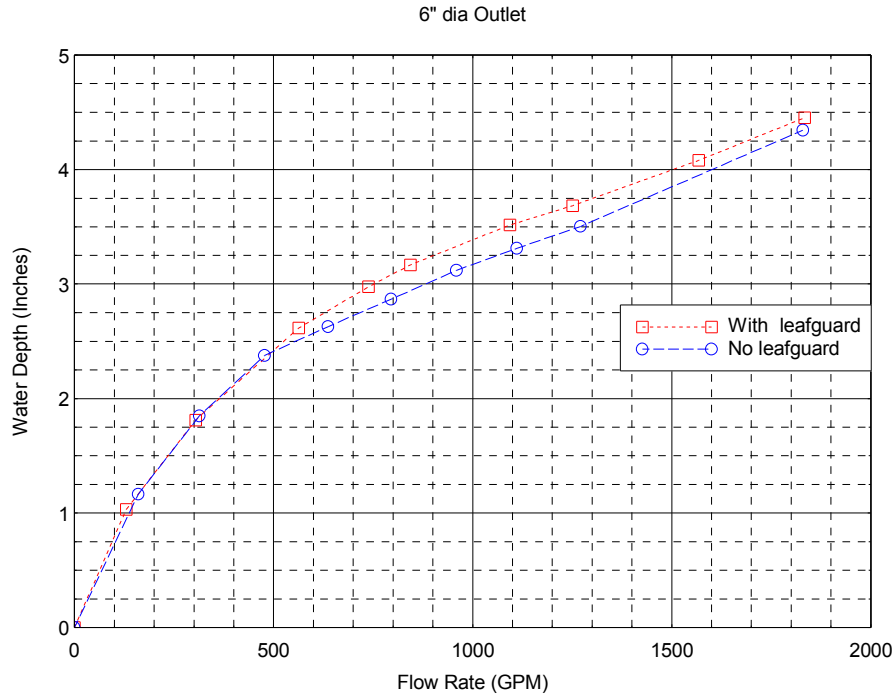


Figure 6.1 - Rating curve (GPM format)

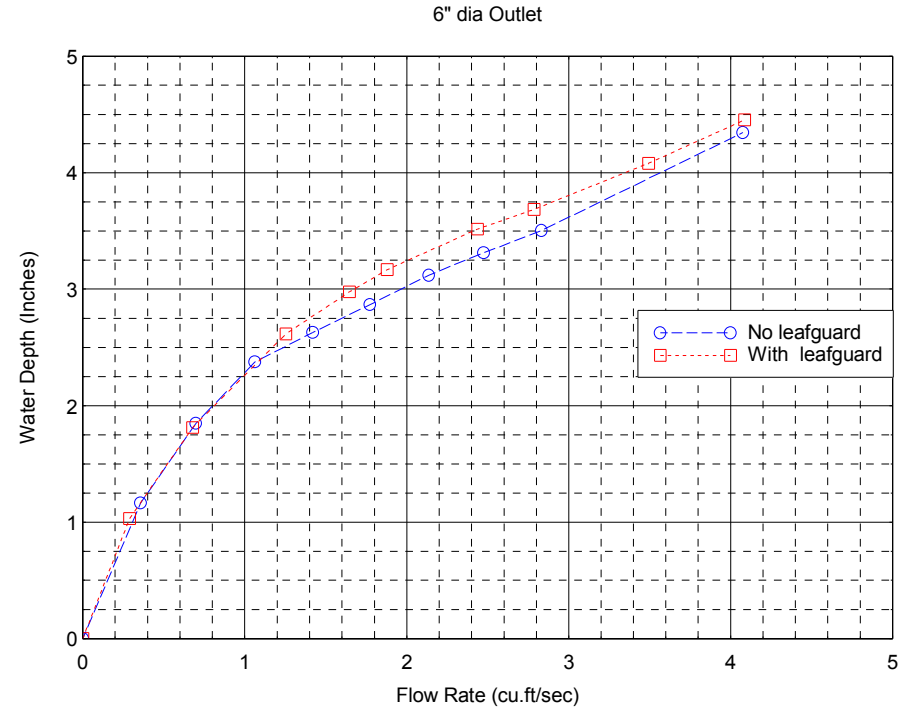


Figure 6.2 - Rating curve (ft³/s format)

WADE-HYDROMAX® Flow Performance WH-500 (Primary Roof Drain) & WH-501 (Overflow Roof Drain)

