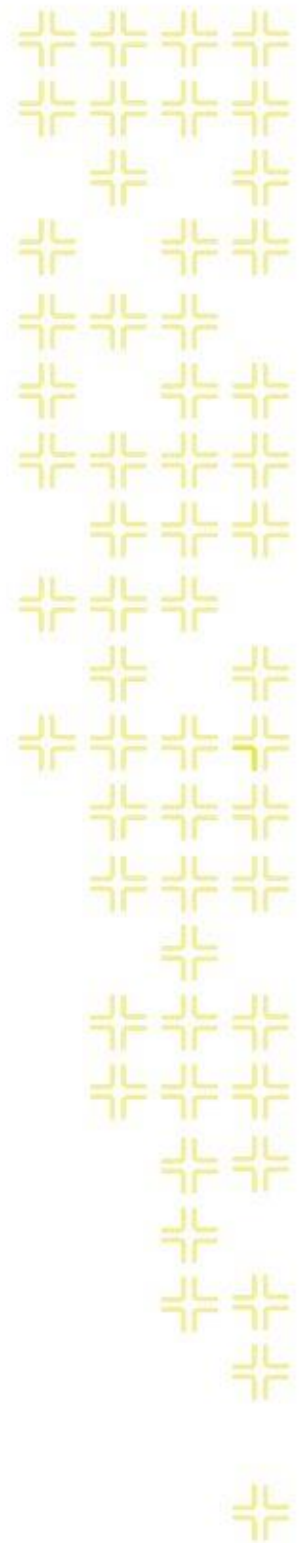




TRAINING GUIDE

Water Flushing



Water Flushing

The water flushing modules allow you to setup a plan for systematically flushing out a series of hydrants in your water system along a route, or tracking a direct hydrant flushing. The flushing records track the volumes, dates, and times of each flushing against the hydrants, pipes & valves.

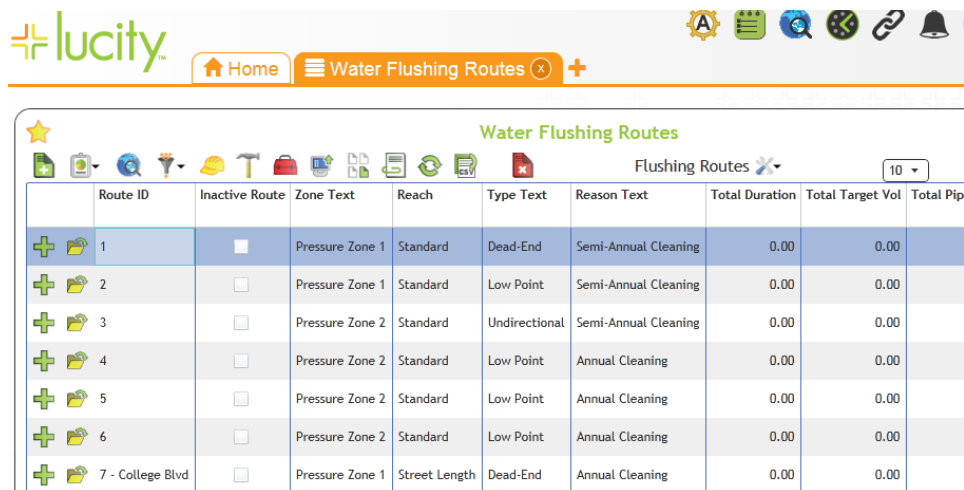
Contents

Water Flushing Routes	2
Water Flushing Route Child Records	4
Water Flushing History	7
Water Flushing History Child Records	8
Direct Hydrant Flushing	12
Water Loss	13

Water Flushing Routes

The Water Flushing Routes module allows you to set up routes for flushing valves, hydrants, and pipes. This module also displays flushing history recorded in the Water Flushing History module for each route, as well as work orders associated with the flushing history. We will look at the Water Flushing Routes module as it is used in the Lucity Web interface.

Water Flushing Routes is located in the Water > Water Distribution > Flushing menu.

