STREAMLINE

Users Guide

MILLER ENVIRONMENTAL

Introduction

The following User Guide provides engineers and regulators the information necessary to develop and review pressure distribution calculations in accordance with the 2002 Title 5 Pressure Distribution Design Guidance (PDG) of the Massachusetts Department of Environmental Protection (MADEP). Engineers are also able to select Streamline™ pumps based on the calculated operating point of the system. It discusses the features and functionality of the Streamline™ pressure distribution network design program and then provides step-by-step instructions on how to use the program.

The complete Miller Environmental Corp. approach to successful pressure distribution projects includes the Streamline™ software utility and providing system installation kits directly to contractors. These systems include all necessary components for system installation from the pump and force main to the manifold and pre-drilled distribution laterals. The distribution laterals are clearly marked and precisely drilled in a controlled environment for accuracy and quality control.
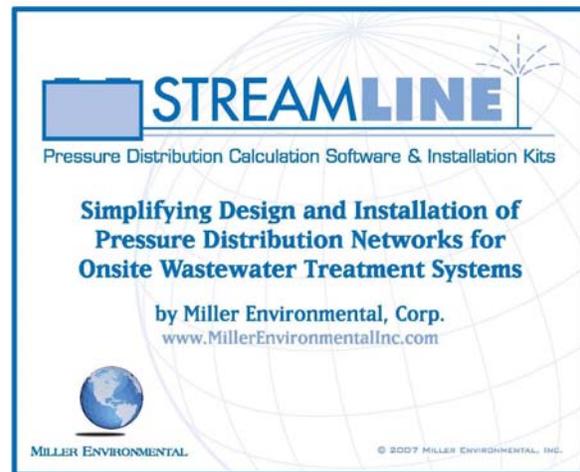
Miller Environmental Corp. has gone to great lengths to select and assemble high quality components for the Streamline™ system. This approach has been developed with the intention of making pressure distribution design, inspection and installation easier and more cost effective than ever before. Designers can specify Streamline™ installation kits by simply presenting the Streamline™ Design Calculate and Pump Curve forms on their plans.

All engineers using this program should be familiar with the Design Guidance for Pressure Distribution Networks, Massachusetts Department of Environmental Protection, 2002. This guidance can be accessed through the Streamline™ Help Menu. Click on MADEP Guide and the program will link to the MADEP Guidance on the web.

NOTE: You must have an internet connect to access the MADEP Guidance from Streamline™. If you do not have an internet connection this guidance can be ordered from the State Bookstore at (617) 727-2834.

New users are encouraged to read and follow the Streamline™ tips provided on the Streamline™ tip bar, the blue text bar located just below the action buttons on the Streamline™ data input and calculation form called the Design Calculate Form. The tip bar provides information associated with data input values and warns users when they should be checking their design against the requirements of the MADEP Guidance. There is a data input tip for each specific data input field on the Design side of the Streamline™ Design/Calculation Form.

Streamline™ is an engineering software program created to provide engineering professionals and regulators with a utility to make designing and reviewing pressure distribution networks quick and simple.

The program is a combination of two facilities. The first facility is the Design Calculation Form (Shown Right) where users input the critical design parameters required to design a pressure distribution network. Once data input for a specific project has been completed the user clicks on the "Calculate" button. The program then evaluates the input values for the project and presents the pressure distribution network calculations on the right side of the Design Calculate Form.

The Streamline™ design and calculation form
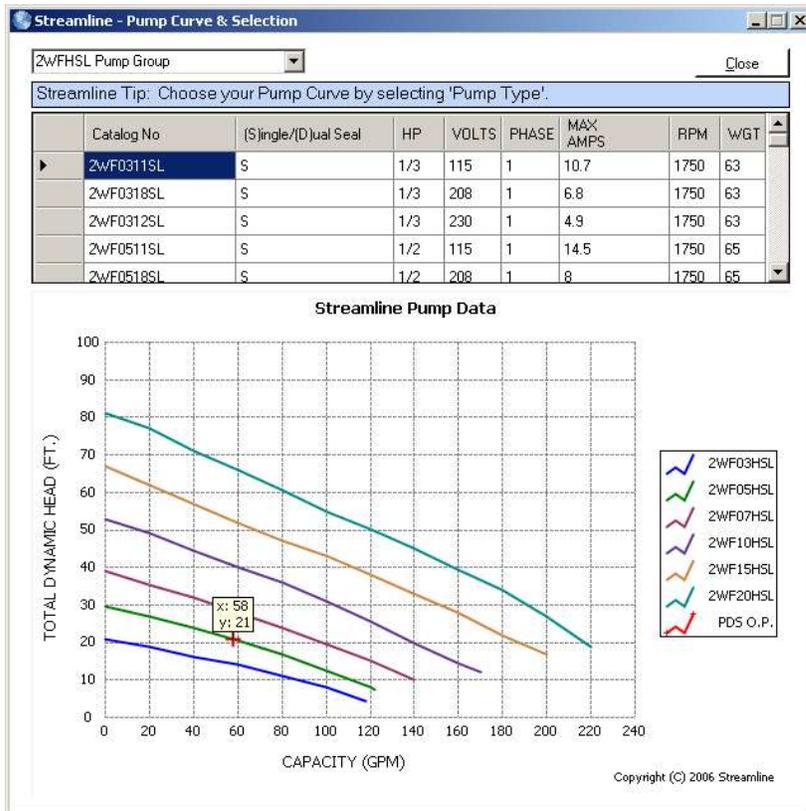
The second facility takes the calculated flow and total dynamic head, the operating point for the distribution system, and displays that on a Streamline™ pump curve in a separate window. From this window the engineer can select various Streamline™ pump curves to locate the one that best fits the specific pump operating point. The scroll-down table at the top of the pump curve lists all available Streamline™ pumps within specific pump groups and allows the engineer to select the individual pump that best suits each specific project.

