



SiphoniTec[®]

A Siphonic Roof Drainage
Design Utility

“The Level Approach to Roof Drainage”™

User's Guide

Release 1.5

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Introduction

Why use a software product to design siphonic roof drainage systems? The answer is simple enough. The design of a system involves mathematics, precision and repetitive use of hydraulic formulas; which is what computer software is best suited for. The software manages the serious number crunching and leaves the designer free to manage simpler physical parameters to arrive at a properly dimensioned system.

Currently, the software takes about 15 megabytes of storage space, including all Library Elements to build a siphonic drainage system. It can load and remove Projects and have multiple Projects loaded at the same time. Projects are saved to simple XML files and can be handled individually.

The Windows Graphic User Interface (GUI) makes system design easy. A GUI Design View tree display of the system shows (and allows selection of) every component. A tabbed display shows Configuration, Calculation, and system Imbalance.

The Library of components is used in building a system. The software can add new Elements to the existing Library and use them in Projects. This gives flexibility to designs and lets an engineer design what is needed.

The Microsoft Excel Report summarizes a system with a hard-copy Report. The Report is produced on request. It is a formal Report intended to be delivered to a client or building official and has an area reserved for your Engineering Seal. The report can be altered to suit varying tastes including your company information and logo. This feature saves engineering time and effort gathering and confirming information.

Who Is This Guide For?

This Guide is for engineers who are installing and using the SiphoniTec® to create siphonic roof drainage systems.

Knowledge of siphonic drainage principles is assumed when using this product. For information on siphonic drainage as it applies to roof systems, we recommend reading ASPE Technical Standard 100 "*Siphonic Roof Drainage*," a technical standard published by the American Society of Plumbing Engineers (ASPE).

Engineers are also advised to seek additional training through www.PDHonline.org, Course Number M256 "Siphonic Roof Drainage."

System Requirements

While this software may run with other hardware and software, performance is not guaranteed. You'll need the following hardware and software to run this program:

- Microsoft Windows® XP with Service Pack 2
- Microsoft .NET Framework 2.0
- 600 MHz Pentium or compatible processor
- 192 MB RAM (256 MB or more recommended)

RMS SiphoniTec® User's Guide Release 1.5

- Video (800 x 600 or higher resolution) monitor with at least 256 colors (1024 x 768 High Color 16-bit recommended)
- CD-ROM or DVD-ROM drive
- Microsoft Mouse or compatible pointing device

Updates

As the software and technology related to this product are updated, links to information will be added to the Rainwater Management Solutions website. Visit the website periodically at www.rainwatermanagement.com for the latest information.

Questions and Comments

If you have questions, comments or ideas regarding this product, please send them to Rainwater Management Solutions via e-mail to

info@RainwaterManagement.com

Or via postal mail to

Rainwater Management Solutions
Attn: SiphoniTec® Software
1260 West Riverside Drive
Salem, VA 24153

Installation and Configuration

Installing the Software

The installation disc for the SiphoniTec® is auto-start enabled. You simply place the disc in the CD/DVD drive of the computer that you want to install the product on, and it will start the installation sequence.

Follow these steps to install the SiphoniTec®:

1. Put disc in CD/DVD Drive. The installation program should run automatically. If not, navigate to the Drive and run the program setup.exe.
2. In the Welcome window, click **NEXT**.
3. In the Customer Information window, enter your Name, Organization and Serial Number. You do not need to enter the dashes in the Serial Number. The Serial Number is a series of six four-digit numbers separated by dashes. It will be located with the documentation for the SiphoniTec® in the CD case along with the registered Name and Organization for the software. **DO NOT** lose this number! This number is unique for your installation and is required to complete the installation. When done, click **NEXT**.
4. In the Select Installation Folder window, enter the installation path, or use the default location (recommended). The Browse button will help you navigate to the location where you want the software installed. You can also check on disk space available and required for the installation with the Disk Cost button. There is also an option to install for just yourself or everyone who uses the computer. The default of "everyone" is recommended. However, if you have multiple users and want to restrict the use of the software to just the current user, select the Just Me option. When done, click **NEXT**.
5. In the Confirm Installation window, click **NEXT** to start the installation.
6. When the progress bar completes, you are at the Installation Complete window. Click **CLOSE** to finish the installation.

The software is pre-configured, so no other changes are needed.

Uninstalling the Software

If you want to remove the installation of the SiphoniTec®, you can do it in two different ways.

You can remove the installation via the Control Panel. Under the Start menu, start up the Control Panel. Then follow these steps:

1. Click on **Add or Remove Programs**.
2. Make sure Change or Remove Programs is selected, then locate and select the currently installed version of the SiphoniTec®.
3. Click on the **Remove** button.
4. In the Add or Remove Programs window, click on the **Yes** button.

You can remove the installation via the Installation Disc. This is the recommended way to remove an installation. Simply place the Installation Disc in the CD/DVD drive and follow these steps:

1. Put disc in CD/DVD Drive. The installation program should run automatically. If not, navigate to the Drive and run the program setup.exe.
2. In the Welcome window, select the Remove option and click on the Finish button.
3. At the Installation Complete window, click on the **Close** button.

Repairing the Software

If the installation of the SiphoniTec® is damaged, it can be corrected. **Note that repairing will overwrite the Element Library with the as-installed Library of Elements.** If you wish to save any Elements you have added to the Library, you must save a copy of the Library database.

You can repair the installation via the Control Panel. Under the Start menu, start up the Control Panel. Then follow these steps:

1. Click on **Add or Remove Programs**.
2. Make sure **Change or Remove Programs** is selected, then locate and select the currently installed version of the SiphoniTec®.
3. Click on the **Change** button.
4. The SiphoniTec® setup program will give you the option to Repair or Remove the software. Select **Repair** and click on **Finish**.
5. The Repair will ask for the installation disc. If it isn't in the CD/DVD drive, place it in the drive and click on the **OK** button.
6. At the Installation Complete window, click on the **Close** button.