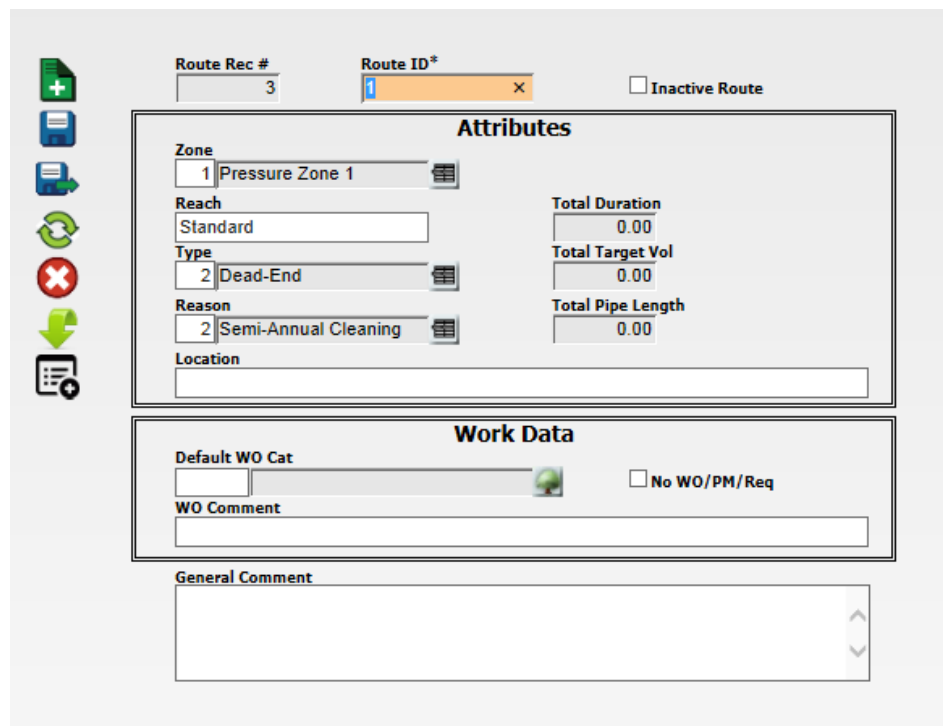


The screenshot shows the Lucity web interface for the Water Flushing Routes module. The breadcrumb trail is Home > Water Flushing Routes. The page title is "Water Flushing Routes" with a sub-header "Flushing Routes". A table displays the following data:

Route ID	Inactive Route	Zone Text	Reach	Type Text	Reason Text	Total Duration	Total Target Vol	Total Pipe
1	<input type="checkbox"/>	Pressure Zone 1	Standard	Dead-End	Semi-Annual Cleaning	0.00	0.00	
2	<input type="checkbox"/>	Pressure Zone 1	Standard	Low Point	Semi-Annual Cleaning	0.00	0.00	
3	<input type="checkbox"/>	Pressure Zone 2	Standard	Unidirectional	Semi-Annual Cleaning	0.00	0.00	
4	<input type="checkbox"/>	Pressure Zone 2	Standard	Low Point	Annual Cleaning	0.00	0.00	
5	<input type="checkbox"/>	Pressure Zone 2	Standard	Low Point	Annual Cleaning	0.00	0.00	
6	<input type="checkbox"/>	Pressure Zone 2	Standard	Low Point	Annual Cleaning	0.00	0.00	
7 - College Blvd	<input type="checkbox"/>	Pressure Zone 1	Street Length	Dead-End	Annual Cleaning	0.00	0.00	

The Water Flushing Routes view displays information for various Water Flushing Route records. The fields displayed in this view are completely customizable for your organization (or department, or user, etc), so may vary. Each of the fields displayed in the view are filterable and sortable.

You can click the form button beside any record to see the detailed information for the record. This form is also completely customizable, but will generally display the following information.



The screenshot shows the detailed form for a Water Flushing Route record. The form includes the following sections:

- Route Rec #**: 3
- Route ID***: 1
- Inactive Route**: ☐
- Attributes**:
 - Zone**: 1 Pressure Zone 1
 - Reach**: Standard
 - Type**: 2 Dead-End
 - Reason**: 2 Semi-Annual Cleaning
 - Location**:
 - Total Duration**: 0.00
 - Total Target Vol**: 0.00
 - Total Pipe Length**: 0.00
- Work Data**:
 - Default WO Cat**:
 - WO Comment**:
 - General Comment**:
 - No WO/PM/Req**: ☐

Header Information

The **Route Rec #** is an auto-generated unique identifier for this record. The system uses this record for look-ups behind the scenes.

The **Route ID*** is another unique identifier, selected by the record creator. This can be any combination of numbers, letters and symbols to help you identify this specific route.

