

# ENGINEERING COMMUNIQUÉ

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From: **THE SMITH ENGINEERING GROUP**

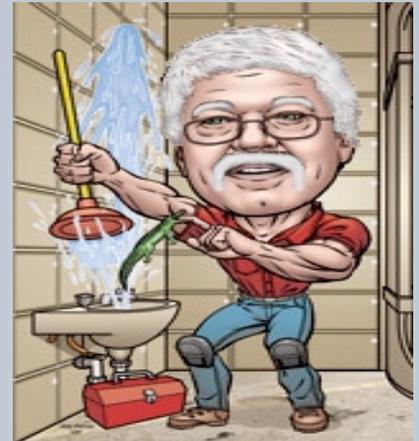
**SUBJECT: Siphonic Roof Drainage**

## **WHAT IS NEEDED TO JUMP START A SIPHONIC REVIEW:**

Before a Proposed Siphonic Drainage System can be reviewed and/or designed, there is a certain amount of research that must be done and information gathered by the Engineer or Design Build Contractor. First, they should purchase/download and study the ASPE Tech Standard 45 (Siphonic Roof Drainage) design standard from the ASPE website. This will give them a good understanding of Siphonic Roof Drainage Design and what it involves. It is also a good idea to download the SiphoniTec Software from the Jay R. Smith website and become familiar with how it works. There is a user guide that is downloaded with the software. There are also webinars and additional instructions available on the Jay R. Smith website.

In using the SiphoniTec Software to design a Siphonic Roof Drainage System, you are required to input each and every piping element of the drainage system into the software. Therefore, before you can begin to use the software, you must know certain parameters pertaining to the design. You must also know the dimensions of the complete piping system. Below is a list of information you will need to consider, gather and layout before submitting the system for design or evaluation.

1. **GENERAL INFORMATION:** Siphonic systems are generally recommended for low rise buildings with large foot prints with 50,000 or more total square footage. Placing the siphonic drains in a gutter works best. Small roof areas and/or high-rise buildings are difficult to design and balance. You will need to know the square footage of roof area assigned to each roof drain and the design rainfall rate (inches per hour). This along with other basic information such as piping material, job information and location (zip code) are also required.



## **HYDRANT SPECIAL:**

SQ-5-3082 is a unique design and application. Please refer to the attached submittal. A large apartment complex designated two areas for auto washing and related activities. In order to provide sufficient hose connections, a special stainless steel rectangular box housing six hydrants in four compartments was provided. Each cover contains a key cylinder lock. Compartment one and two each houses two cold water hydrant stations, compartment three has a hot water hydrant station and compartment four has a twin temp station offering both hot and cold water. The tenants have to provide their own hoses but the hydrant station allows for simultaneous washing of multiple autos. This design can be altered to accommodate various arrangements of hydrants.

2. **ROOF DETAIL:** Provide a detailed drawing (with dimensions) of the roof with drain locations and how the water is directed to the drains. Flat roofs, Roofs sloped to one side or to the middle (“V” or “W” type) and roof with a gutter system are preferred. Divided roofs (cricket systems) with multiple peaks and valleys can be more difficult to balance. Overflow systems are usually more complicated for this type of roof design.

3. **EMERGENCY OVERFLOW:** Determine how the emergency overflow drains will be incorporated into the design. Will scupper drains through the parapet be used (preferred) or will the overflow drains and piping system be conventional or siphonic (siphonic overflow system is not recommended for divided/cricket roof systems – contact Smith’s Sales Engineering Department for more information).

4. **PIPING SYSTEM DETAILS/LAYOUT:** An isometric or 2D drawing must be created and submitted for the whole piping system from each roof drain to the discharge point (where the siphon is terminated and converts to large sloped piping). The siphonic piping system can discharge into a catch basin (preferred) or directly into a larger sloped pipe sized according to conventional drainage design (based on code flow charts - pipe must have free flow of air).

Each and every element of the siphonic piping system must be accounted for in the design. Each elbow, each junction, each roof drain and each section of horizontal and vertical piping including lengths and elevations must be input into the software. Piping should be dimensioned along the centerline to each change in direction and to the center of each fitting (for junctions dimension to the point in the centerline where the two horizontal flows meet). Elevations (at centerline of pipe) of all horizontal piping as well as top of roof (top of roofing membrane) should also be given. Generally, a 24” minimum drop from the top of flashing on the roof to the centerline of the horizontal manifold piping is recommended.

