

Contract for Radiator Work at 191 Joralemon Street Brooklyn, New York

Contractor agrees to perform heating system work at 191 Joralemon Street in Brooklyn, New York, for the sums shown below, to be paid by Owner. Prices hold for thirty days from date of Contractor's signature. Individual prices hold only as part of total price.

The work is specified in the attached pages of this Contract. The Work does not include asbestos abatement. Any changes to the Work resulting in extra costs will require a change order, to be signed by both the Owner and the Contractor. No substitution of specified equipment or materials shall be allowed without the prior written approval of the Construction Manager. Contractor shall have general-liability and workman's-compensation insurance. The Owner and Jonathan Flothow shall each be named as additionally insured parties. All labor and materials will be warranted for a period of one year commencing with receipt of all signoffs. Contractor shall remove from the premises all debris generated by the work. All equipment shall be installed in strict conformance with the manufacturers' recommendations, requirements, and instructions. The work shall conform to all applicable laws, codes, and standards. Contractor is responsible for confirming all site conditions, and for immediately reporting all problems, discrepancies, errors, or omissions relating to the site or this specification to the Construction Manager. **A COPY OF THE ATTACHED SPECIFICATION SHALL BE MAINTAINED ON THE JOBSITE AT ALL TIMES THAT WORK IS BEING PERFORMED!**

INSTALL PLATES & TRV'S AT 45 CONVECTORS & FIN-TUBE BASEBOARDS:	\$ _____
INSTALL PLATES & TRV'S AT 70 OPPOSITE-CONNECTED RADIATORS:	\$ _____
INSTALL PLATES & TRV'S AT 95 SAME-SIDE CONNECTED RADIATORS:	\$ _____
ADDITIONAL COST FOR 85 REMOTE OPERATORS FOR ENCLOSED RADIATORS:	\$ _____
WORK AT MISCELLANEOUS HEATERS:	\$ _____
RISER VENTS:	\$ _____
ALL BASEMENT & CONTROL WORK:	\$ _____

Offered By:

Accepted By:

Date

Date

("Contractor")

("Owner")

Revisions

General

Pipe Dope

Except in the basement, use only gray pipe-dope with lampwick, or use teflon tape. Other pipe dopes give off odors that bother some tenants.

Copper

Rigid copper tubing may be used for all piping, **BUT ONLY IF** water-soluble flux is used. Note that some water-soluble fluxes have short working windows. They also require proper ventilation and skin protection.

Valves

Except where noted, all new valves shall be domestic-quality full-port ball-valves.

Pipe Insulation

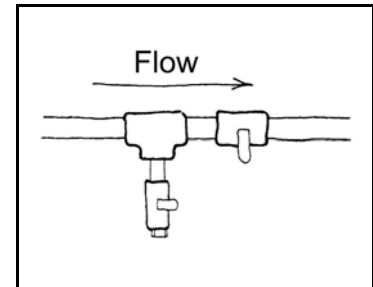
Pipe insulation is excluded.

Test-Valve Sets

At various specified locations, pipe test-valve-sets into return pipes. These valves make it possible to check for steam in a return-pipe.

Cut a Tee and valve into the return-pipe, with the valve downstream of the Tee. From the bull of the Tee, pipe a valve, and plug it hand-tight.

The plugged valve is the test-port. It shall be minimum $\frac{3}{4}$ " IPS.



Orifice Plate Installation

Description

Under this contract, Thermostatic Radiator Valves (TRV's) will be installed onto the radiators and convectors.

At the same time, the radiators and convectors will be fitted with orifice-plates, which are about the size and shape of a bottle cap. The orifices fit inside the TRVs' unions.

Orifice-plates shall be supplied by Owner to Contractor at no charge. TRV's shall be supplied by Contractor.

Drill Holes Into Orifice Plates

Drill an orifice into each plate before installing it. Count the radiator sections, the convector width, or the baseboard element length, and select the orifice size based on the charts on page 4. If a heater type or size is found that is not covered in the charts, notify the Construction Manager, and temporarily install a blank plate.

It is CRITICAL that the correct size hole be drilled into each plate. Never use a different-sized drill or guess the size of the hole needed.

The orifice should be drilled into the approximate center of the plate.

Install Into Unions

Install the plate by slipping it into the TRV union, between the tail-piece and valve-body.

If not carefully installed, the plates can get bent in half, rendering them useless. This can be prevented by applying a small daub of gray dope to the plate to hold it in position on the tail-piece.



The photos at right show an orifice-plate after the hole has been drilled into it, and how a plate fits into a TRV union.

Bathroom Heaters Excluded

Do no work at bathroom heaters (except for the 13th floor lady's bathroom).

Radiators with Three Columns per Section

Radiator charts are for radiators that have three columns per section, as shown in photo at right. Almost all are 22" high, but some are 18" high. Charts are provided for both.

**22" High Radiators**

Sections	Orifice Size
7	1/16"
8	5/64"
9	5/64"
10	5/64"
11	3/32"
12	3/32"
13	3/32"
14	3/32"
15	3/32"
16	7/64"
17	7/64"
18	7/64"
19	7/64"

18" High Radiators

Sections	Orifice Size
7	1/16"
8	1/16"
9	1/16"
10	5/64"
11	5/64"
12	5/64"
13	5/64"
14	5/64"
15	3/32"
16	3/32"
17	3/32"
18	3/32"
19	3/32"

Convectors and Baseboards

- For convectors, measure the width of the cabinet.
- For baseboards, measure the total length of finned element. Record the lengths on the plans provided.

Convectors & Baseboards

Length	Orifice Size
24"	1/16"
28"	1/16"
32"	1/16"
36"	5/64"
40"	5/64"
44"	5/64"
48"	3/32"
52"	3/32"
56"	3/32"
60"	3/32"
64"	3/32"
68"	3/32"
72"	7/64"
76"	7/64"
Longer	1/8"

Atypical Heaters

- 14th Floor Hallway: 1/16"
- 6th Floor, Northeast Corner Office: Consult with Construction Manager.