Inactive Route allows you to remove the route from selectability in picklists, in essence, to “retire” the route, but maintain the historical linked information to the route.

Attributes

- **Zone** is a user-defined area picklist, likely a list of pressure zones that the route is located in.
- **Reach** is a text field that allows anything to be typed in it.
- **Type** allows you to select the type of route it is (unidirectional, dead-end, etc).
- **Reason** provides a way to track the reason the flushing route was created. This could be due to a set cleaning schedule.
- **Location** is a text field that allows you to fill in any general location information.
- **Total duration**, **Total Target Volume**, and **Total Pipe Length** are all auto-calculated based on the associated assets to the Water Flushing Route. For example, the Total Pipe Length is a sum of all linked pipes to the Hydrants being flushed.








Work Data

- **Default Work Order Category** allows to you to set a type of category which will be auto-filled in whenever a Work Order, etc. is generated from this record.
- **No Work Order/Pm/Template** is a checkbox, which, when set to true, will remove this route from any related Work Order/Pm/Template picklists so it is not selectable. This will also remove the ability to create these records directly from the record from the Water Flushing Route view.
- **WO Comment** is a text field that allows any comment to be filled in that should carry over on the asset to the work order.

Other

Other user-defined custom fields can be included for any additional information needing to be tracked, as well as a short general comment field. Creation fields and Last Modified fields will track when and who created and last updated this record.

Water Flushing Route Child Records

1		Pressure Zone 1	Standard	Dead-End	Semi-Annual Cleaning
Hydrants (55) History (3) PM/Work Templates (0) Work Orders (1) Comments (1)					
      Hydrants 					

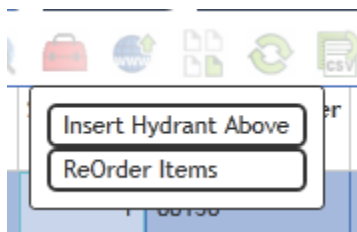
When hitting the + button, you display related child records for each Water Flushing Route record. The child records displayed vary, but could include: Hydrants (including the linked Valves and Pipes), Water Hydrant Flushing History for that Route, PM/Work Templates that route is assigned to, Work Orders, and Comments.

Hydrants:

This child grid is where all the hydrant asset information related to the water flushing is stored. The individual hydrants that are on the water flushing route are tracked here. Each hydrant record is specific for the water flushing route: it tracks not only the Hydrant number, but the sequence in the route, the individual flush type, and the Target Flush Duration, Gallons Per Minute, and Volume for each hydrant. Additional fields can also be included.

Sequence
1
Flush Type
Hydrant Number*
00138
Target Flush Duration
Target GPM
of Nozzles Used
Target Volume
Notes

Toolkit items in the hydrants view allows the hydrants that are added to be reordered, or that allows you to insert a new hydrant at the top of the list (rather than the bottom, which is the default).



The pipes and valves for each hydrant can be linked as well. This allows calculation of the total length of pipes flushed, and additional information about valve exercising.

	Sequence	Hydrant Number	Building No	Address	Street Name	Street Suffi
	1	00138				

Valves (1) Pipes (1)

In the valves grid, the toolkit provides an option to Change Hydrant Sequence Number or to Open Closed Valves.

Recommendation: It is recommended to have a dummy hydrant record that you add to the end of every Flushing Route to help in cleanup. This tool is run in the Valves grid for the dummy hydrant.

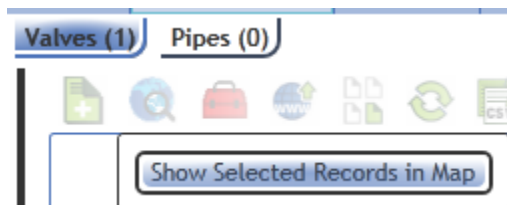
Running the Open Closed Valves process on the Dummy Hydrant will add all of the closed valves from the rest of the route to the Valves grid. Those valves that should not be opened can simply be deleted from the grid.

	Sequence	Hydrant Number	Building No	Address	Street Name	Street Suffix	Street Type	Direction	Open Text	Turns
	47	Dummy Hydrant								

Valves (1) Pipes (0)

Change Hydrant Sequence Number
Open Closed Valves

For any of these route, hydrant, pipe or valve assets, you can use the show in map feature for all selected in order to view in the GIS Web map.