You can repair the installation via the Installation Disc. This is the recommended way to repair an installation. Simply place the Installation Disc in the CD/DVD drive and follow these steps:

1. Put disc in CD/DVD Drive. The installation program should run automatically. If not, navigate to the Drive and run the program setup.exe.
2. In the Welcome window, select the **Repair** option and click on the **Finish** button.
3. At the Installation Complete window, click on the **Close** button.

Working with the Software

You can start the SiphoniTec® by either clicking on the desktop icon or clicking on the RMS icon under the **Start > All Programs** menu. On startup, the program automatically loads the Element Library. This may take a few seconds, depending on the speed of your processor.

Overview

The main interface gives you access to all the features of the SiphoniTec®. Just below the title bar are the drop-down menus, action buttons and status display. The drop-down menu gives access to Help features, the About information for this release, and the load and save commands for Projects as well as the Library. The action buttons give access to the check, calculate and report generation functions. The status display shows the status of the selected Element.

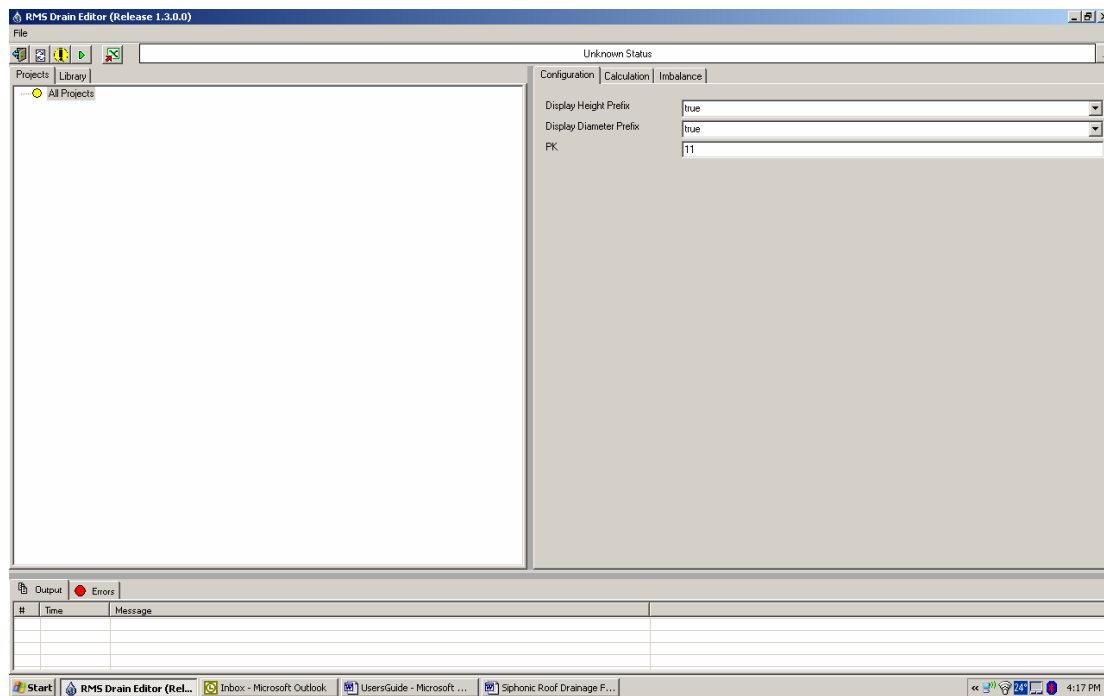


Figure 1: Main Interface

The window on the left side of the screen is the Project Window. It has two tabs, [Projects] and [Library]. Depending on which tab is selected, the window displays the composition of a Project or the Elements of the Library to the right side of the screen.

The window on the right side is the Detail Window. It has three tabs, [Configuration], [Calculation] and [Imbalance]. It shows the configuration data, calculation details or imbalance of the selected Element, respectively.

The area across the bottom of the screen is the Message Window. It has two tabs, [Output] and [Errors]. It shows informational messages or error messages, depending on which tab is selected.

The area between the Project, Detail and Message windows is adjustable by placing the Windows cursor over the dividing bar and dragging left or right.

The best way to use the SiphoniTec® is start by opening or creating a Project. Then build a system by selecting Elements from the Library to put a roof drainage system in place from discharge to roof drain. When the basic system is in place, review the design by checking the details of the configuration, calculations and imbalance. Adjust the values and check again. When you are satisfied with the results, generate a report.

Determining the Version

To determine the version number for the release of SiphoniTec® running on your computer, right click **About** on the drop-down menus. This will make the About box appear. It contains the version number, as well as other information describing the release of SiphoniTec® that is running on your computer.

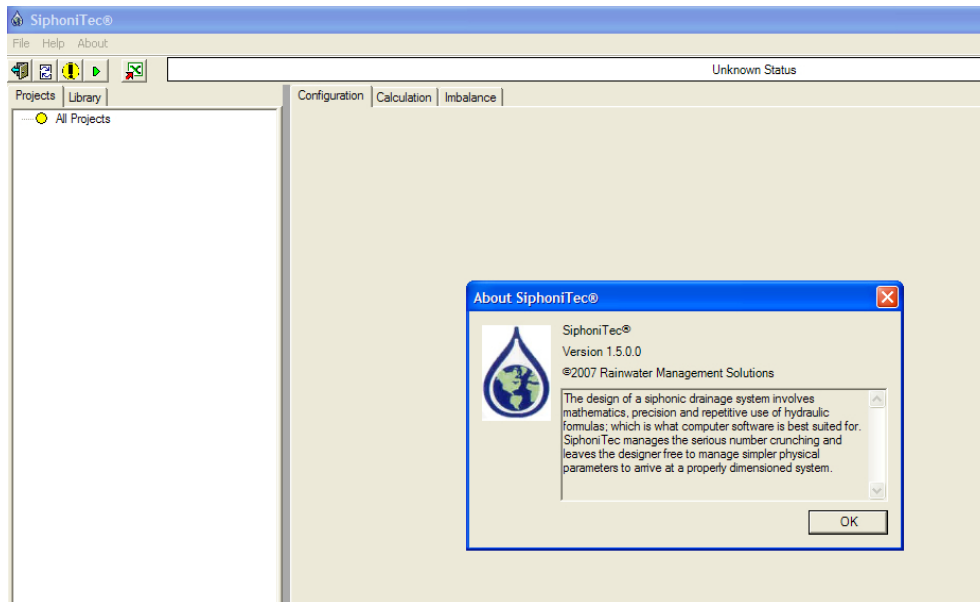


Figure 2: Version Number

Getting Help

SiphoniTec® offers three different types of help. All three are accessed by right clicking on **Help** in the drop-down menu. From the drop-down menu you can select **RMS Website**, **Users Guide**, or **Get Latest Components**.