Thermostatic Radiator Valves: General

- The operator-mount shall be opposite the tailpiece.
- Set the TRV operator to 7.
- The price for convectors & baseboards includes a remote sensor. The price for radiators includes a direct mount operator, with an add-on price for a remote operator. Installation details are given on the following pages.

Install Plates & TRV's at Convectors and Fin-Tube Baseboards

Install TRV Valve-Body

Replace the hand-valve with a TRV, and install an orifice plate into the TRV. Price assumes that the supply connects to the top of the convector core. Notify Construction Manager of any bottom-connected convectors.

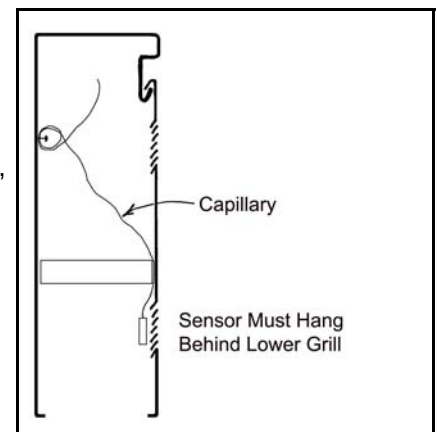
Install TRV Operator

Fit the TRV with a 3-part remote-mounted operator comprising separate valve-mount, dial, and sensor (photo at right).

Use a concrete screw to attach a mounted-head cable-tie onto the wall (refer to sketch at right below). Locate it near the middle.

Remove the plastic housing from the sensor, and completely uncoil the capillary from the element. Loop up the extra capillary and fasten it with the cable tie, so that the sensor hangs behind the lower grille, in the stream of entering air. If the enclosure becomes closed off, blocking airflow through it, the sensor should become surrounded by heated air, closing the TRV. (Otherwise, steam won't condense in the convector, and it might bypass into the returns.)

Mount the dial just above the floor, and run the capillary under the front of the enclosure. Contractor's option to use other mounting details if they are approved by the Construction manager.



Option at Takeoffs Outside Convector Cabinets

At some convectors, the supply piping is exposed outside the convector cabinet (see photo at right). Contractor's option to install the TRV outside the convector cabinet, with a direct-mount operator. It can be installed in place of an elbow or angle-valve, or a straight-body TRV can be cut into a vertical run.



Install Plates & TRV's Onto Radiators

Opposite-Connected Radiators

At freestanding radiators with the supply connection at the opposite end from the return (photo at right), replace the hand-valve with a TRV, and install an orifice plate into the TRV. Install a direct-mount operator.



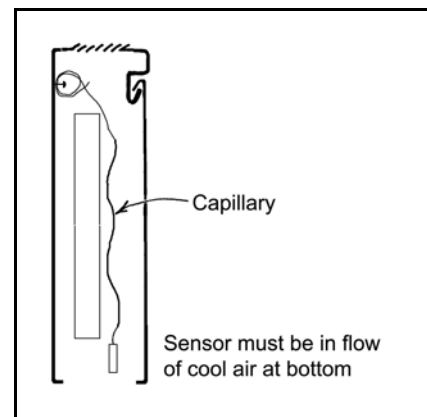
Same-Side-Connected Radiators

- Many radiators have their supply and return connections at the same end (photo at right).
- In addition to installing a TRV, direct-mount operator, and orifice-plate, move either the supply or the return to the opposite end of the radiator.
- If moving the supply, connect to the top tapping. New supply piping shall be minimum $\frac{3}{4}$ ", except where existing piping is $\frac{1}{2}$ ".
- If moving the return, the trap can be eliminated. New return piping shall be minimum $\frac{1}{2}$ ".



Remote-Mount Operators for Enclosed Radiators

At enclosed radiators, install remote-mounted operators. Use the same detail as for the convectors, locating the sensor where the room air enters the enclosure. Where practical, cut a $1\frac{1}{4}$ " hole into the front of the enclosure, near the top, and mount the dial over the hole, using three screws. If it is impractical to drill a hole in the enclosure, mount the dial just above the floor, and run the capillary under the front of the enclosure. Contractor's option to use other mounting details if they are approved by the Construction manager.



Work at Miscellaneous Heaters

10th Floor Conference Room

The room has four radiators, grouped in tight pairs (photo at right).

At each pair, pipe the two radiators together, cutting out the end plugs and all bushings. Join the radiators top and bottom using close nipples and unions, or short pieces of copper. Pipe a new return to the second radiator, and cap the existing one. Install a TRV in place of the remaining hand-valve, and fit it with a remote operator.



10th Floor Hallway Convector

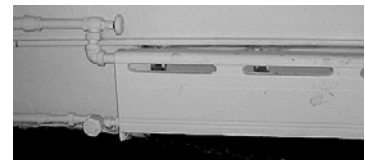
Install a $\frac{3}{4}$ " plate with $\frac{1}{16}$ " orifice into the hand-valve.

3rd Floor Offices

- Seventeen radiators have TRV's in place. Install orifice plates into them.
- Add remote operators to the four radiators that don't have them already.
- At all seventeen radiators, move the remote sensor so that it hangs in the flow of cold air entering the enclosure at the bottom.
- Do not re-pipe the three radiators that have the supply and return at the same end. Instead, replace the trap element (Mepco 1E), and install a Gorton D vent low on the opposite end of the radiator, by drilling and tapping the low vent-boss $\frac{1}{8}$ " IPS (use a right-angle drill). Owner shall open enclosures as needed to facilitate the work.