History:

This view shows some basic information about historical flushing history. Water Flushing History is also a separate module to track additional dates, multiple assets, and individual amounts of the flushing. All the information for a historical event will roll up into this child record. This includes Total Volume & Total Pipe Length. More detailed event information can be found by opening up the History record separately. *See Water Flushing Route History section for more details.*

PM/Work Templates:

When a flushing route is included on a template or scheduled work order (PM), the route is automatically linked to that PM or Template, which is displayed in the child grid. The details shown will include PM/Template ID and Text, Category/Task/Problem for the PM/Template, and details about what kind of PM/Template it is. Toolkits available for these PM/Templates are: Calculations for Average Durations and Estimates based on Historical Data.



Work Orders:

When a flushing route is used to generate a work order, the route is automatically linked to that work order, which is displayed in the child grid. The work orders may display additional information about the water flushing process, including labor, time, materials, etc.

Comments:

Allows for the additional tracking of an unlimited number of text comments. These comments can also track who and when each comment record was created or last modified.

Finally, the Water Flushing Routes module has two toolkit items called “Create Flushing History and WO for Current Filter” and “Create Flushing History and WO for Selected Records”.

Water Flushing Routes			
			
Flushing Routes 			
Zd		Total Duration	Total Target Vol
Create Flushing History and WO for Current Filter			
Create Flushing History and WO for Selected Records			
Pressure Zone: 1 Standard Dead End 30min Annual Cleaning		0.00	0.00

These will allow you to select all filtered or selected routes you are viewing and generate new flushing histories for them, along with an associated work order. The work order will automatically include the flushing route as an asset. Depending on your Water Option settings, the following assets may also be included:





- | | |
|-----------------------------------------------------------|-------------------------------------|
| In Flushing Route, Copy Hydrants to Work Orders with Tool | <input checked="" type="checkbox"/> |
| In Flushing Route, Copy Valves to Work Orders with Tool | <input checked="" type="checkbox"/> |
| In Flushing Route, Copy Pipes to Work Orders with Tool | <input checked="" type="checkbox"/> |











Water Flushing History















The Water Flushing History module allows users to record water flushing data and attributes, as well as track the flushing records related to valves, hydrants, and pipes. This module allows users to record flushing data using the routes defined in the Water Flushing Route module. We will look at the Water Flushing History module as it is used in the Lucy Web interface.

Water Flushing History is located in the Water > Water Distribution > Flushing menu.

