WaterMark PRO
Irrigation Design System

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WaterMark PRO Irrigation Design Software

USER GUIDE

V 3.2 US / V 35.2 Metric
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WaterMark PRO Irrigation Design Software 3.2/35.2

Contents

Introduction

WaterMark PRO is a full-featured object-oriented lawn irrigation design software incorporating time-proven hydraulic engineering techniques and a user-friendly interface that greatly accelerates the design process. WaterMark PRO was developed with the goals of flexibility, speed, simplicity, and ease of use. The software assumes the user's basic knowledge of sprinkler system design.

The system interfaces with an independent database containing all system parts and provides automated, system-generated reports to facilitate the estimating, pricing, planning, and physical implementation phases of the irrigation project. The database includes sprinkler heads, bodies, pipe and pipe fittings, clocks, tools, accessories, valves, and even labor charges.

The program runs on the Microsoft Windows™ operating system and should run successfully on any currently supported version of Windows™. We recommend running it on the latest version for the best results.

The **Metric Version** also utilizes this user guide. Both the US as well as the Metric versions of the programs utilize their native measurement standards, including the parts library. To avoid managing multiple user guides, it will only be published in the US version, so please be aware of the following substitutions as you read through the guide. Of course, the metric version of the program itself utilizes all metric measurements.

Measurement	US Version	Metric Version
Water Pressure	PSI (pounds per square inch)	Bar (barometric pressure)
Water Flow	GPM (gallons per minute)	LPM (liters per minute)
Linear Measure	Feet or (') or Ft.	Meters or M.
Precipitation Rate	Inches/hour (in/hr)	mm/hour (mm/hr)
Area	Square feet (sq ft)	Square meters (sm or m^2)

Setup

Following successful installation, launch the program. The following screen will pop up:
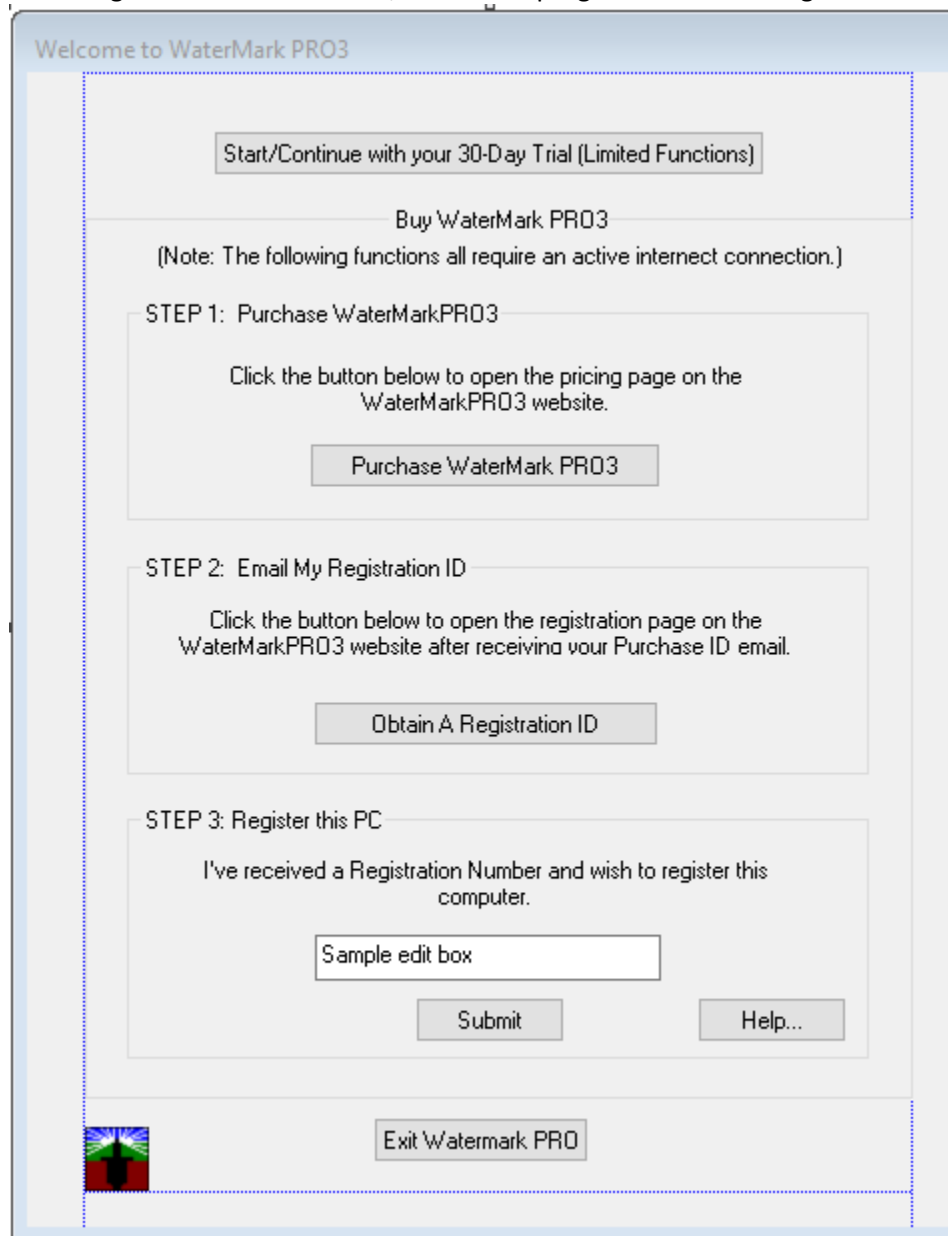
If you haven't already purchased the program and wish to launch the free trial version, click the "Start/Continue with your 30-Day Trial (Limited Capabilities)" button to launch the program in trial mode. You will have 30 days to demo the program but with limited capabilities: disabled saving of projects, disabled ability to add to the parts database, and inability to upload your organization's logo and provide other branding information. Other than the above, all functions will be available.

If you wish to purchase the full version of WaterMarkPRO3: (you must be connected to the Internet)

1. Go to STEP 1 in the figure above and click the "Purchase WaterMark PRO3" button which will take you to the purchase page of our website.

2. If you've purchased WaterMarkPRO3 and have received your Purchase ID that you copied from the Purchase ID email, go to STEP 2 above and click the "Obtain A Registration ID" button and fill in the Web page form with your Purchase ID. The system will then email you with your Registration ID (see STEP 1 above).
3. If you've purchased WaterMarkPRO3 and have received your Registration ID that you copied from your Registration ID email, enter it in the text box in STEP 3 above and click Submit. The program will open into the full version and will include the ability to save projects, manage the parts database, and enter your organization's logos and other branding information.
4. Note: If you've purchased a previous version of WaterMark PRO, please contact us at support@watermarkprol.net. We will provide you with a discounted license to WaterMark PRO3 once we've verified your purchase.

Upon opening If you see "**The WaterMark PRO Parts Database was not found. Would you like to find it yourself?**" notification, click OK to navigate to the folder where the wmdb.mdb file is located:

(C:\Program Files (x86)\Science Hill LLC\WaterMark PRO 3). Click on the wmdb.mdb file to lock in the location. The location will be stored permanently.

In case of any other difficulties launching the program, please contact Science Hill Support at (303) 807-7500 (8-5 MDT, M-F) or email us at support@watermarkprol.net.

Once the program launches, you should be greeted with the following main screen:
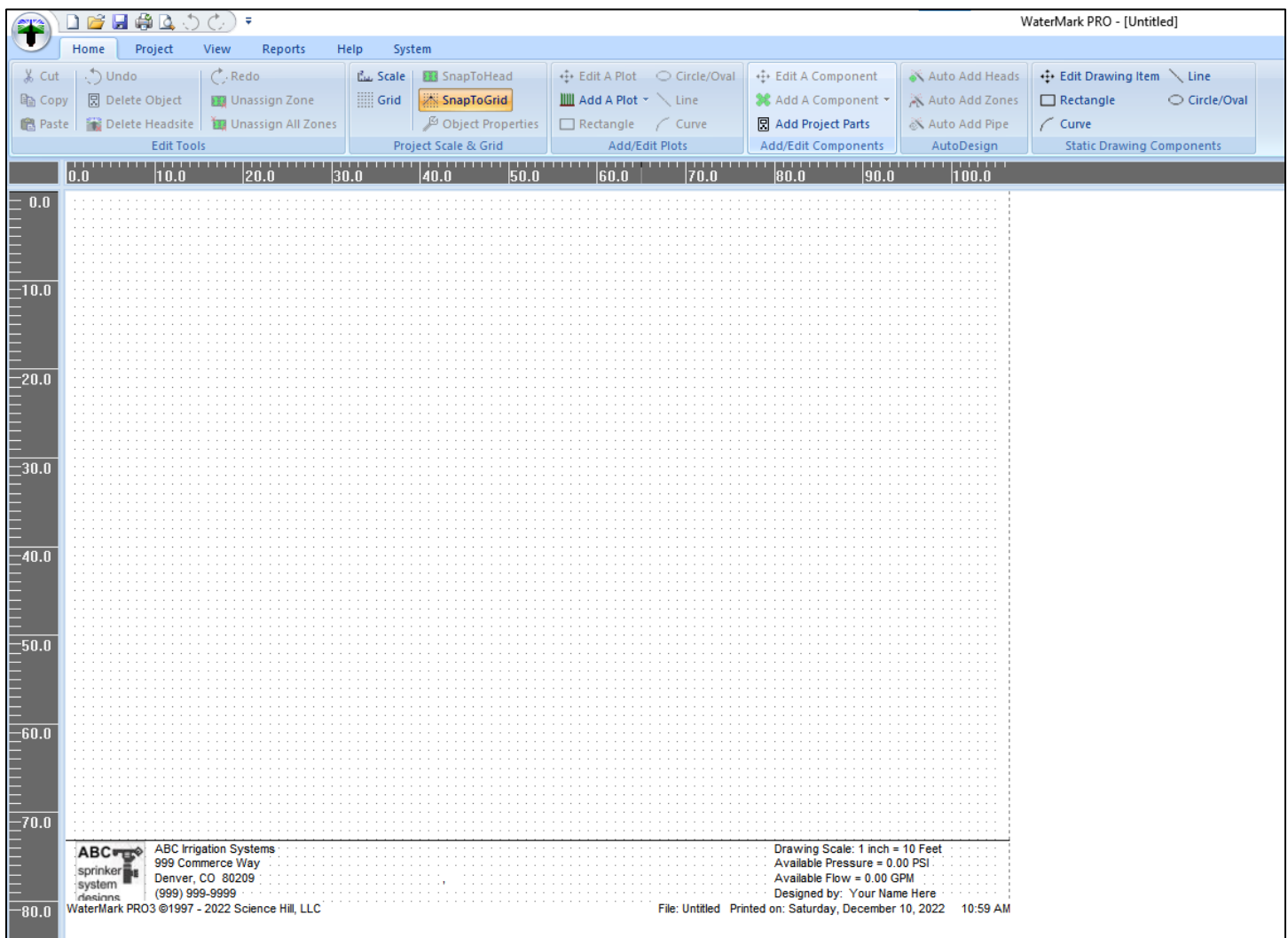
Initial Printer Setup

The drawing surface is designed to mimic the paper size of your printer; therefore, you must scale the drawing screen to comfortably size the drawing onto your printer paper. Select the main menu item in the upper left corner of the window. The main file screen opens (below image). Click the "Print/Print Setup" button. Make certain that the correct printer is selected for the drawing. Next, determine the paper orientation. If your sketch is drawn so that the layout is taller than it's wide, select "Portrait" orientation; otherwise, choose "Landscape" (landscape is preferred). Also, choose the available paper size you intend to use (the larger the better - items on the layout will be easier to read). Click "OK" and return to the drawing screen.

It's not necessary to have a physical printer connected to your computer, just that you've loaded a printer driver of some type that will frame out your drawing surface. You can always go back and add a printer after completing your project.

Note the extreme dimensions of your property sketch. Obviously, the entire drawing must appear on one page.
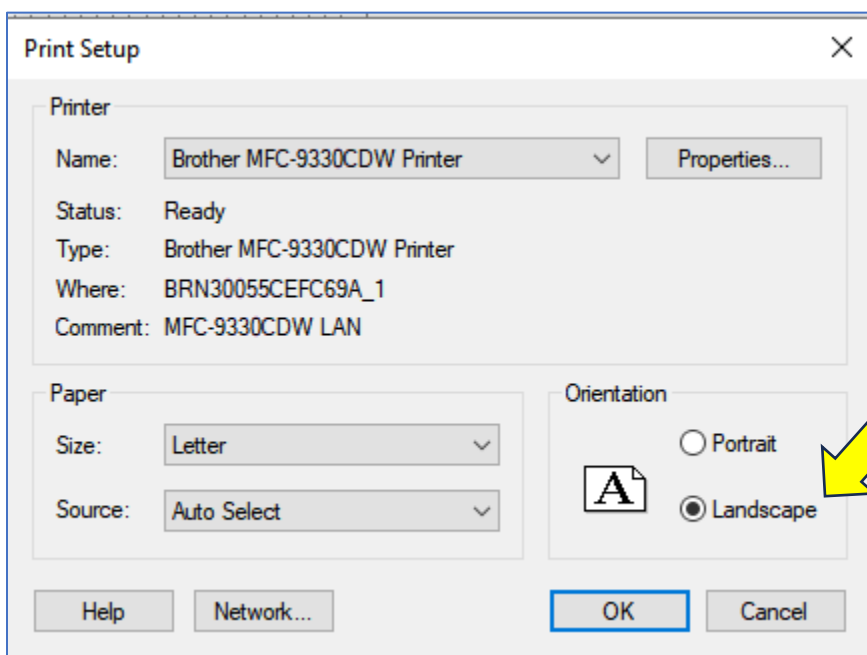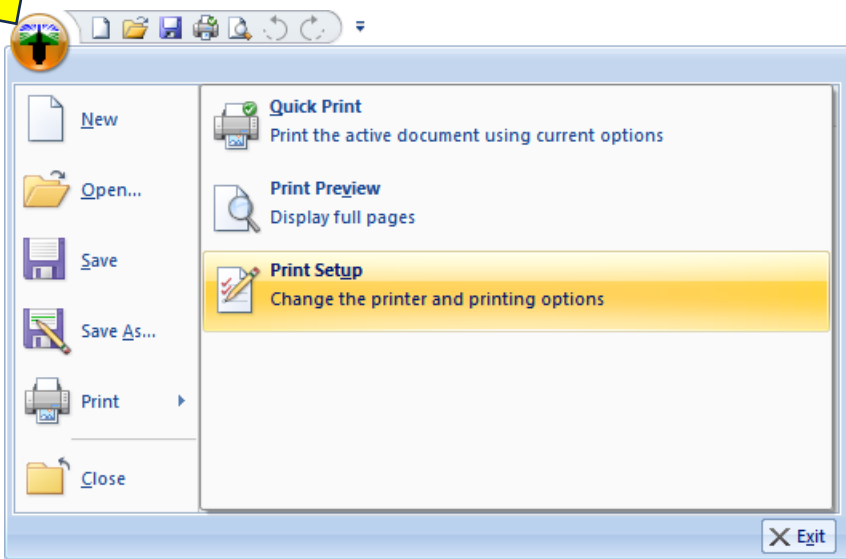
Designer Favorites (full version only)