Cast-Iron Baseboard

- Room #8 on the seventh floor has a cast-iron baseboard heater.
- Re-pipe the return to the opposite end.
- Replace the hand-valve with a $\frac{3}{4}$ " angle TRV, with remote operator.
- Install an orifice plate with $\frac{1}{16}$ " hole.



9th Floor Mechanical Equipment Room

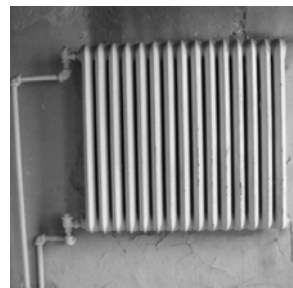
In the ninth floor mechanical room, install a $\frac{3}{4}$ " blank plate into the existing radiator valve.

Mezzanine

At all three wall radiators, install $\frac{3}{4}$ " plates into the hand-valves, and close the valves. Orifices shall be $\frac{3}{32}$ ".

Elevator Bulkhead

- The room has two radiators, both piped same-end. Install TRV's & orifice plates at both, with direct-mount operators.
- At the North, wall-mounted radiator, repipe the return. Orifice shall be $\frac{7}{64}$ ".
- At the West, freestanding radiator, repipe the $\frac{3}{4}$ " supply. Orifice shall be $\frac{5}{64}$ ".



12th Floor Heaters Without Hand-Valves

If the TRV's do not swap out cleanly with the existing elbows, any necessary repiping of the connections will be extra work not-in-contract. (Note: each supply connection has a union near the elbow that will be swapped out.)

Riser Vents & Other Upstairs Work

General

- All vent shall be Gorton #2. These have ½" connections.
- As an alternative to the various installation details given below, the following detail can be used instead: drill & tap the steam supply pipe ¼" IPS, install a brass ¼"xClose nipple into the tapping, and install a ½"x¼" reducing-coupling onto the close nipple.
- Wherever practicable, locate vents inside radiator enclosures.

14th Floor: Install Vents Inside Convectors

At four locations, cut Tee's into the convectors' supply takeoffs, and pipe on vents. Locate them inside the convector cabinets. Locations are as follows:

- Room 2
- Room 5
- Room 7
- End of Hallway in Northeast corner

14th Floor Bathroom

Cut a Tee into the baseboard-convector's supply takeoff, and install a vent. Vent can be located outside the enclosure.

14th Floor Northeast Corner

Pipe a vent from the capped stubout in the corner.

14th Floor Room 4

Cut Tee's into the supply takeoffs to both radiators, and pipe on vents. (Note: both these radiators are same-side connected, so they'll have to be repiped anyway.)

14th Floor Conference Room (In Southwest Corner)

- West radiator: cut a Tee into the supply takeoff, and pipe on a vent.
- East radiator: pipe a vent from the plugged Tee in the supply takeoff.
- (Note: both these radiators are same-side connected, so they'll have to be repiped anyway.)

13th Floor Mechanical Equipment Room

Pipe a vent from the plugged Tee in the supply takeoff

9th Floor Room 5

Cut a Tee into the radiator's supply takeoff, and pipe on a vent.

Mezzanine Air Handler

Cut a test-valve-set into the common 1" piping from the traps.