lucity™

 Home  Water Flushing Routes  Water Flushing History 

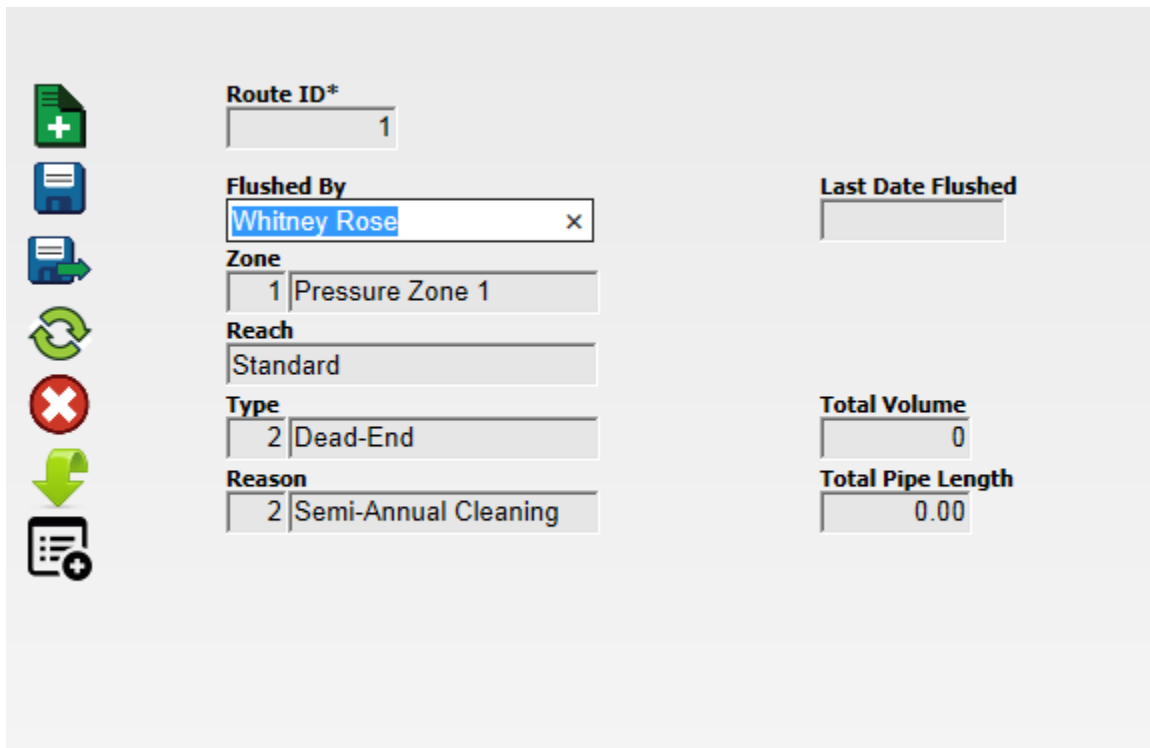
        History  10 

	Route ID	Last Date Flushed	Flushed By	Zone Text	Reach	Type Text	Reason Text	Date Flushed	Total Volume	Tot
 	1			Pressure Zone 1	Standard	Dead-End	Semi-Annual Cleaning			
 	1		Whitney Rose	Pressure Zone 1	Standard	Dead-End	Semi-Annual Cleaning	8/31/2016		
 	5		Alonso Culligan	Pressure Zone 2	Standard	Low Point	Annual Cleaning		0	
 	4		Lakia Norden	Pressure Zone 2	Standard	Low Point	Annual Cleaning		0	
 	3		Ilene Jamerson	Pressure Zone 2	Standard	Undirectional	Semi-Annual Cleaning		0	
 	2		Margy Merck	Pressure Zone 1	Standard	Low Point	Semi-Annual Cleaning		0	
 	1		Whitney Rose	Pressure Zone 1	Standard	Dead-End	Semi-Annual Cleaning	8/1/2016	0	

The Water Flushing History view displays information for the historic flushing events. These are separate than, but could be associated with, a work order. The fields displayed are customizable and easily sortable and filterable.

Notes: _____

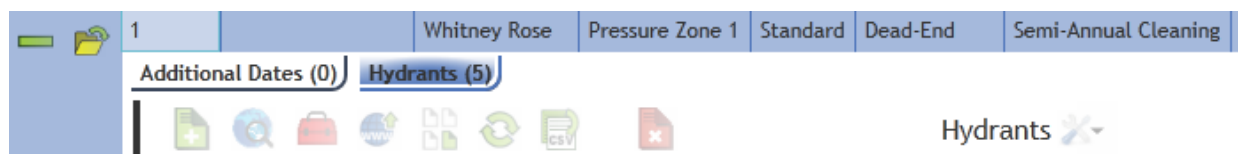
You can click the form button beside any record to see the detailed information for the record. This form is completely customizable, but will generally display the following information.



Route ID*	1
Flushed By	Whitney Rose
Zone	1 Pressure Zone 1
Reach	Standard
Type	2 Dead-End
Reason	2 Semi-Annual Cleaning
Last Date Flushed	
Total Volume	0
Total Pipe Length	0.00

Most of these fields are automatically filled in and un-editable. The values are being carried over from the route information. The Flushed By field and General Comment field are available for editing by the user. There also a number of custom fields available for any additional information that needs to be tracked.

Water Flushing History Child Records



When hitting the + button, you display related child records for each Water Flushing History record. The available child records display Additional Dates and Hydrants (including associated valves and pipes).

Additional Dates

Enables users to add any additional dates on which the route was flushed.

Hydrants

All of the hydrants along the associated Water Flushing Route will be included in this list. This will also include the associated valves and cleaned pipes if included. Each individual Water Flushing History Hydrant record will have its own unique information to be filled out about the flushing event. This includes the following fields:

Sequence	1	Target Flush Duration	2.00	<input checked="" type="checkbox"/> Exercised	
Flush Type		# of Nozzles Used	1	Exercised Date	8/27/16
Hydrant Number*	00521	Target GPM	100	Target Pipe Vol (gal)	0
Notes					
Flushed By	Flushing Crew 2	Static Pressure (psi)	42.00		
Date Flushed	8/27/16	Residual Pressure (psi)	25.00		
Start Time	8:15 AM	Flow at 20 psi	68.96		
End Time	8:30 AM	Chlorine Start			
Time Flushed	15.00	Chlorine End			
Discharge Rate	60	Problem 1			
Discharge Volume	900	Problem 2			
Total Pipe Length		Problem 3			
Water Loss Number					