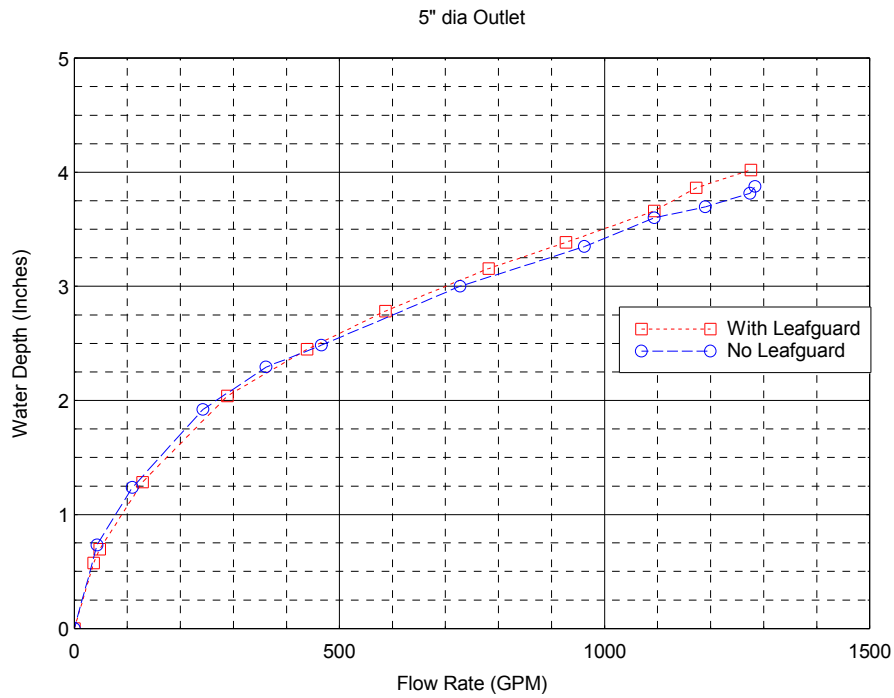


Figure 5.1 - Rating curve (GPM format)

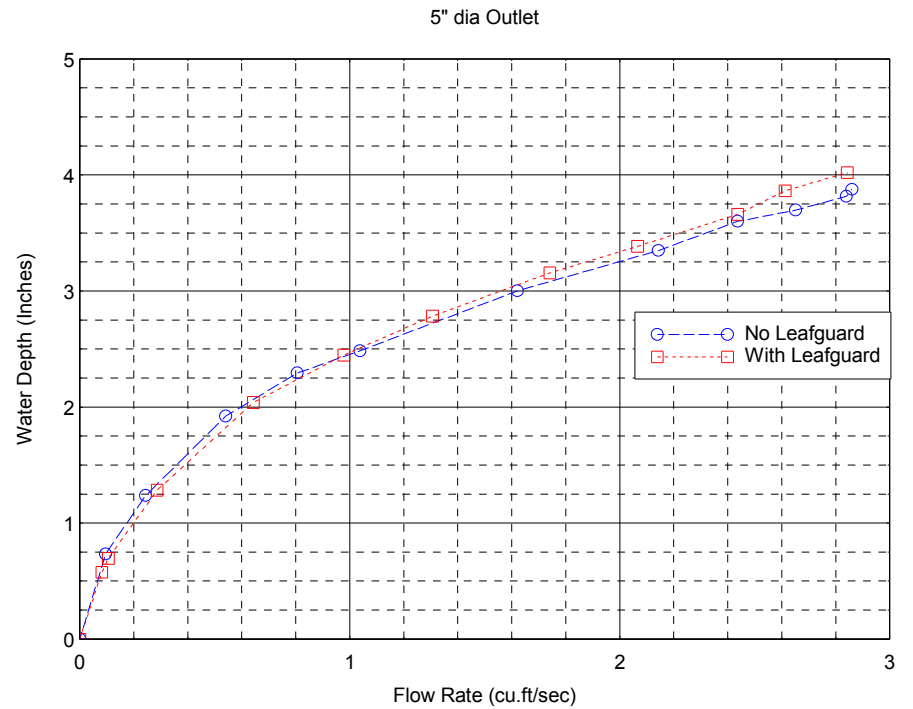


Figure 5.2 - Rating curve (ft³/s format)

WADE-HYDROMAX® Flow Performance

WH-400 (Primary Roof Drain) & WH-401 (Overflow Roof Drain)