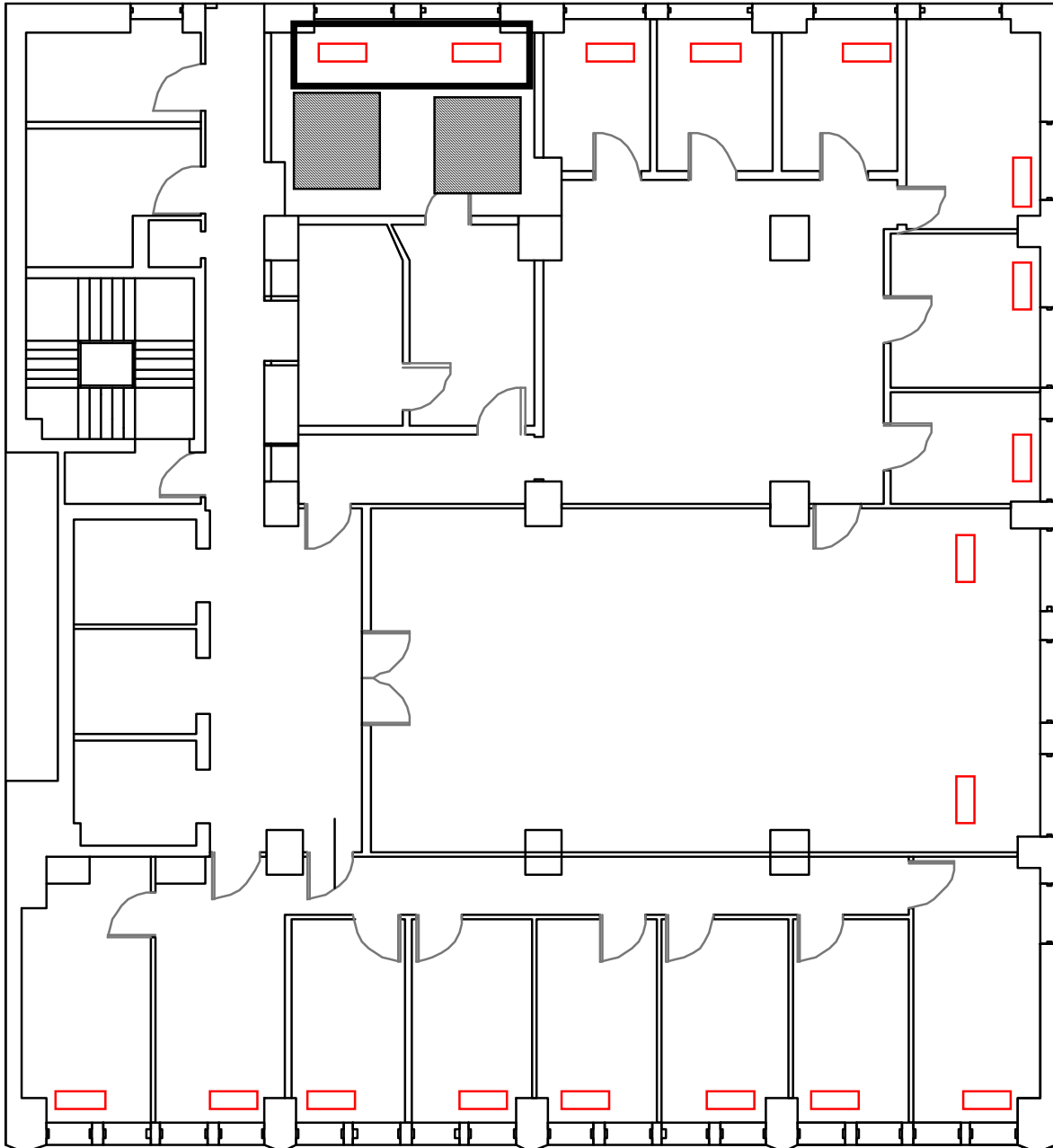
Hoffman F&T at Top of Stairwell

- Cut a valve into the trap's discharge.
- From the trap's unused discharge tapping, pipe a valve.
- From the trap's unused supply tapping, pipe a Gorton #2 vent.



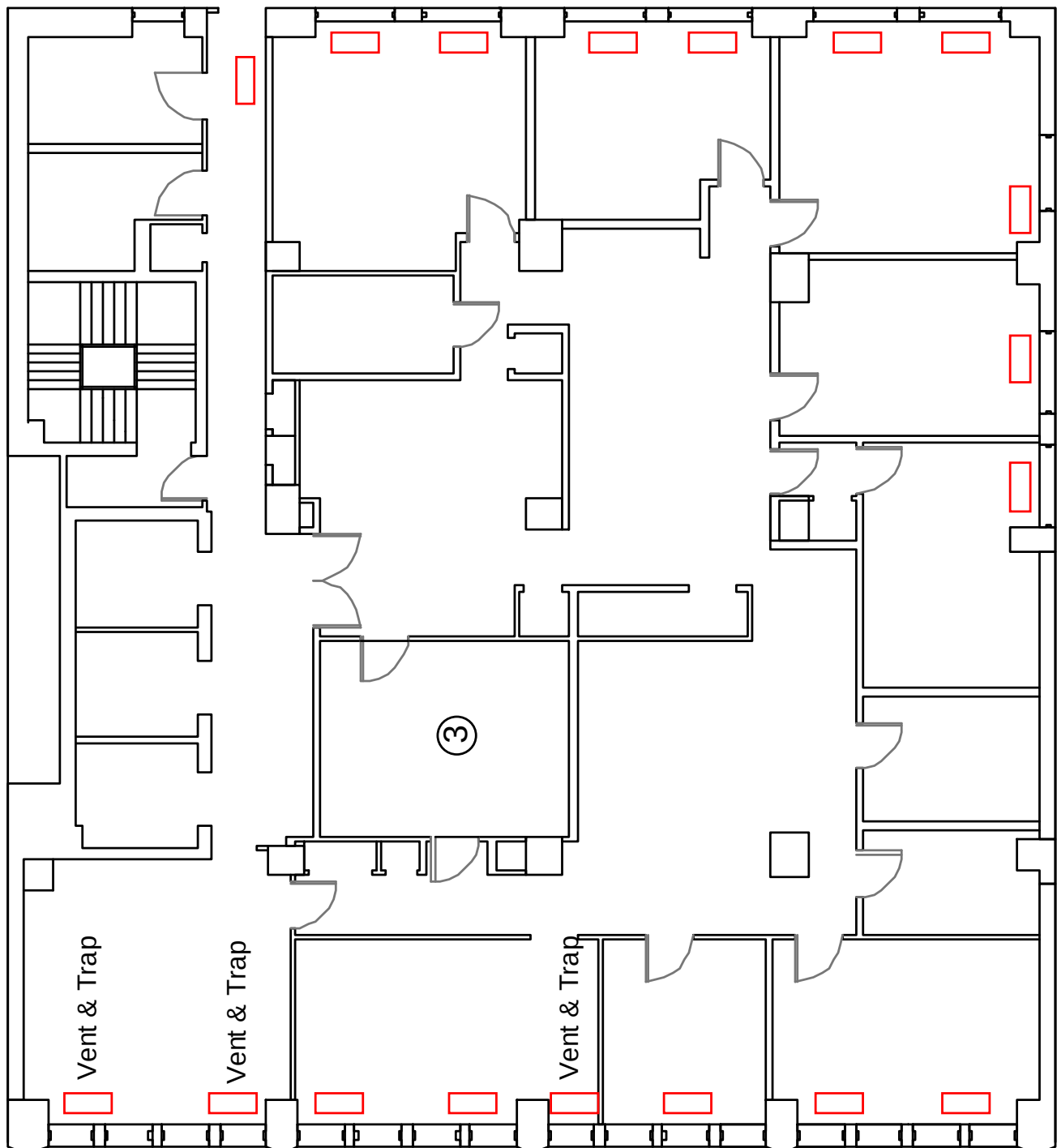
Floorplans

- Mark completed work on these floorplans.
- Show which radiators are same-side connected.
- Show which radiators needed remote sensors.
- Show the lengths of fin-tube elements.