- **Sequence** is the order of the hydrant in the flushing route.
- **Flush Type** is the specific type of flushing that occurred.
- **Hydrant Number*** is a required field that needs to be associated with an existing Hydrant Asset Record.
- **Notes** allows any additional comments or notes regarding the event.
- **Target Flush Duration** allows you to track a number of minutes of anticipated flushing.
- **# of Nozzles Used** allows you to track a number.
- **Target GPM** allows you to track a number of gallons per minute desired.
- **Exercised** and **Exercised Date** allow you to select if and when the valves were exercised.

- **Flushed by** is a text field for tracking who did the flushing.
- **Date Flushed**, **Start Time** and **End Time** track when the flushing on this hydrant actually occurred.
- **Time flushed** is a number of minutes the flushing took.
- **Discharge Rate** allows you to track the number of gallons per minute of water flushed.
- **Discharge Volume** will use Time and Discharge Rate to auto calculate a number of gallons flushed.
- **Target Pipe Volume in Gallons** and **Total Pipe Length** are auto calculated from the associated Pipe records.
- **Water Loss Record #** is the auto ID of a new Water Loss Record in the Lucity system. This is automatically generated when the new History record is saved, and tracks the total Volume used during the flushing.
- **Static Pressure** and **Residual Pressure** allow you to track the pounds per square inch of pressure during the flushing.
- **Flow at 20 psi** will allow you to track the rate of flow at 20 psi, and will automatically calculate if discharge rate and the two pressures have values.
- **Chlorine Start** and **Chlorine End** can track the Chlorine measurement of the water at the beginning and end of the flushing.
- **Problem** fields allow you to select any problems that occurred during the flushing. These use a user-defined picklist.




Water Flushing History Additional Flushing Dates Form

Flushed By	Andrea	Time Flushed	30.00
Date Flushed*	9/01/2015	Discharge Rate	100
Start Time	8:00 AM	Discharge Volume	3000
End Time	8:30 AM		
Last Modified By		Last Modified Date	
		Last Modified Time	

Additional Dates




This module allows you to track additional flushing dates on the same route. For each additional flushing date, you can track the Flushed By, Date, Start/End Time for the event. Additionally, the Times Flushed will get multiplied by the Discharge Rate, and the Discharge Volume will be automatically calculated for each additional event.

Hydrants - Valves

Hydrants					
	Sequence	Hydrant Number	Building No	Address	Street Name
	1	00001	3401		COLLEGE
<div> <div>Valves (2)</div> <div>Pipes (1)</div> </div>					
					V
	Valve Number	Valve Rec #	Set Valve to Text	Bl	
	00003	3	Close		
	00001	1	Close		

The valves associated with each hydrant flushing are displayed. The Valve status, location, and Turn # and direction are tracked in this child record. The Exercised Status and Exercised Date are automatically updated with each Hydrant Flushing record.

Hydrants - Pipes

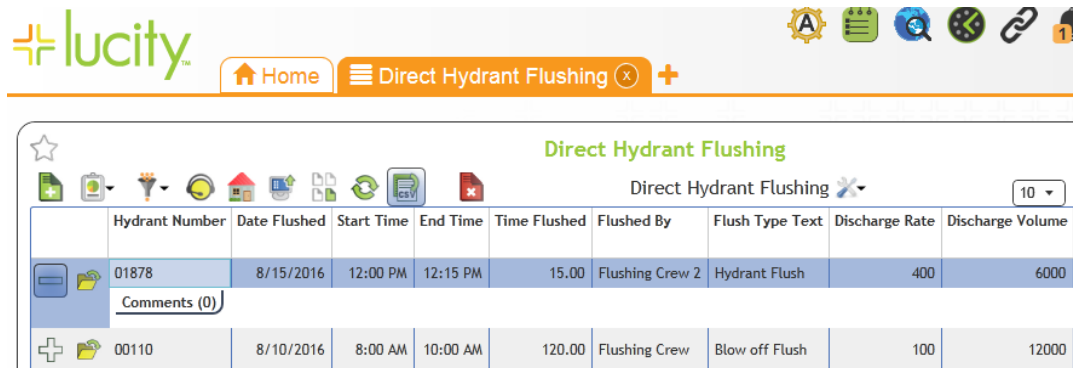
Hydrants						
	Sequence	Hydrant Number	Building No	Address	Street Name	Stree
	1	00001	3401		COLLEGE	
<div> <div>Valves (2)</div> <div>Pipes (2)</div> </div>						
					Pipes	
	Pipe Number	Length (ft)	Diameter (in)	From End Typ		
	00002	100.00	30.00			
	00001	100.00	30.00	Pump Station		