RMS Website

Right clicking on **RMS Website** will open your web browser and take you to the RMS website. From there you can find out the latest news about rainwater harvesting and SiphoniTec®.

Users Guide

Right clicking on **Users Guide** will bring up this document in a new window. You can browse this document for the section you need without having to locate this document on your computer.

Get Latest Components

At times the components of the library used for building a system will change. By right clicking on **Get Latest Components** your web browser will be opened in a new window and will take you to the RMS website. There, a download of the latest version of the components will start. Please note that the components will be stored wherever you say. If you replace the current components, you will lose any components you have manually added with the SiphoniTec® software.

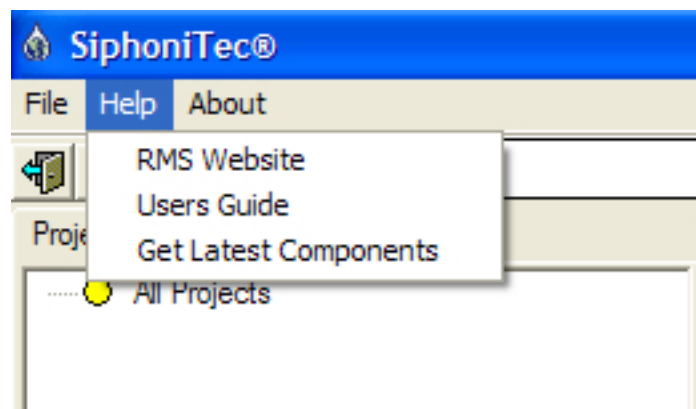


Figure 3: Help Options

Projects

Managing Projects

Starting a New Project

To start a new Project, select the [Projects] tab in the Project Window. Right click on the **All Projects** entry. Click on **New** in the popup menu. The entry “New Project” will appear under the All Projects entry. In the right hand detail window there are several fields to fill in.

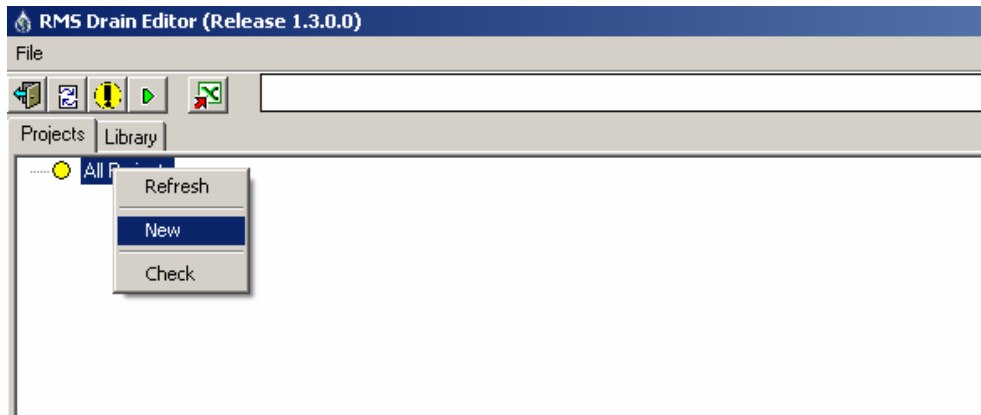


Figure 4: Starting a New Project

The system designed to call up the Project's city and state by entering in the Zip Code. If the Zip Code is known, enter it in the appropriate field and tab out. The city and state should appear. If there is no Zip Code or you don't yet know what it is, enter a temporary Zip Code (your own if you want) to get started.

Location File	L:\Leg Swap.xml
Max Negative Pressure	-33
Max Positive Pressure	30
Name	Junction Bug 1
Rain Intensity (in/hour)	4
Zip Code	02045
USA State	Massachusetts
City	HULL
Sea Level Elevation (ft)	0

Figure 5: Project Zip Code and Rain Intensity Fields

Above the Zip Code field is the field to enter the design Rainfall Intensity. Check with local code requirements for the intensity or use the intensity you select for design purposes.

In this version of the software, you also need to enter the assumed water temperature (50 degrees is recommended as a default).

Below that, pull down the list-box to select the default piping material. This establishes the Pipe interior roughness value for the energy loss calculations.

Longitude	-70.836748
Temperature (F)	50
E-mail	siphonic@rainwatermanagement.com
Pipe Material (Default)	Cast Iron, Aged
Contact Person	John M. Rattenbury
Contact Phone	781-925-6314
Water Viscosity	0.000

Figure 6: Water Temperature and Pipe Material Fields

Proceed to build the Project by adding Elements, starting with the Discharge and working back into the building to the roof drains.

Removing a Project

To delete a Project from the Project Window, first select a Project. Right click on the selected Project. In the popup window that appears, click on **Delete**.

Renaming a Project

To rename a Project, first select the Project in the Project Window. Right click on the Project. In the popup window that appears, click on Rename. In the highlighted box, enter the new name for the Project.

Loading a Project

To load a Project file previously created and saved, go to the pull down the menu at the top of the screen and click on **File**. Click on **Load Project** and select the file from the Open window that appears. Navigate to the directory and file the Project was saved to. Finally, click on the **Open** button. Alternately, click on the **Load Recent** selection in the File menu to load a recent Project.