Click the "Designer Favorites" menu item on the System tab:
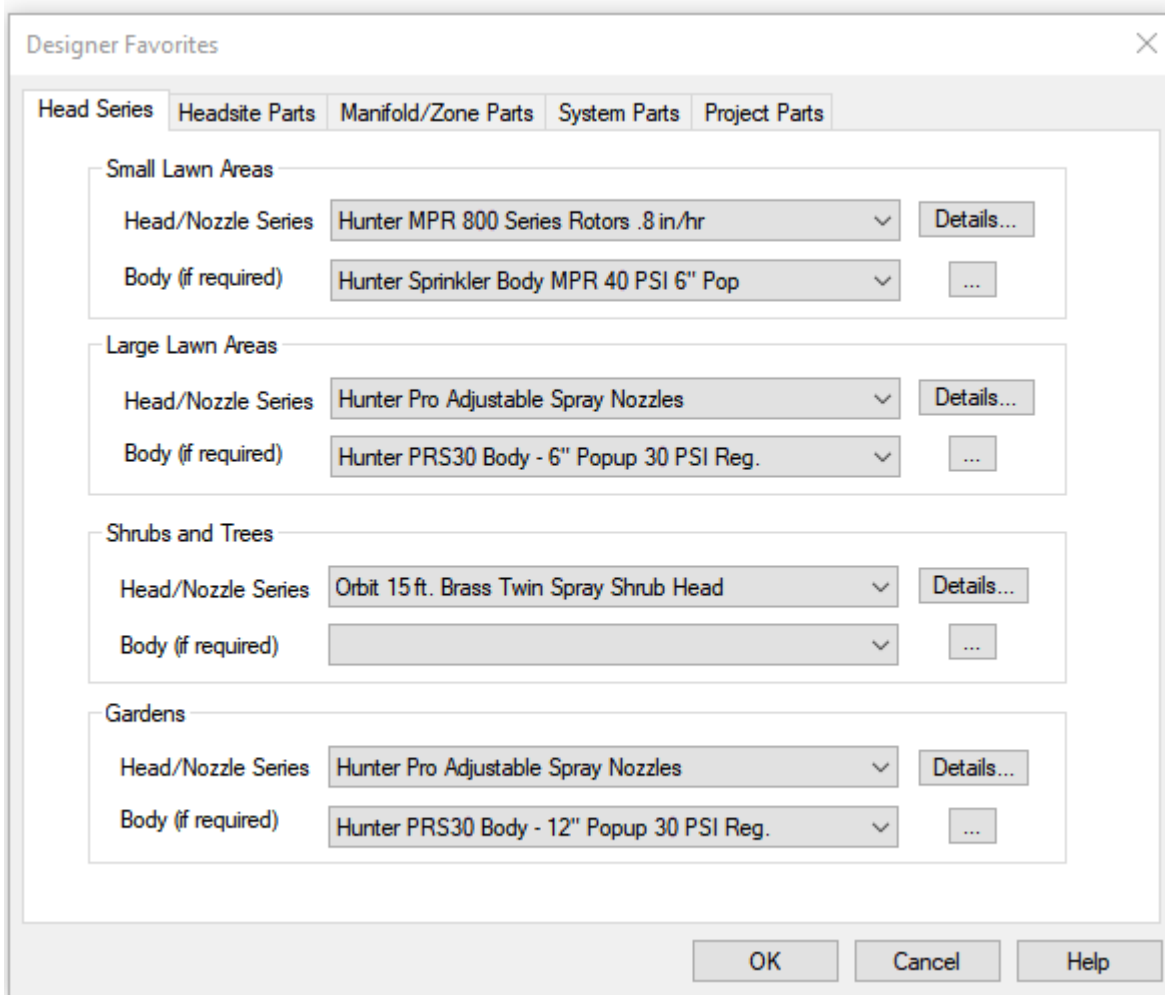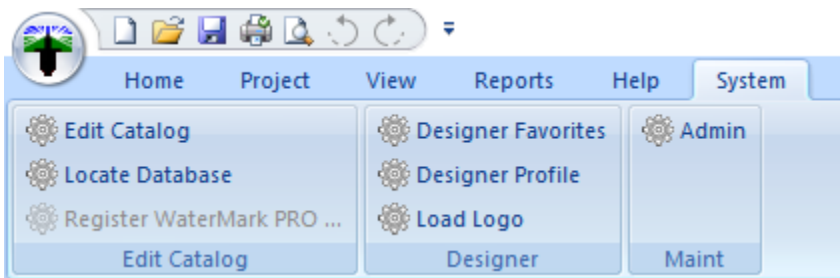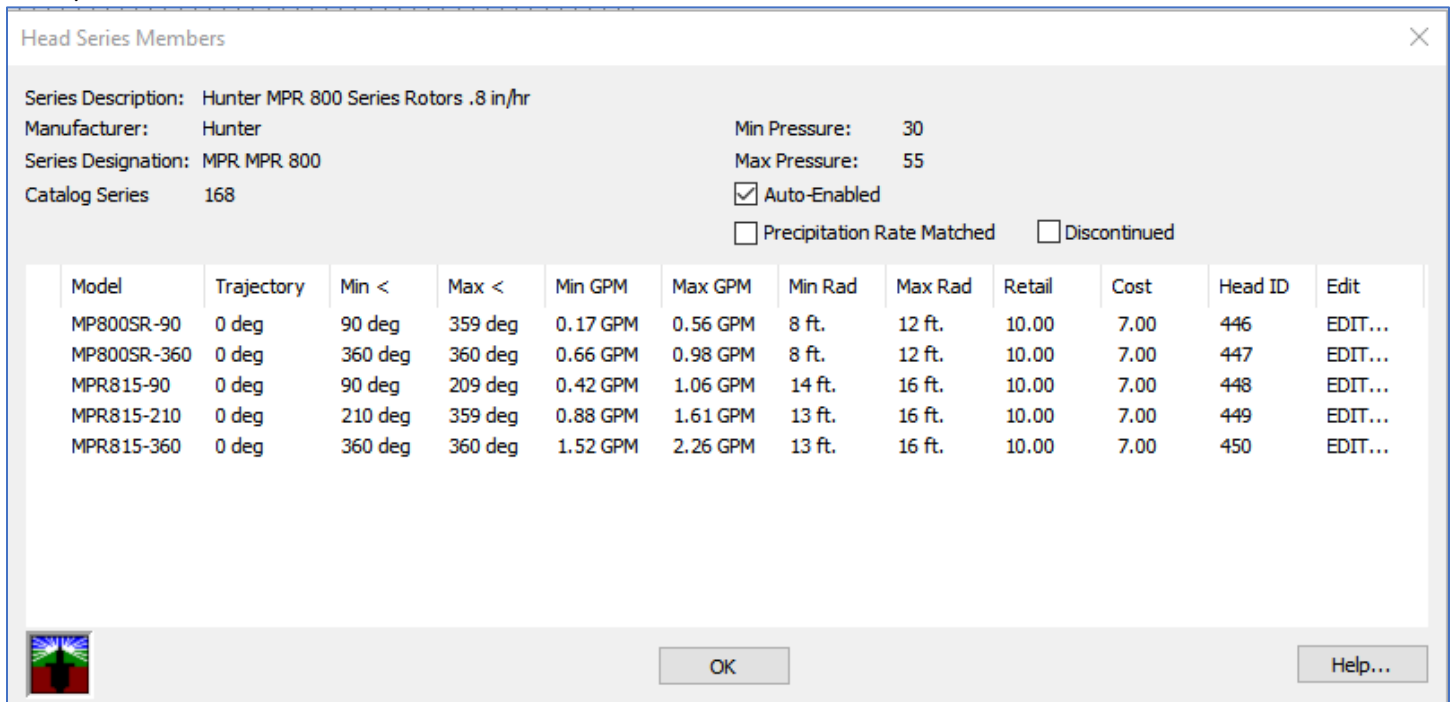
The Designer Favorites sheet opens:

The Designer Favorites screen allows designers to pre-pick their favored series of heads and individual parts, thus simplifying the selection process when assigning them later to a project. Additional parts can be manually added to the database – see the "Modifying the Database" section later in this manual (full version only). Note the button to the right of the "Body" drop list. Click it to add/edit individual model and pricing information. Unlike the head series drop lists, the body drop lists display individual items that require pricing if used in projects that generate estimates or invoices.

The first step is to decide on the types of sprinkler heads you'd like to use in your projects. On the "Head Series" tab, you can select a different series of heads for both the small lawn areas as well as large areas. If a nozzle series is chosen, select the nozzle body that you intend to pair up with those nozzles. Select the "Plant Heads" tab to choose your preferred shrub/tree and garden heads. Later, as you create new projects your designer favorites will be displayed in the Project/Client Data/Favorites area, thus simplifying the parts selection process (but you have the option of changing your mind later).

On the **Head Series** tab only, head product **series** are displayed and not the specific heads. This way, when utilizing the **Auto Head** design function, the system can select individual heads from the series to intelligently place on the plots. Note the "Details" button to the right of the series. The head series detail screen opens which displays all the different heads/nozzles of the series:
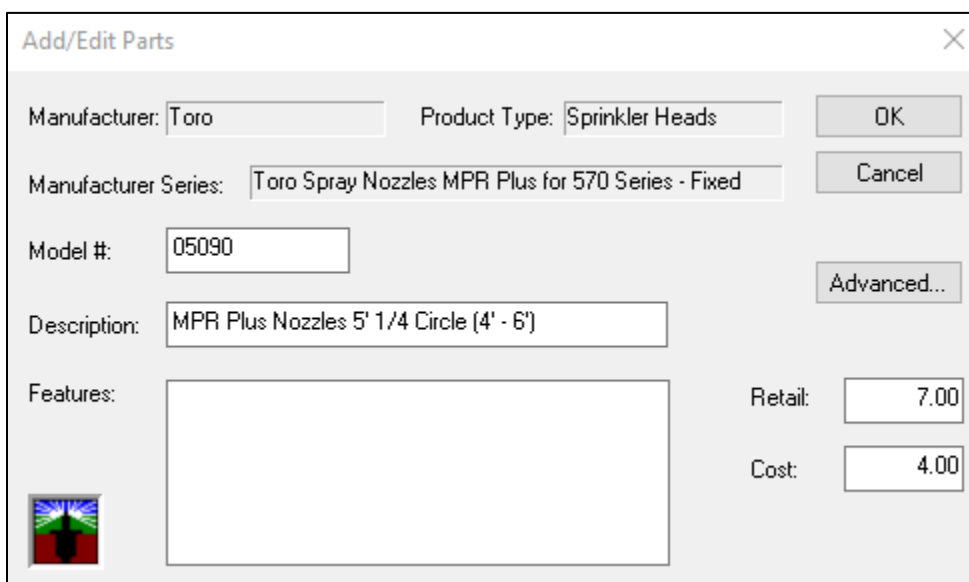
Head Series Members

Series Description: Hunter MPR 800 Series Rotors .8 in/hr
Manufacturer: Hunter
Series Designation: MPR MPR 800
Catalog Series 168

Min Pressure: 30
Max Pressure: 55
☑ Auto-Enabled
☐ Precipitation Rate Matched   ☐ Discontinued

Model	Trajectory	Min <	Max <	Min GPM	Max GPM	Min Rad	Max Rad	Retail	Cost	Head ID	Edit
MP800SR-90	0 deg	90 deg	359 deg	0.17 GPM	0.56 GPM	8 ft.	12 ft.	10.00	7.00	446	EDIT...
MP800SR-360	0 deg	360 deg	360 deg	0.66 GPM	0.98 GPM	8 ft.	12 ft.	10.00	7.00	447	EDIT...
MPR815-90	0 deg	90 deg	209 deg	0.42 GPM	1.06 GPM	14 ft.	16 ft.	10.00	7.00	448	EDIT...
MPR815-210	0 deg	210 deg	359 deg	0.88 GPM	1.61 GPM	13 ft.	16 ft.	10.00	7.00	449	EDIT...
MPR815-360	0 deg	360 deg	360 deg	1.52 GPM	2.26 GPM	13 ft.	16 ft.	10.00	7.00	450	EDIT...

OK   Help...

Click the "Edit" button to the right of a model to make database edits to that item (full version only):

Add/Edit Parts

Manufacturer: Toro   Product Type: Sprinkler Heads   OK

                                                                   Cancel

Manufacturer Series: Toro Spray Nozzles MPR Plus for 570 Series - Fixed

Model #:   05090

                                                                   Advanced...

Description: MPR Plus Nozzles 5' 1/4 Circle (4' - 6')

Features: Retail: 7.00

                                                   Cost: 4.00

Here you can make edits to the model number, description, and pricing of the item. The prices entered will be reflected in any report/invoice or estimate generated by the system. Click the "Advanced" button to modify the physical specs of the item (full version only):

Select the remaining tabs to select favored parts related to the various portions of the project (parts related to the headsites, manifold/zone, system, and project parts). Click the button to the right of each selection to edit the model/description and enter pricing information.

Note that we provide both a retail price and a cost price. The cost price is provided to allow the designer/contractor to enter their cost for the product. This could be an estimated cost in the case of labor or equipment usage. With both cost and retail stored away, compiled numbers related to gross/net profit of individual projects can be recorded and utilized in determining pricing and business growth strategies. In the auto-generated parts reports, the option exists to hide the cost or retail columns on the printed output.

Click the "Designer Profile" menu item above. Fill in your company information that is displayed on reports.

Click the "Load Logo" button in the system menu to select and upload your company logo to drawings and reports. You may have to modify its size to fit properly. The logo graphic can be in the form of .jpg, .png, or .gif formats. The logo graphic should be approximately 62 x 62 pixels in size. Paid clients can forward their logos to us and we will size them at no additional cost.

Start A New Project – Setup

The program opens to a blank project, or you can create a new one by clicking the "New" button below:
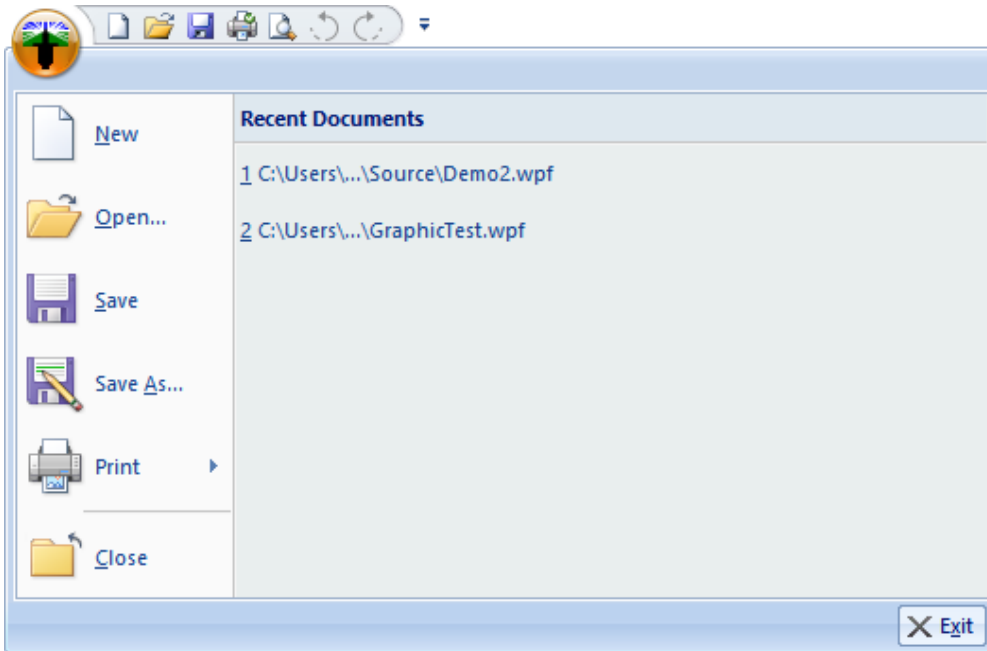
The **Open**… button opens any projects you've saved, the **Save**… button (not operational in the trial version) saves projects to your computer and **Save As**… saves a copy of an existing project under a new name. We've included a couple sample programs for you to view, Demo1 and Demo2. Click Open to load them.

The **Print** button allows you to print your drawings and reports and the **Print Setup** screen lets you select your default printer, page orientation, and various other printer properties. Make sure to select a default printer to define your work surface size. Click **Print Preview** to show how your drawings and reports will look prior to printing them.
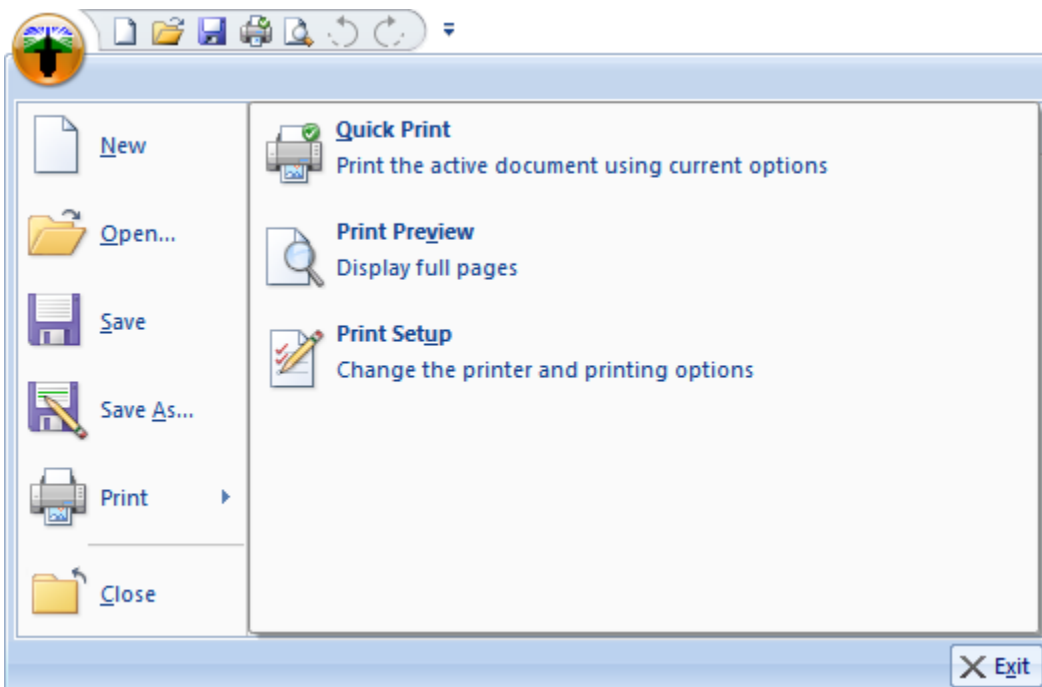
Once you've created a new document, the first step is to fill in the project data. Click the Project Tab/Client Data/**Client** button:
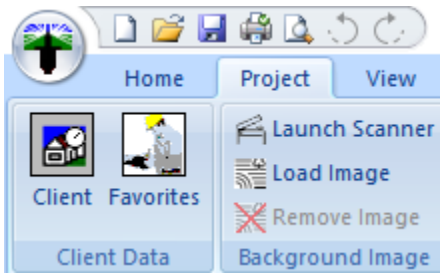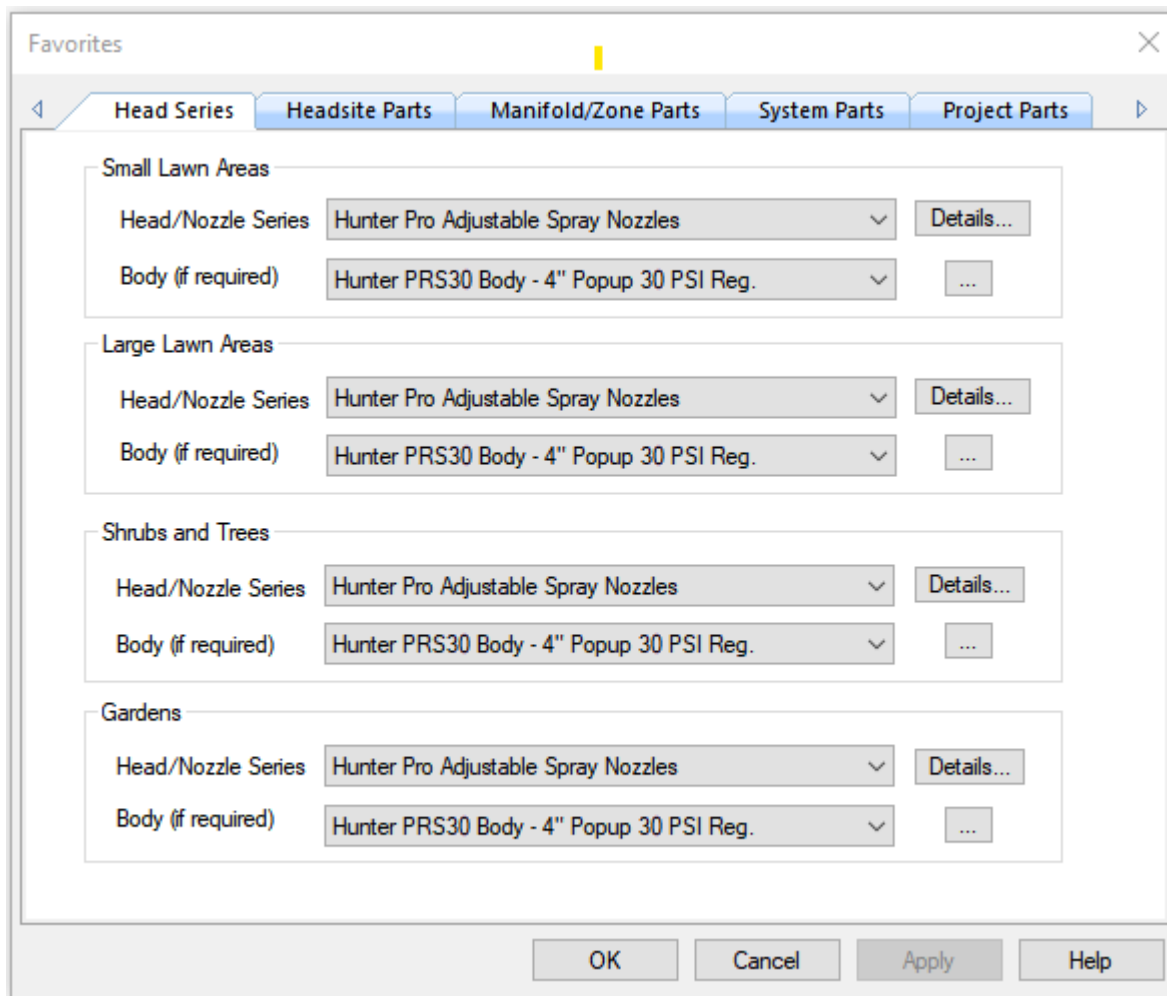
The **Client Profile** Dialog Box Opens:

Fill in the text boxes as indicated above. Enter the project's available water pressure (PSI) and water flow (GPM) available at the head of each zone.