The pipes being flushed are associated with each hydrant record. The total lengths for these pipes is what will calculate the flushed pipe length in the Hydrant Flushing History record. This value will dynamically change as pipes are added or deleted from this list.

Direct Hydrant Flushing

The Direct Hydrant Flushing module enables users to create hydrant flushing records that only include a single hydrant. This simplifies entering single hydrant flushing information. We will look at the Direct Hydrant Flushing module as it is used in the Lucity Web interface.

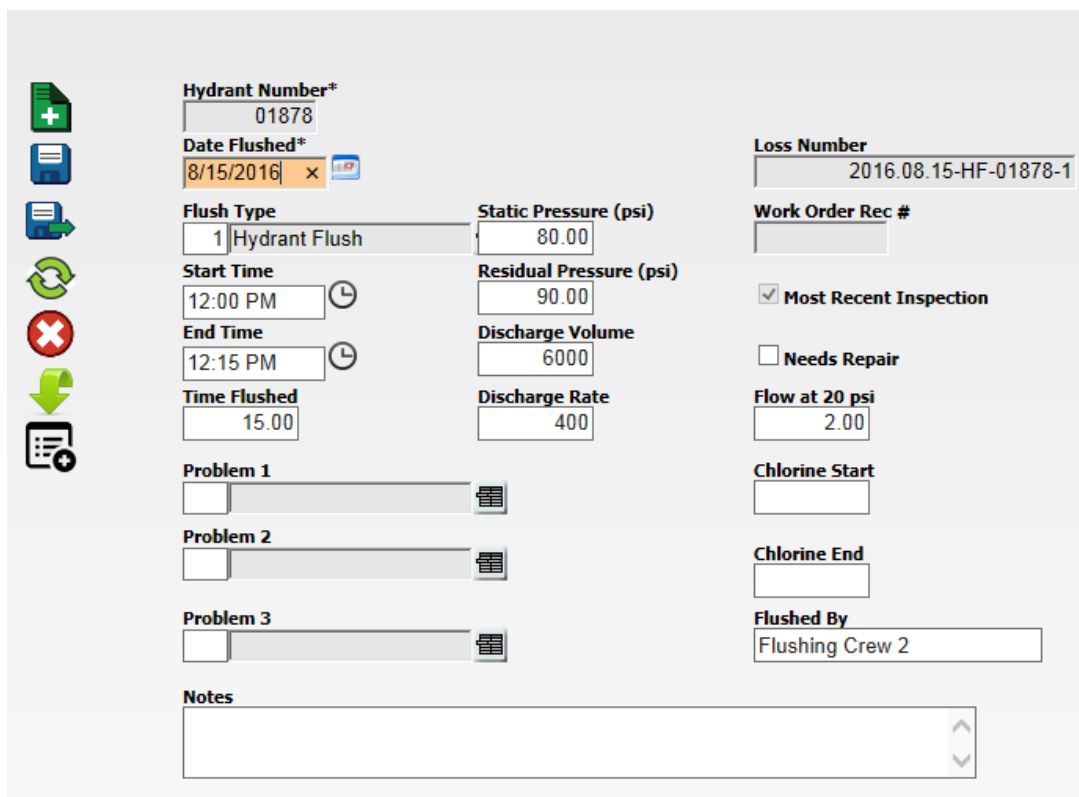
Direct Hydrant Flushing is located in the Water > Water Distribution > Flushing menu.



Hydrant Number	Date Flushed	Start Time	End Time	Time Flushed	Flushed By	Flush Type Text	Discharge Rate	Discharge Volume
01878	8/15/2016	12:00 PM	12:15 PM	15.00	Flushing Crew 2	Hydrant Flush	400	6000
00110	8/10/2016	8:00 AM	10:00 AM	120.00	Flushing Crew	Blow off Flush	100	12000

The Direct Hydrant Flushing view displays information for single hydrant flushing events. These track the attributes and measurements from a direct hydrant flushing. The fields displayed are customizable and easily sortable and filterable.