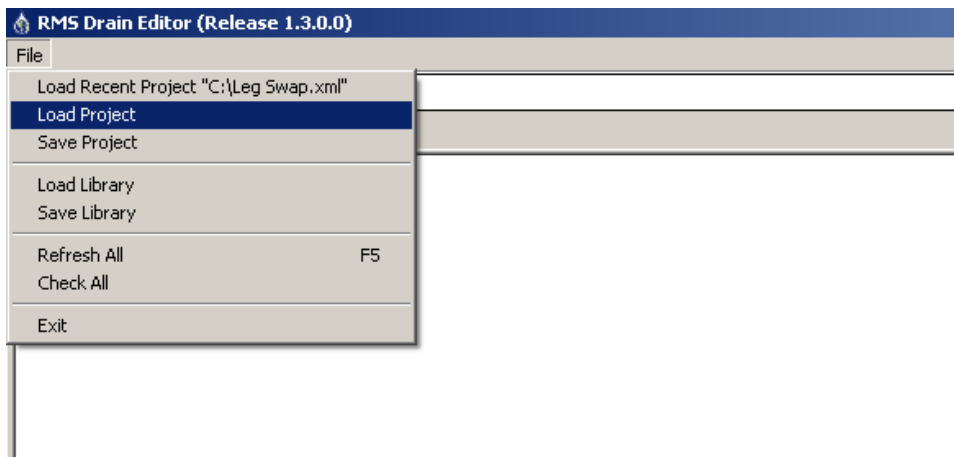


Figure 7: Loading a Project

Saving a Project

To save a Project file, in the pull-down menu at the top of the screen, click on **File**. Click on **Save Project** and enter a filename in the **Save As** window that appears. Click on the **Save** button.

Clearing Messages

To clear all messages, select a message and right click on the message. In the popup menu that appears, click on **Delete** to remove the selected message or click on **Clear All** to remove all the messages from the Message Window.

Building a System

Adding Elements

Once the Project has been created and the Project information has been entered, begin “building” the Pipe system by adding Elements. Start with a Discharge Element.

Discharges

Select the Discharges heading in the GUI under Project and right click on it. Click on **New** in the popup menu that appears. Select the **New Discharge** Element that appears. In the Detail Window, click on the [Configuration] tab. The information displayed is the configuration data for the selected Discharge. Enter a Diameter, Inner Diameter, Static Head, Name and Height for the Discharge.

Tip: In this version of the software, the designer must make a first guess at the Pipe and fitting sizes when entering the Elements. A good “rule of thumb” that works well is to determine the total square footage served by the Pipe and look up the specified size in the plumbing code for horizontal piping at 1/8” per foot slope and at the design rainfall intensity. Take that Pipe size and divide it in half. This will be the approximate size of the siphonic Pipe. For example, if the code says that a traditionally sized Pipe should be 10 inches, the resulting siphonic size is 5 inches (or 6 inches depending on availability). When in doubt, round up.

Once there is a Discharge, Elbows, Pipes, Junctions and Reducers can be added. Right click on the **Empty** placeholder in the GUI Design View and select **Replace** in the pop up menu. Select the new Element from the pop-up menu to the right (Pipe, Reducer, Roof Drain, Junction or Elbow).

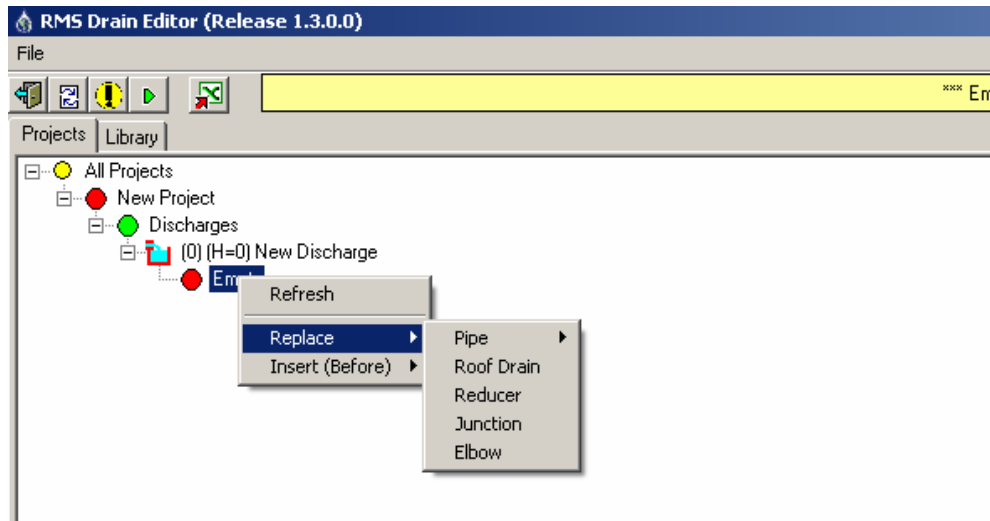


Figure 8: Inserting an Element

A Project may include several Discharge points. To add another Discharge, right click on the Discharges heading, select **New**, and repeat the process.

Pipes

To insert a Pipe, right-click on the **Empty** placeholder Element and select **Replace > Pipe**. When inserting a Pipe, select an orientation (**vertical, horizontal, or slope**). Horizontal Pipes inherit the elevation of the previous Element (the Parent) and the Nominal Diameter of the Parent. If the Pipe inserted is to have a different Nominal Diameter, then a Reducer Element (the Library includes both Increases and Reducers) otherwise the GUI Design View tree will show a discontinuity error. If the Pipe system is to change in elevation, then the Pipe must be either vertical or sloped in orientation. A vertical Pipe must have an “Elevation In” specified in the [Configuration] tab Detail Window.