THE STREAMLINE™ PUMP CURVE FORM

Once the system has been designed with Streamline™ the user can easily create raster images of both the Design Calculate Form and the Pump Curve which can then be inserted into AutoCAD drawings resulting in complete plans with all information required by regulators for project approval.

Designers should be aware that additional requirements from local approving authorities may be required and it is their responsibility to research local regulations and bylaws prior to system design. Furthermore, this program has been developed to assist design engineers with designing pressure distribution systems with the ultimate operational responsibility of pressure distribution networks belonging to the system design engineer and the installing contractor and as such no liability or warrantees of any kind are either expressed or implied by Miller Environmental Corp. and its affiliates by providing this program to designers.

Installation

Before you install Streamline, ensure that your computer meets the minimum system requirements presented below.

Minimum System Requirements

The table below lists the minimum resources that are required to install the Streamline program.

Hardware/Software	Requirements
Operating System	Windows 2000 Windows XP Home/Professional
Processor	Pentium 450 or Higher Equivalent Processor
RAM	128 MB (minimum)
Video	The Streamline program is functional on any video resolution setting from 800 x 600 and above however the printing facilities will not work properly for resolution less than 1280 x 1024. Refer to Instructions below to change screen resolution.
CD ROM Drive	Any speed (for installation only)

Changing Computer Screen Resolution

To change the computer screen resolution begin by placing the mouse over the desktop and click the right mouse button.
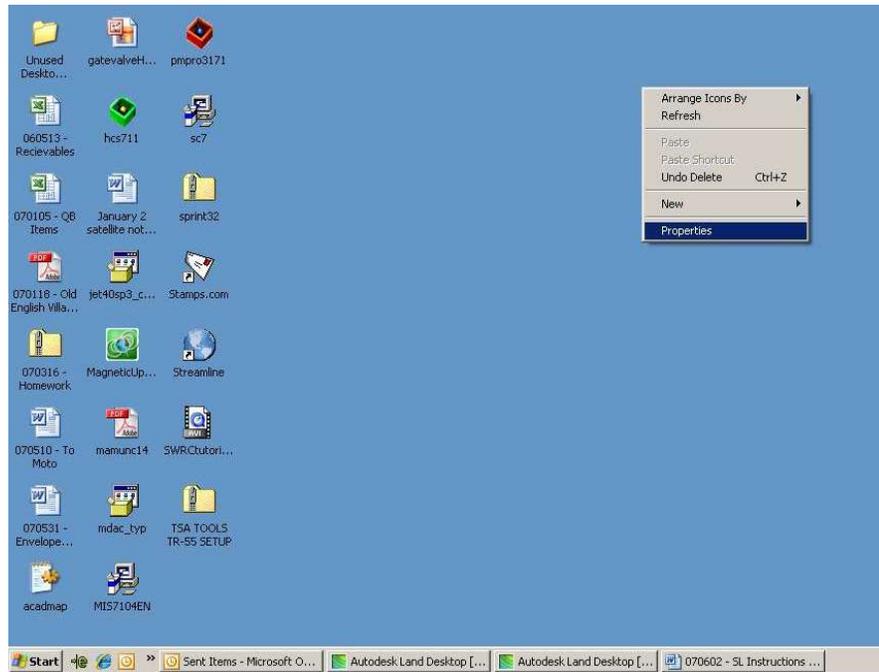
This will open a small window on the desktop as shown above. Highlight "Properties" and click the left mouse button. This will open the "Display Properties" window shown below. Click on the "Settings" tab and adjust the screen resolution by sliding the slide bar until the screen resolution is indicated as 1280 x 1024 and then click "OK". The screen will go blank for an instant while the screen resolution is adjusted and then Windows may ask you if you want to keep the screen settings. If so click "yes" otherwise the screen resolution has been changed.
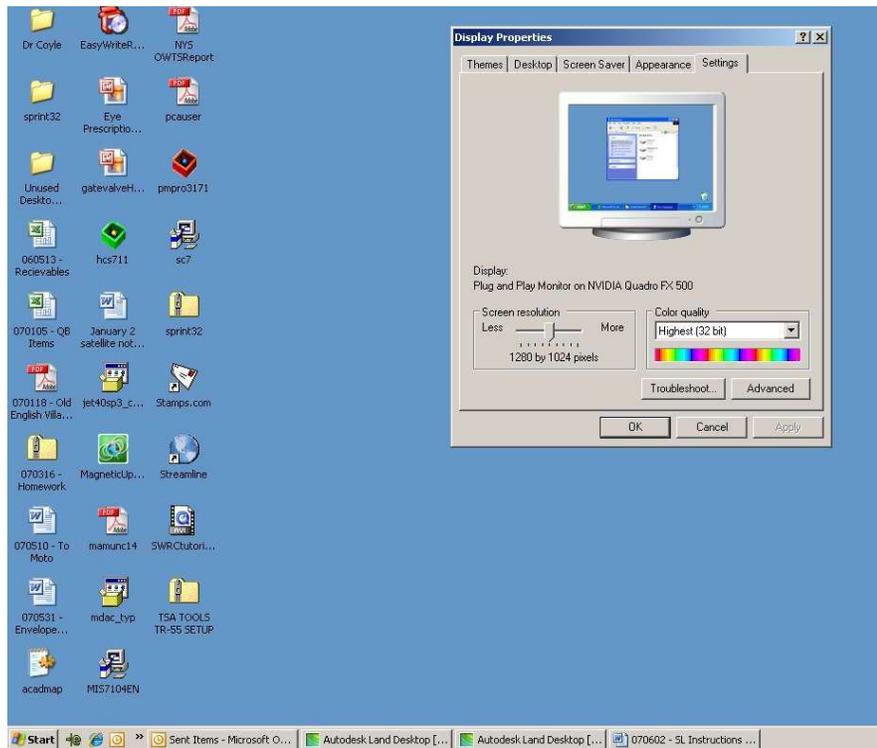
Installing the Streamline Program
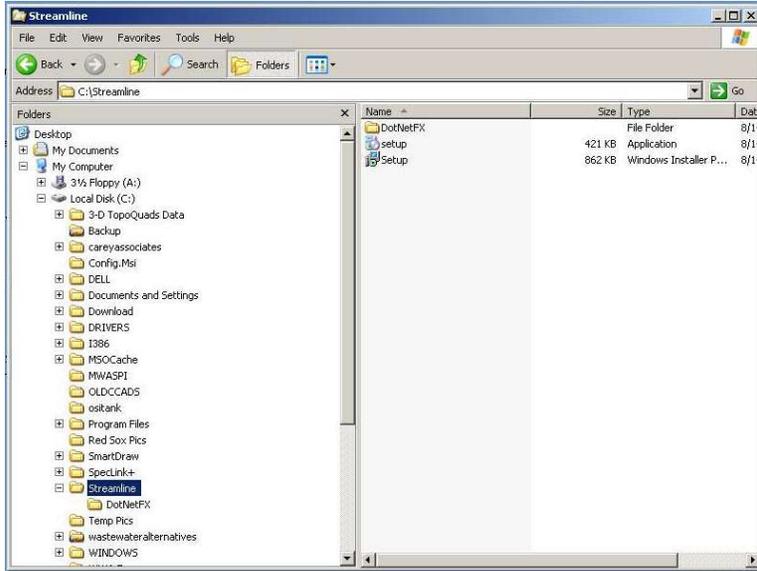
Installation of the Streamline™ program is quick and simple. The Setup file of Type "Application" provided with your purchase will open a Setup Wizard that will guide you through the installation process. The following instructions will guide you through the Streamline™ Setup Wizard installation screens.