Click the Project Tab/Client Data/Favorites icon to open the **Favorites** Dialog Box:

If you populated the "Initial Designer Favorites" (full version only), the Favorites will already be filled in with those items. If not, select your preferred parts for this project (see directions from "Initial Designer Favorites" above), or change any that were brought over from your designer favorites. Selecting system preferences simplifies selecting parts for your project. Once you've made these selections, they will be saved along with the project you've created (full version only).

The next step is to set the **drawing scale**. Click the "**Scale**" button below to open the "**Drawing Scale**" dialog box.

Here you must consider the scale of the drawing compared to the actual property you wish to bring into your project. Select a number that comfortably fits the property within the screen's dotted boundary and informational footer.

The "**SnapToGrid**" button is selected by default upon creating a new project. Deselect if you don't want your drawing objects to snap to the grid points.

You may also wish to adjust the spacing between grid points by clicking the "Grid" button. The following dialog box opens: Select a grid spacing or use the default spacing of .1, which works well for most drawings.
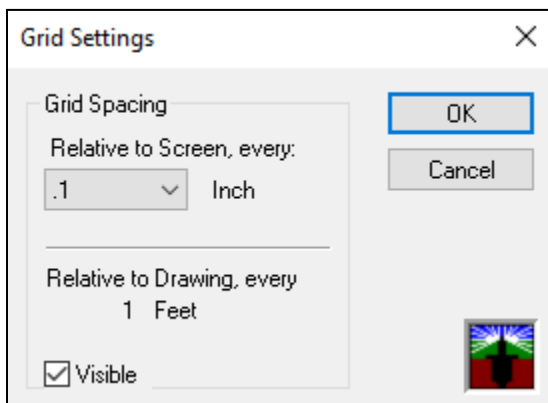
View Menu

The "View Menu" enables the ability to add or remove layers from the drawing screen. Note the various layers in the menu area:
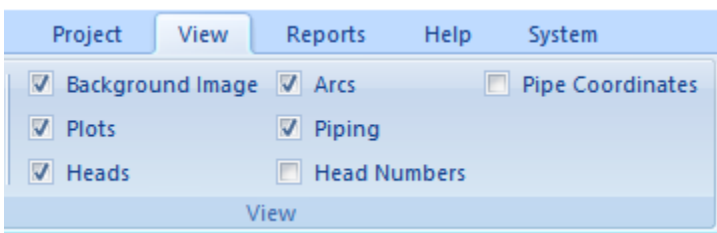
The above selections define the default layers shown. Check or uncheck layers to provide the view of the drawing screen desired. Utilize Print or Print Preview to generate helpful views without being obscured by other layers. For example, if you wish to print out a diagram of head numbers and piping, uncheck all except for Heads, Head Number and Piping. Then it's simply a matter of printing a Heads by Plot or Heads by Zone report to mark head and piping positions on the property.

Other helpful menu items:
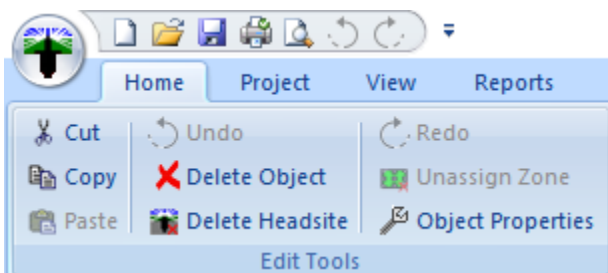
The "**Edit Tools**" panel provides several helpful tools. Utilize the "**Cut**", "**Copy**" and "**Paste**" tools to duplicate components throughout a project. Simply select the item and then click the appropriate button to execute the function. Utilize the "**Delete Object**" function to delete any selected plot, component, or static drawing item.

Adding Plots

Plots designate the various areas with the property. Plots can be "wet" (fine grasses, coarse grasses, shrubs, gardens, trees) or they can be "dry" (structures, driveways, walkways). When adding the plots, consider the logical breakdown of the property.

Plots must be separated and can't overlay each other.
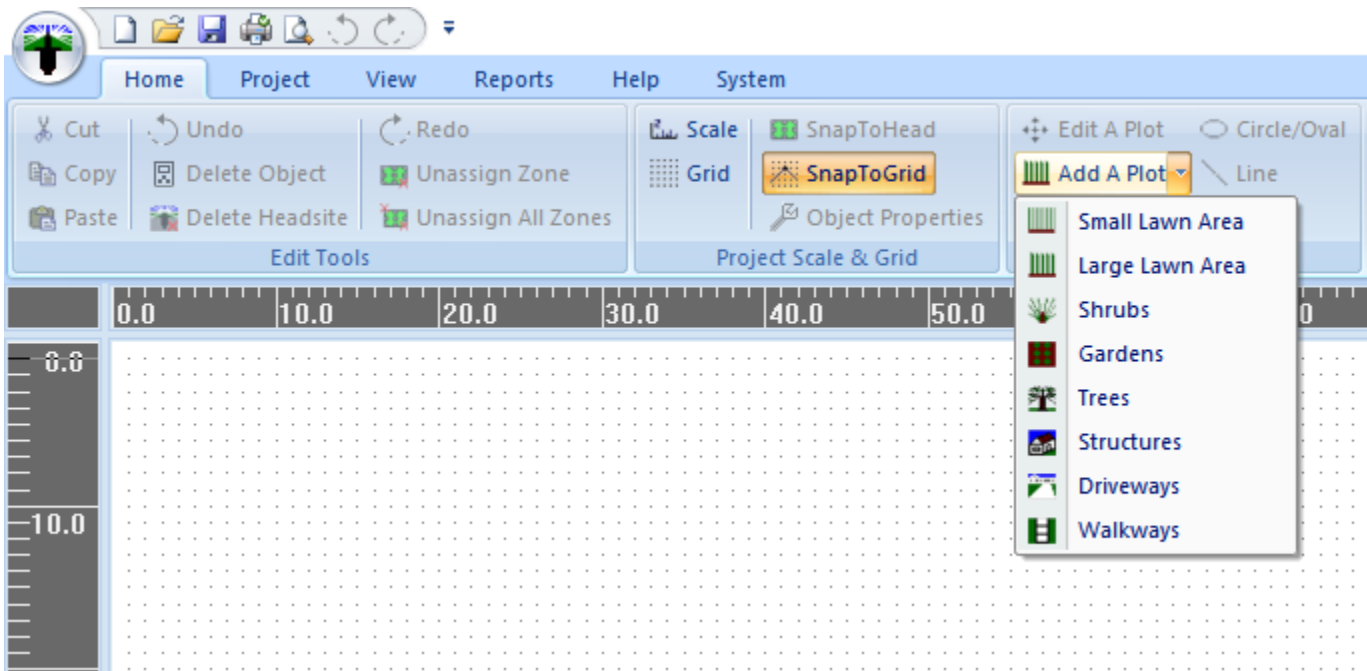
The following drawing tools are available for drawing plots: **Rectangle tool, Circle/Oval tool, Line and Curve tools**. Entire closed plots can be created with just the Rectangle or Circle/Oval tools. The Curve tool and Line tool both create arcs/sides of a plot and must be connected end-to-end to create a closed area which becomes a plot once whole. The Circle/Oval and Line tools can be used together to create virtually any shaped plot.
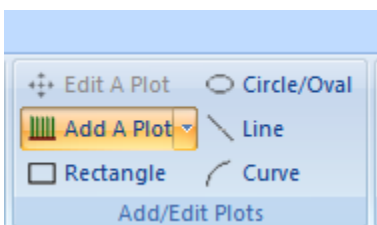
The following plot layout defines a typical residential project property. Note that the top left corner of the top and side rule defines the (0,0) point of the drawing. All measurements should be referenced from this point. Back yard was added with the "Coarse Grass" type; front with the "Fine Grasses" type; house with the "Structures" type; shrubs, garden and walkway as noted.
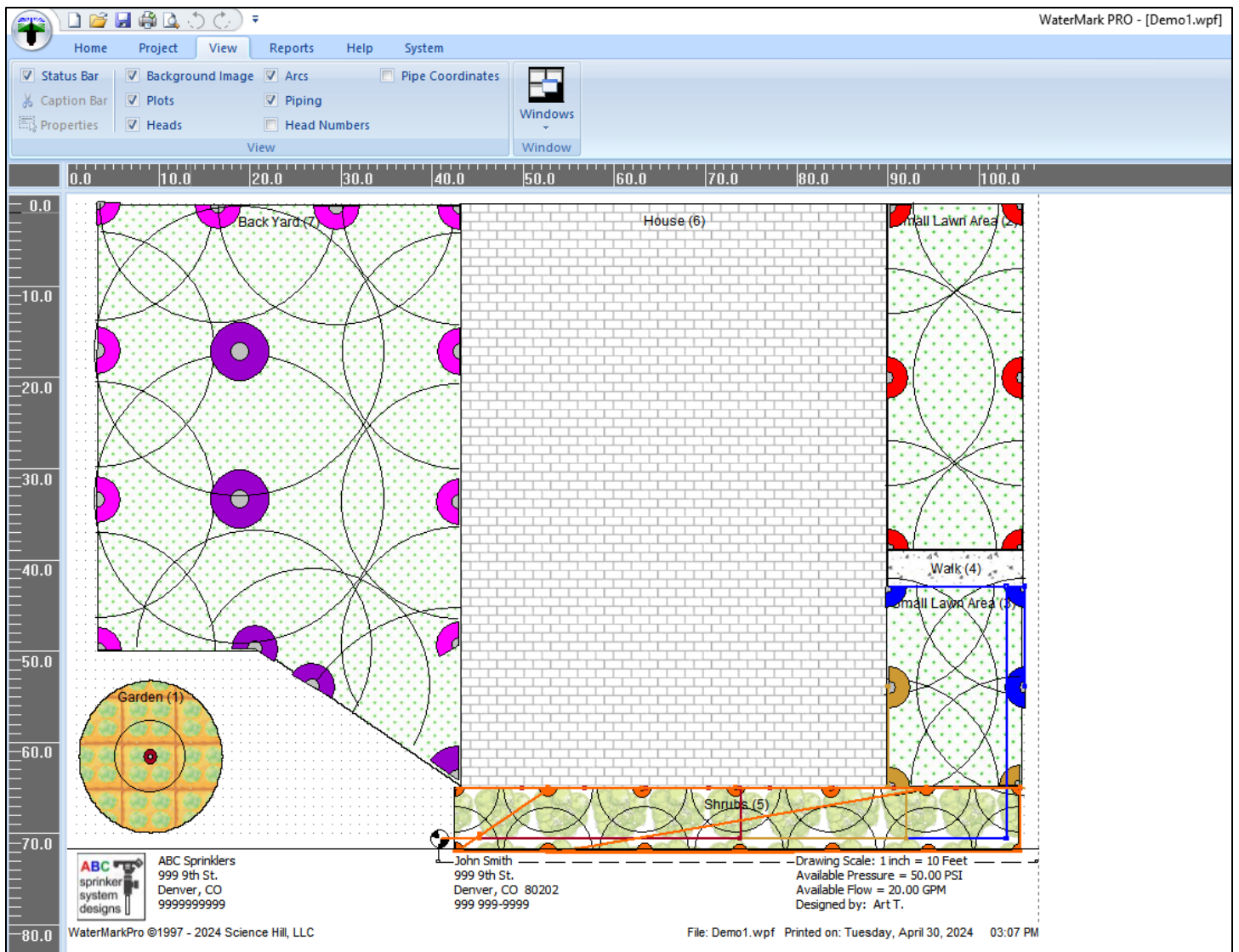
To add a plot, first select the plot type from the "**Add A Plot**" button, select a drawing tool (in the below case, a rectangle), and click the right mouse button to trace the rectangle onto the drawing. Start at the top left of the rectangle and move the mouse, while holding down the right button, completing the rectangle at its right-bottom point.
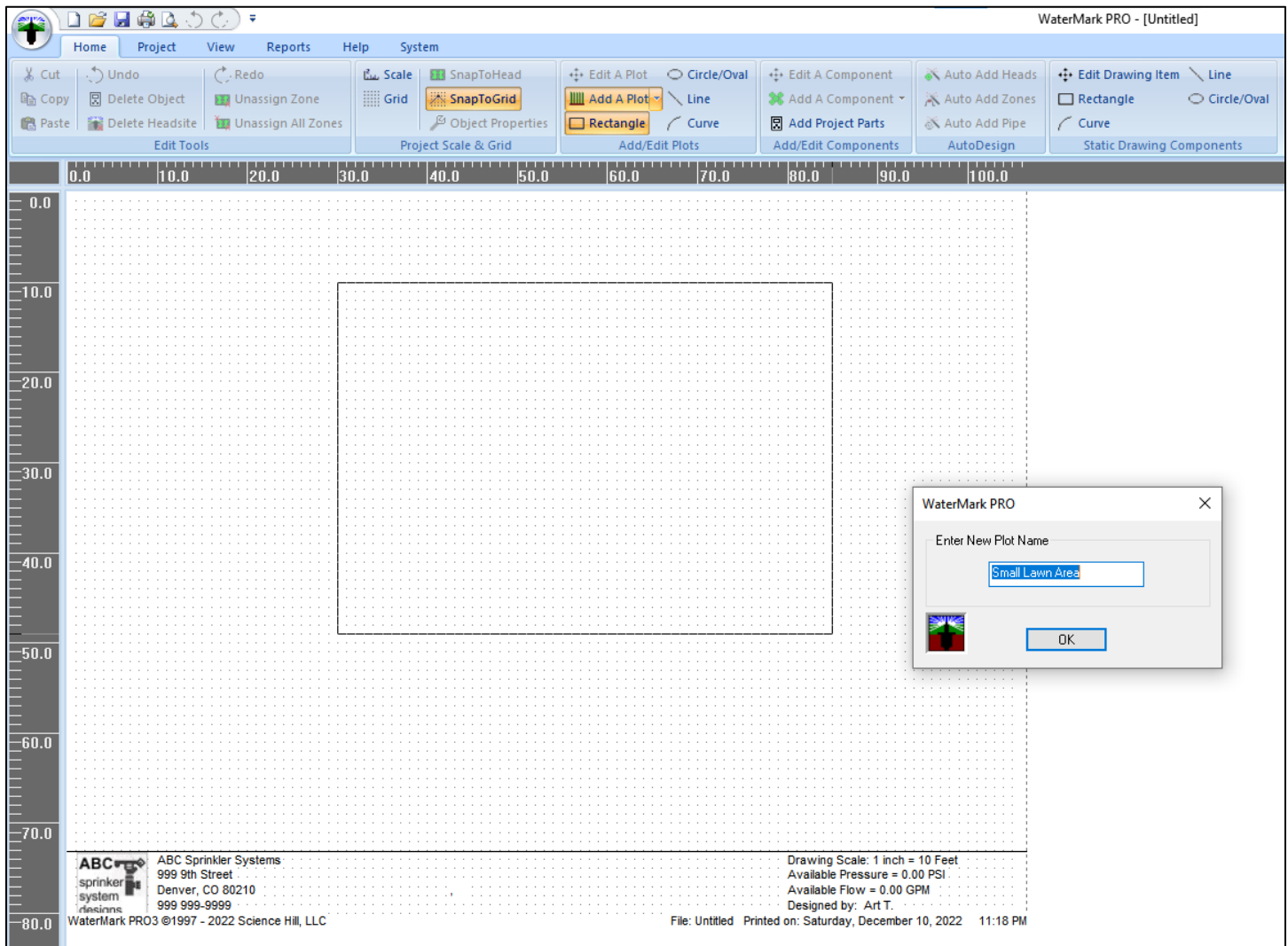
Clicking OK completes the plot onto the drawing surface. Prior to clicking OK, you may wish to change the name of the plot to match the actual property area:
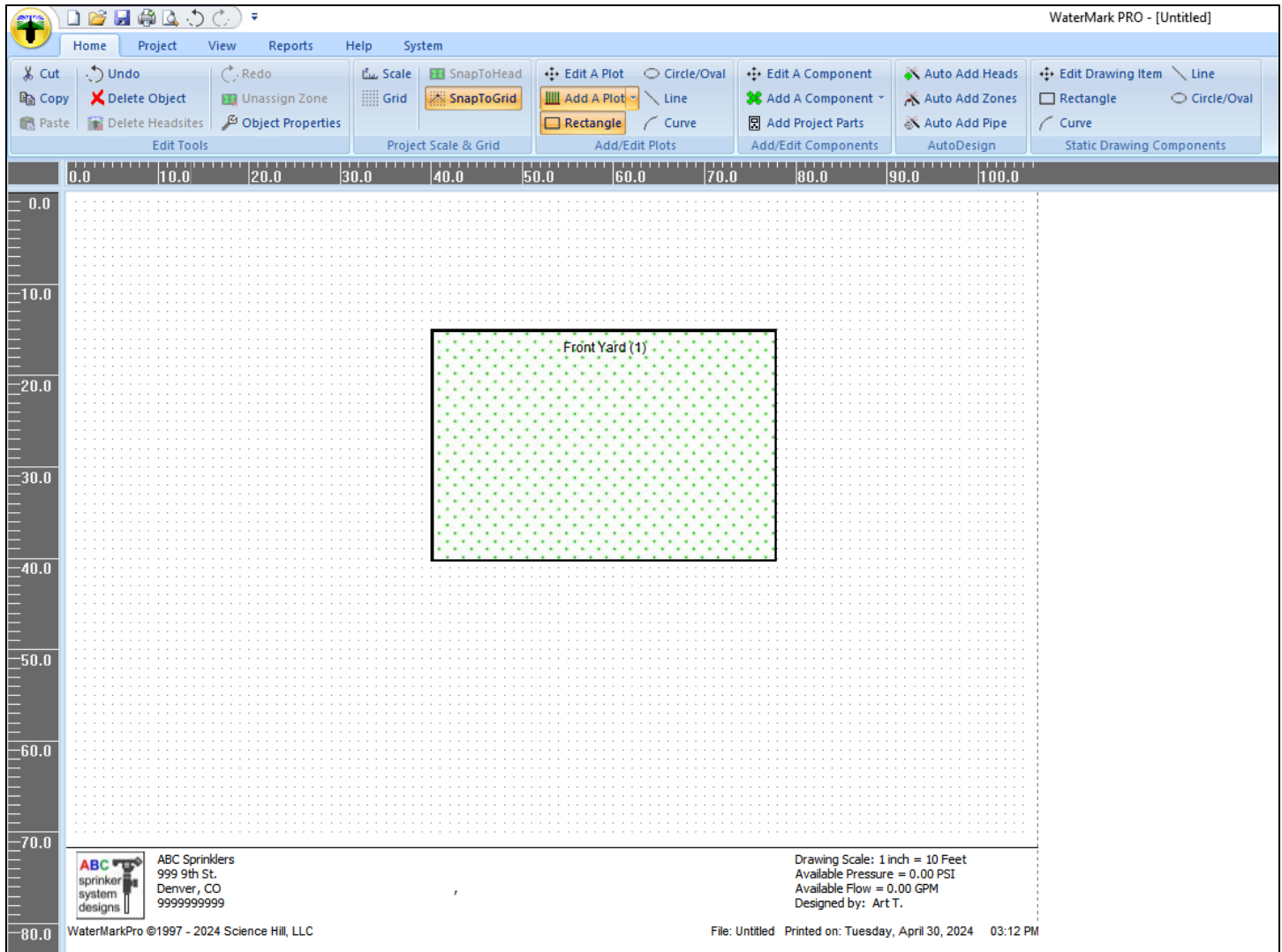
Utilize the line and curve tools to create non-rectangular, non-circular plots. The final shape must be closed by connecting the last selected point to the first. Hold down the Ctrl key while drawing lines to confine the line tool to the x and y axes of the drawing.
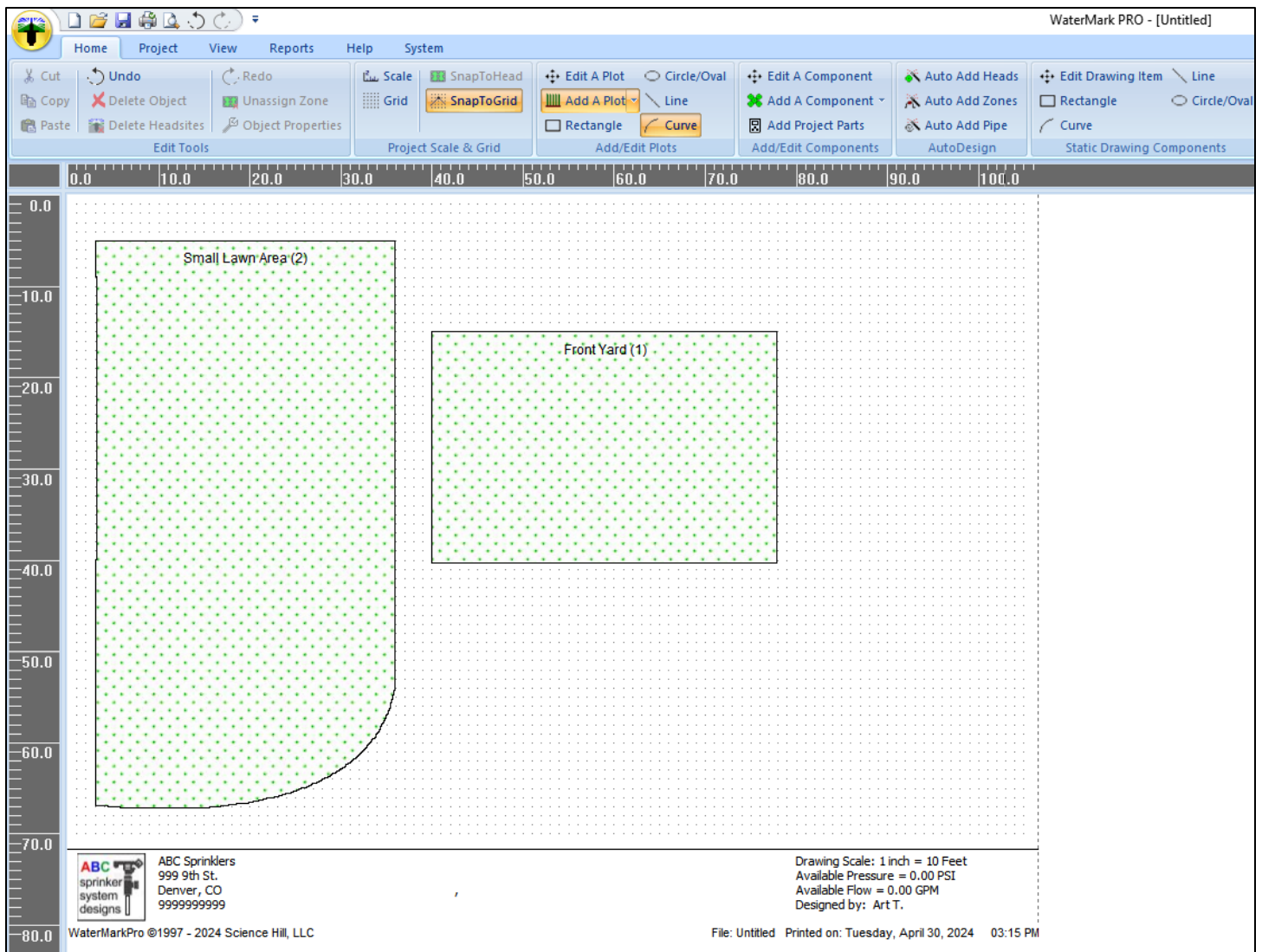
Editing Plots