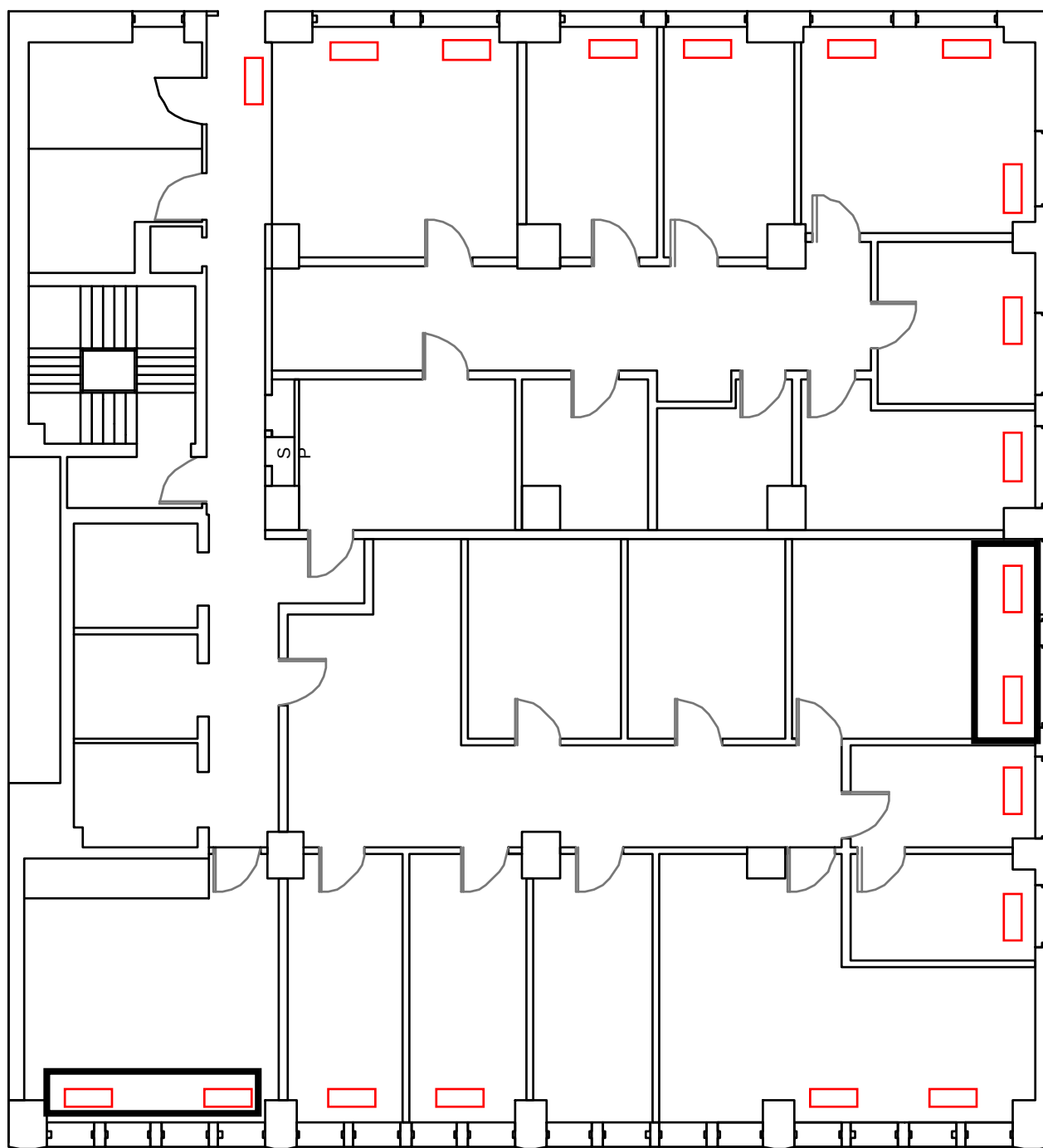


Second Floor Plan

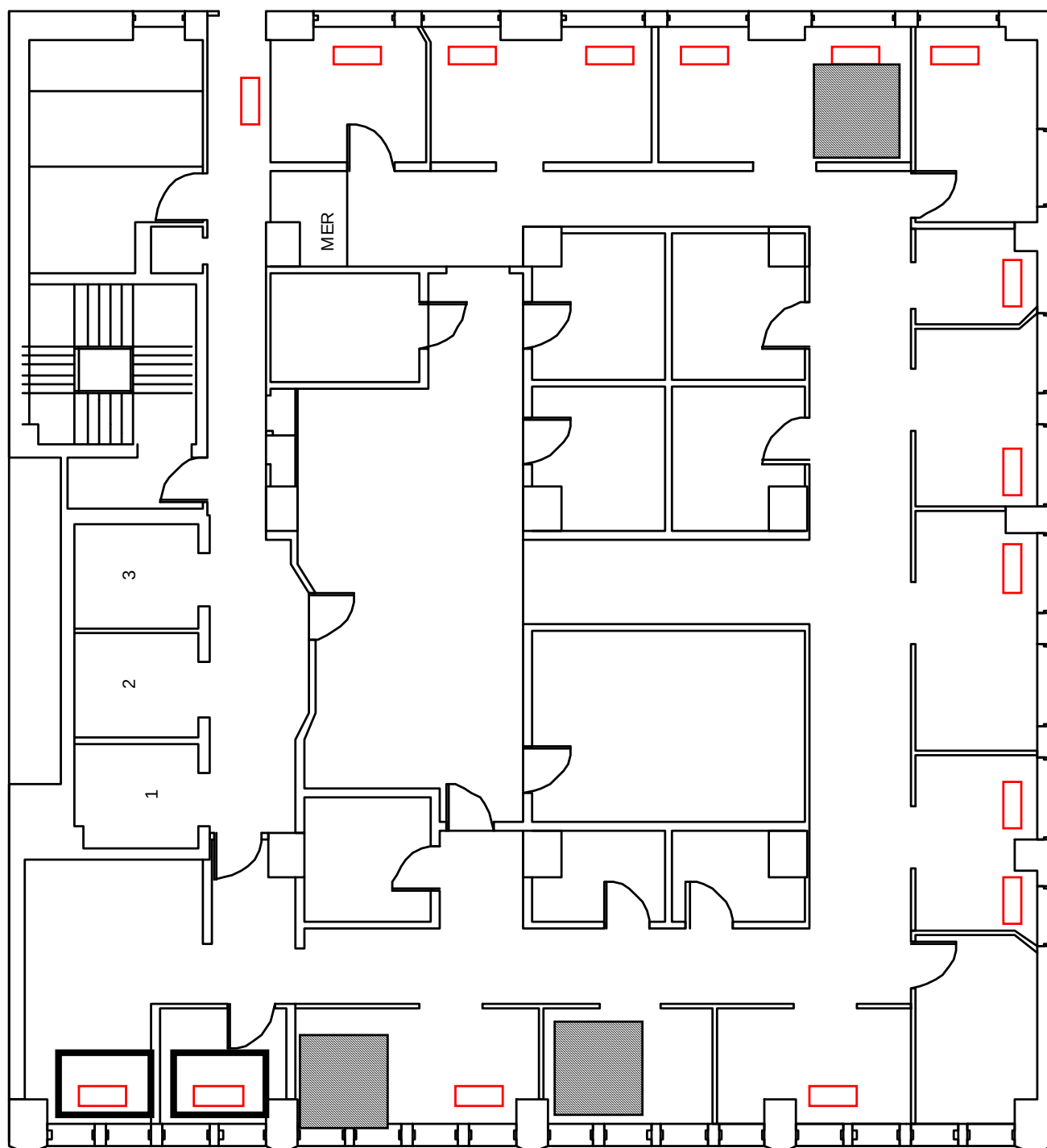
(TRV's In Place Already Throughout Floor)



