

**FLOWMIX DOMESTIC HOT WATER (DHW)  
SYSTEM DESIGN GUIDELINES**

October 13, 2020

Marin Vratonjic, Ph.D., P.Eng  
Post-Doctoral Fellow  
University of Toronto


Pierre Sullivan, Ph.D., P.Eng  
Professor  
University of Toronto

Ali Rahmatmand, Ph.D.  
Post-Doctoral Fellow  
University of Toronto

X 

---

Marin Vratonjic

X 

Pierre Sullivan

X 

Ali Rahmatmand

# Contents

<b>Introduction .....</b>	<b>3</b>
General Flowmix Installation Design Guidelines.....	3
<b>Schedule A Flowmix Integration with Single-Zone, Heat Source from DHW Boiler .....</b>	<b>4</b>
Description of Flow-Circuit Operation .....	4
Installation Design Guidelines.....	4
<b>Schedule B: Single Storage Tank (Internal Heat Exchanger), Heat Source from Primary Boiler Loop .....</b>	<b>5</b>
Description of Flow-Circuit Operation .....	5
Installation Design Guidelines.....	5
<b>Schedule C: Single Storage Tank (External Heat Exchanger) and Boiler Loop .....</b>	<b>6</b>
Description of Flow-Circuit Operation .....	6
Installation Design Guidelines.....	6
<b>Schedule D: Turbomax Tanks Connected to the Boiler .....</b>	<b>7</b>
Description of Flow-Circuit Operation .....	7
Installation Design Guidelines.....	7
<b>Schedule E: Small-Scale Storage Tanks Connected to the Boiler .....</b>	<b>8</b>
Description of Flow-Circuit Operation .....	8
Installation Design Guidelines.....	8
<b>Schedule F: Multiple-Zone Design.....</b>	<b>9</b>
Description of Flow-Circuit Operation .....	9
Installation Design Guidelines.....	9

## Introduction

This document provides design guidelines for installation of Flowmix in all buildings with a building circulation line. The key to proper system design is through proper installation of the Flowmix device and all the ancillary components in the DHW system.

### General Flowmix Installation Design Guidelines

- Recirculation Pump sizes – A min of 14 gpm for a single zone building (up to 100 units.) For multi-zone buildings min of 10 gpm per zone for multiple zones (based on a 100 units per zone, if more scale accordingly).
- Recirc line pipe size – min 1.5” (an existing 1.25” pipe will work for a single zone requiring about 10 gpm) (based on a 100 units per zone, if more scale accordingly)
- Domestic risers to be balanced as per code (Ex. 1 gpm per riser for 10-floor risers and 1.5 gpm per riser for 20-floor risers, scale accordingly)
- Flowmix is suitable for roof top boiler room installation as well as from the bottom of the building in the mechanical rooms with a maximum static pressure of 145 psi.

## Schedule A Flowmix Integration with Single-Zone, Heat Source from DHW Boiler

### Description of Flow-Circuit Operation

Figure A-1 shows Flowmix connected to the heating loop in a single-zone configuration. The Flowmix receives Domestic Hot Water (DHW) at 140°F from the storage tank and reduces water temperature to 120°F water to the single-zone loop. Building circulation return water goes back to the Flowmix device mixing with the hot and cold-water streams. During system low-demand or no-demand hot water use a portion of the recirculation water returns to the storage tank to ensure the loop maintains 120°F at all times.