First locate the Setup file provided to you when you purchased Streamline™. Double click on this file to begin the installation process.

Depending on the security software running on the computer you may see a screen similar to the one shown to the right. If you do click "Run" to open the Streamline™ Setup Wizard window shown below.

Click on "Next" once you have read the copyright message provided on this window. This will open the "Select Installation Folder" window shown below

The Streamline™ Setup Wizard provides a default location to install the Streamline™ program. If this is not the location where you want to install the program click "Browse" and you can browse for a Windows location to install the Streamline™ program. Once the program installation location has been verified Click "Next".
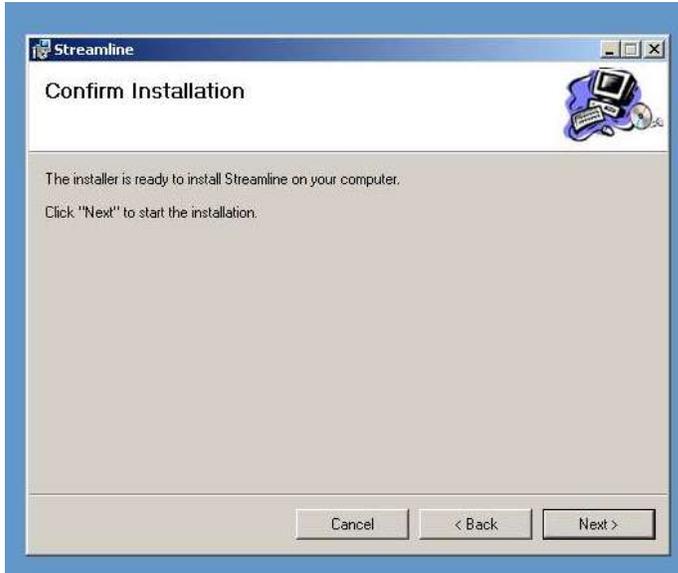
This opens a window that confirms your intentions to install the program. If you decide not to install the program at this time click "Cancel" and the Streamline™ Installation Wizard will end; if you want to change the location of program installation click "Back" and you will go to the previous window where you can change the installation location for the program. If you are ready to install the program click "Next"

The Streamline™ Installation Wizard will display a new window with a progress bar that will show you the progress of installation as the program is installed on your PC.
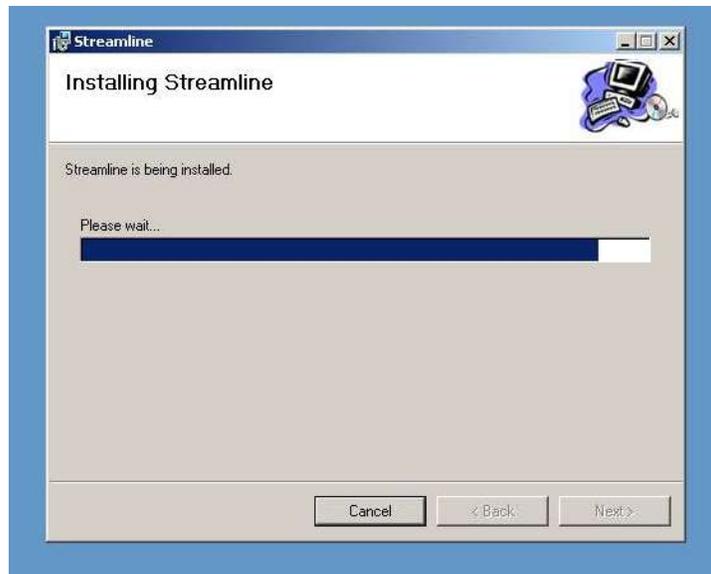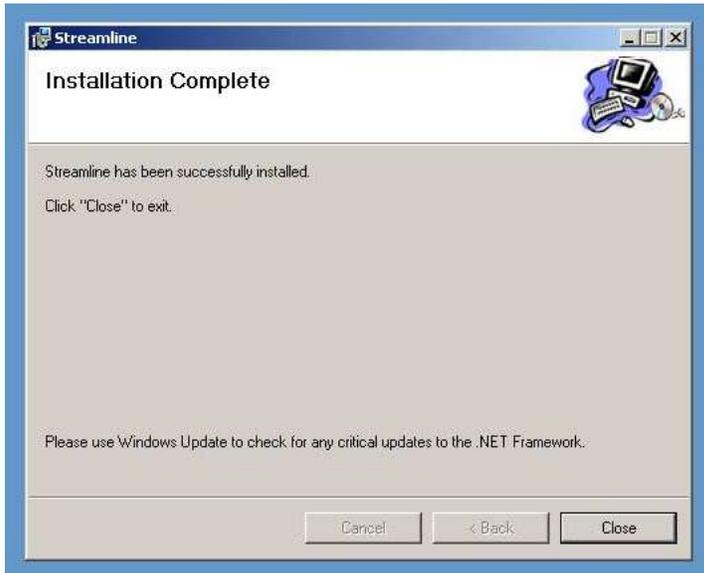
Once the Streamline™ Installation Wizard has completed the installation a final window with the message "Installation Complete" will appear.