In some cases, the siphon may need to be terminated in the vertical stack piping (usually for taller buildings). If this is the case, the vertical pipe size will have to be increased (at the siphonic termination point) to conventional gravity drainage pipe sizing. This will allow the vertical piping to drop just far enough to create the necessary flow velocities to adequately drain the roof area (if this method is utilized, space will have to be allotted for the larger pipe size). In some cases (again with taller buildings) an alternate method may be used. This method involves reducing the pipe size of the vertical stack near the base to slow the systems velocity and decrease the residual head of all the drains. The pipe size will then be increased after the piping turns horizontal to terminate the siphon.

We have qualified licensed Plumbing Engineers/ Consultants that can design and stamp the system design. However, you will still need to provide the information stated above. Engineering cost will be included in the roof drain quotation and an estimated completion date can be issued once the required information is provided and reviewed. Keep in mind that when a system is designed using Jay R. Smith siphonic roof drains, **Smith drains must be installed** or the system will need to be redesigned using the alternate drain. Alternate Drains cannot just be substituted as they will change the dynamics and flow of the system. See attached for an example of a properly dimensioned isometric piping layout for a siphonic system.

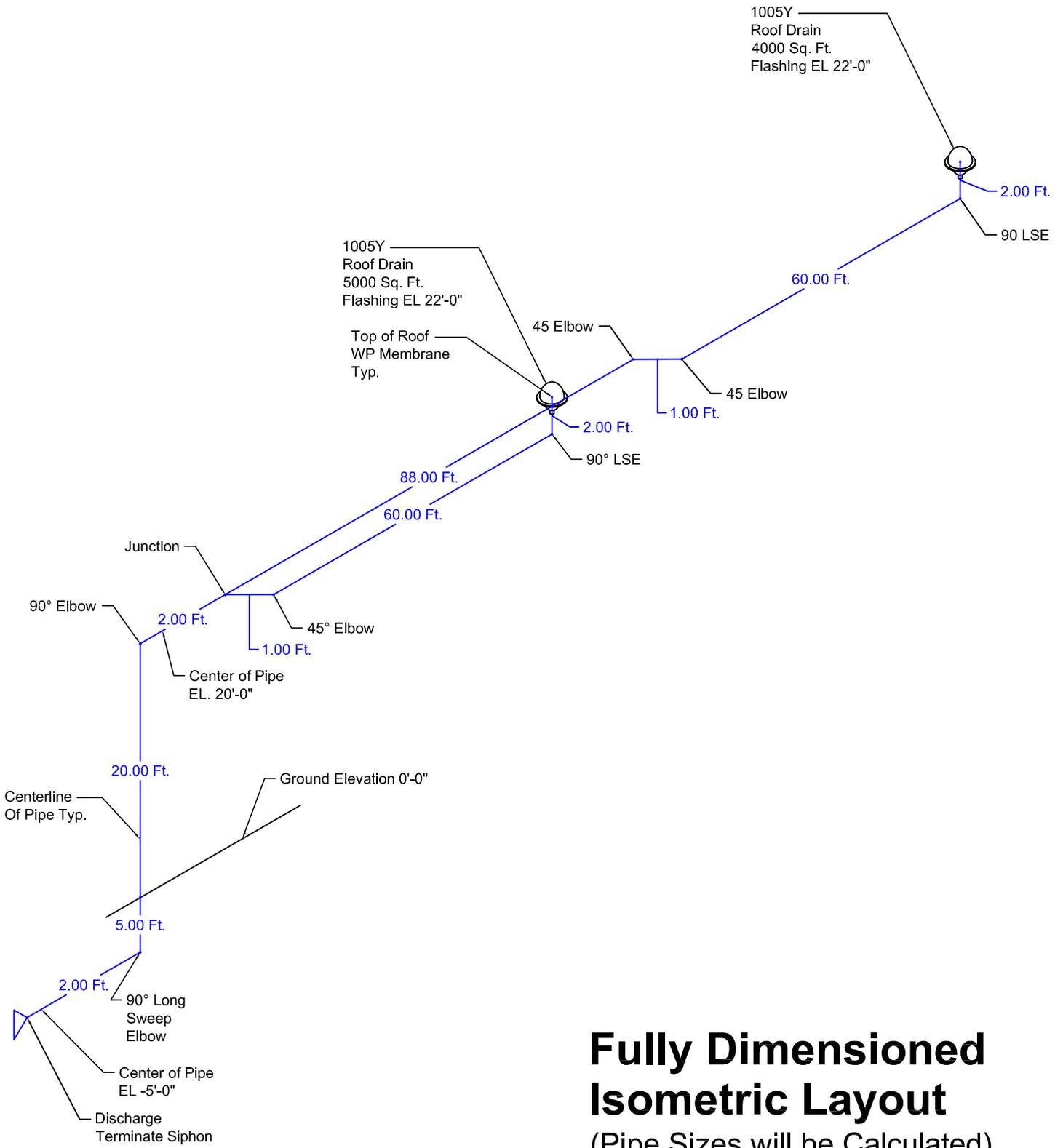
Chris Rylant, Senior Sales Engineer

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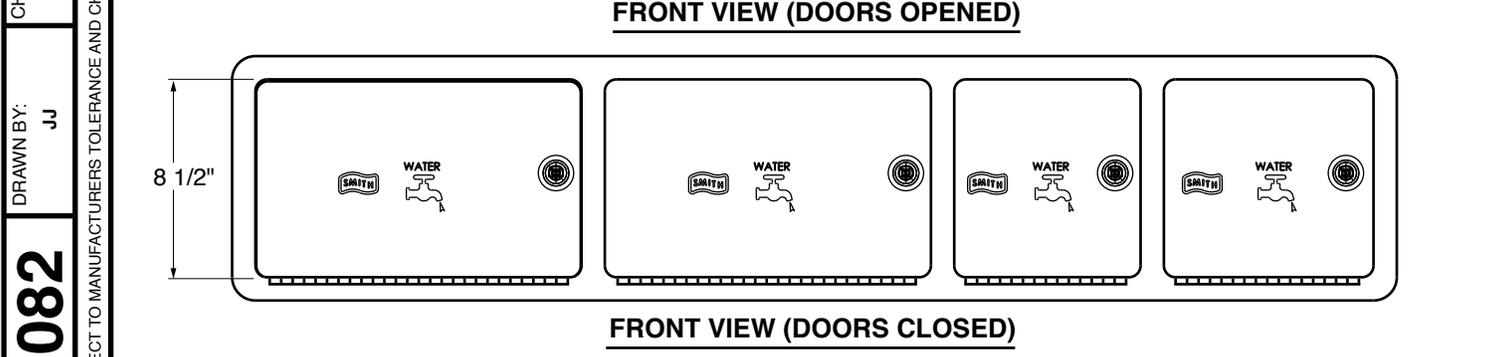