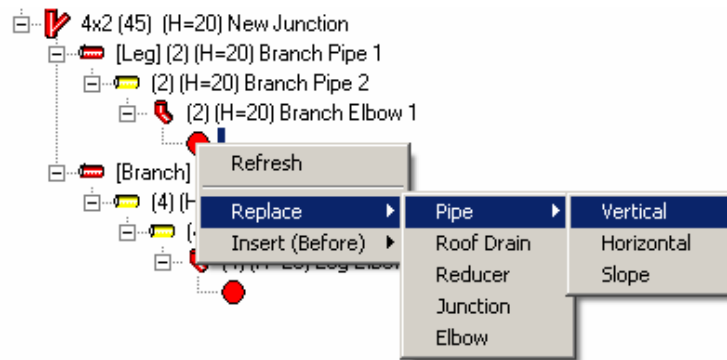


Figure 9: Entering a Pipe Element

The sloped orientation Pipe must have an “Elevation In” and a “Length Horizontal” dimension specified. Use the pull-down on the Library Element entry of the Configuration to select the appropriate Pipe Element from the Library. If the new Pipe selected is of a different material, make sure the correct Pipe Material is selected from the pull-down window.

Name	New Pipe
Library Element	(2) A888
Material	Cast Iron, Aged
Height In (ft)	21
Height Out (ft)	20
Height Diff (ft)	1
Length Horizontal (ft)	1
Orientation	eSlope

Figure 10: Vertical Pipe Entry Fields

Specify the Pipe length in the Configuration Detail Window field.

Tip: Pipe lengths, by convention should be measured from the intersections of the centerlines of upstream and downstream elements. For example, the distance from an elbow to a junction is measured from the intersection of the centerlines of the elbow to the node point at which the junction branches off. More information can be found in the ASPE Technical Standard 100.

When all required information is entered, the entry fields will be white (i.e. not red) and the Pipe icon appearing in the GUI Design View tree will be yellow.

Note: The software's error checking engine will sometimes catch the lack of a flow, pressure, or velocity as an error even though the calculation process has not yet been executed. If the Element is red even though the physical information has been entered, check the nature of the error by clicking on the ellipsis button to the right of the top status bar. A pop-up window will appear describing the error. Most likely it will indicate calculated parameters are missing. If this is the case, ignore the error until after calculations have been executed.

Changing Orientation: If you select the wrong Pipe orientation or if you wish to change the orientation for any reason, right-click on the Pipe icon and select **Pipe Orientation** from the pop up menu and then the desired orientation. Check the Pipe elevations in the Configuration tab.

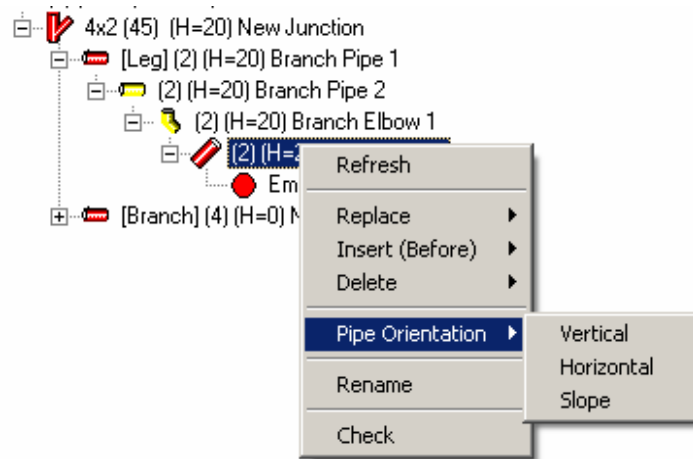


Figure 11: Changing Pipe Orientation

Elbows

Where the Pipe system layout has a change in direction, either in the horizontal or vertical plane, an Elbow occurs. The Library includes Elbows for 45 degree and 90 degree bends as well as a selection of long-sweep bends. To insert an Elbow, right-click on the **Empty** placeholder and select **Replace > Elbow** from the pop-up flag menus. The Elbow will inherit the elevation of the previous Element (the Parent) and the Nominal Diameter of the Parent. If the Elbow inserted is to have a different Nominal Diameter, then a Reducer Element (the Library includes both Increases and Reducers) otherwise the GUI Design View will show a discontinuity error.

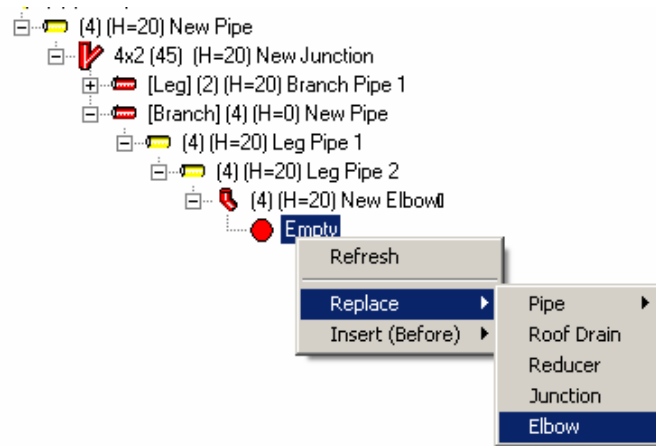


Figure 12: Entering an Elbow

Although an Elbow fitting has dimension (a sweep), Elbows are treated as nodes located at the intersection of the centerlines of an upstream and downstream Element. This version of the software does not include an orientation of the Elbow (i.e. turned up, turn down, turn left or turn right). Elbows account only for the minor loss they introduce due to their assigned resistance coefficient.

When all required information is entered, the entry fields will be white (i.e. not red) and the Elbow icon appearing in the GUI Design View tree will be yellow.

Note: The software's error checking engine will sometimes catch the lack of a flow, pressure, or velocity as an error even though the calculation process has not yet been executed. If the Element is red even though the physical information has been entered, check the nature of the error by clicking on the ellipsis button to the right of the top status bar. A pop-up window will appear describing the error. Most likely it will indicate calculated parameters are missing. If this is the case, ignore the error until after calculations have been executed.