Click on "Close" to complete the installation process.

Getting Started

The figure shown to the right shows the basic generic requirements for all designs that are to be developed using Streamline™. These requirements include lateral and orifice spacing, length and width of the Soil Absorption System (SAS) and manifold requirements as shown.

It is recommended that engineers begin with a preliminary layout of individual systems similar to that shown above. This develops a foundation for entering data into the Streamline™ program.
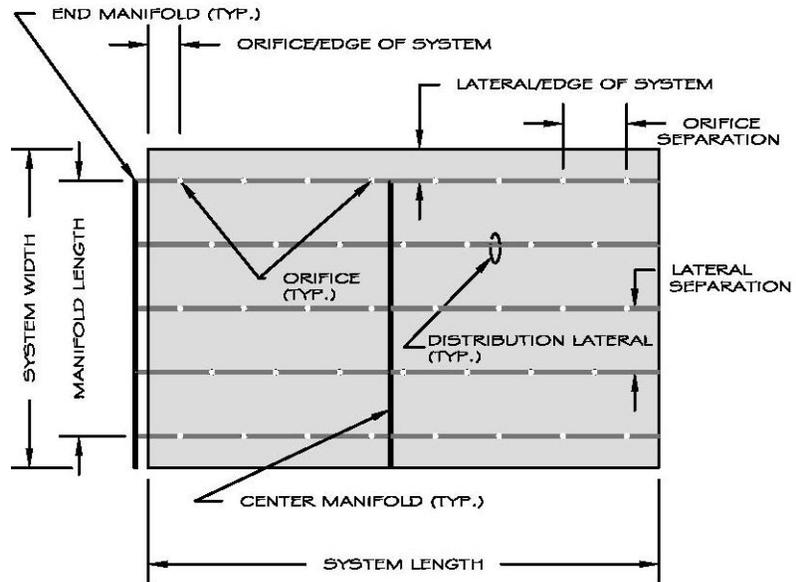

Once data from the preliminary layout is input into the Streamline™ Design Calculate Form and the design is calculated the user is presented with the calculated design results for the system including, discharge rates, system head loss, system dosing and pump parameters for the system.

This begins an iterative process where the user can revise design input values to adjust calculated system values to fit the specific project

Opening the Streamline™ Program

When you install Streamline™ on your computer the Setup Wizard creates a shortcut on your desktop. The Streamline™ program can be opened by either double clicking on this icon or by accessing the program file through the Windows Start Menu ["Start" "All Programs" locate the "Streamline" folder then click on the Streamline program file].

Entering Project Data

Either of these methods of opening the Streamline™ program will open the Design Calculate Form with all data input fields blank. This is where the user enters the input values for their preliminary distribution network design; the Streamline™ Tip Bar and the table below are provided to aid program users as they go through the data input process.

DATA INPUT REFERENCE TABLE

Input Prompt	Input Value
Project Information	
Project:	Enter project title or identification
Engineer:	Enter name of engineer or engineering firm
Orifices	
Distal In-line Pressure:	This is the desired squirt height that the system will generate when charged by the pump specified in Streamline™. The Title 5 design guidance minimum is 2.5-feet. A minimum of 4-feet is recommended to provide adequate blow-out pressure at the perforation although the designer can select any distal in-line pressure provided it is at least 2.5-feet.
Diameter:	This is the desired orifice diameter. Input this value as a decimal reflecting orifice diameters within the MADEP allowable range of 0.125 (1/8") and 0.625 (5/8"). Smaller diameters result in lower orifices discharge rates; larger diameters result in higher orifice discharge rates.
Total # of Orifices:	Enter the total number of orifices for the pressure distribution network.
Spacing:	Enter orifice spacing up to the MADEP allowable maximum of 5-feet.
Orientation:	This is the desired orientation for orifices. Select 5 & 7 O'clock, 10 & 2 O'clock or 12 & 6 O'clock. Note that only an orientation of 5 & 7 O'clock can be installed without orifice shields.
Staggered?	Click the check box if the orifice locations will be staggered between laterals, as recommended by MADEP. Engineers may choose to not stagger orifice locations for designs that include trenches where staggering orifice locations between laterals does not affect system performance.

Input Prompt	Input Value
Laterals	
Pipe Class:	Here the designer selects between Schedule 40 and Schedule 80 PVC piping for the distribution network laterals.
Spacing:	Enter the desired lateral separation distance. This must be in compliance with 310 CMR 15.000.
Diameter:	Enter the diameter of the distribution laterals in inches. The designer should refer to Figures 8A – 8G in the MADEP PDG.
Length (or average):	Enter the lateral length. If the length of laterals varies enter the average length of all laterals as this value is used to calculate system volume for system dosing parameters.
Total # of Laterals:	Enter the total number of laterals in the complete distribution network.
Force Main	
Pipe Class:	Here the designer selects between Schedule 40 and Schedule 80 PVC piping for the system force main.
Diameter:	Select the force main diameter from the drop down menu.
Length:	Enter the full length of the force main.
Manifold	
Pipe Class:	Here the designer selects between Schedule 40 and Schedule 80 PVC piping for the system manifold.
Diameter:	Select the manifold diameter from the drop down menu. The designer should refer to Table 2 in the MADEP PDG.
Length:	Enter the length of the distribution manifold, the distance between the first and last distribution system lateral.