Plots can be removed by first **selecting the plot** (click the "**Edit Plot**" button and left click over the plot to select it) and then click the "Delete Object" button; alternatively, right clicking the mouse will reveal the plot's context menu. Selecting "Delete Selection" will also remove the plot, or simply clicking the "Delete" button on the keyboard accomplishes the same.

Plots can be **moved** by selecting the plot, positioning the mouse cursor over the plot while holding the left mouse button down and moving the mouse until the plot moves to the desired location. Small, micro movements can be made using the arrow keys on your keyboard. (Note: moving a plot will include moving the plot's array of heads/zones, but not piping or valve sources, which are always relative to the drawing coordinates.)

The mouse pointer's location can always be monitored by viewing the X and Y position displayed on the left side of the window's status bar:

Coordinates: X=8.00, Y=75.00
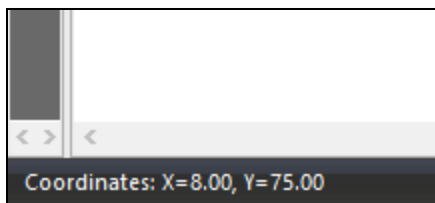
Plot details can be edited by selecting the "**Object Properties**" button or the **Properties** item from the context menu, revealed when right-clicking the mouse button (the plot must be selected):

The **Plot Properties** dialog box opens:

From the Plot Properties, you can make several changes: The plot's Name, Soil Type, Solar Exposure, Slope, Slope Crest Side can be modified, and Water Demand can be selected. Once the watering components have been added, a precipitation rate will be calculated for the plot. At this point, a water demand can be selected (or suggested, based upon all the above settings). The system will calculate a suggested number of watering periods per week and watering times per period. Click the "Override Suggested Watering Periods Per Week" button to override the number of watering periods per week, and the "Time Per Watering Period" time will change.

The Location/Size Coordinates group provides the plot's location coordinates, size, and area. These indicators can only be edited by removing the plot and re-adding it.

Adding Headsites

The term "**headsite**" refers to the location and physical parts that comprise a specific sprinkler head's location, head type, and settings as well as any associated parts (riser, tees, swing joints, etc.).

Headsites can be added either manually or by utilizing WaterMark Pro's "AutoHead" design tool that automatically places headsites within a selected plot. AutoHead design tools are discussed later in this manual. For now, manual placement of headsites will be addressed.
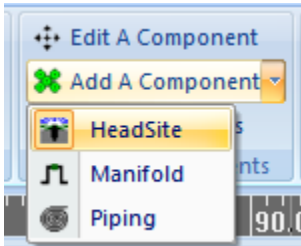
To **add a headsite to a plot**, first select a "wet" plot (click the Edit Plot button and left click over the plot). Now click the "Add A Component" button and select the "Headsite" item. The mouse cursor becomes a crosshair. Position the crosshair over the spot you wish to locate the headsite and left click the mouse button. To assist in manually placing headsites, activate the "SnapToHead" button which displays a "help" cursor once it's near a corner or center of a rectangular plot.
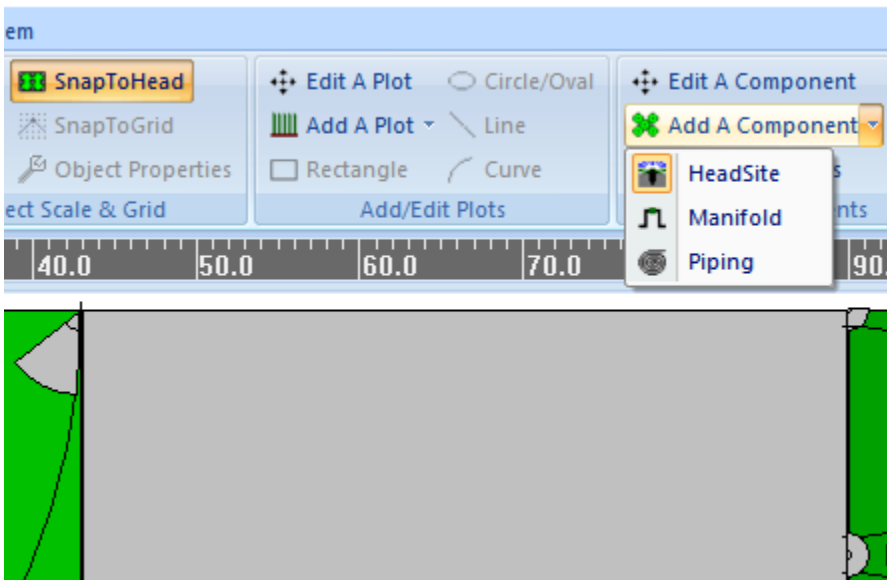
When clicked, the Headsite Properties dialog box appears:

If you've completed the **Favorites** section above, your preferred head series for this type of plot is displayed in the "Series" box. If not, select a series from the dropdown list.

Once a series is selected, click the "Head" drop down box and select a specific head (or nozzle) part. The spray pattern will be noted in its description, so match the pattern to the area within the plot where you want it positioned. Click the "Body" list to determine whether a sprinkler body must be selected for the head. If empty, the selected head doesn't require a separate body.

Configuration:

- Click the up/down arrows to the right of the **Position/Angle** item to position the spray pattern within the plot.
- Click the up/down arrows to the right of the **Radius/Width** item to widen or lessen the spray radius. The head's max and min spray radius are programmed with the part's database record based upon manufacturer specs.
- Click the up/down arrows to the right of the **Adjust. Angle** item to adjust the head's pattern. This adjustment will be unavailable for fixed pattern heads and only used with adjustable pattern heads.
- When editing an existing headsite and upon changing one of the parameters above, clicking the **Apply** button will transmit those changes to the main drawing screen where you can view the actual change. Note that once the Apply button is clicked, the changes will occur even if the "Cancel" button is activated.
- Note: If the head's required pressure exceeds pressure availability less a safety buffer, a caution message will appear when you attempt to close the window. You will have the opportunity to change parameters or continue with the existing pressure settings.

Other Headsite functions......

The top area of the Headsite Window (ID) contains positional information as well as plot number and headsite number (relative to the plot). Also shown in the Current Configuration panel is the head's precipitation rate. This is the amount of water spread over the area of coverage per hour of operation. Precipitation rates from all heads in the plot are then summarized in the Plot Properties window and can be viewed by selecting Plot Properties as described above. Clicking on "Head Details" brings up the Head Detail Window that provides more information about the selected head. At this point, you can also assign other system parts to this headsite, such as risers, ells, etc. We recommend that this action be

completed when all heads are assigned, as you can clone all headsite parts within its parent plot, thus saving time. Details are discussed later in this document.

Click the "**Add Parts**" button to assign additional hardware to this headsite. The "Edit Headsite Parts" dialog opens:
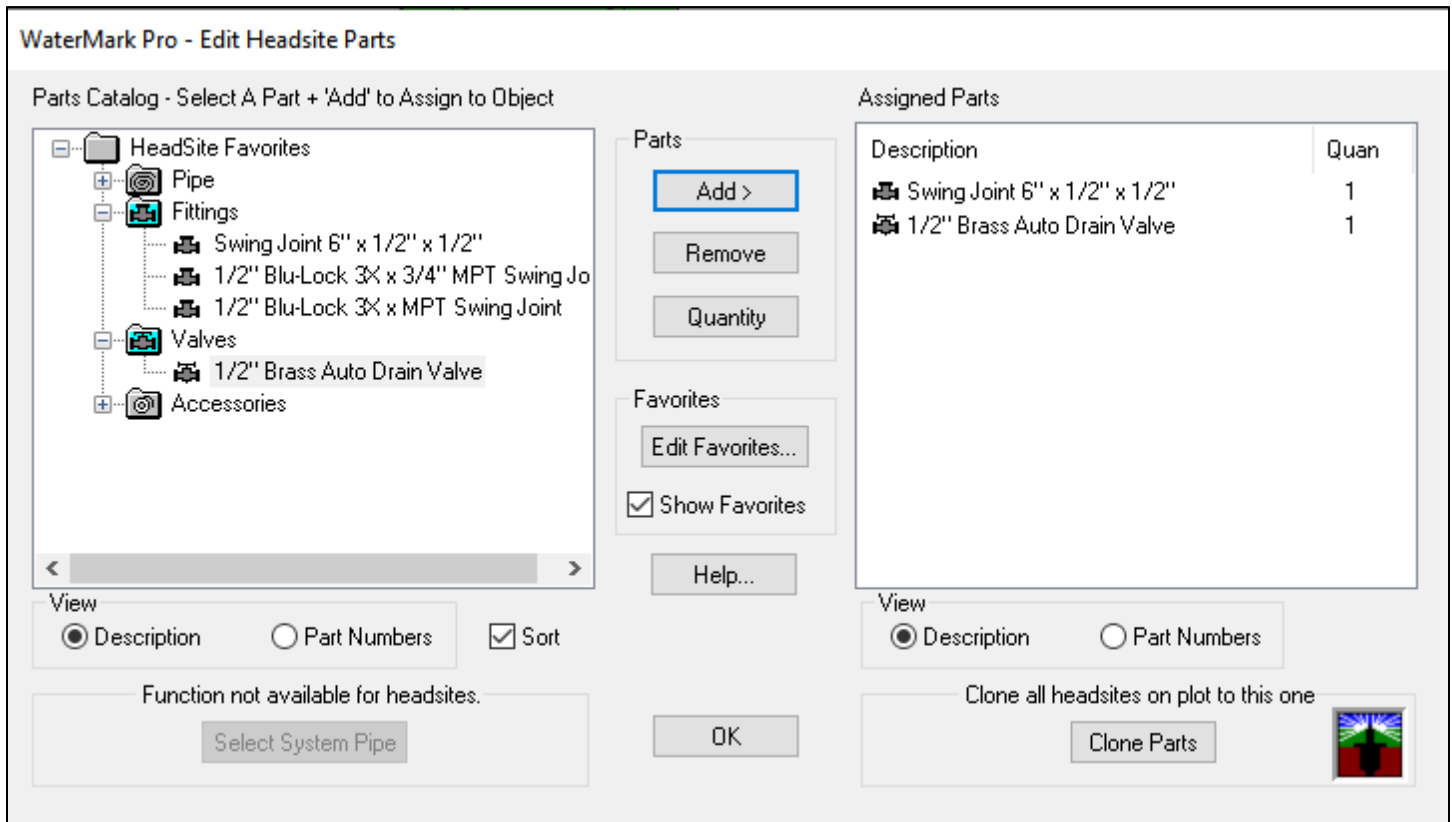
Any headsite favorites previously selected will display on the left of the screen. Click the +/- buttons to the left of the part type folder icons to display the parts. To select a part, simply click the part and click the "Add" button to place it on the selected list to the right. After adding, you can change the quantity (defaults to 1) by clicking on the selected item and then clicking the "Quantity" button. To remove an item, click the selected item and then the "Remove" button.

To view the entire library of parts, uncheck the "Show Favorites" button. Click the "Edit Favorites" button to update the Favorites selections.

Clicking the "Clone Parts" button will automatically add the assigned parts to any other headsites that already exist on the parent plot.

Editing Headsites

You can always edit any head/headsite that has been added to the system. Click the "Edit A Component" button.
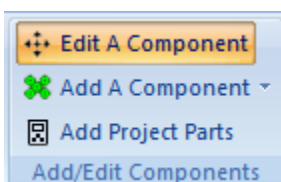
To edit a head/headsite, click over the center-point of the head's radius (or center of the square). The outline of the head center area will turn red - now select "Properties" from the "Edit" menu. (You can access the Properties menu from the right mouse-click context menu). Once the **Headsite Properties** Window is opened, you can make any changes you wish to the head or headsite.

You can also delete a head/headsite by selecting the head (as noted above) and clicking "Delete" from the "Edit" menu. **Headsites may also be moved** by selecting the head, and while holding down the left-mouse button, moving it around the plot. Use the keyboard arrow keys to make small changes to the headsite's position.

Copying & Pasting

WaterMark PRO contains several features that speed and simplify the process of head layout. Oftentimes you will wish to copy existing identical heads to other locations within the plot without having to go through the entire configuration process (this is particularly handy with half-circle heads).

The "Edit A Component" button must be selected while performing these procedures. To copy a head, simply select the head as noted above and then click the "Copy" item from either the "Edit" menu or the popup menu. Move the cursor to the point where you would like to copy the head and then select "Paste" from the "Edit" or popup menus. If the head isn't placed exactly where you like it, move it as described above, or edit it by selecting its properties screen.

You may also "Cut" and "Paste" a head by selecting the head, clicking the "Cut" command and then pasting the head to the new location using the "Paste" command.

Headsite Layout - Completion

Continue to add heads to the parent plot and continue to populate the remainder of the "wet" plots with heads. Gardens and shrubs can also be part of the system if your head catalog contains heads appropriate to these areas.

Now would be a good time to revisit each **Plot Properties** window. See the Plot Properties discussion above for details.

Auto Head Design Tool

The manual headsite functions are mostly useful for adjustments while tweaking a design, but the **Auto Head** design tool is the preferred method for adding headsites.

Preparing to auto-design headsites is straightforward, yet important for the accurate processing of the auto-design function.

Since auto-design relies on the selection of a preferred head/nozzle series part, make certain that the Favorite parts are selected as described in the "**Start A New Design Project – Setup**" section above. If available, choose adjustable head series for irregular plots (multi-sided or curved areas). Fixed nozzle series (i.e., quarter-circle, half-circle, etc.) work well in rectangular areas.

The auto-design function extracts hydraulic information from the "Project/Client Data" window, so this information must be available for the calculation of head spacing and spray radius.

Auto Add Heads
Auto Add Zones
Auto Add Pipe
AutoDesign
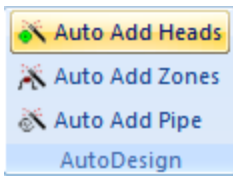
The auto-design process can add headsites for a selected plot or for all "wet" plots in the drawing. To design a single plot, select that plot.

Click the "Auto Add Heads" link. The system will ask whether you wish to design headsites for all the drawing's plots. If you select "NO", the system will design headsites for only the selected plot.

If headsites already exist on the plot, the system will prompt you of this fact and ask whether you wish to continue (existing headsites will be deleted) or cancel out of the process.