Reducers

When a change in Pipe size occurs, a Reducer (In increaser) must be inserted. Two Elements of different diameters must have a Reducer (In increaser) inserted between them to account for the minor energy loss that occurs due to the gradual or sudden expansion or contraction of the water flow. The Reducer/In creaser Library provides the appropriate resistance coefficient for the calculations.

To insert a Reducer/In creaser, right-click on the **Empty** placeholder and select **Replace > Reducer** from the pop-up flag menus. The Element inherits the elevation of the previous Element (the Parent). By convention, the Reducer Element has an A x B designation. The A value corresponds to the downstream (Parent) Element Nominal Diameter and the B value corresponds to the next upstream (Child) Element Nominal Diameter.

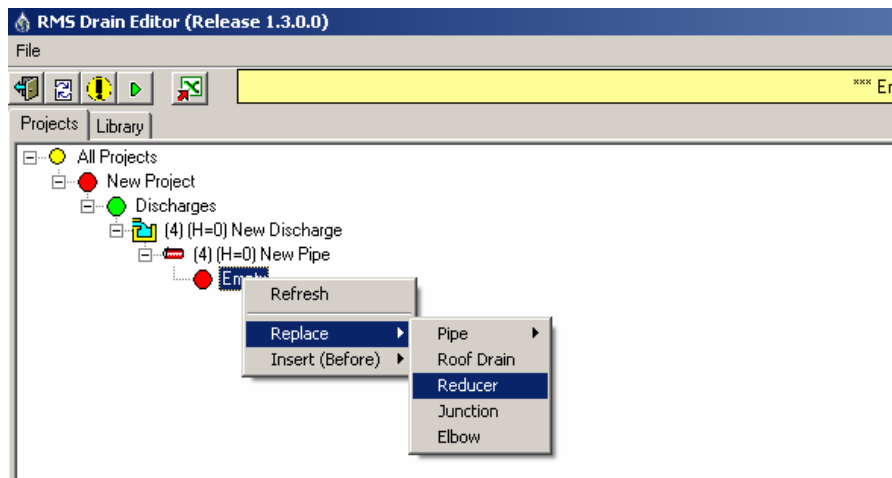


Figure 13: Inserting a Reducer

The screenshot shows a software window titled "New Reducer Configuration is Invalid". It contains a configuration form with the following fields:

Field	Value
Library Element	4x3 A888
Loss Coefficient (K)	0.699
Name	New Reducer
Height (ft)	20
Total Height (ft)	0
Material	Cast Iron, Aged
Total Friction Lost (ft)	0

Figure 14: Reducer Configuration Fields

When all required information is entered, the entry fields will be white (i.e. not red) and the Pipe icon appearing in the GUI Design View tree will be yellow.

Note that some display fields are gray. These fields are display only and contain information that is calculated or dropped in from the database. White fields are user entry fields.

Note: The software's error checking engine will sometimes catch the lack of a flow, pressure, or velocity as an error even though the calculation process has not yet been executed. If the Element is red even though the physical information has been entered, check the nature of the error by clicking on the ellipsis button to the right of the top status bar. A pop-up window will appear describing the error. Most likely it will indicate calculated parameters are missing. If this is the case, ignore the error until after calculations have been executed.

Junctions

Roof drainage systems frequently consist of several roof drains tied into a common manifold. When the flow stream from a drain ties into a manifold, a Junction must be inserted. Junctions account for the merger of two flow streams into one. Junctions may occur either:

- a. In the horizontal plane (i.e. flat),
- b. With the main barrel in the horizontal with the branch occurring at a slope, or,
- c. With the main barrel in the vertical.

The Library of Junctions includes several sizes including Reducer Junctions with the branch to barrel angle as 45 degrees as is standard for drainage fittings.

Junctions account for the minor energy loss that occurs due to the merger of two flow streams. The software evaluates the appropriate resistance coefficients for the leg and the branch approaches for the calculations.

To insert a Junction, right-click on the **Empty** placeholder and select **Replace > Junction** from the flag menus. The Element inherits the elevation of the previous

Element (the Parent). By convention, a Junction Element has an A x B designation. The A value corresponds to the Leg (i.e. barrel) Nominal Diameter and the B value corresponds to the Branch Nominal Diameter. Select the desired Junction from the pull-down menu in the Configuration Detail Window.

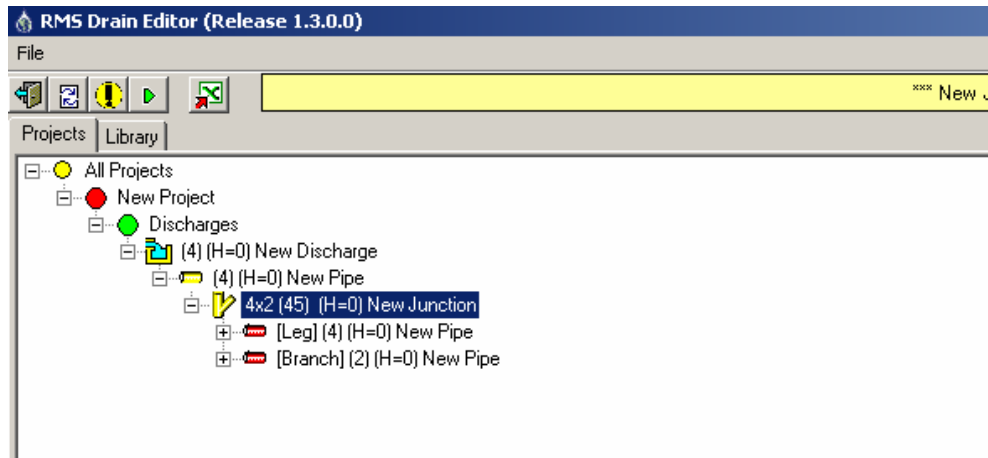


Figure 15: Inserted Junction Element

Like Elbows, Junction fittings have dimensions (a Leg and Branch length). Like Elbows, Junctions are treated as nodes located at the intersection of the centerlines of two converging Elements. This version of the software does not include an orientation of the Junction (i.e. turned up, down, left or right). Junctions account only for the minor loss they introduce due to their calculated resistance coefficient. The orientation is accounted for by the orientation of the Parent and Child Elements.