You can click the form button beside any record to see the detailed information for the record. Once again, this form is completely customizable, but will generally display the following information.



Hydrant Number*
01878

Date Flushed*
8/15/2016

Flush Type
1 Hydrant Flush

Static Pressure (psi)
80.00

Residual Pressure (psi)
90.00

Discharge Volume
6000

Discharge Rate
400

Time Flushed
15.00

Problem 1
[Text Field]

Problem 2
[Text Field]

Problem 3
[Text Field]

Loss Number
2016.08.15-HF-01878-1

Work Order Rec #
[Text Field]

☒ **Most Recent Inspection**

☐ **Needs Repair**

Flow at 20 psi
2.00

Chlorine Start
[Text Field]

Chlorine End
[Text Field]

Flushed By
Flushing Crew 2

Notes
[Text Area]

- **Hydrant Number*** is a required field that needs to be associated with an existing Hydrant Asset Record.
- **Date Flushed, Start Time** and **End Time** track when the flushing on this hydrant actually occurred.
- **Flush Type** is the specific type of flushing that occurred.
- **Time** flushed is a number of minutes the flushing took.
- **Static Pressure** and **Residual Pressure** allow you to track the pounds per square inch of pressure during the flushing.
- **Discharge Rate** allows you to track the number of gallons per minute of water flushed.
- **Discharge Volume** will use Time and Discharge Rate to auto calculate a number of gallons flushed.
- **Water Loss Record #** is the auto ID of a new Water Loss Record in the Lucity system. This is automatically generated when the new History record is saved, and tracks the total Volume used during the flushing.
- **Target Flush Duration** allows you to track a number of minutes of anticipated flushing.
- **# of Nozzles Used** allows you to track a number.
- **Flow at 20 psi** will allow you to track the rate of flow at 20 psi, and will automatically calculate if discharge rate and the two pressures have values.
- **Chlorine Start** and **Chlorine End** can track the Chlorine measurement of the water at the beginning and end of the flushing.
- **Problem** fields allow you to select any problems that occurred during the flushing. These use a user-defined picklist.
- **Flushed by** is a text field for tracking who did the flushing.
- **Notes** allows any additional comments or notes regarding the event.

Comments

Allows for the additional tracking of an unlimited number of text comments. These comments can also track who and when each comment record was created or last modified.

Water Loss

The Water Loss module enables users to track loss event information such as location, damages, responsible parties, testing results, and work orders. As it relates to Water Flushing, an automatic water loss record is created with each flushing history record or direct hydrant flushing record created. This automatically tracks the estimated water loss as a record in this module. We will look at the Direct Hydrant Flushing module as it is used in the Lucity Web interface.

Water Loss is located in Water > Water Loss.

Loss Number	Date	Time	Address	Street Direction	Street Name	Street Type	Street Suffix	Cross Street	Street Dir 2
2016.08.10-HF-00110-1	8/10/2016	10:00 AM							
2016.08.15-HF-01878-1	8/15/2016	12:15 PM							

The Water Loss view displays information any water loss events. These track the attributes details from a variety of water loss events. The fields displayed are customizable and easily sortable and filterable.

You can click the form button beside any record to see the detailed information for the record. Once again, this form is completely customizable, but will generally display the following information:

Water Loss Rec # 1 **Loss Number*** 2016.08.10-HF-00110-1 **Date** 8/10/2016 **Time** 10:00 AM

Address **Street Name** **Cross Street** **Street Name 2**

AutoGenerated From 1 Hydrant Flush **Est Water Loss** 12000

General

Employee **Reason** **District** **Location** **Storm Location**

Loss Type **Cause**

☐ **Locate Needed** ☐ **Billable WO** ☐ **Damage**

When a water loss record is automatically generated from a Hydrant Flushing, the following fields are automatically populated from the flushing record:

- **Loss Number*** fields is automatically generated based on the date and type of water loss event that created the water loss record.
- **Date & Time** are brought over automatically from the water flushing record.
- **AutoGenerated From** will be set automatically to 1 - Hydrant Flush for these types of automatic records.
- **Est. Water Loss** is automatically carried over from the total Discharge Volume of the flushing record.