### Installation Design Guidelines

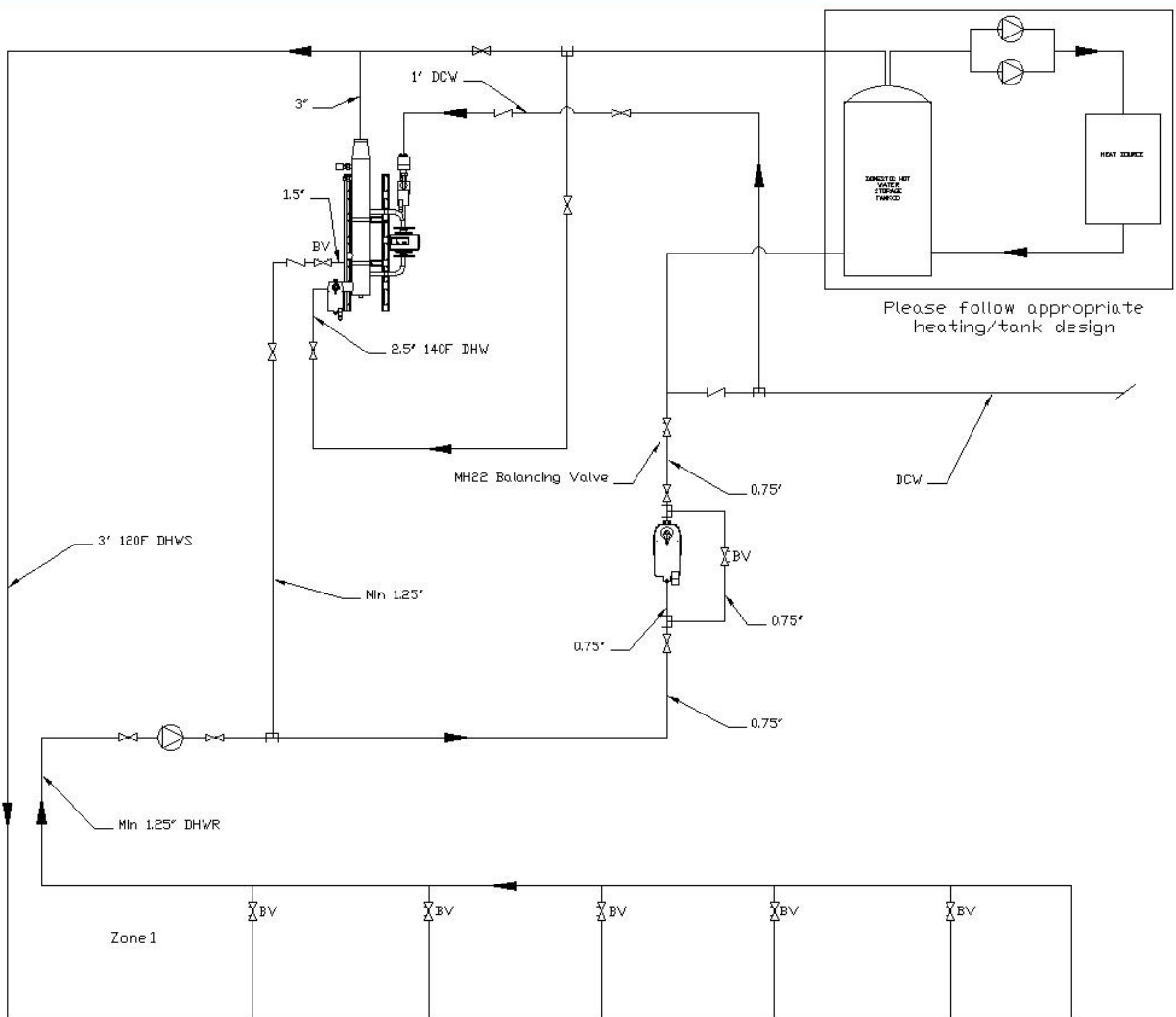


Figure A-1: Flowmix integration with a heating loop and single-zone recirculation loop.

## Schedule B: Single Storage Tank (Internal Heat Exchanger), Heat Source from Primary Boiler Loop

### Description of Flow-Circuit Operation

Figure B-1 shows Flowmix connected to a single Domestic Hot Water (DHW) storage tank with an internal heat-exchanger. To ensure the hot water tank maintains equal temperature throughout, install an anti-stratification loop. The movement of water must flow from the top of the tank to the bottom keeping the tank temperature steady.