Input Prompt	Input Value
Head Losses	
90 Degree Elbows:	Enter the quantity of 90∘ Elbows in the force main
45 Degree Elbows:	Enter the quantity of 45∘ Elbows in the force main
Tees:	Enter the quantity of Tees in the force main
Check Valves:	Enter the quantity of Check Valves in the force main
Coupling/Quick Connect:	Enter the quantity of Couplings in the force main
Gate Valves:	Enter the quantity of Gate Valves in the force main
Static Head:	Enter the static head for the pressure distribution net work. This will be equal to the distribution lateral invert elevation minus the elevation of the pump off switch.
Additional Losses:	Here the engineer can specify additional head for the system when all head losses for a system are not captured by head losses presented above.
Dosing	
Pipe Vol. to Dose:	Select the number of pipe volumes to dose from the drop down menu. This menu allows selection of pump volumes as recommended in the MADEP PDG.
Is system designed to drain back?	Click on the check box if the system is designed to drain back to the pump chamber. This allows for accurate dosing volume calculations.

Calculate the Design

Once all of the data input values have been entered click the "Calculate" button at the top of the Streamline™ Design Calculate Form. Streamline™ uses the data input values to calculate the design parameters of the pressure distribution network and displays them on the right side of the Streamline™ Design Calculate Form (See Streamline™ Design Calculate Form below). Calculated values are shown in blue data fields that can not be edited by the user. These change only when design input values are changed and the "Calculate" button is clicked. Notice that a pump has not been selected for this design yet.

Pump Curves

Once the design has been calculated pump curves for various Streamline[TM] Pumps can be displayed by clicking the "Display Graph" button at the top of the Streamline[TM] Design Calculate Form.

This opens the Streamline[TM] Pump Curve & Selection screen shown here. In this case, the default pump curve is suitable for the project design. If this had not been the case; i.e. the pumps could not support the calculated flow or head parameters another pump curve must be selected. This is done by clicking the drop down "Pump Group" menu arrow at the top of this form. From this Engineers can select different pump groups to find the one that best fits the calculated pump
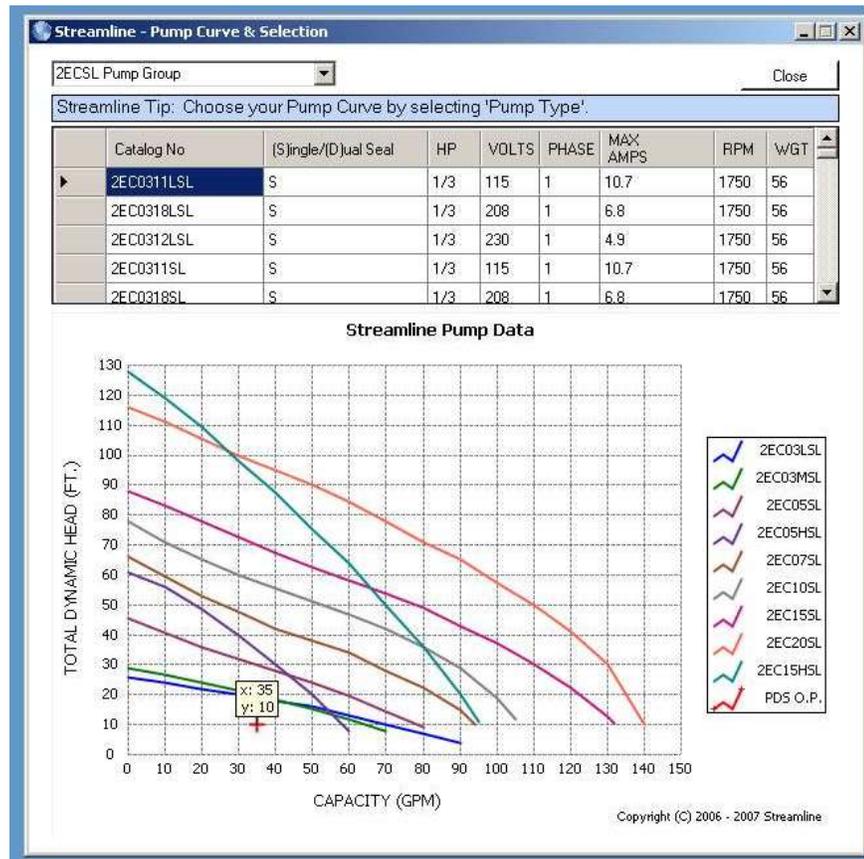
operating point. If none of the curves provide a suitable pump option for the project, the designer should go back to the Design Calculate Form and change design parameters that will result in a calculated pump operating point that fits on one of the Streamline[TM] pump curves. This is an iterative process and designers should repeat the data input, design calculate, pump curve evaluation process until the design results in a pump selection that best fits the project.

Once a suitable pump curve has been established the designer can select a Streamline[TM]

pump for the project using the pump catalog table located directly above the pump curve. From the pump curve the designer identifies the appropriate pump that best fits the project. This is done using the color code of the pump curve and matching it to a pump model in the pump curve legend. Using that model number the designer can then go to the scroll down pump selection table and select a pump with a catalog number that matches the pump model number and pump specifications (Seal, HP, Volts, Phase, Amps and RPM) that best fit the project.

When the designer locates an appropriate pump they can select it for the project by double clicking that catalog item in the scroll down pump selection table. This pump selection now shows in the Streamline™ Pump Selection field located at the bottom of the Calculations side of the Design Calculate Form as shown here.