4" dia outlet

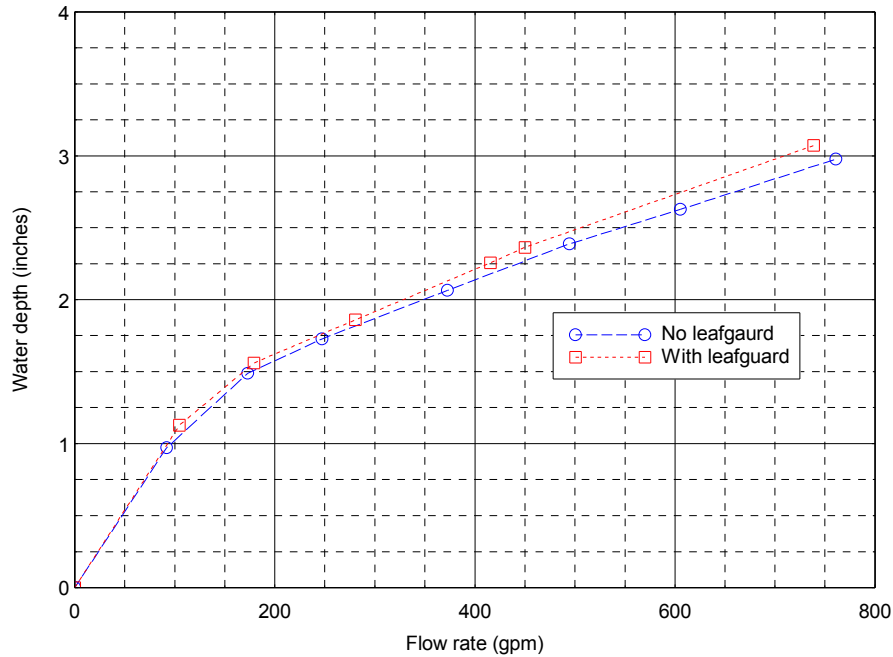


Figure 4.1 - Rating curve (GPM format)

4" dia outlet

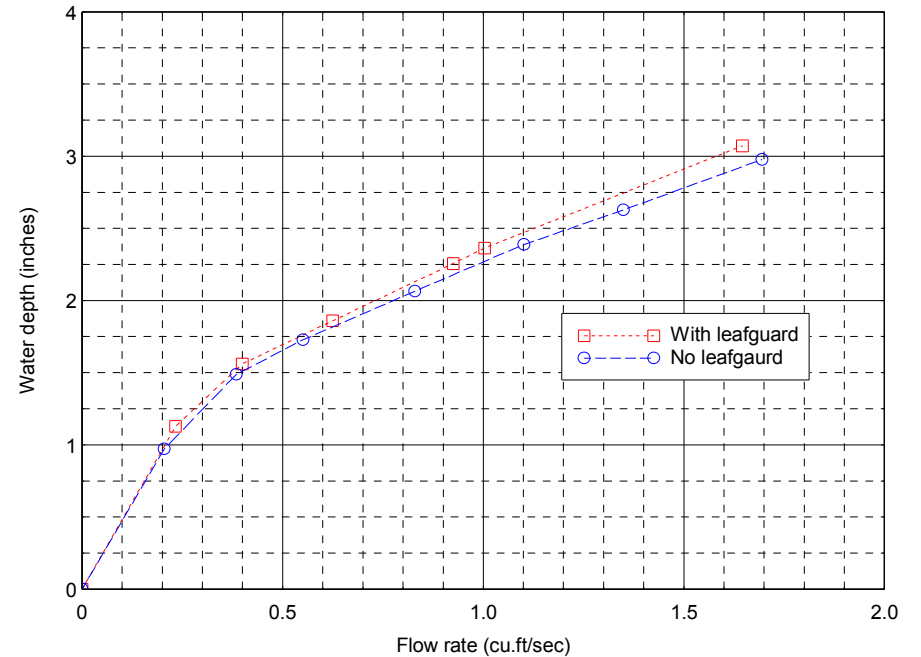


Figure 4.2 - Rating curve (ft³/s format)

WADE-HYDROMAX® Flow Performance

WH-300 (Primary Roof Drain) & WH-301 (Overflow Roof Drain)