Automatic Headsite Design – Options

The "Auto Head Design Process" window will now appear. This window offers several configuration options prior to the actual auto-design procedure:
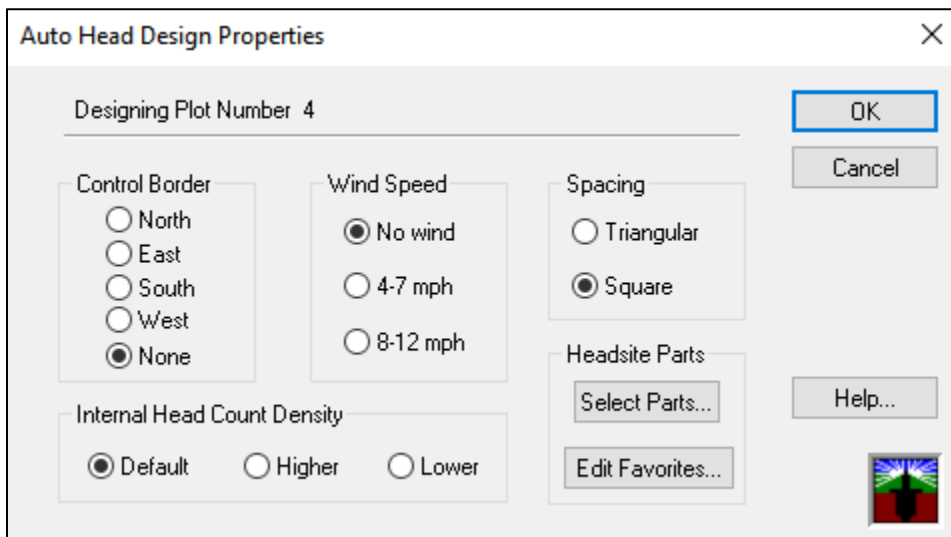
Select a Control Border: The control border determines where the process will begin its placement of headsites along the perimeter of the plot. Select the control border that requires the most accurate head placement (to avoid overspraying boundary areas). Heads will be "fitted" within the control border with appropriate spacing and spray radius (based upon available water pressure and flow). You can also decide to select "None" (the default). This option will maximize spacing and spray radius, but no attempt will be made to "fit" headsites along any border. For rectangular plots, the system will also attempt to fit headsites along all sides based upon the spacing and radius derived from the control border.

Wind Speed: If the watering areas are prone to constant winds that might divert water spray from their designated targets, the system provides an option to space the heads closer together to assure better coverage using industry standards. Select an option that matches your wind condition.

Spacing: Select triangular spacing to place headsites at the vertices of equilateral triangles that fill the plot. Triangular spacing is always recommended for non-rectangular plots because the number of headsites is usually minimized, water

coverage is more consistent, and water consumption is generally less than with square spacing. Square spacing works better in plots that require a small number of headsites – typically in rectangular areas utilizing rotor-type heads.

Internal Head Count Density: This option allows you to "tweak" the number of heads designed by the system. Since the procedure relies on numerous calculations based on disparate hydraulic and geometric values, design output may not always be "perfect". You may wish to delete the generated headsites and repeat the process with a different density value.

Headsite Parts: Select any headsite parts that you wish to be added to the generated headsites (risers, ells, etc.). Please see "Other Headsite Functions**"** section above for details. Whatever you select will be added to the current plot's generated headsites. If the above option was to add headsites to all plots, the selected parts will be added to all the generated headsites in all the plots.

Edit Favorites: If you haven't already selected preferred head/body parts for the procedure, you may do so at this point.

As with any computer-generated function that attempts to mimic the human brain, it's often impossible to do so with perfection. Though the auto-design process is extremely sophisticated, it's important that you review the output for anomalies resulting from the complex interaction of the numerous hydraulic and geometric calculations. Rectangular areas (with a selected control border) will be designed with the most accuracy, but irregular areas may require some adjustment of head placement and/or spray angle. Again, avoid using "fixed" nozzles in irregular plots.

Utilize the manual functions outlined above to implement your adjustments.

Adding Manifolds/Zones

Like their physical counterparts, WaterMark Pro manifolds define the watering zones and all its integral parts.

To add a manifold (or valve box location), click the "Add A Component" button and select the "Manifold" menu item. Move the mouse crosshairs to your chosen location on the drawing and click the left mouse button.
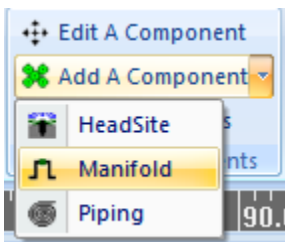
The Manifold/Zone Editor window starts out with no zones. Click the Zones - New button to add Zone 1. To add heads to the zone, click the + symbol next to the plot icon in the tree list. Click the + symbol next to plot 1 to reveal all the heads assigned to this plot.

Heads can now be added to Zone 1. Feel free to move around the window to reveal plot/head numbers on the drawing surface below. Attempt to group heads in such a way that the pipe lengths will be as short as possible and that the head groups are logical (always group like heads together - never mix impact with spray or strip heads). Assign heads from any plot to a zone if the selection makes sense. To reference a head, select the head on the tree list and click the Heads - Add button. Notice that the selected head is removed from the tree list and has been added to the list box on the right.
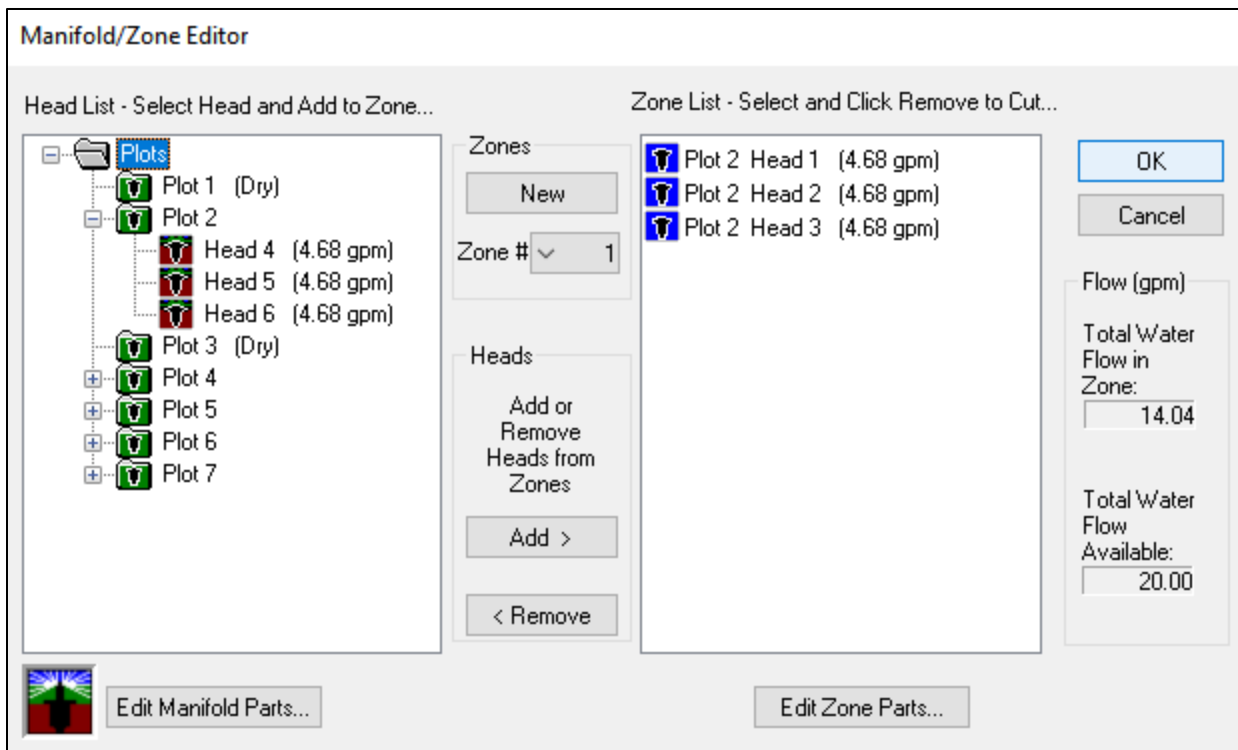
As heads are added to the zone, note the flow information to the right of the list box. When a head is added to the zone, the total flow required for all heads will be displayed. Below is the total system flow available that was calculated from the Client Data window earlier. Attempt to include a fair safety margin to assure that the heads perform as designed over all water availability conditions.

If you change your mind about a selection, simply select the head in the list and click the Heads - Remove button to remove the head from the zone list and return it to the list of unreferenced heads on the tree list. Again, at this point we can add the zone fittings, valves, etc., but it's more convenient to perform this after all zones have been created. Continue to add zones and heads until all heads have been assigned to a zone.

Edit Manifold/Zones
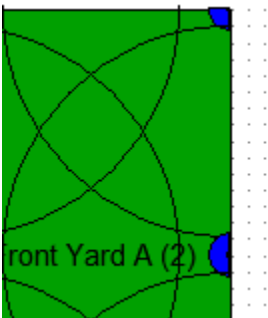
Note that the inner circles/squares of each head have been color-coded to match the zone to which they are referenced (same as the color in the Manifold/Zone Editor window). In the case of multiple manifolds, the same color is used for zone 1, 2, etc., on each manifold. Unreferenced heads are colored a neutral gray.
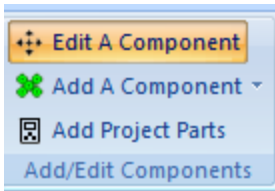
The process of editing zones, manifolds, and piping is straightforward. As with headsites, click the "**Edit A Component**" button. Select the manifold you want to edit (or after opening, a zone assigned to that manifold). Add or remove any or all heads from a zone. Note: If all heads are removed from a zone, that zone will be automatically deleted from the manifold when the window is closed.

You can also delete an entire manifold (which deletes all the zones and head references - not the actual heads/headsites). Simply select the manifold and click "Delete".

Auto Zone Design Tool
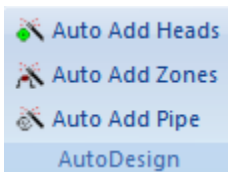
Like the Auto Head design tool, the **Auto Zone design tool** is the recommended process for adding zones to a project.

WaterMark PRO provides a function to automatically create watering zones and then assigns those zones to headsites within a plot. Though straightforward, the process requires some preparation.

Since zones must be assigned to manifolds, make certain that manifolds are created at their planned positions. Large areas that may require 12 or more zones are usually better served with multiple manifolds. The auto-zone procedure supports multiple manifolds servicing a single plot (or over several plots).

Since zones are configured based upon available water flow, the "Project/Client Data" information must be available to the process.

The auto-design process can design zones for a selected plot or for all populated plots in the drawing. To design zones for a single plot, first select that plot.

Click the "Auto Add Zones" menu item. The system will ask whether you wish to design zones for all the drawing's plots. If you select "NO", the system will design zones for only the selected plot.

If zones already exist on the plot, the system will prompt as to whether you wish to continue (existing zones/system pipe will be deleted) or cancel out of the process.

The "Auto Zone Assignment Properties" window will now appear. This window offers several configuration options prior to the actual auto-assignment procedure:
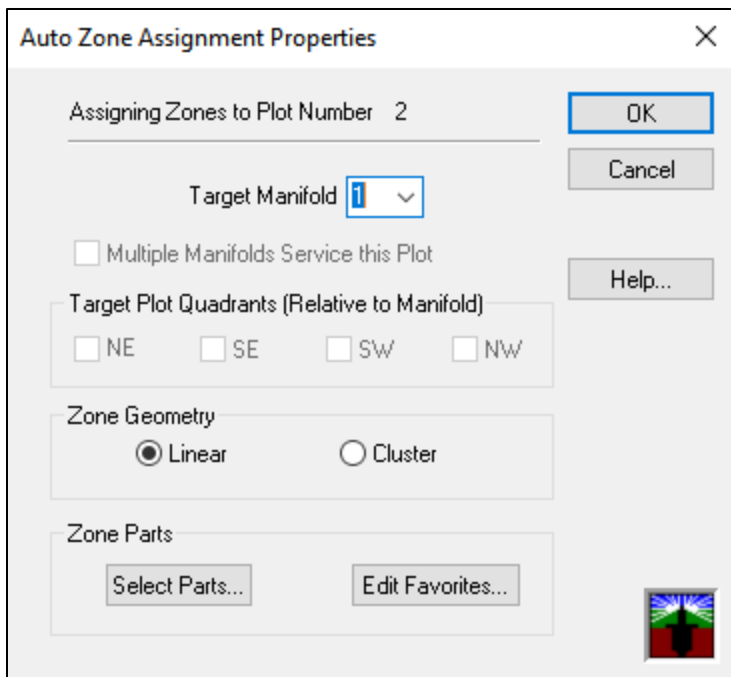
Target Manifold: The drop-down box contains all existing manifolds. Select the parent manifold for the generated zones.

Multiple Manifolds Services This Plot: This checkbox is enabled when multiple manifolds exist on the system. Check the box if you wish to split zones within this plot to multiple parent manifolds.

Target Plot Quadrants: These options are enabled if the above box is checked. Check one or more boxes to determine which headsites positioned relative to the target manifold will be assigned to a zone serviced by the target manifold.

Zone Geometry: Select "Linear" (default) to assign heads linearly and "Cluster" to assign heads in a cluster.

Click OK to assign the zones. Repeat the process for each zone.

As noted in the "Auto Head Design" discussion above, click "Select Parts" to add zone parts to the created zones and "Edit Favorites" to edit or add parts to the zones.

As with any computer-generated function that attempts to mimic the human mind, it's often impossible to do so with perfection. Though the auto-assign process is extremely sophisticated, it's important that you review the output for anomalies resulting from the complex interaction of the numerous hydraulic and geometric calculations. Zones in rectangular areas will be designed with the most accuracy, but irregular areas may require some adjustment of zone headsite assignment.

Utilize the manual zone assignment functions outlined above to implement your adjustments.

Adding Pipe

System pipe type can be assigned either directly to a zone, a manifold (all zones assigned to the manifold will use the same pipe) or to the entire project (all manifolds and zones will use the same pipe). In most cases, a design will utilize the same system pipe throughout, but WaterMark PRO leaves you the option of specifying pipe down to the individual zone, which will be essential with drip systems, etc. Use this tool to also add main line piping to the project (see below).

To assign a system pipe type to an individual zone, open a manifold for editing. Now select a zone from the drop-down list. Click "Edit Zone Parts". See the discussion above relating to adding parts to headsites.

Adding System Pipe - Assigning Pipe Type to a Manifold and Project

If you wish to assign different system pipe types to different zones, follow the instructions above. In most cases, though, the same pipe will be utilized throughout the entire manifold (or the entire project, in the case of multiple manifolds).

To assign system pipe type to an entire manifold, open the manifold in edit mode, as before. Now select the "Edit Manifold Parts" button. The same Parts Window is exposed. Dig down the tree list to the specific pipe type to assign to the manifold and click "Select System Pipe".

To assign system pipe to the entire project (multiple manifolds) is even simpler. Select the "**Add Project Parts**" button. Follow the same procedure above to assign a system pipe type to the entire project.
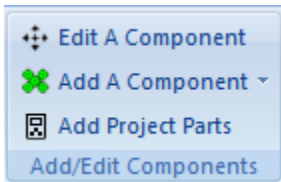
Adding System Pipe - Pipe Layout

The system pipe connects the heads to the zones and then the zones to the manifold. All system piping in the Pipe Catalog is listed "per foot" so that pipe lengths can be totaled when creating the materials reports.

To add pipe to a zone, you must first select a zone - to do so, simply select one of the headsites assigned to that zone ("Edit A Component" button"). While the head is still selected, click the "Add A Component/Piping" button. You can now draw the pipe segments onto your drawing. Pipe will be colored the same as the zone color for easy recognition. As you connect pipe segments, the system will "snap" a connection at their endpoints to facilitate drawing. When branching 90 degrees from a pipe run, set the cursor on the source pipe until the crosshair highlights Make sure to draw the main trunk from the manifold area to all zones. Continue with all zones in the same manner.
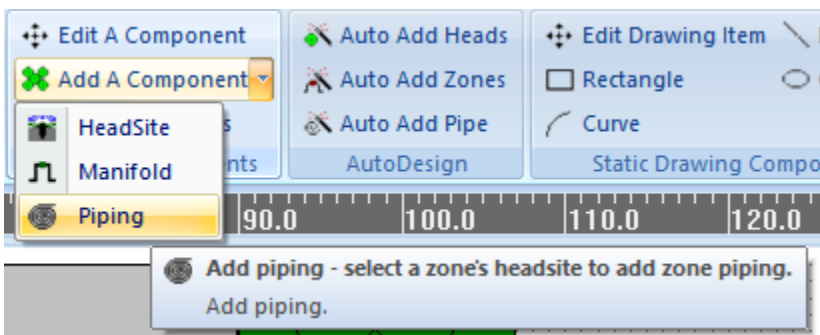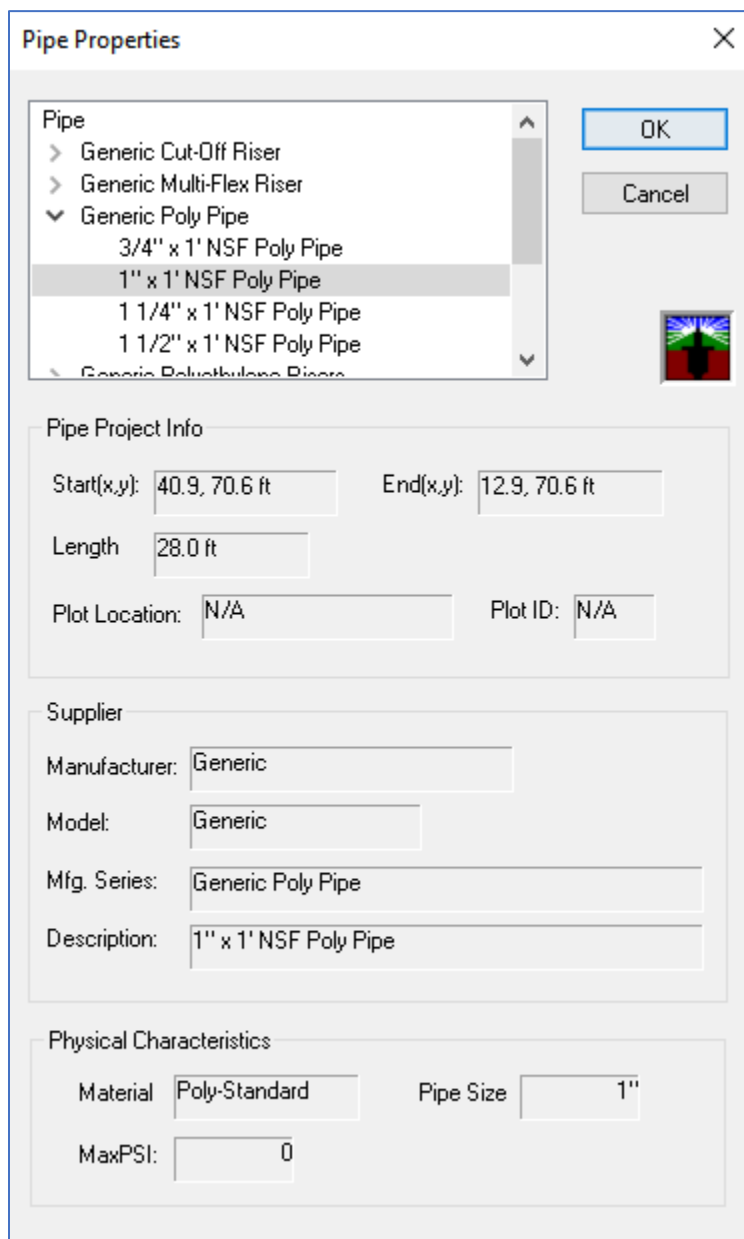
Adding System Pipe - Editing

To edit system pipe segments, simply delete and re-draw them. Select the pipe item ("Edit A Component" button) and click the "Delete" item from the Edit menu or right-click the "Delete Selection" item.