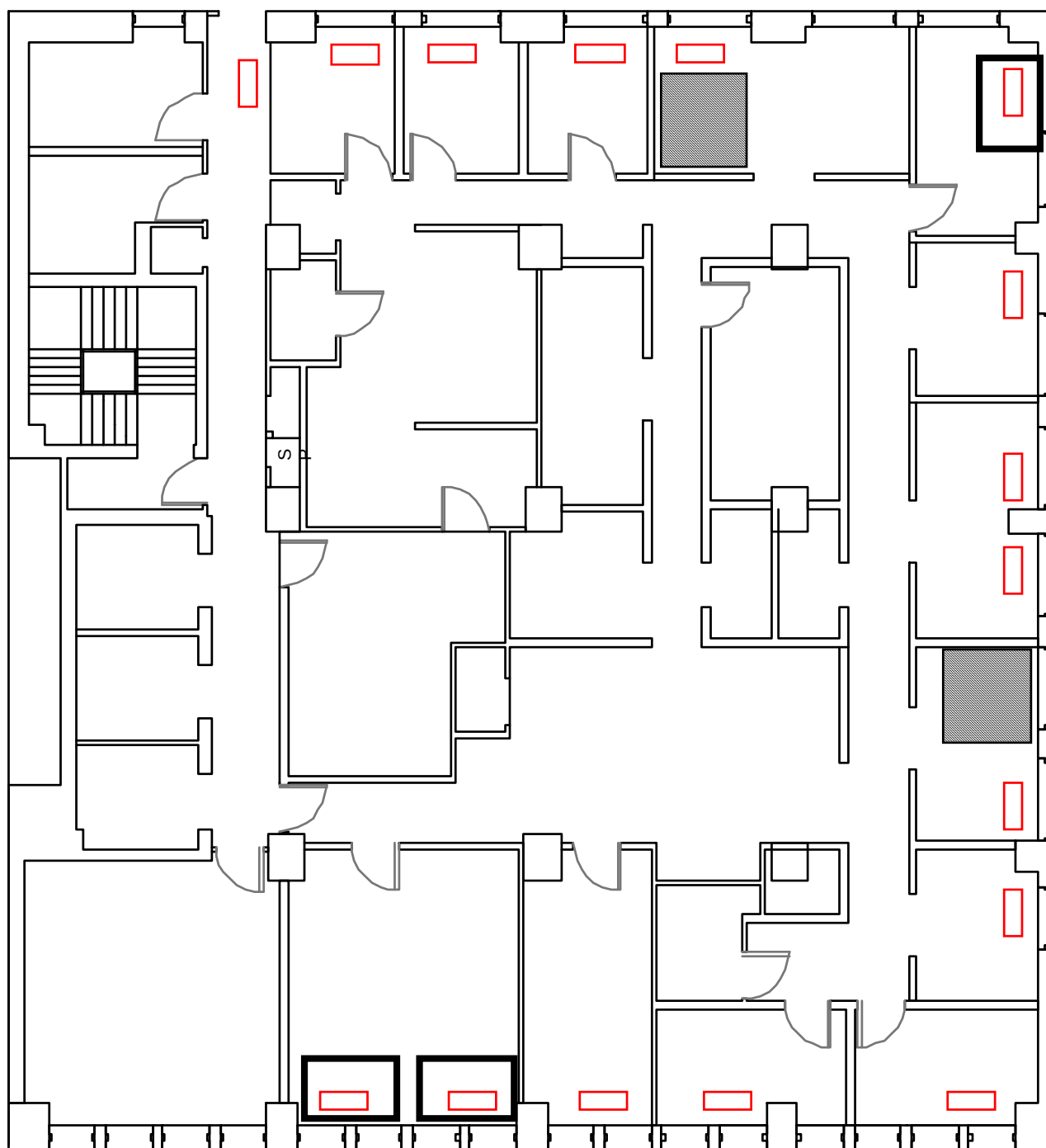
Third Floor Plan



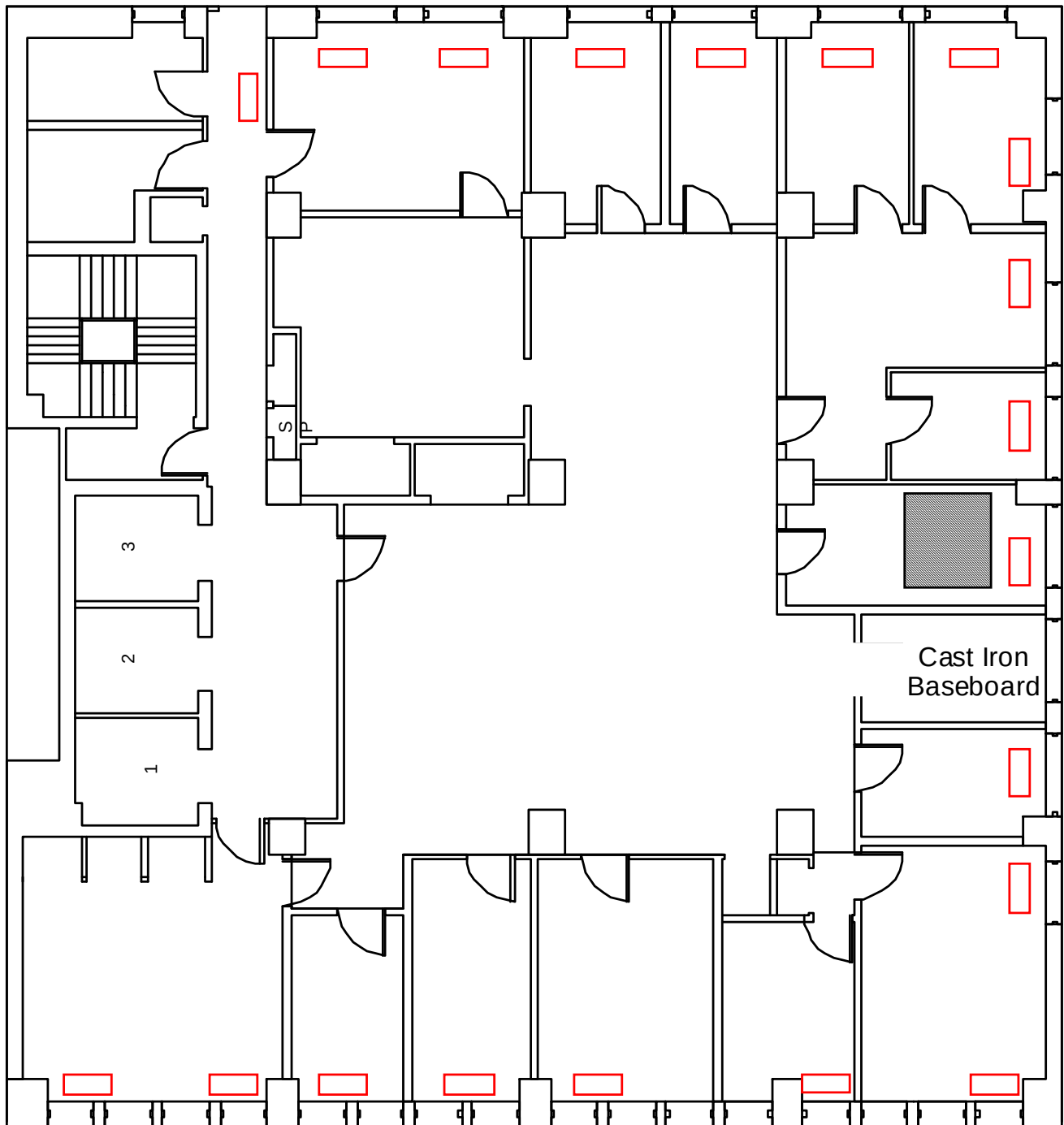