This completes the design process and the pressure distribution network calculation and pump curves are ready for regulatory approval and project construction.

Streamline - Pressure Distribution Calculation Utility

File   Help

Project Information

Project: **11 Russell Street, Plymouth, MA**

Project Engineering Firm: **Wastwater|Alternatives, Plymouth, MA**

[Calculate]   [Display Graph]   [Clear Calculation]   [Clear Project]

Streamline Tip . . .

Design

Project Design Flow:	220	GPD

ORIFICES

Distal In-Line Pressure:	4	FT.
Diameter:	.25	IN.
Total # of Orifices:	24	Each
Spacing:	2	FT.
Orientation:	5 and 7 O'cloc ▼	
Staggered?	☑ Yes	

LATERALS

Pipe Class:	SCHD. 80 ▼	
Spacing:	0	FT.
Diameter:	1.5	IN.
Length (average):	25	FT.
Total # of Laterals:	2	Each

FORCE MAIN

Pipe Class:	SCHD. 80 ▼	
Diameter (in inches):	2.50 ▼	IN.
Length:	58.5	FT.

MANIFOLD

Pipe Class:	SCHD. 80 ▼	
Diameter (in inches):	2.00 ▼	IN.
Length:	0	FT.

HEAD LOSSES

90 Degree Elbows:	2
45 Degree Elbows:	2
Tees:	1
Check Valves:	1
Coupling / Quick Connect:	2
Gate Valves:	1
Static Head:	3.5 FT.
Additional Losses:	0 FT.

DOSING

Pipe Volumes to Dose:	10.00 ▼	
Is system designed to drain back?	☑ Yes	

Calculations

DISCHARGE RATES

Orifice Flow Rate, q. :	1.47	GPM
Lateral Flow Rate, Lq. :	17.5	GPM
System Flow Rate, Q :	35	GPM

HEAD LOSS

Force Main:	0.48	FT.
Fittings & Valves:	0.38	FT.
Distribution Network:	5.24	FT.
Static Head:	3.5	FT.
Total Dynamic Head:	10	FT.

SYSTEM DOSING

Delivery System Volume:	15	GAL.
Distr. Network Volume:	5	GAL.
Required Dose Volume:	50	GAL.
Total Volume per Dose:	70	GAL.

PUMP PARAMETERS

|		
Flow:	35	GPM
Total Dynamic Head:	10	FT.
Doses / Day:	4.4	
Pump Runtime / Dose:	2.00	MIN.
Pump Runtime / Day:	8.80	MIN

Streamline Pump Selection

Pump: **2EC0311LSL**

Notice: Pump Selected Above

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STREAMLINE
Pressure Distribution Calculation Software & Installation Kits

Simplifying Design and Installation of Pressure Distribution Networks for Onsite Wastewater Treatment Systems