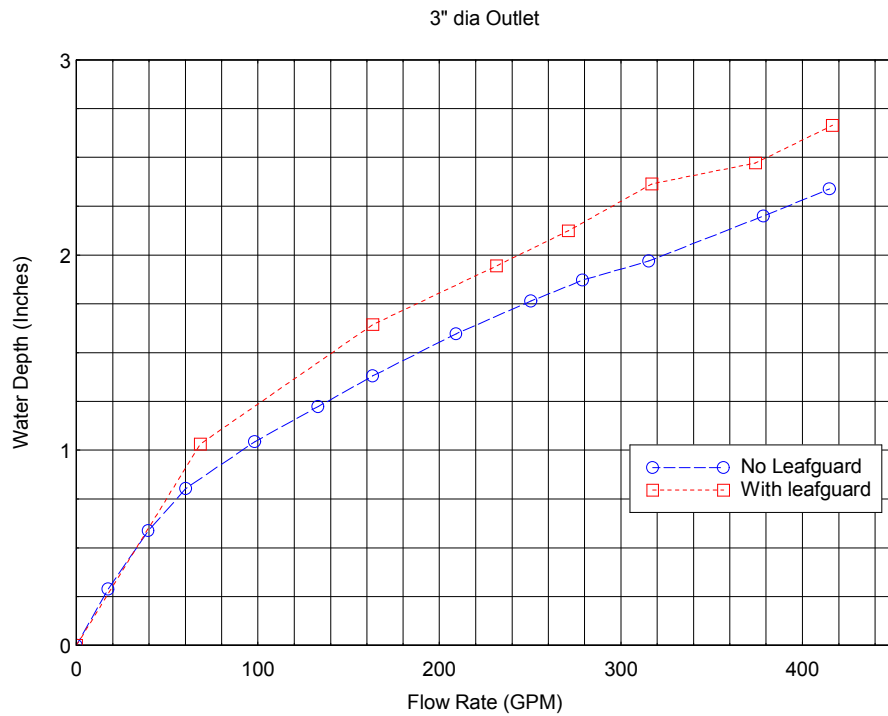


Figure 1, Rating curve (GPM format)

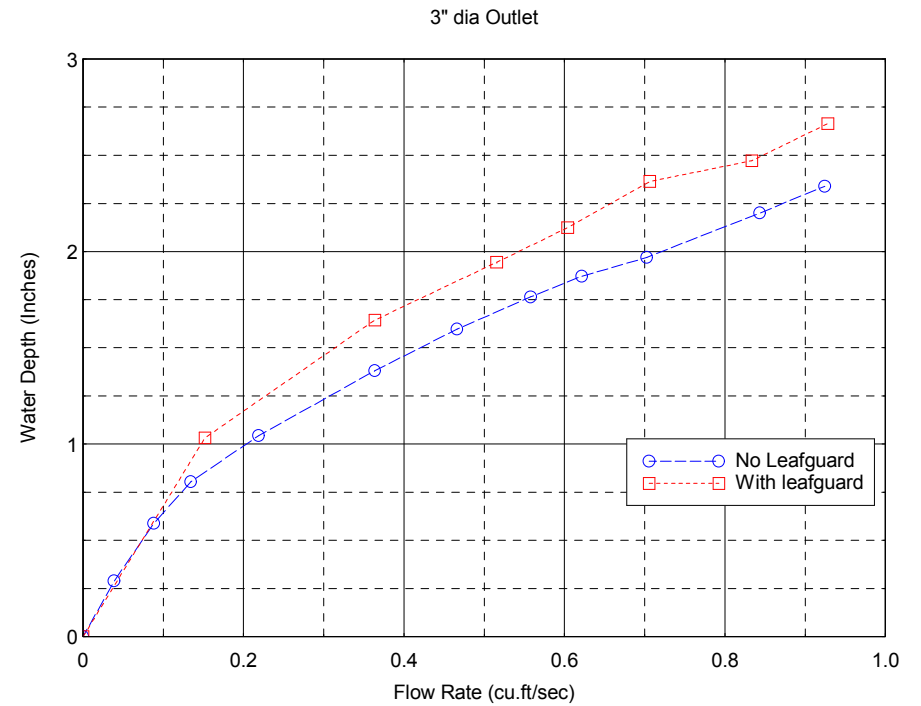


Figure 2, Rating curve (ft³/s format)

General Tips

We strongly recommend following ASPE Technical Design And Engineering Standard 45 – Siphonic Roof Drainage

The WADE-HydroMax® HydroTechnic™ software program is a tool used to calculate the hydraulics within a piping system and identify the pipe diameters required for a system to perform properly.

Before using the HydroTechnic™ pipe sizing program it is necessary for the design engineer to work through the following steps.

1. Determine the design rainfall intensity rate.
2. Identify and calculate roof areas.
3. Determine quantity and location of roof drains.
4. Calculate individual roof drain catchment areas.
5. Calculate inflow to each roof drain (catchment area x rainfall rate).
6. Identify discharge location (break to gravity flow or collection tank)
7. Determine required pipe routing to collect from the roof drains and run to the discharge point.
8. Draw a schematic drawing with all directional and pipe length information.

Following the completion of the above steps, the design engineer can then use the HydroTechnic™ Analytical Design Program as described above.