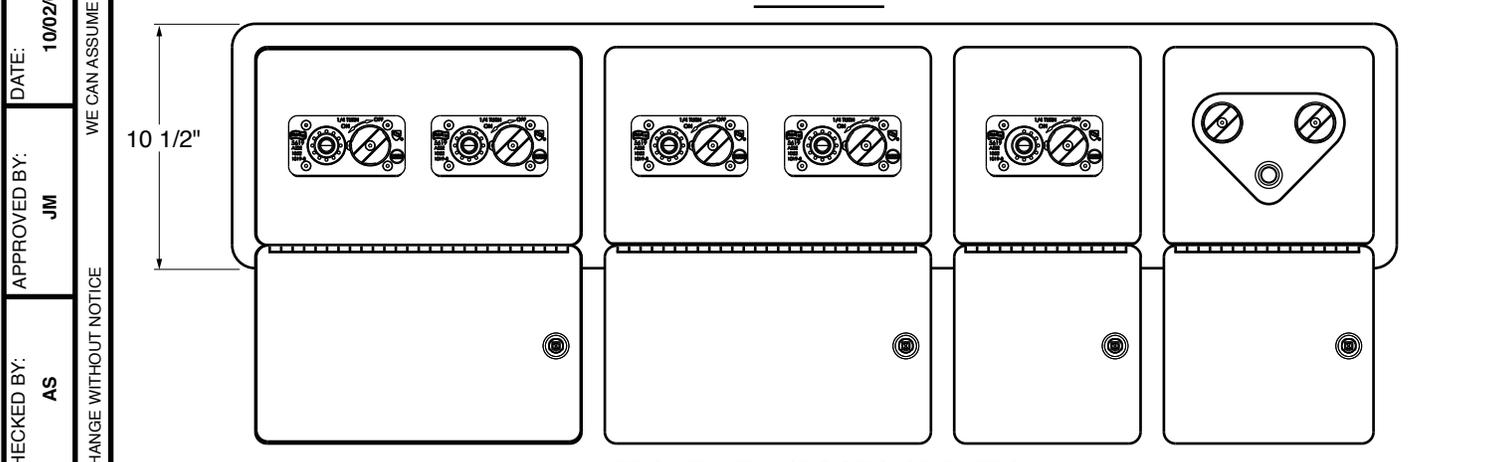
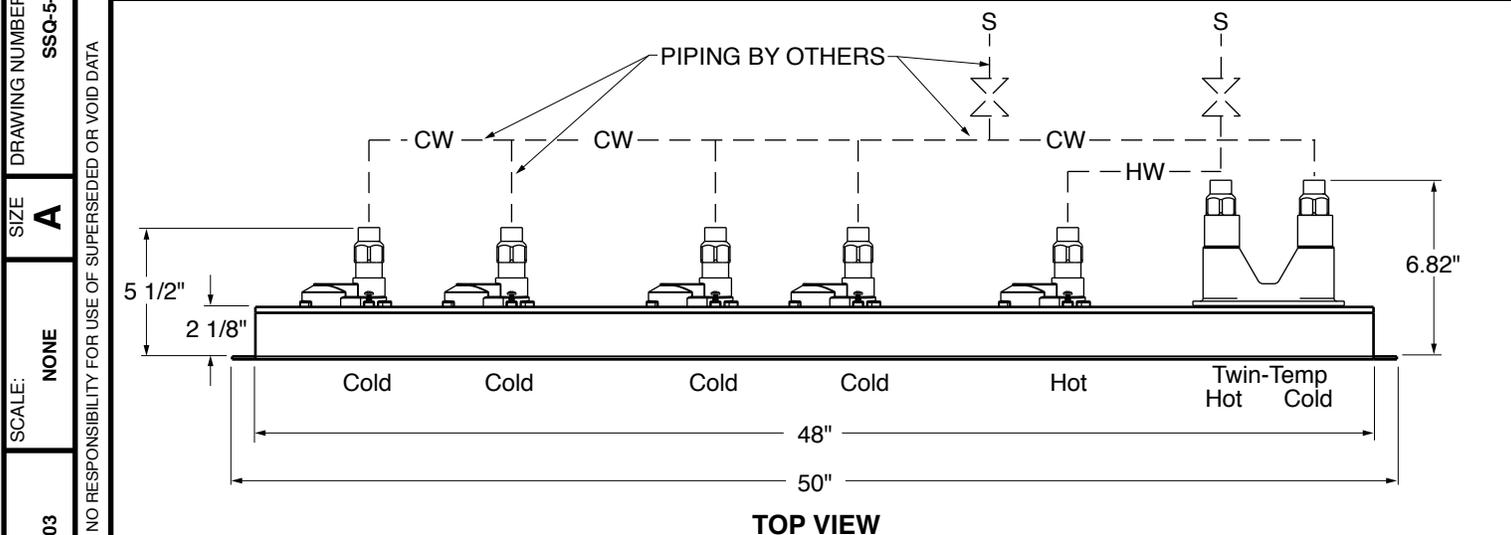
**NOTE:** Dimensions are in Decimals of a Foot.



# Fully Dimensioned Isometric Layout

(Pipe Sizes will be Calculated)

MULTIPLE HOSE STATION



**REGULARLY FURNISHED:**  
 Fabricated 304 Stainless Steel Hose Box with Four Compartments,  
 Complete with Six Hydrants with Wheel Handles. Each Compartment  
 Door shall be Provided with a Key Cylinder Lock and Keys.

**NOTE:** The AB1953, California Lead Law, and NSF/ANSI Standard 61-2008 - Drinking Water System Components are not applicable to Jay R. Smith hydrants as they do not convey/dispense water for human consumption through drinking or cooking.

FIGURE NUMBER	A	10-8-09	Revised Notes	RN	CL	WEIGHT POUNDS	VOLUME CUBIC FEET	FIGURE NUMBER
	REV.	DATE	DESCRIPTION	BY	CKD. BY			SQ-5-3082