Fourth Floor Plan



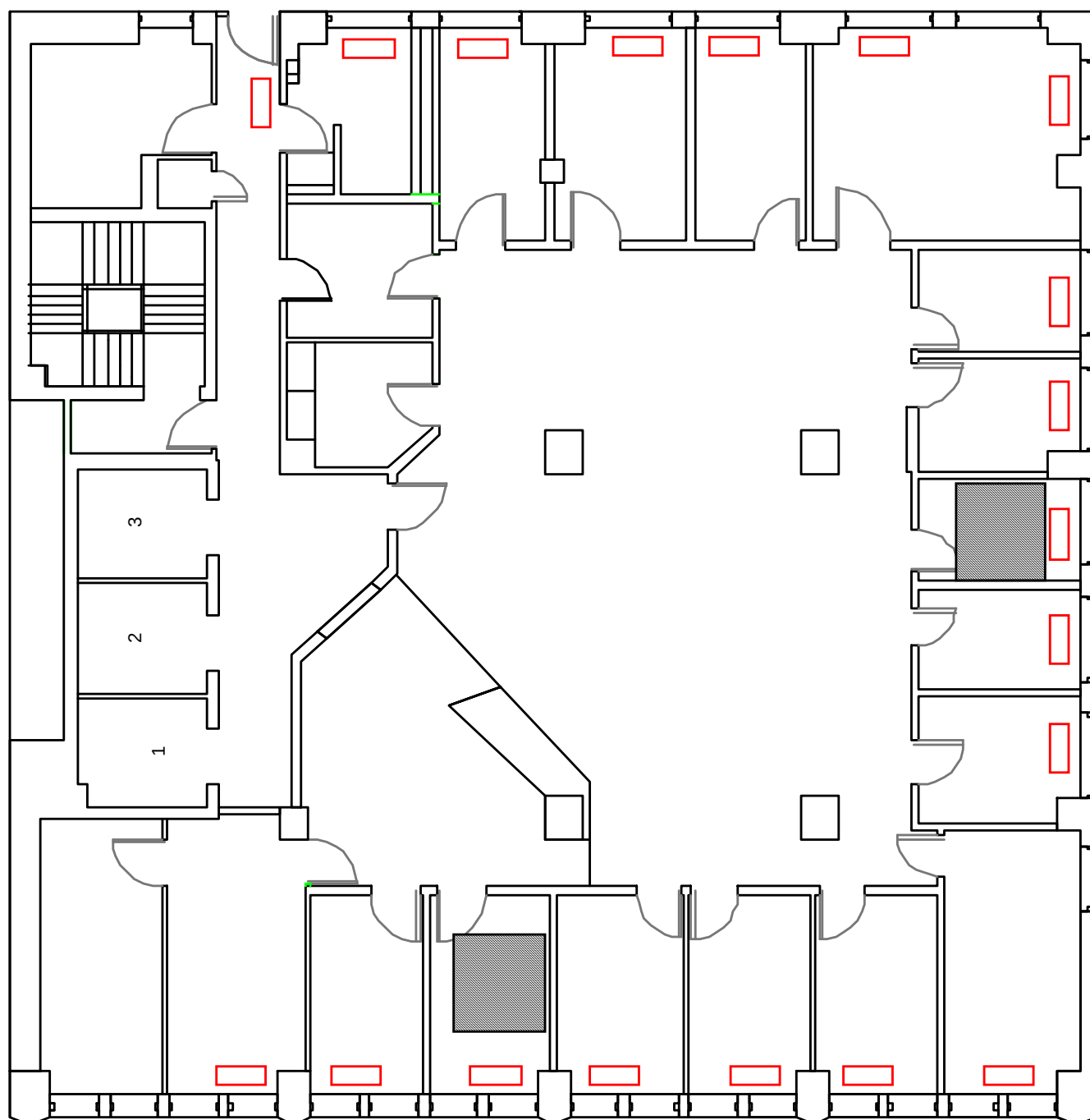