### Installation Design Guidelines

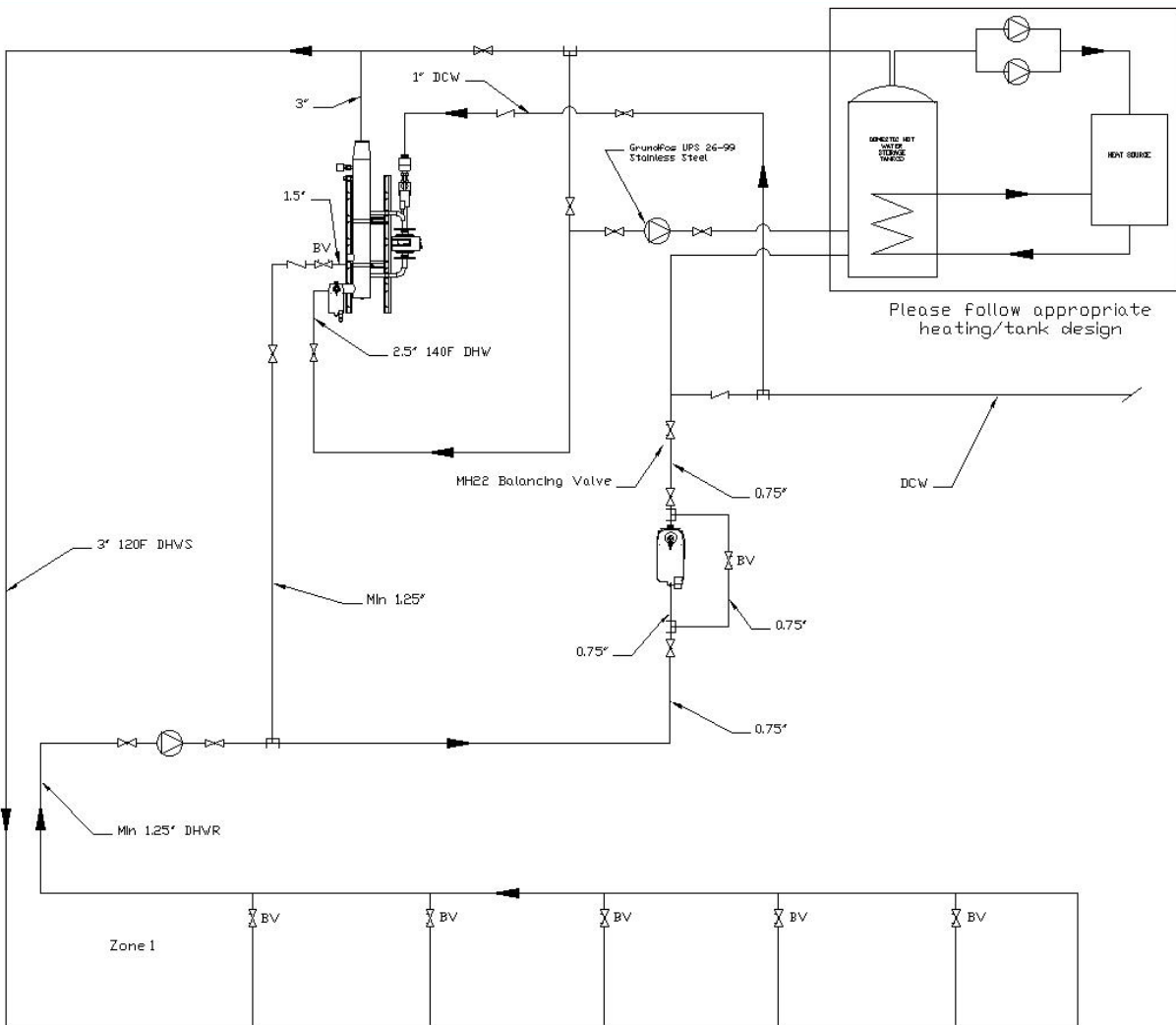


Figure B-1: Flowmix integration with single storage tank (internal heat-exchanger) and boiler loop.

## Schedule C: Single Storage Tank (External Heat Exchanger) and Boiler Loop

### Description of Flow-Circuit Operation

Figure C-1 shows Flowmix connected to a single Domestic Hot Water (DHW) storage tank with an external heat-exchanger. The heat exchange occurs between primary heating source and the domestic storage tank.