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Save Your Project

Once the design is complete the project should be saved for future retrieval and use. This is done by clicking the "File" menu, highlighting the "Save" menu and then clicking on the "Save Project" facility.
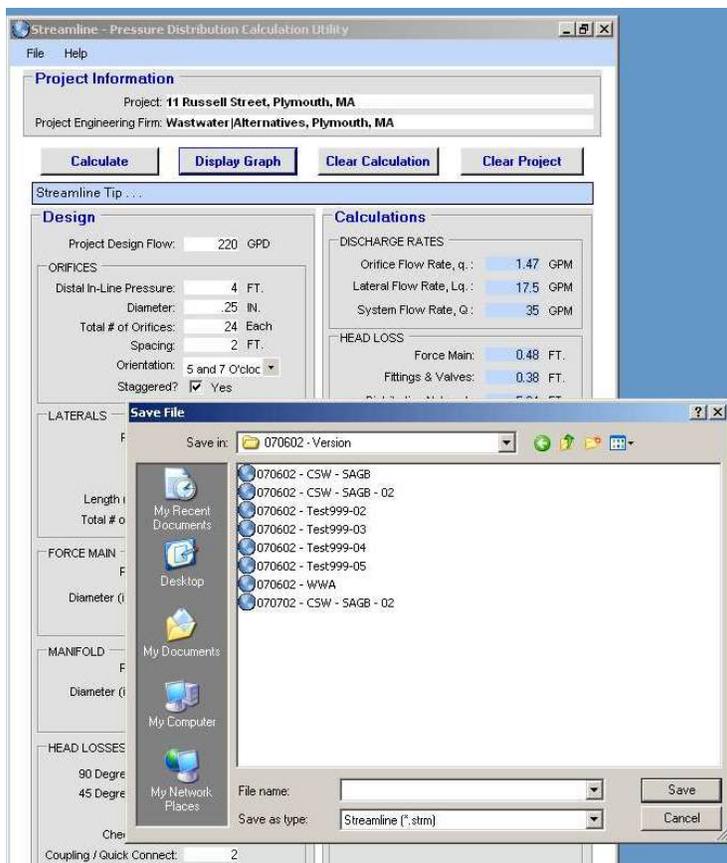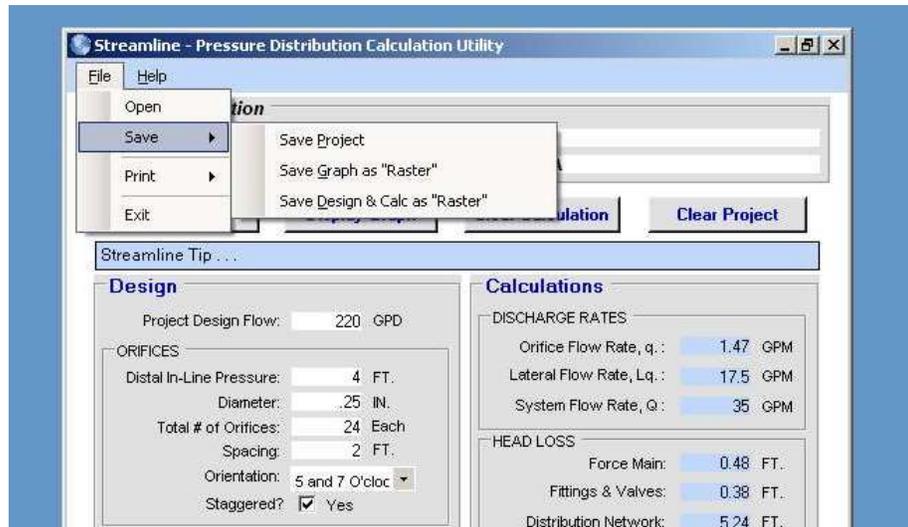
This opens the "save File" screen. Select the location where you want to save the file, enter a unique filename for the project file in the "Filename" field and click "Save".
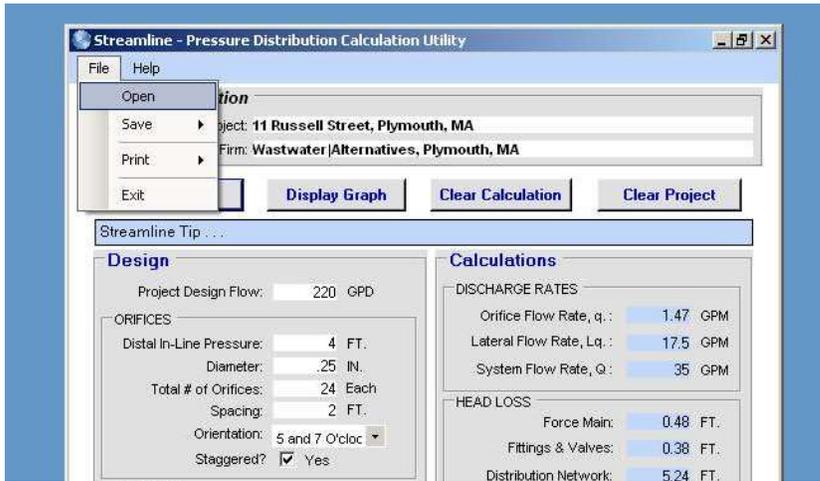
Now this project can be opened by selecting "Open" from the "File" menu, selecting the file and clicking the "Open" button. It can also be accessed directly by double clicking on that file from the My Computer or Windows Explorer file browsers.
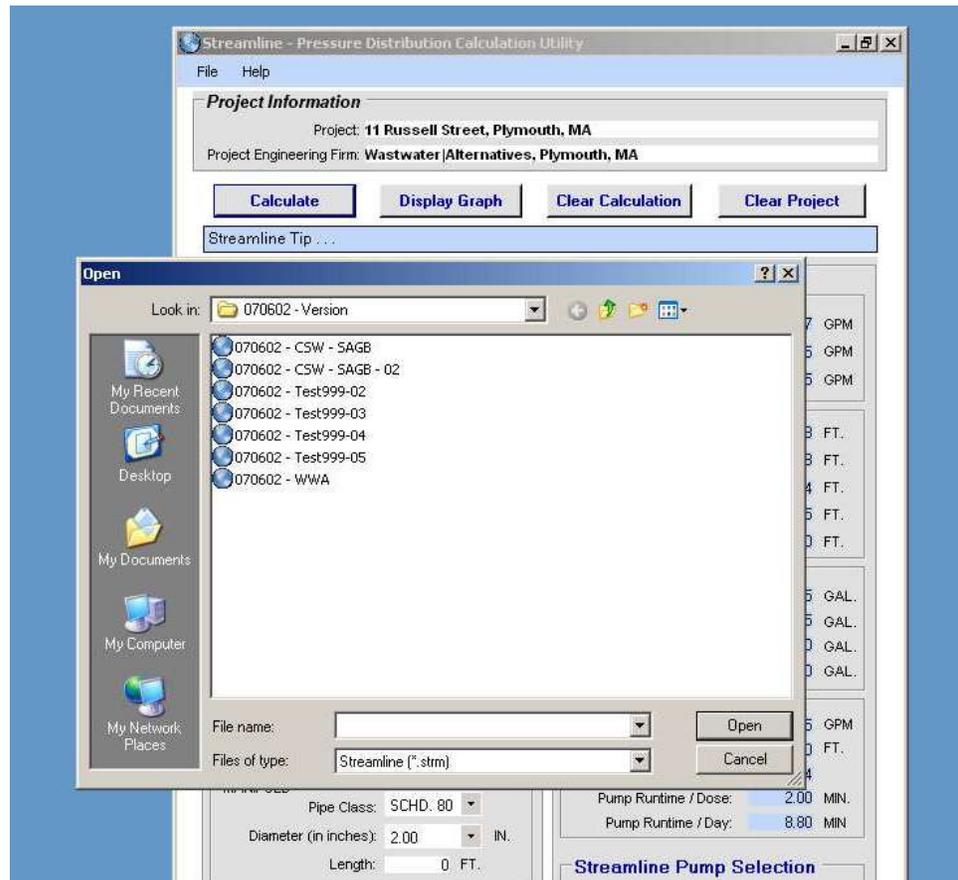
Print Your Project

Streamline™ offers two facilities to print the Design Calculation Form and Pump Curve.