Design Parameters which must be met to achieve a system which works:-

1. Minimum pressure = -26.247 feet water column (-8 mwc)
2. Minimum velocity = 2.625 feet per second (0.8 m/s) on Horizontal pipework – 7.218 feet per second on vertical stack
3. Maximum out of balance = 3.281 feet wc (1 m water) or 10% of Design Head – whichever is lower.
4. Maximum Residual Head = 3.281 feet wc (1 mwc)
5. Maximum velocity = 26.247 feet per second (8 m/s)
6. Stack Exit Velocity – Default Set at 19.685 ft/s
(Adjustable User setting for compatibility with gravity break connection)
7. Maximum fill time = 60 seconds

Reasons for the Design Parameters

1. Minimum pressure = -26.247 feet wc

What if pressure drops below the minimum pressure setting?

- Risk of Cavitation (air coming out of suspension)
- Risk of Pipe collapse (implosion)

2. Minimum velocity = 2.625 feet per second (0.8 m/sec) on Horizontal pipework – 7.218 feet per second on vertical stack

What if velocities are lower?

- Risk of Sedimentation
- Poor priming response

3. Maximum out of balance = 3.281 feet water column (1 m/wc)

What if out of balance figures are greater?

- Risk of air entrainment = break siphonic action
- Underperformance

Reasons for the Design Parameters (continued)

4. Maximum Residual Head – 3.281 feet wc

- Prevents piping System having too much spare capacity
- Ensures hydraulic parameters within system are safe even if rainfall exceeds design rate

5. Maximum velocity = 26.247 feet per second (8 m/sec)

What if velocities are higher?

Risk of Cavitation (air coming out of suspension)with reduction in drainage capacity

Risk of excessive vibration & noise

6. Stack Exit velocity = Default set at 19.685 feet per second (6 m/sec)

This is a changeable user setting to ensure compatibility at the transition break to gravity flow

7. Fill Time 60 Seconds - What is fill time?

Fill time is determined by the program through a calculation of system volume and design rainfall rate. It is necessary to calculate the fill time to ensure the system primes and operates with siphonic action within 60 seconds even under flash storm (micro storm) conditions the building.

- Tail pipes must fill system
- System must fill in reasonable time to prevent water build-up on roof
- Large systems need more filling

Common tactics for achieving a system design 'PASS'.

First step should be to ensure negative pressures on the vertical section are within the required range.

Negative Pressure must be above -26.247 feet wc.

If negative pressure drops below -26.247 feet wc there are a few tactics which may be adopted. The first attempt should be to reduce the pipe diameter on the bottom section of the vertical drop pipe. (If you choose to reduce the diameter of the upper section of the vertical downpipe and have a larger diameter at the lower section, you must insert an offset bend where the pipe diameter increases in the vertical in the direction of flow.)

Please note: A reduction in diameter in the vertical may result in underperformance in the system as the reduction in diameter will restrict flow. To counter this, revisit and increase the pipe diameters for the carrier pipe and tail pipes.

If this fails, the other solution is to reduce the height of the siphonic vertical drop pipe and make the transition to gravity flow before you reach the ground level. If this option is required then it is essential that the transition point is such that the pipe diameter is sized for traditional gravity flow to cater for the volume of water from the siphonic pipe. Additionally, it is necessary for the gravity pipe to be ventilated.

Second Step is to work on tail pressures.

If you work on the farthest tail pipe from the vertical drop pipe and then the nearest tail-pipe and ensure they are within the pressure balance range between 0.00 and -3.281ft, it should be easy to bring the remaining tail pressures into balance.

Tail Pressures – Must be between 0.00 and -3.281ft

Where a tail pressure is showing a positive number it is undersized.

Solution: Increase pipe diameters on the sections of the tail pipe connecting to the drain. You can also increase pipe diameters on the main carrier pipe and/or the vertical downpipe but this will affect other tail pressures.

Where a tail pressure is showing a negative figure less than -3.281ft the pipe is oversized.

Solution: Decrease pipe diameters on the sections of the tail pipe connecting to the drain. You may also decrease pipe diameters on the main carrier pipe and/or the vertical downpipe but this will affect other tail pressures.

Flow velocity must be between 2.625 ft/s on horizontal (7.218 ft/s on vertical stack) and 26.7 feet per second.

If flow velocity drops below 2.625 feet per second the pipe is oversized.

Solution: Decrease diameters on the sections of pipe where the velocity is too slow.

If flow velocity is above 26.7 feet per second the pipe is undersized.

Solution: Increase diameters on the sections of pipe where the velocity is too fast.

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