This version of the software requires that the Leg and Branch Pipes be entered manually. A physical Junction is essentially two Pipes converging at an angle. These two Pipes must be inserted at the Branch and Leg. Their diameters must correspond to the Junction Element Branch and Leg diameters (A x B). Their lengths should be the dimensions specified in the Junction fitting standard, but as a “rule of thumb” a length of 1 foot is typical.

When all required information is entered, the entry fields will be white (i.e. not red) and the Pipe icon appearing in the GUI Design View tree will be yellow.

Note: The software’s error checking engine will sometimes catch the lack of a flow, pressure, or velocity as an error even though the calculation process has not yet been executed. If the Element is red even though the physical information has been entered, check the nature of the error by clicking on the ellipsis button to the right of the top status bar. A pop-up window will appear describing the error. Most likely it will indicate calculated parameters are missing. If this is the case, ignore the error until after calculations have been executed.

Roof Drains

The start of each siphonic roof drainage system begins with a Discharge. The end of each system consists of a Roof Drain at the end of each branch off of the manifold. To enter a Roof Drain, select the **Empty** placeholder Element and right-click. On the popup menu

that appears, select **Replace > Roof Drain**. In the Detail Window, click on the [Configuration] tab and select the desired drain from the Element pull-down list.

Note: The outlet inner diameter of a selected roof drain may not be exactly equal to the Pipe it connects to. When this condition occurs, a Reducer must be inserted between the drain and the connecting Pipe to account for the difference. Several “Adaptors” are listed in the Library for use.

Editing a System

General

In every design effort, both major and minor changes will be needed to achieve a properly dimensioned system. The cues to make changes are provided by the calculations. The calculations provide Residual Heads for each roof drain, the Imbalance between drains, Pipe velocities, and static pressures. Based on the results, Pipes and fittings may need to be resized or a new configuration may be required.

Replace an Element

With the exception of Discharge and Roof Drain Elements, any Element in the system can be replaced with another. To do this, right-click on the Element icon and select **Replace** and then select the Element type you wish to change to. Go the [Configuration] view to update the physical parameters. The only Element types that can not be made to appear in a system are Roof Drains and Discharge Elements because these Elements can appear only at the ends of a system.

Change Library Element

Any Element can be changed with a like Element from the Library. This feature is used mainly to re-size Pipe, Elbows, Junctions, Reducers and Roof Drains. To change the Element, go to the [Configuration] tab and pull down the Library Element list-box. Select the desired Element from the list. If there is a diameter change, appropriate Reducers must be inserted ahead of and/or behind the changed Element to account for transitions in Pipe size. In this version of the software, only one Element can be changed at a time. So if an entire series of Elements need to be changed in diameter, each one must be changed individually.

Insert an Element

Inserting an Element in the GUI Design View tree is very easy. Upon identifying the spot where you need to insert a new Element between two existing Elements, right-click on the Child Element, that is, the Element that is to become “upstream” of the new Element referenced to the direction of water flow. In the GUI Design View tree, it is always the Element below on the tree. From the pop-up menu, select **Insert Before** and then select the desired Element type. Go to the Configuration tab to update the physical parameters.

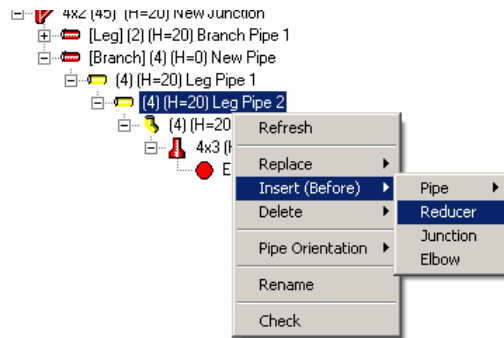


Figure 16: Inserting an Element in the GUI Design View

Inserting Junctions: When inserting a Junction, you will be asked if you want the Child Elements to be placed on the Branch or the Leg. Specify which and click **OK**.

Deleting an Element


Deleting Elements is also easy. Right-click on the Element to be deleted and select **Delete**. From the pop-up menu, select either **Move Children Up** or **Delete All Children**. By moving the children up, all of the successive Elements will be tacked on to the Parent of the deleted Element (i.e. moved up). By selecting **Delete All Children**, all of the children will be deleted. This is useful if you wish to strip away an entire branch and start over.

Deleting Junctions: When deleting a Junction, one of three choices needs to be made. Either to keep and move up the Branch children (deleting all of the Leg children), keep and move up the Leg children (deleting all of the Branch children), or delete both the Leg and Branch children and start over.

Checking the Design

Running Calculations

To run the calculations on a Project, make sure an Element of the Project is selected in

the Project Window. Click on the action button  with the green arrow icon near the top right of the screen. The colors of each Element will change to red, yellow or green. Red Elements indicate an error. Yellow Elements indicate a warning that may require system adjustment. Green Elements are fine as they are.

Viewing Calculations

The calculation results for any Element in the system can be viewed by clicking on the Element and then going to the [Calculation] tab in the Detail Window. If there were any errors or warnings, the specific parameter will appear in either red or yellow. View the calculations to check minimum velocities, static pressures, etc. in order to understand the operating conditions of the system.

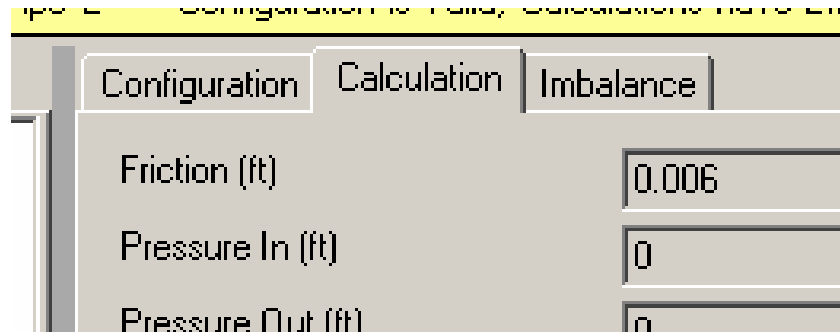


Figure 17: Detail Window [Calculation] Tab

Checking Errors

Review the calculated values of the Elements of the Project in the [Calculation] tab as well as the Error Messages in the Message Window by clicking on the ellipsis to the right of the status bar. Change the physical parameters of Elements in the Project to remove any errors. When satisfied, run the calculations again.