The first facility allows users to print the forms directly to a system printer. To do this, click on "Print" under the "File" menu. This drops down a menu that allows the designer to print the

Design Calculation Form, the Pump Curve or both the Design Calculation Form and Pump Curve by selecting "Print All".
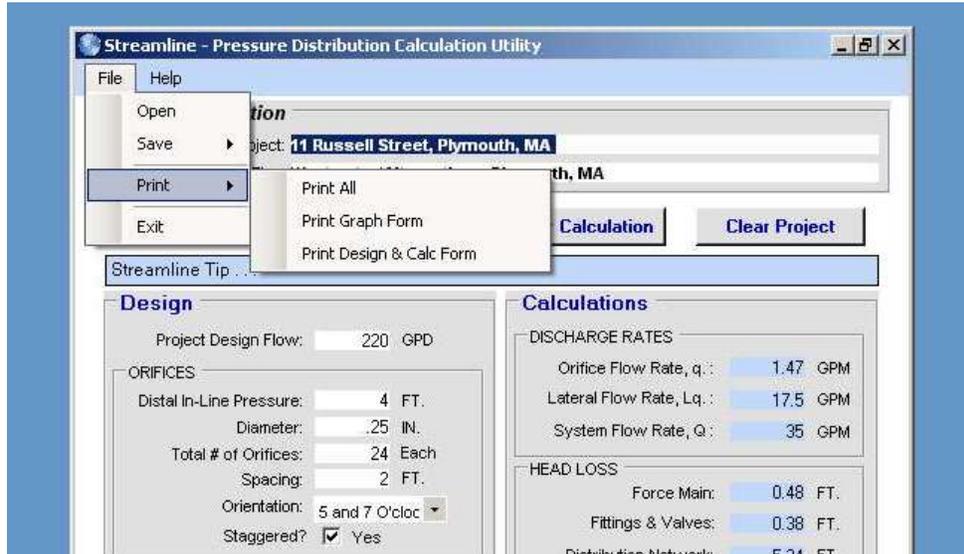

The other Streamline™ reproduction option allows designers to create raster images of the Design Calculation Form and Pump Curve for insertion into AutoCAD drawings. To do this, click on
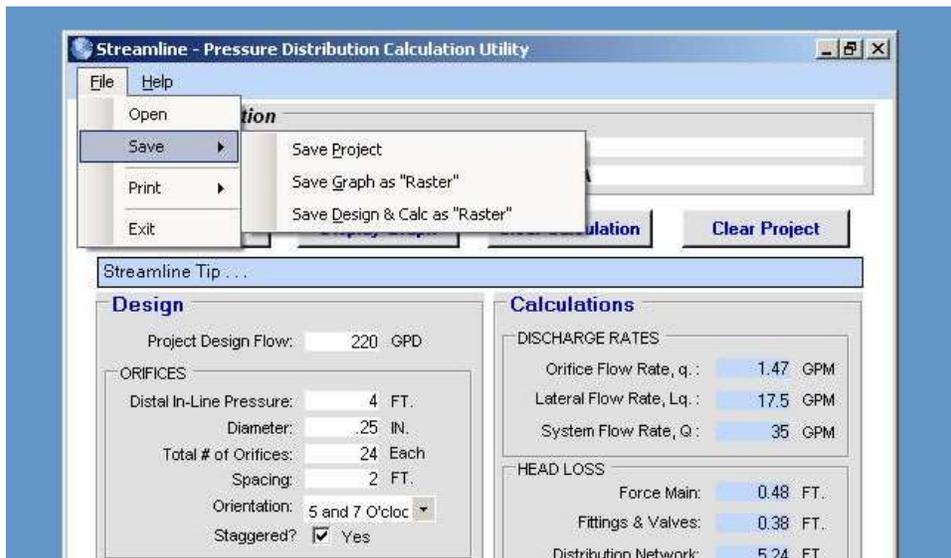
"Save" under the "File" menu. This opens a drop down list that allows the designer to save the project to disk or save the Design Calculation Form and/or the Pump Curve to a raster image. These images are saved to disk as jpeg files which can be inserted into AutoCAD drawings through the AutoCAD image manager. Designers can specify Streamline™ installation kits by simply presenting the Streamline™ Design Calculate and Pump Curve forms on their plans.

Streamline™ Help & Support
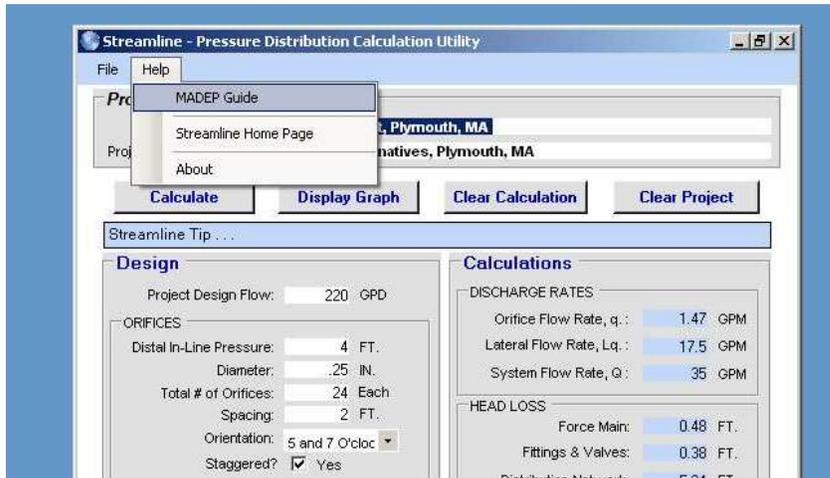
Designers will find the following facilities under the Streamline™ Help menu:

MADEP Guide — Selecting this option will open the 2002 Title 5 Pressure Distribution Design Guidance on the Massachusetts Department of Environmental Protection website provided the computer has an internet connection.

Engineers and designers are encouraged to reference this document frequently and especially to verify the diameters of Distribution network manifolds and laterals.

Streamline™ Home Page — Selecting this option will link the user to the home web page of Miller Environmental Corp. a Streamline™ program developer and distributor.

About — Selecting this option opens an informational window with Streamline™ copyright and development information.

For additional Streamline™ support or to order Streamline™ installation kits call Miller Environmental Corp.; they can be reached by phone, fax or e-mail:

Miller Environmental Corp.
608 Spring Street, East Bridgewater, MA 02333
p.   508-378-3800   f. 508-378-2411   info@millerenvironmentalinc.com