### Installation Design Guidelines

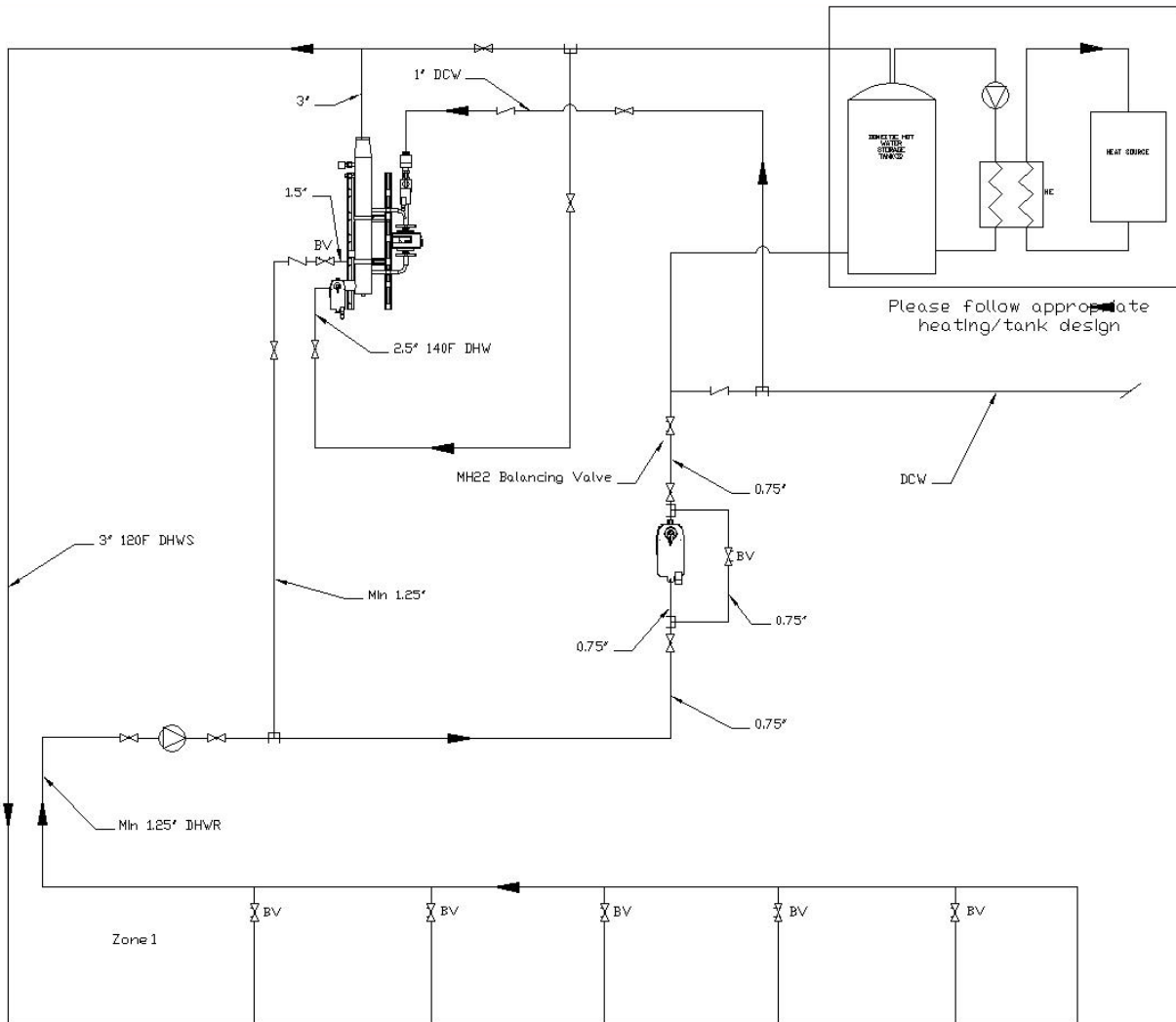


Figure C-1: Flowmix integration with single storage tank and boiler connected to an external heat-exchanger.

## Schedule D: Turbomax Tanks Connected to the Boiler

### Description of Flow-Circuit Operation

Figure D-1 shows Turbomax tanks connected to the primary heat source (boiler), the supply to the Flowmix and the reheat line from the recirculation line. Primary hot water needs to be maintained as per manufacturers recommendations to supply the DHW at 140F discharge at all times to Flowmix. The primary balancing valves must be balanced for maximum equal flow. The domestic balancing valves must also be balanced for maximum equal flow.