Checking Residual Head and Imbalance

When executing calculations of the system, it is most helpful to be in the [Imbalance] tab of the Detail Window. In this view, each Roof Drain will be displayed indicating the roof drain size, roof surface area, elevation, energy loss, and residual head. There are two parameters important to a properly dimensioned system.

The first is the Imbalance of the system. The Imbalance is the difference between the maximum and minimum Residual Heads of the Roof Drains. The maximum and minimum Residual Heads are indicated by the two drains highlighted in blue in the Imbalance tab. The Imbalance of a system should be less than 3 feet or 10 percent of the building height, whichever is less. When the system is in an acceptable Imbalance, the status bar above the Imbalance tab will be green.

The second parameter is the overall Residual Head. Even though a system is within Imbalance tolerances, a high Residual Head will indicate that the system will drain faster and at a higher capacity than the design rainfall intensity. Although it may be desirable to have a slightly positive Residual Head, a very high value may result in cavitation within the system. If a Residual Head of more than 3 feet is encountered, increase the design rainfall intensity until a Residual Head of less than 3 feet is achieved. Then check static pressures in the system to make sure no warnings are present.

If static pressure are too low with increased rainfall intensity, the return to the original rainfall intensity and re-dimension the system to achieve both acceptable Imbalance and low Residual Head.

Note that in a system with two or more Roof Drains, two Roof Drains will be highlighted in blue. These two highlighted Roof Drains represent the maximum Residual Head and the minimum Residual Head among the set of drains. The difference between these two Residual Heads is the system Imbalance, which is displayed in the status bar immediately above the Imbalance window. This highlighting feature is useful when managing systems with several Roof Drains that have to be balanced.

Imbalance: 1.162, Max height: 96, Imbalance as a percent of max height: 1.21%, Max height percent: 10%

Name	Library ...	Area (sq.f)	Height (ft)	Total E...	Residua...	Diamete...	Friction ...	Exit Vel...	Min/Max
1 C	3.1 JRS...	4,462	96	29.234	0.766	3.100	24.735	4.499	min
2 F	3.1 JRS...	3,359	96	29.046	0.954	3.100	24.548	4.499	
3 E	3.1 JRS...	3,351	96	29.027	0.973	3.100	24.529	4.499	
4 D	2.5 JRS...	3,732	96	28.071	1.929	2.500	23.573	4.499	max
5 B	3.1 JRS...	6,134	96	29.062	0.938	3.100	24.564	4.499	
6 A	3.1 JRS...	7,251	96	29.203	0.797	3.100	24.704	4.499	

Figure 18: Imbalance View

Generating a Formal Report

Reports are generated on a Project by Project basis. To generate a Report, select a Project in the Projects Window. Click on the action button with the X and a red arrow icon. In the Report to Excel window that appears:

1. Select a template
2. Select an output file
3. Determine if you want to see the changes as they occur
4. Click on Export Now
5. Close the window when done

The Report will be produced at the location with the name selected. It is based on the format of the template selected. Users can create their own templates based on the template provided by Rainwater Management Solutions.

The Library

The Library contains information on pipes and fittings used for designing your drainage system. There are two types of Elements in the Library: Drainage Elements and Configuration Elements. To view all of the available types, select the Library tab in the Project Window.

Note that while the Library tab is selected in the Project Window, the Calculation and Imbalance tabs in the Detail Window have no purpose. When you are planning on viewing information on Library items, we suggest you select the Configuration tab in the Detail Window first. This will save you time as you browse items.

Drainage Elements

There are several types of drainage Elements included in the Library. They are Elbows, Junctions, Pipes, Reducers and Roof Drains.

Viewing Elements

To view all the available items under a Drainage Element type, click on the + symbol beside the Name of the item type in the Project Window. This will expand a list showing each item. If you want to view the detailed information for an item, click on the name of the specific item. Then, make sure the Configuration tab is selected in the Detail Window. This will display all of the detailed information about the selected item.

Modifying Elements

To modify an item, start off by viewing it, as described above. Then you can alter the information in the Detail Window. Simply use your mouse to select a value and change it. You may notice that you can't just type in every field to replace a value. Some fields restrict what values you can enter. If there is a box with a down-arrow at the far right of the field, you can only pick from a select list of values. Click on the down-arrow and a pull-down list will appear. Click on a displayed value and it will be entered for you. Some fields have a gray background. The values in these fields can not be modified.

Adding Elements

To add a new item to the list of an Element type, right-click on the name of the Element type in the Project Window. A menu will appear. Select New from the menu, and a new item will be added to the list of items. To give the item specific values for the various fields, just select the item then modify them as described above.

Saving the Library

After you have made changes, don't forget to save what you changed! In the pull-down menu at the top of the screen, click on **File > Save Library**.

Configuration Elements

There are many types of configuration Elements included in the Library. They are Materials, Nominal Angles, Nominal Sizes, States & Provinces, Unit Culture, Water Density, Water Viscosity and Zip Codes. Many of these are reserved for future use, and not currently active for users.

You may view all of the items of these Elements. Most items and Elements can not be modified, and will not let you add new items. However a few will let you add and modify. We recommend that you leave these Element lists as they are. Changing them can have a severe effect on the calculations, and give erroneous results.

If you are interested in the values in this area, we suggest formal training in the area of siphonic drainage. Please contact Rainwater Management Solutions to find out the latest schedule and fees for advanced siphonic training.