To edit the pipe part type, select the pipe segment and click the "Edit A component" menu item.

The Pipe Properties screen opens.

Adding Main Line Piping

Select the **Piping** link above to add main line piping. Unselect any headsites to avoid associating the pipe with a zone. Draw the piping lines as above, except that the lines will be displayed as black dashed lines. You will be given the opportunity to select a pipe type/size which will more than likely be different than your system piping. Connect manifolds/sprinkler boxes together or draw main lines out to the main house connection or pressure/vacuum breaker valves.

A word about the system hierarchy and component deletions: WaterMark PRO is an object-oriented application. This means that the various components of the system have hierarchical relationships. For example, the project is the top object in the hierarchy, and projects are composed of plots and manifolds. Headsites are assigned to plots, and if you delete a plot all headsites assigned to that plot are also deleted. Zones are assigned to manifolds, and when a manifold

is deleted, so are the zones. Pipe is assigned to zones, so when you delete a zone its system pipe is deleted. Heads are not assigned to zones, but are referenced to a zone; therefore, if you delete a zone, the actual head is not deleted.

Auto Add Pipe Tool
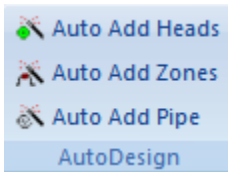
The auto-design process can design system pipe for a single zone, an entire manifold's assigned zones, or for all manifolds and zones in the project. To design piping for a single zone, select any headsite member of that zone.

Click the "**Auto Add Pipe**" button. The system will ask whether you wish to design system pipe for all the drawing's zones. If you select "NO", the system will design system pipe for only the selected zone. If you select "YES", the system will ask whether you wish to assign system pipe to all zones serviced by the parent manifold.

If pipe is already assigned to the target zone, the system will prompt you of this fact and ask whether you wish to continue (existing system pipe will be deleted) or cancel out of the process.

The "Auto Pipe Design Properties" window will now appear. This window offers configuration options prior to the actual auto-assignment procedure:
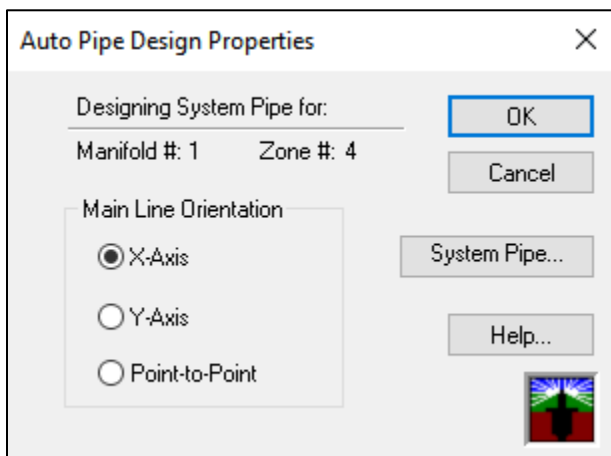
Main Line Orientation: The process offers three different options for the orientation of the main system line feeding the zone's headsites from a manifold. Choose "Point-to-Point" to position main lines directly from the manifold position to the center of the zone's interconnected lateral lines. Choose "X-Axis" to direct the main line laterally along the drawing's x-axis and then up or down the y-axis to the center point of the lateral lines. Choose "Y-Axis" to direct the main line vertically along the y-axis and then across the x-axis to the center point of the lateral lines.

System Pipe: If you haven't already selected system pipe for the zone, you may do so at this time. See the manual system pipe procedure outlined above.
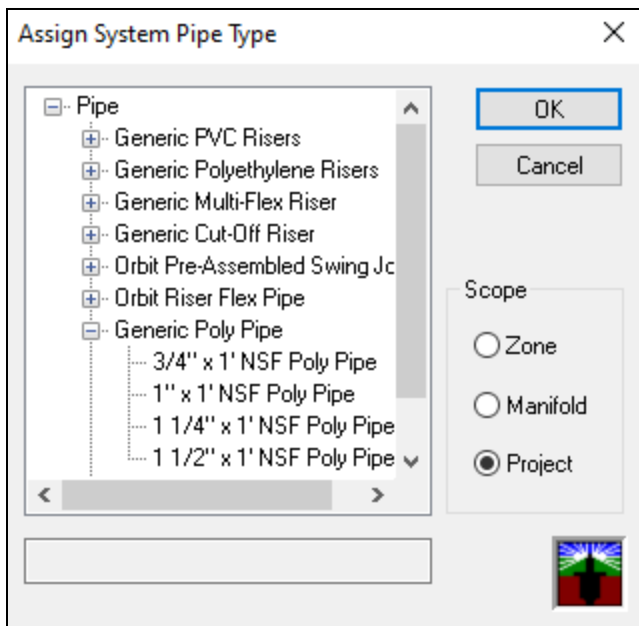
Once a pipe type is selected, click OK to assign pipe to your zone(s). Utilize the manual pipe properties tool above to tweak or modify the results of the auto-add pipe tool.

Adding Associated Parts

WaterMark PRO is a total system design tool. As well as the normal functions of adding heads, zones, manifolds, etc., WaterMark PRO facilitates the addition of pipe, fittings, clocks & timers, valves, sprinkler accessories, sprinkler tools and even design and labor charges.

Parts can be added to headsites, zones, manifolds, and even the entire project. Headsite parts encompass everything common to the headsite other than the actual head. This can include a riser, riser tee, auto drain valve or pipe clamps. After assigning parts to a headsite, the option exists to clone these parts to all heads on the plot. Parts added to zones usually consist of everything from the zone valve to the headsite. Like headsite parts, zone parts can be cloned to all zones on the manifold. Project parts usually include entrance plumbing pipe and fittings, tools, accessories, and labor charges.

Project parts can be added by clicking the "**Add Project Parts**" button from the Project toolbar. Add project parts from the "**Edit Project Parts**" screen.
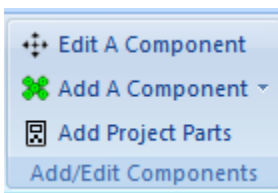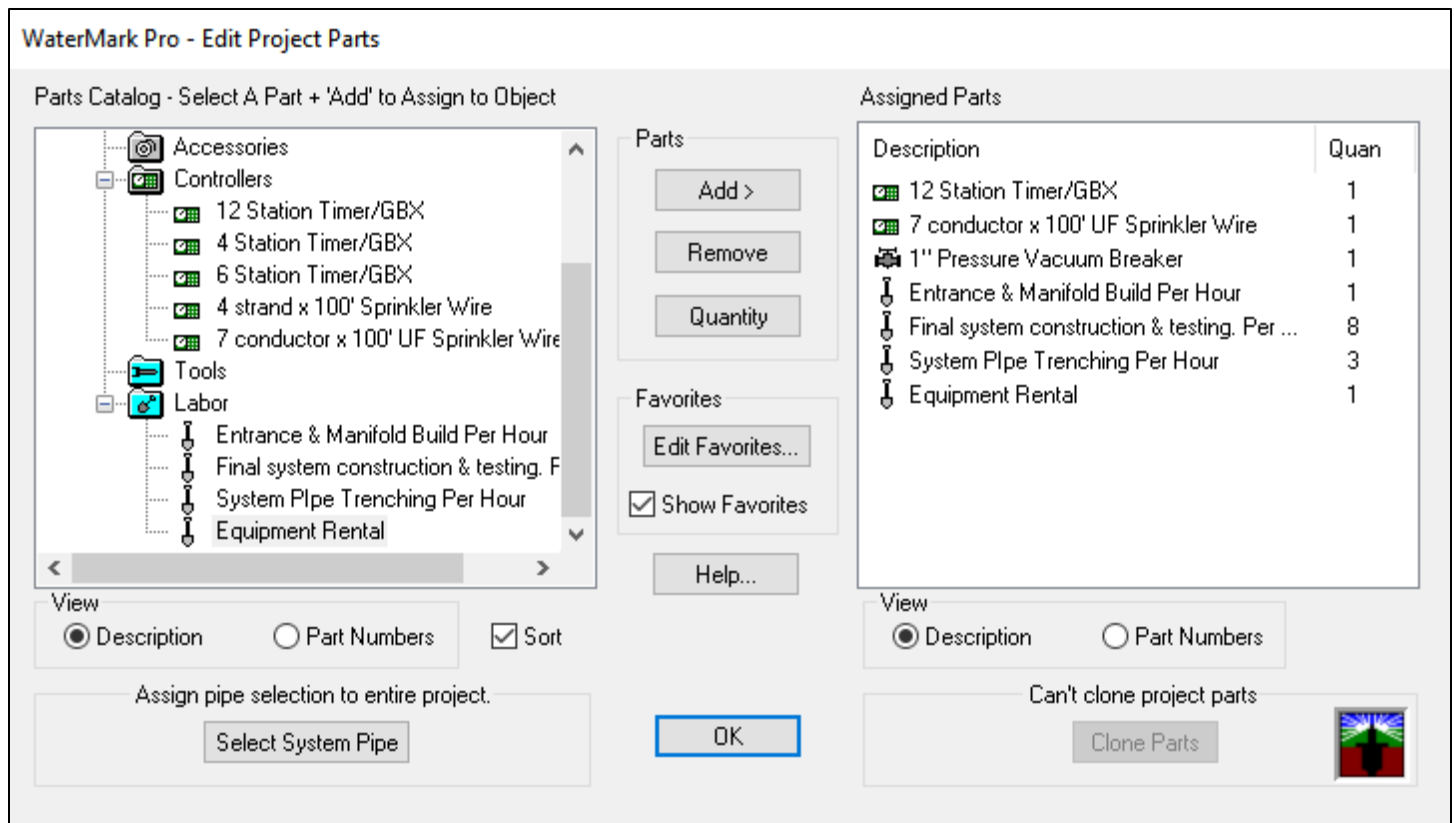
Importing/Scanning A Tracing Image

WaterMark Pro supports the ability to import an image into the system, providing for a background graphic where plots can be traced. Once imported, images can be resized, moved, flipped/rotated, and the project's scale and 0,0 reference point can be matched to the image. The system also includes a scanner utility that acquires images from most scanning devices.
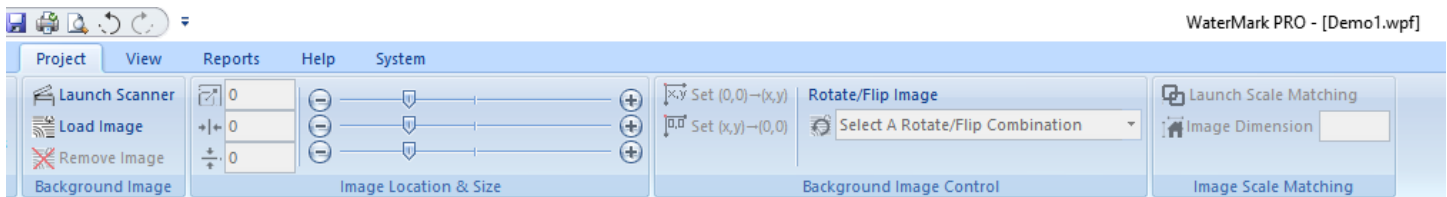
Acquiring an image through a scanner:

Click the "Launch Scanner" menu item from the Project/Background Image panel to open the scanner utility.
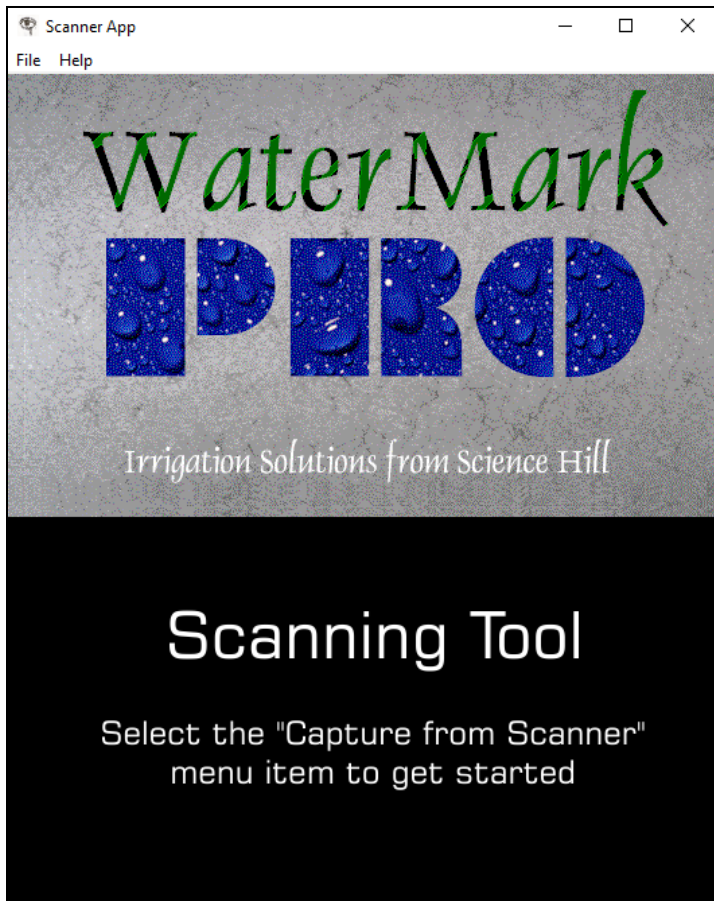
Click the File/Capture menu from the Scanner menu to acquire the graphic displayed in the scanner. Save the file in your WaterMark Pro folder or any convenient folder you may wish to create.

Importing an image:

Click the "Load Image" menu item from the Project/Background panel. WaterMark Pro can import all popular image types (.jpg, .png, .gif) as well as any image scanned from the above scanning process. The image loads onto the drawing surface. These tracing images load onto the lowest level of the project's drawing and may be imported at any time during or after the creation of plots or components, but it's **highly recommended** that images get imported prior to creating plots, as more than likely the scale of the drawing will change based upon the imported image's scale.

We recommend placing drawings in a "landscape" orientation (horizontally) onto the drawing surface. In most cases, scanned images are created in a "portrait" orientation (vertically aligned). If so, load the completed graphic on to most any photo or painting program to rotate the orientation 90 degrees to landscape.
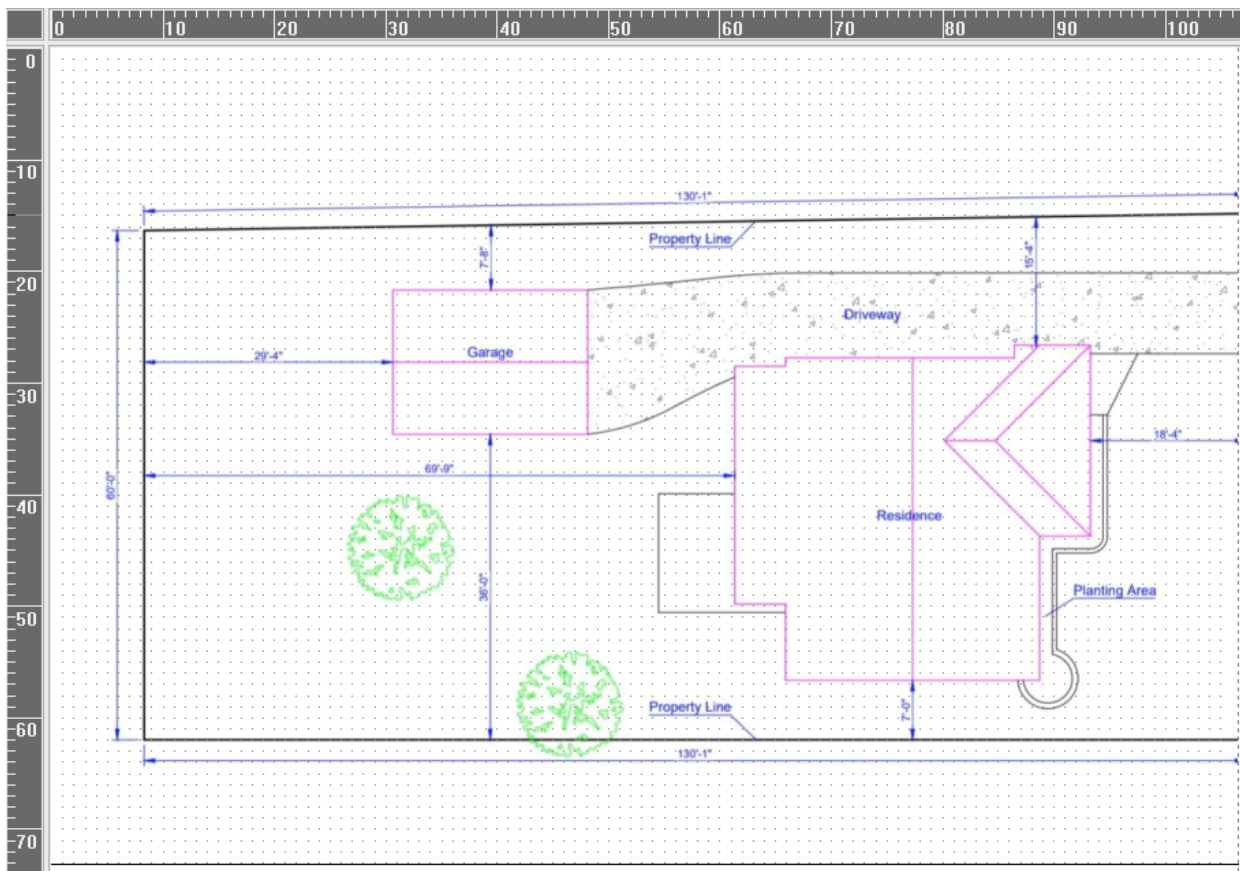
Utilize the "Project/Image Location & Size" slider controls: Resize Image menu, Horiz. Align menu, and Vert. Align to fit the image to the drawing surface. Make sure to fit the drawing close to the top and left sides of the drawing surface with none of the drawing outside of the drawing's borders. Click the -/+ buttons to the right and left of the slider to micro adjust.
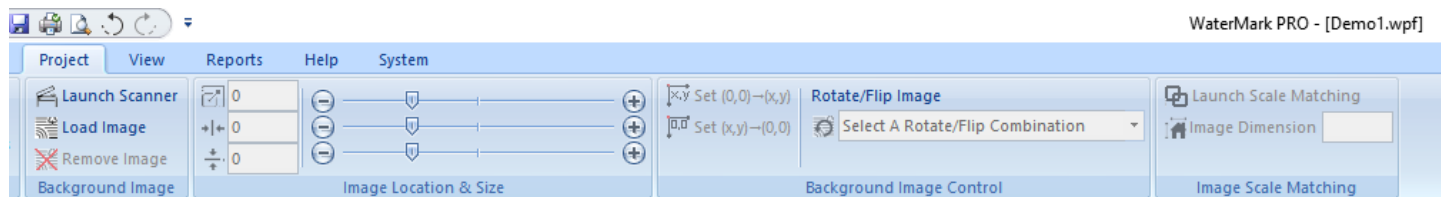
If necessary, set the (0,0) X and Y point to match the drawing (0,0) point to the upper left-most point on the image. Click the Set (0,0)->(x, y) menu item. Click the point on your image where you want the (0,0) point of the drawing. To return the image to the original size/position, click the Set (x, y)->(0,0) menu item.