### Installation Design Guidelines

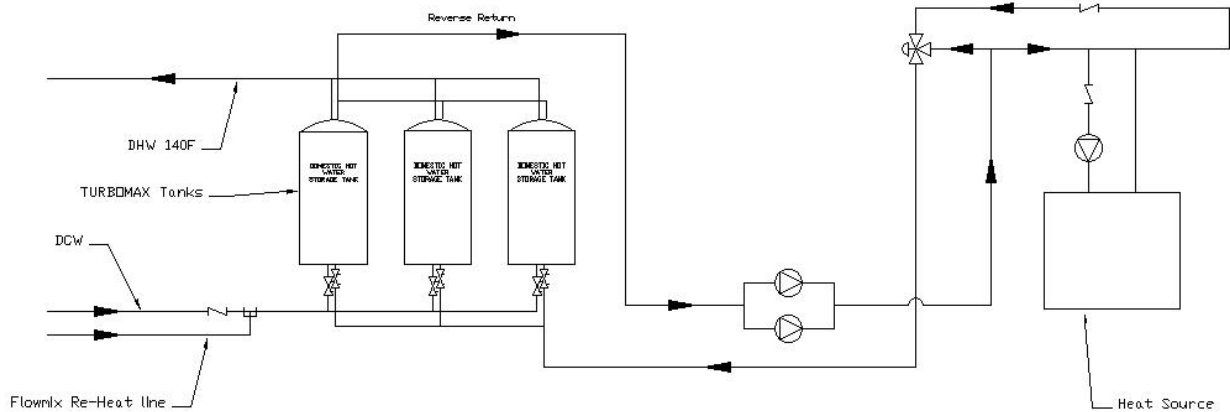


Figure D-1: Flowmix integration with Turbomax tanks.

Schedule E: Small-Scale Storage Tanks Connected to the Boiler

Description of Flow-Circuit Operation

Figure E-1 shows multiple small-scale storage tanks connected to the primary heat source (boiler or external heat exchanger), the supply to the Flowmix and the reheat line from the recirculation line. Domestic hot water tank balancing valves must be balanced for maximum equal flow.

Installation Design Guidelines

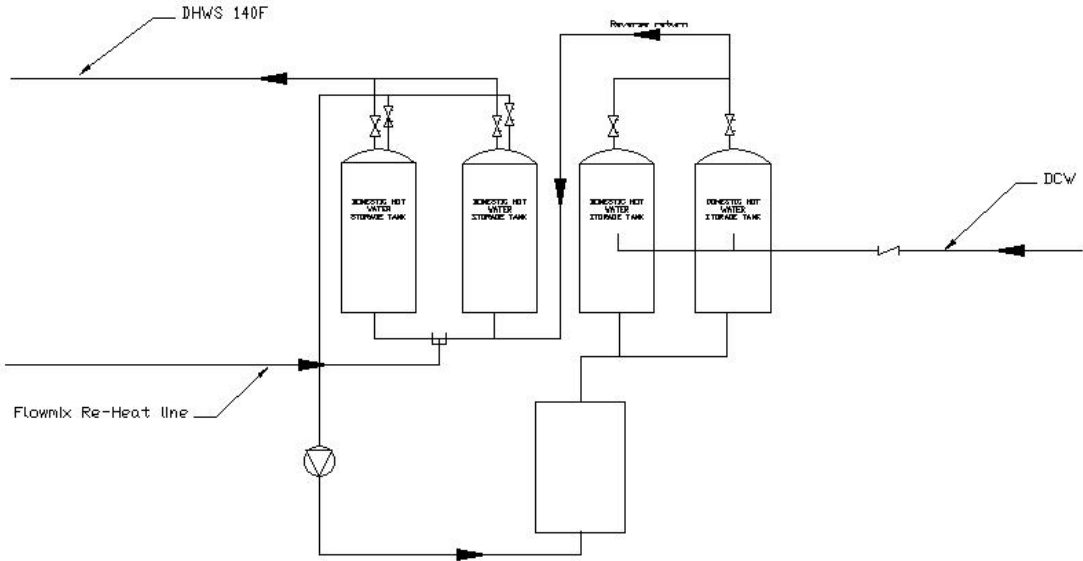


Figure E-1: Flowmix integration with Small-Scale Storage Tanks.