If necessary, "Select A Rotate/Flip Combination" to change the image orientation. Rotating the original image 90 degrees will result in a distortion of the figures, so always use a third-party paint or photo program to rotate prior to loading it into the project

Finally, click the "Launch Scale Matching" menu to initiate matching the drawing's scale to the image. To match the scale of the drawing, first select a written dimension from the drawing and enter it in the "Image Dimension" text box. The next step is to click the "Launch Scale Matching" button which will guide you to click at the starting point on the drawing where the dimension begins. Once selected, click the end dimension. Once completed, the system's scale will automatically match your drawing's scale. Of course, for the system scale to be accurate, the drawing's scale must also be accurate throughout.
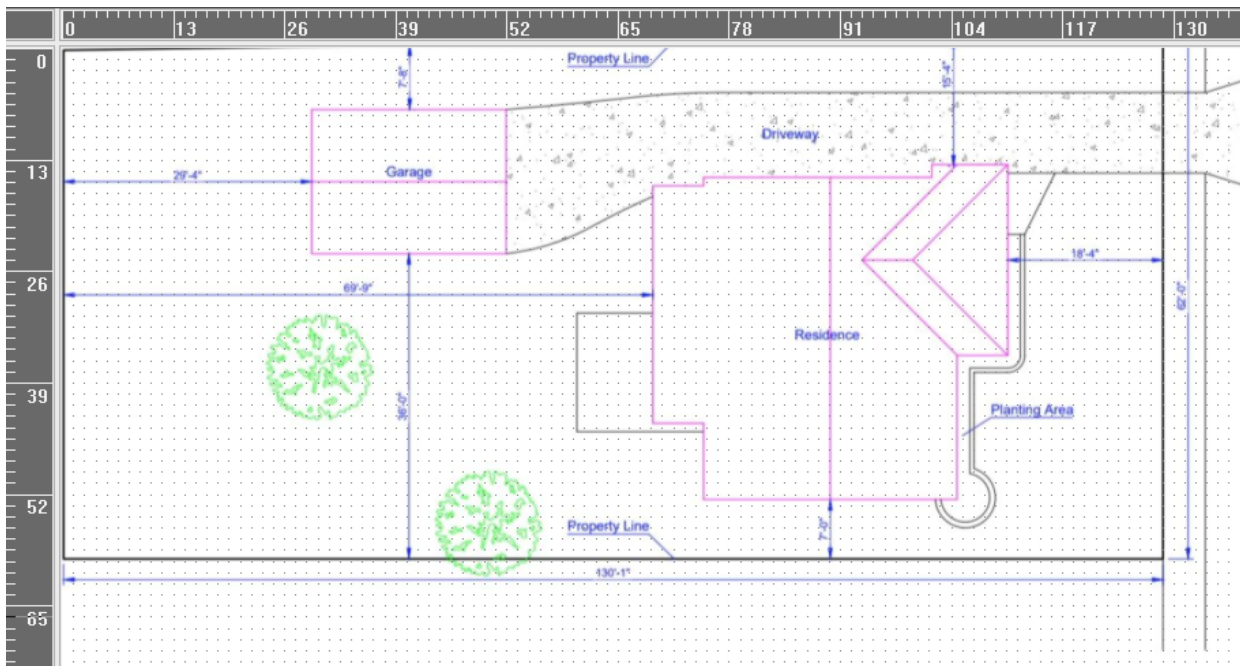
Save your project to save the image settings.

Add the plots, as discussed in the "Adding Plots" section above. Below is an example of two plots and headsites using the Auto Add Heads function. Note that when a graphic is loaded, the plot pattern fillers aren't filled in so that the graphic's details remain visible.
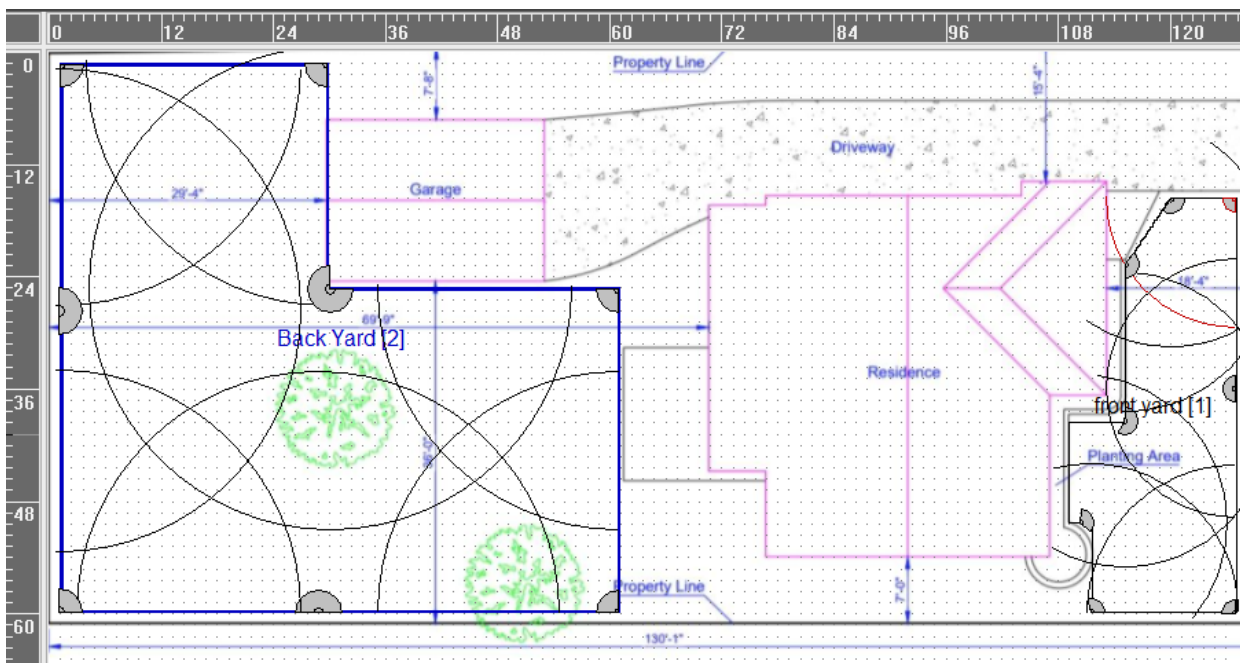
Adding to or Editing the Parts Database (full version only)

The parts database is populated with many of the more common and popular heads, fittings, tools, and accessories utilized in basic sprinkler system design. No attempt has been made to provide an exhaustive list of parts, as the great majority of manufactured parts will never be used by most irrigation professionals. To address this issue, the database allows the designer to add their own favored parts.

Open the database by clicking the "**Edit Catalog**" menu item:
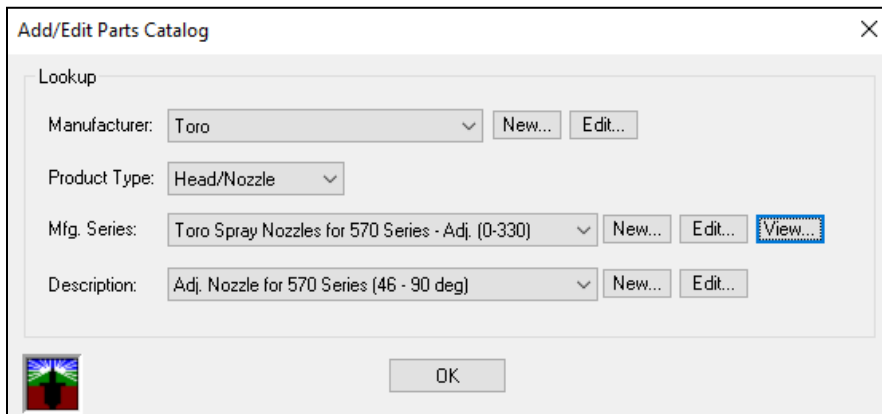
Click the "Manufacturer" drop list to select a manufacturer. Once selected, you can click the "New…" button to add a new manufacturer or the "Edit…" button to edit the selected manufacturer.

Once a manufacturer is selected, select a product type from the "Product Type" drop list. Once selected, select the manufacturer's series from the "Mfg. Series" drop list. To view individual parts from the series, select from the Description drop list. Note that product types not related to the manufacturer are not shown.
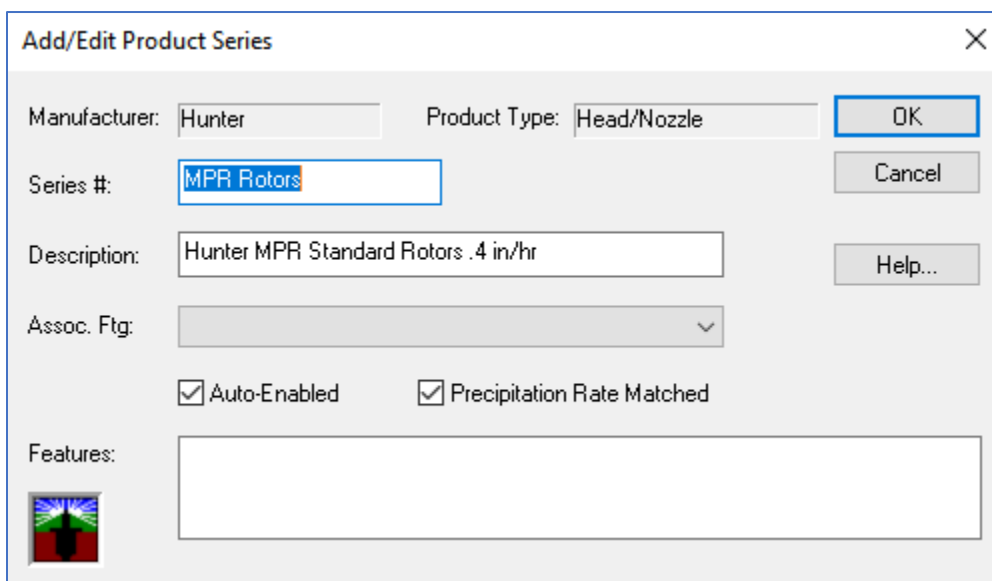
On the manufacturer's series list, you can add a new series by clicking the "New…" button, you can edit the selected series by clicking the "Edit…" button or you can view details of the entire series by selecting the "View" button.

On the Add/Edit Product Series dialog box, you can edit the manufacturer's Series Number, Description, Associated Fitting (if available), and Features, for your personal notes.

The Auto-Enabled checkbox should be checked if the head series is available to use in an Auto Head design function. To qualify, the series must include all standard fixed pattern heads (360, 90, 180 degree) or adjustable pattern heads.

The Precipitation Rate Matched checkbox should be checked if the head series is precipitation rate matched.

Note that fixed pattern heads should not be utilized in irregular-shaped plots (i.e., not rectangular), as they will be unable to satisfactorily cover plots with curved sides. We recommend using variable-pattern heads for these areas.

The following **Series View…** screen displays the heads comprising the series in a list with all permanent specs. (**Please note: these specifications were taken from manufacturer and vendor product catalogs. Please verify specs prior to purchasing and installation.**) Note the "Edit…" link in the furthest-right column. See the "Designer Favorites" topic above for details.

Clicking the "Description" drop list from the Add/Edit Catalog Parts box displays each item in the series. Here you can add new items, edit various fields, and assign a retail and cost price which is referenced in the parts list report.

Clicking the "Advanced" button from the above opens a new screen where detailed product information can be added or edited:

Reports

WaterMark PRO features five basic reports that can be viewed or printed. The "Heads by Plot" report lists all the system heads sorted by their parent plots. This report displays plot type, location, area, and total precipitation rate, soil type, solar exposure, slope of grade, crest of slope, water demand, and recommended watering period and number of periods per week. The head information includes head part numbers, location description, radius, angle, aim, and flow. Use this report to assist in actual head layout on the property.

```
Science Hill Sprinkler Design        Jim Smith              REPORT:  HEADSITE LIST SORTED BY PLOT
999 9th Street                       999 9th Street         Available Pressure = 50.00 PSI
Denver, CO 80108                     Denver, CO  80108      Available Flow = 20.00 GPM
9999999999                           9999999999             Designed by:  Art T.
                                     Permit ID:  0909304
```

Plot 1 : Front Yard
Pos(x,y)=(72.0', 3.0') Size(x,y)=(29.0', 52.0') Area = 1290 sf
Soil Type: Silty Loam; Solar Exposure: Neutral; Slope: 0 Deg; Crest: None
Demand: 1.75 In/Wk; Water 3 Times/Wk for 31 Min Precip Rate: = 1.10 In/Hr

Head #	Part #	Pos(x,y)		Description	RadHt	RadLn	Angle'	Aim'	GPM
Head 1	0890	(1.1',	0.1')	MPR Plus Nozzles 8' 1/4 Circle (7' - 9')	0'	8'	90	269	0.23
Head 2	08180	(10.9',	0.1')	MPR Plus Nozzles 8' 1/2 Circle (7' - 9')	0'	8'	180	180	0.51
Head 3	08180	(28.9',	20.9')	MPR Plus Nozzles 8' 1/2 Circle (7' - 9')	0'	8'	180	90	0.51
Head 4	08180	(28.9',	30.7')	MPR Plus Nozzles 8' 1/2 Circle (7' - 9')	0'	8'	180	90	0.51
Head 5	08180	(28.9',	40.5')	MPR Plus Nozzles 8' 1/2 Circle (7' - 9')	0'	8'	180	90	0.51
Head 6	0890	(28.9',	52.0')	MPR Plus Nozzles 8' 1/4 Circle (7' - 9')	0'	8'	90	90	0.23
Head 7	08180	(19.1',	52.0')	MPR Plus Nozzles 8' 1/2 Circle (7' - 9')	0'	8'	180	0	0.51
Head 8	08180	(9.3',	52.0')	MPR Plus Nozzles 8' 1/2 Circle (7' - 9')	0'	8'	180	0	0.51
Head 9	0890	(0.0',	51.9')	MPR Plus Nozzles 8' 1/4 Circle (7' - 9')	0'	8'	90	0	0.23
Head 10	08180	(0.0',	42.1')	MPR Plus Nozzles 8' 1/2 Circle (7' - 9')	0'	8'	180	270	0.51
Head 11	0890	(0.1',	28.1')	MPR Plus Nozzles 8' 1/4 Circle (7' - 9')	0'	8'	90	268	0.23
Head 12	08270	(9.0',	27.9')	MPR Plus Nozzles 8' 3/4 Circle (7' - 9')	0'	8'	270	181	0.78
Head 13	08180	(9.0',	18.1')	MPR Plus Nozzles 8' 1/2 Circle (7' - 9')	0'	8'	180	270	0.51
Head 14	08270	(8.9',	8.0')	MPR Plus Nozzles 8' 3/4 Circle (7' - 9')	0'	8'	270	271	0.78
Head 15	0890	(1.0',	7.9')	MPR Plus Nozzles 8' 1/4 Circle (7' - 9')	0'	8'	90	0	0.23
Head 16	08360	(19.5',	9.0')	MPR Plus Nozzles 8' Full Circle (7' - 9')	0'	8'	360	0	1.02
Head 17	08360	(21.2',	16.1')	MPR Plus Nozzles 8' Full Circle (7' - 9')	0'	8'	360	0	1.02
Head 18	08360	(21.2',	25.8')	MPR Plus Nozzles 8' Full Circle (7' - 9')	0'	8'	360	0	1.02
Head 19	08360	(20.5',	35.6')	MPR Plus Nozzles 8' Full Circle (7' - 9')	0'	8'	360	0	1.02
Head 20	08360	(14.2',	43.6')	MPR Plus Nozzles 8' Full Circle (7' - 9')	0'	8'	360	0	1.02
Head 21	08360	(8.4',	37.2')	MPR Plus Nozzles 8' Full Circle (7' - 9')	0'	8'	360	0	1.02
Head 22	08360	(14.0',	14.7')	MPR Plus Nozzles 8' Full Circle (7' - 9')	0'	8'	360	0	1.02
Head 23	10120	(28.6',	7.4')	MPR Plus Nozzles 10' 1/3 Circle (9' - 12')	0'	12'	120	145	0.75

Plot 5 : Back Yard
Pos(x,y)=(5.0', 3.0') Size(x,y)=(35.0', 32.0') Area = 1120 sf
Soil Type: Silty Loam; Solar Exposure: Neutral; Slope: 0 Deg; Crest: None
Demand: 1.75 In/Wk; Water 3 Times/Wk for 30 Min Precip Rate: = 1.15 In/Hr

Head #	Part #	Pos(x,y)		Description	RadHt	RadLn	Angle'	Aim'	GPM
Head 1	3404-00-	(0.0',	0.0')	Rotor Head 340 Series - 90 deg. - Fixed	0'	16'	90	270	0.84
Head 2	3408-00-	(17.5',	0.0')	Rotor Head 340 Series - 180 deg. - Fixed	0'	16'	180	180	1.66
Head 3	3404-00-	(35.0',	0.0')	Rotor Head 340 Series - 90 deg. - Fixed	0'	16'	90	180	0.84
Head 4	3408-00-	(35.0',	16.0')	Rotor Head 340 Series - 180 deg. - Fixed	0'	16'	180	90	1.66
Head 5	3404-00-	(35.0',	32.0')	Rotor Head 340 Series - 90 deg. - Fixed	0'	16'	90	90	0.84
Head 6	3408-00-	(17.5',	32.0')	Rotor Head 340 Series - 180 deg. - Fixed	0'	16'	180	0	1.66
Head 7	3404-00-	(0.0',	32.0')	Rotor Head 340 Series - 90 deg. - Fixed	0'	16'	90	0	0.84
Head 8	3408-00-	(0.0',	16.0')	Rotor Head 340 Series - 180 deg. - Fixed	0'	16'	180	270	1.66
Head 9	3416-00-	(17.5',	16.0')	Rotor Head 340 Series - 360 deg. - Fixed	0'	16'	360	0	3.33