## Schedule F: Multiple-Zone Design

### Description of Flow-Circuit Operation

Figure F-1 shows Flowmix connected to a building DHW distribution heating loop in a multiple-zone configuration. Maximum capacity 50GPM recirculation flow and 500 suites.

### Installation Design Guidelines

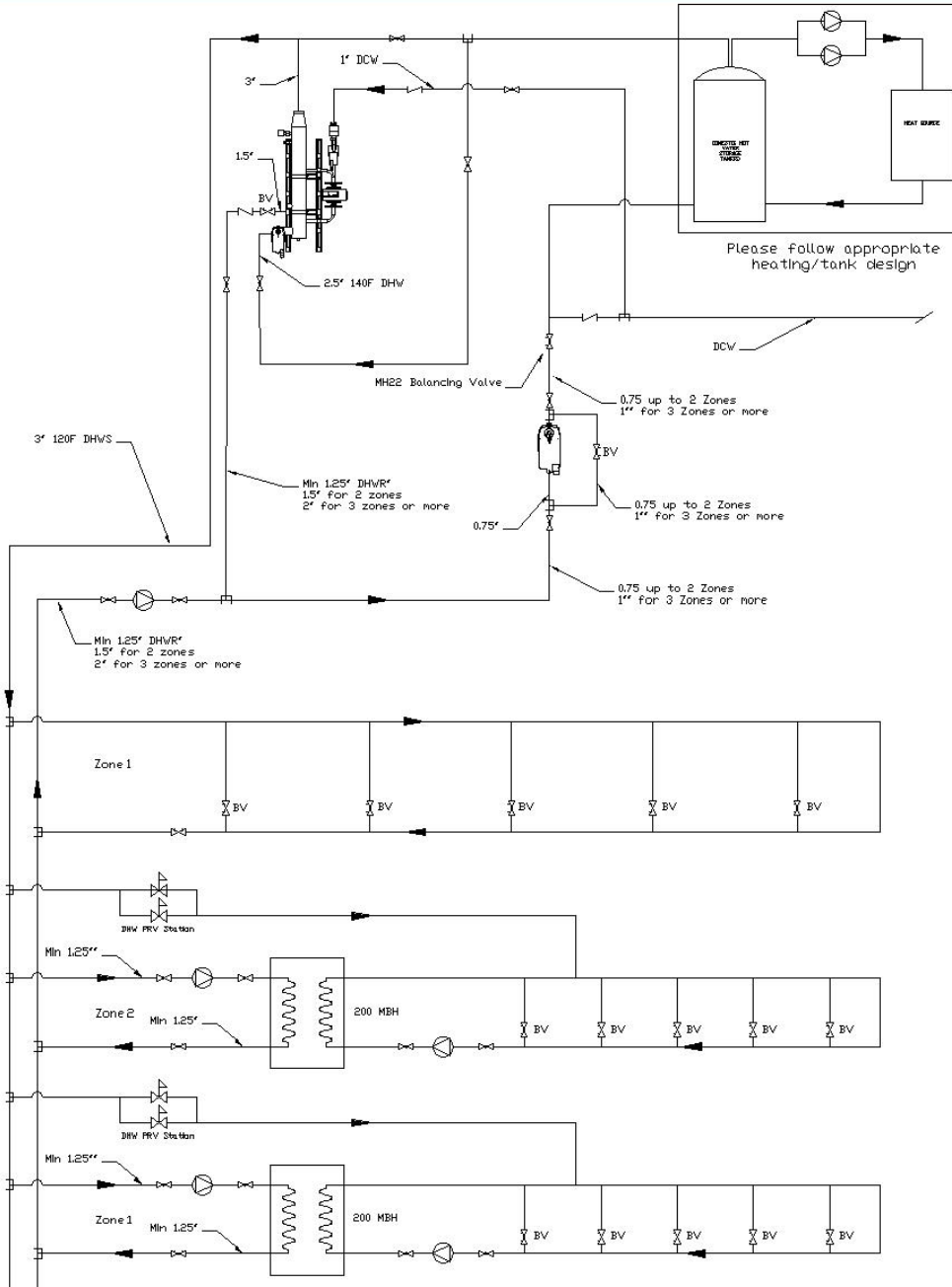


Figure F-1: Flowmix integration with Multiple-Zones.