The "Heads by Zone" report lists heads sorted by their zone assignments. This report shows zone number, total flow in zone, and all referenced heads with the same information as the "Heads by Plot" report. Use this report to assist in zone construction and clock/timer configuration.

```
ABC
sprinkler
system
designs

         Science Hill Sprinkler Design        Jim Smith                    REPORT:  HEADSITE LIST SORTED BY ZONE
         999 9th Street                        999 9th Street               Available Pressure = 50.00 PSI
         Denver, CO 80108                      Denver, CO  80108            Available Flow = 20.00 GPM
         9999999999                            9999999999                   Designed by:  Art T.
                                               Permit ID:   0909304


         Manifold 1     Pos(x,y) = (70.5' ,55.0')

         Zone 1    Total Flow (GPM) = 14.68
         Head #    Part #    Pos(x,y)           Description                              RadHt  RadLn  Angle'  Aim'  GPM
         Head 1    0890     (    1.1',    0.1')  MPR Plus Nozzles 8' 1/4 Circle (7' - 9')   0'     8'     90    269   0.23
         Head 2    08180    (   10.9',    0.1')  MPR Plus Nozzles 8' 1/2 Circle (7' - 9')   0'     8'    180    180   0.51
         Head 3    08180    (   28.9',   20.9')  MPR Plus Nozzles 8' 1/2 Circle (7' - 9')   0'     8'    180     90   0.51
         Head 4    08180    (   28.9',   30.7')  MPR Plus Nozzles 8' 1/2 Circle (7' - 9')   0'     8'    180     90   0.51
         Head 5    08180    (   28.9',   40.5')  MPR Plus Nozzles 8' 1/2 Circle (7' - 9')   0'     8'    180     90   0.51
         Head 6    0890     (   28.9',   52.0')  MPR Plus Nozzles 8' 1/4 Circle (7' - 9')   0'     8'     90     90   0.23
         Head 7    08180    (   19.1',   52.0')  MPR Plus Nozzles 8' 1/2 Circle (7' - 9')   0'     8'    180      0   0.51
         Head 8    08180    (    9.3',   52.0')  MPR Plus Nozzles 8' 1/2 Circle (7' - 9')   0'     8'    180      0   0.51
         Head 9    0890     (    0.0',   51.9')  MPR Plus Nozzles 8' 1/4 Circle (7' - 9')   0'     8'     90      0   0.23
         Head 10   08180    (    0.0',   42.1')  MPR Plus Nozzles 8' 1/2 Circle (7' - 9')   0'     8'    180    270   0.51
         Head 11   0890     (    0.1',   28.1')  MPR Plus Nozzles 8' 1/4 Circle (7' - 9')   0'     8'     90    268   0.23
         Head 12   08270    (    9.0',   27.9')  MPR Plus Nozzles 8' 3/4 Circle (7' - 9')   0'     8'    270    181   0.78
         Head 13   08180    (    9.0',   18.1')  MPR Plus Nozzles 8' 1/2 Circle (7' - 9')   0'     8'    180    270   0.51
         Head 14   08270    (    8.9',    8.0')  MPR Plus Nozzles 8' 3/4 Circle (7' - 9')   0'     8'    270    271   0.78
         Head 15   0890     (    1.0',    7.9')  MPR Plus Nozzles 8' 1/4 Circle (7' - 9')   0'     8'     90      0   0.23
         Head 16   08360    (   19.5',    9.0')  MPR Plus Nozzles 8' Full Circle (7' - 9')  0'     8'    360      0   1.02
         Head 17   08360    (   21.2',   16.1')  MPR Plus Nozzles 8' Full Circle (7' - 9')  0'     8'    360      0   1.02
         Head 18   08360    (   21.2',   25.8')  MPR Plus Nozzles 8' Full Circle (7' - 9')  0'     8'    360      0   1.02
         Head 19   08360    (   20.5',   35.6')  MPR Plus Nozzles 8' Full Circle (7' - 9')  0'     8'    360      0   1.02
         Head 20   08360    (   14.2',   43.6')  MPR Plus Nozzles 8' Full Circle (7' - 9')  0'     8'    360      0   1.02
         Head 21   08360    (    8.4',   37.2')  MPR Plus Nozzles 8' Full Circle (7' - 9')  0'     8'    360      0   1.02
         Head 22   08360    (   14.0',   14.7')  MPR Plus Nozzles 8' Full Circle (7' - 9')  0'     8'    360      0   1.02
         Head 23   10120    (   28.6',    7.4')  MPR Plus Nozzles 10' 1/3 Circle (9' - 12') 0'    12'    120    145   0.75

         Manifold 2     Pos(x,y) = (5.1' ,54.9')

         Zone 1    Total Flow (GPM) = 13.34
         Head #    Part #    Pos(x,y)           Description                              RadHt  RadLn  Angle'  Aim'  GPM
         Head 1    3404-00- (    0.0',    0.0')  Rotor Head 340 Series - 90 deg. - Fixed    0'    16'     90    270   0.84
         Head 2    3408-00- (   17.5',    0.0')  Rotor Head 340 Series - 180 deg. - Fixed   0'    16'    180    180   1.66
         Head 3    3404-00- (   35.0',    0.0')  Rotor Head 340 Series - 90 deg. - Fixed    0'    16'     90    180   0.84
         Head 4    3408-00- (   35.0',   16.0')  Rotor Head 340 Series - 180 deg. - Fixed   0'    16'    180     90   1.66
         Head 5    3404-00- (   35.0',   32.0')  Rotor Head 340 Series - 90 deg. - Fixed    0'    16'     90     90   0.84
         Head 6    3408-00- (   17.5',   32.0')  Rotor Head 340 Series - 180 deg. - Fixed   0'    16'    180      0   1.66
         Head 7    3404-00- (    0.0',   32.0')  Rotor Head 340 Series - 90 deg. - Fixed    0'    16'     90      0   0.84
         Head 8    3408-00- (    0.0',   16.0')  Rotor Head 340 Series - 180 deg. - Fixed   0'    16'    180    270   1.66
         Head 9    3416-00- (   17.5',   16.0')  Rotor Head 340 Series - 360 deg. - Fixed   0'    16'    360      0   3.33

         Zone 2    Total Flow (GPM) = 7.28
         Head #    Part #    Pos(x,y)           Description                              RadHt  RadLn  Angle'  Aim'  GPM
         Head 1    0890     (    0.0',    0.0')  MPR Plus Nozzles 8' 1/4 Circle (7' - 9')   0'     7'     90    270   0.17
         Head 2    08180    (   17.0',    0.0')  MPR Plus Nozzles 8' 1/2 Circle (7' - 9')   0'     7'    180    180   0.37


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The "Pipe by Zone" report lists all system parts (including heads) in order of project, manifold, and zone. This report is designed to simplify piping placement and may be utilized as a Bill of Materials or Estimate.

```
ABC Sprinklers                    John Smith                REPORT:  ALL PIPE LIST SORTED BY ZONE
999 9th St.                       999 9th St.               Available Pressure = 50.00 PSI
Denver, CO                        Denver, CO  80202         Available Flow = 20.00 GPM
9999999999                        999 999-9999              Designed by:  Art T.
                                  Permit ID:  380403
```

Piping:

Length Part #	Start(x,y)	End(x,y)	Manufacturer Series	Description	Unit Price
1 Generic	(40.7, 71.2 ft)	(40.7, 73.1 ft)	Generic PVC Sch. 40 Pipe	1" x 1' PVC Sch. 40 Pipe	2.49
65 Generic	(40.7, 73.1 ft)	(106.4, 73.1 ft)	Generic PVC Sch. 40 Pipe	1" x 1' PVC Sch. 40 Pipe	2.49

Manifold 1   Pos(x,y) = (40.9' ,70.6')

Zone 1   Total Flow (GPM) = 2.00

Length Part #	Start(x,y)	End(x,y)	Manufacturer Series	Description	Unit Price
31 Generic	(40.9, 70.6 ft)	(9.1, 70.6 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
9 Generic	(9.1, 70.6 ft)	(9.1, 61.6 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20

Zone 2   Total Flow (GPM) = 7.60

Length Part #	Start(x,y)	End(x,y)	Manufacturer Series	Description	Unit Price
14 Generic	(90.3, 1.2 ft)	(104.8, 1.1 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
19 Generic	(104.8, 1.1 ft)	(104.8, 20.1 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
18 Generic	(104.8, 20.1 ft)	(104.8, 39.0 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
14 Generic	(104.8, 39.0 ft)	(90.1, 38.9 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
18 Generic	(90.1, 38.9 ft)	(90.0, 20.1 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
63 Generic	(40.9, 70.6 ft)	(104.8, 70.6 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
41 Generic	(104.8, 70.6 ft)	(104.8, 29.5 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20

Zone 3   Total Flow (GPM) = 9.60

Length Part #	Start(x,y)	End(x,y)	Manufacturer Series	Description	Unit Price
20 Generic	(42.6, 65.0 ft)	(63.1, 65.1 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
20 Generic	(63.1, 65.1 ft)	(83.8, 65.1 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
20 Generic	(83.8, 65.1 ft)	(104.6, 65.0 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
7 Generic	(104.6, 65.0 ft)	(104.6, 72.0 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
20 Generic	(104.6, 72.0 ft)	(84.0, 72.0 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
20 Generic	(84.0, 72.0 ft)	(63.4, 72.0 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
20 Generic	(63.4, 72.0 ft)	(42.6, 72.0 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
12 Generic	(42.6, 72.0 ft)	(52.8, 65.0 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
20 Generic	(52.8, 65.0 ft)	(73.4, 65.0 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
20 Generic	(73.4, 65.0 ft)	(94.3, 65.0 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
42 Generic	(94.3, 65.0 ft)	(52.8, 72.1 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
21 Generic	(52.8, 72.1 ft)	(73.8, 72.1 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
20 Generic	(73.8, 72.1 ft)	(94.5, 72.1 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
4 Generic	(40.9, 70.6 ft)	(45.3, 70.6 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
0 Generic	(45.3, 70.6 ft)	(45.3, 70.2 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20

Zone 4   Total Flow (GPM) = 6.11

Length Part #	Start(x,y)	End(x,y)	Manufacturer Series	Description	Unit Price
15 Generic	(89.8, 42.7 ft)	(104.8, 42.7 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
22 Generic	(104.8, 42.7 ft)	(104.8, 64.7 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
15 Generic	(104.8, 64.7 ft)	(89.8, 64.7 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20
13 Generic	(89.8, 64.7 ft)	(97.3, 53.7 ft)	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.20

The "Parts by Zone" report lists all system parts (including heads) in order of project, manifold, and zone. This report is designed to simplify zone construction and may be utilized as a Bill of Materials or Estimate.

Project Parts:

Quan. Part #	Manufacturer Series	Description	Price	
64 Generic	Generic PVC Sch. 40 Pipe	1" x 1' PVC Sch. 40 Pipe	0.00	0.00
1 57016	Orbit Super Dual Timer with Remote	6 Station Timer with Remote/GBX	200.00	100.00
50 37099	Generic Gear Clamps - Nickel-Plated Sc	#20 3/4" to 1 3/4" Nickel-Plated Scre	0.99	0.50
1	System Design	System Estimate & Design Fees Per Hour	40.00	20.00
3	Trenching	System PIpe Trenching Per Hour	40.00	20.00
2	Manifold Creation	Entrance & Manifold Build Per Hour	40.00	20.00
8	System Construction	Final system construction & testing. P	40.00	20.00
1 51058	Generic Pressure & Vacuum Breakers	1" Pressure Vacuum Breaker	200.00	100.00

Manifold 1   Pos(x,y) = (70.5' ,55.0')

Quan. Part #	Manufacturer Series	Description	Price	
1 53021	Generic Valve Boxes	6" Circular Box	14.50	9.90

Zone 1   Total Flow (GPM) = 14.68

Quan. Part #	Manufacturer Series	Description	Price	
296 Generic	Generic Poly Pipe	1" x 1' NSF Poly Pipe	1.00	0.50
1 57103	Orbit Automatic Inline Valves	1" NPT Auto Inline Valve w/flow contro	19.90	12.50
1 51039	Generic Auto Drain Valves	1/2" Brass Auto Drain Valve	2.00	1.00
1 0890	Toro Spray Nozzles MPR Plus for 570 Se	MPR Plus Nozzles 8' 1/4 Circle (7' - 9	7.00	4.00
1 570Z-6P	Toro Body - 570 SmallTurf Series	Toro 570Z Body 6" Pop	3.00	1.50
1 37069	Generic Cut-Off Riser	1/2" x 6" Cut-Off Riser	1.00	0.50
1 1402-130	Generic Insert Fittings	Combo Tee 1 x 1 x 1/2 Ins x Ins x FIPT	2.00	1.00
1 08180	Toro Spray Nozzles MPR Plus for 570 Se	MPR Plus Nozzles 8' 1/2 Circle (7' - 9	7.00	4.00
1 570Z-6P	Toro Body - 570 SmallTurf Series	Toro 570Z Body 6" Pop	3.00	1.50
1 37069	Generic Cut-Off Riser	1/2" x 6" Cut-Off Riser	1.00	0.50
1 1402-130	Generic Insert Fittings	Combo Tee 1 x 1 x 1/2 Ins x Ins x FIPT	2.00	1.00
1 08180	Toro Spray Nozzles MPR Plus for 570 Se	MPR Plus Nozzles 8' 1/2 Circle (7' - 9	7.00	4.00
1 570Z-6P	Toro Body - 570 SmallTurf Series	Toro 570Z Body 6" Pop	3.00	1.50
1 37069	Generic Cut-Off Riser	1/2" x 6" Cut-Off Riser	1.00	0.50
1 1402-130	Generic Insert Fittings	Combo Tee 1 x 1 x 1/2 Ins x Ins x FIPT	2.00	1.00
1 08180	Toro Spray Nozzles MPR Plus for 570 Se	MPR Plus Nozzles 8' 1/2 Circle (7' - 9	7.00	4.00
1 570Z-6P	Toro Body - 570 SmallTurf Series	Toro 570Z Body 6" Pop	3.00	1.50
1 37069	Generic Cut-Off Riser	1/2" x 6" Cut-Off Riser	1.00	0.50
1 1402-130	Generic Insert Fittings	Combo Tee 1 x 1 x 1/2 Ins x Ins x FIPT	2.00	1.00
1 08180	Toro Spray Nozzles MPR Plus for 570 Se	MPR Plus Nozzles 8' 1/2 Circle (7' - 9	7.00	4.00
1 570Z-6P	Toro Body - 570 SmallTurf Series	Toro 570Z Body 6" Pop	3.00	1.50
1 37069	Generic Cut-Off Riser	1/2" x 6" Cut-Off Riser	1.00	0.50
1 1402-130	Generic Insert Fittings	Combo Tee 1 x 1 x 1/2 Ins x Ins x FIPT	2.00	1.00
1 0890	Toro Spray Nozzles MPR Plus for 570 Se	MPR Plus Nozzles 8' 1/4 Circle (7' - 9	7.00	4.00
1 570Z-6P	Toro Body - 570 SmallTurf Series	Toro 570Z Body 6" Pop	3.00	1.50
1 37069	Generic Cut-Off Riser	1/2" x 6" Cut-Off Riser	1.00	0.50
1 1402-130	Generic Insert Fittings	Combo Tee 1 x 1 x 1/2 Ins x Ins x FIPT	2.00	1.00
1 08180	Toro Spray Nozzles MPR Plus for 570 Se	MPR Plus Nozzles 8' 1/2 Circle (7' - 9	7.00	4.00
1 570Z-6P	Toro Body - 570 SmallTurf Series	Toro 570Z Body 6" Pop	3.00	1.50

The "Parts by Type" report is like the "Parts by Zone" report but lists all parts in order of the part type. This report is extremely handy as a "pick list" or may also be utilized as a Bill of Materials or Estimate.

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┌──────────────────────────────────────────────────────────────────────────────────────────┐
│ ABC┌──┐   ABC Sprinklers              John Smith                REPORT:  ALL PARTS LIST SORTED BY TYPE │
│ sprinkler 999 9th St.              999 9th St.                Available Pressure = 50.00 PSI │
│ system    Denver, CO               Denver, CO  80202          Available Flow = 20.00 GPM    │
│ designs   9999999999               999 999-9999               Designed by:  Art T.          │
│                                    Permit ID:  380403                                       │
│ ─────────────────────────────────────────────────────────────────────────────────────────│
│     HEAD LISTING:                                                                           │
│     Quan. Part #      Manufacturer Series           Description                  Unit Price │
│        2 8A Brown     Hunter Pro Adjustable Spray Nozzles  Hunter Pro Adj. Nozzle Brown 8'      1.95 │
│       21 12A Green    Hunter Pro Adjustable Spray Nozzles  Hunter Pro Adj. Nozzle Green 12'     1.95 │
│       14 6A Lt. Blu   Hunter Pro Adjustable Spray Nozzles  Hunter Pro Adj. Nozzle Lt. Blue 6'   1.95 │
│        2 15A Black    Hunter Pro Adjustable Spray Nozzles  Hunter Pro Adj. Nozzle Black 15'     1.95 │
│        1 17A Grey     Hunter Pro Adjustable Spray Nozzles  Hunter Pro Adj. Nozzle Grey 17'      1.95 │
│                                                                                             │
│     HEAD BODY LISTING:                                                                      │
│     Quan. Part #      Manufacturer Series           Description                  Unit Price │
│       39 PROS-04-PR   Pro-Spray Bodies PRS30        Hunter PRS30 Body - 4" Popup 30 PSI Re   10.95 │
│        1 PROS-06-PR                                 Hunter PRS30 Body - 6" Popup 30 PSI Re   10.95 │
│                                                                                             │
│     PIPE LISTING:                                                                           │
│     Quan. Part #      Manufacturer Series           Description                  Unit Price │
│       66 Generic      Generic PVC Sch. 40 Pipe      1" x 1' PVC Sch. 40 Pipe          2.49 │
│      785 Generic      Generic Poly Pipe             1" x 1' NSF Poly Pipe             1.20 │
│                                                                                             │
│     CLOCK TIMER LISTING:                                                                    │
│     Quan. Part #      Manufacturer Series           Description                  Unit Price │
│        1 Easy-Set     Orbit Super Dual Programmable Timer  6 Station Timer/GBX           180.00 │
│        1 57088        Orbit Timer Accessories       7 conductor x 100' UF Sprinkler Wire  99.00 │
│                                                                                             │
│     PIPE FITTINGS LISTING:                                                                  │
│     Quan. Part #      Manufacturer Series           Description                  Unit Price │
│                                                                                             │
│     TOOLS LISTING:                                                                          │
│     Quan. Part #      Manufacturer Series           Description                  Unit Price │
│                                                                                             │
│     VALVE LISTING:                                                                          │
│     Quan. Part #      Manufacturer Series           Description                  Unit Price │
│        1 51058        Generic Pressure & Vacuum Breakers  1" Pressure Vacuum Breaker      299.00 │
│                                                                                             │
│     ACCESSORY LISTING:                                                                      │
│     Quan. Part #      Manufacturer Series           Description                  Unit Price │
│        1 53030        Generic Valve Boxes           12" Standard Box                25.00 │
│                                                                                             │
│     LABOR LISTING:                                                                          │
│     Quan. Part #      Manufacturer Series           Description                  Unit Price │
│        1              Manifold Creation             Entrance & Manifold Build Per Hour   40.00 │
│        8              System Construction           Final system construction & testing. P  40.00 │
│        1 Rental       Misc Items                    Equipment Rental                100.00 │
│        3              Trenching                     System PIpe Trenching Per Hour    40.00 │
│                                                                                             │
│     ***************************************************************************Totals:   2805.34 │
│                                                                                             │
│                                                                                             │
│ WaterMarkPro ©1997 - 2024 Science Hill, LLC          Page 1          File: Demo1.wpf Monday, May 13, 2024    11:57 AM │
└──────────────────────────────────────────────────────────────────────────────────────────┘
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For the parts reports, you can choose to show parts dealer costs, retails, or neither. In most cases, when the reports are used as Bill of Materials or Estimates, you will choose to not show the dealer costs.