Fifth Floor Plan



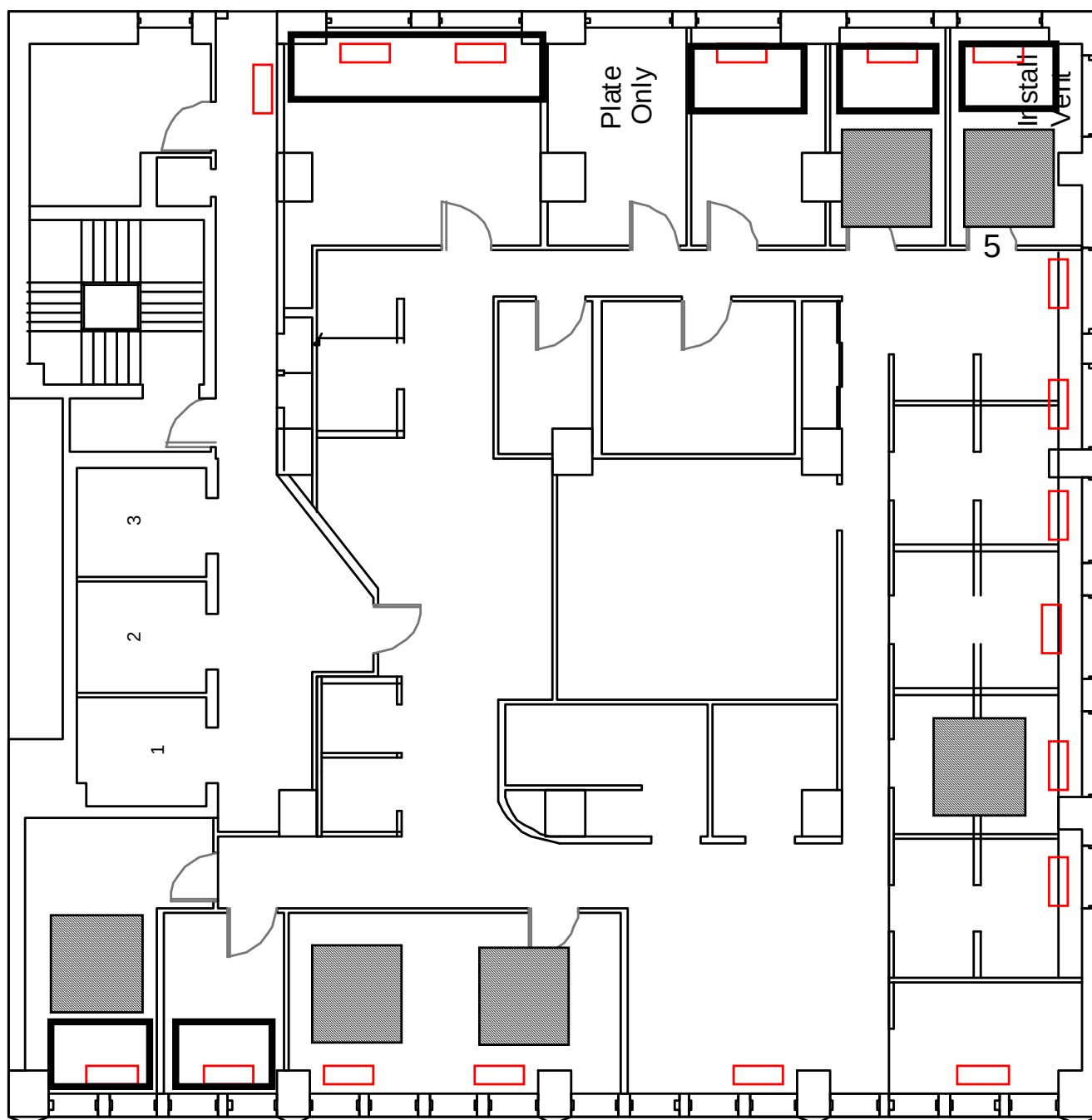
Sixth Floor Plan



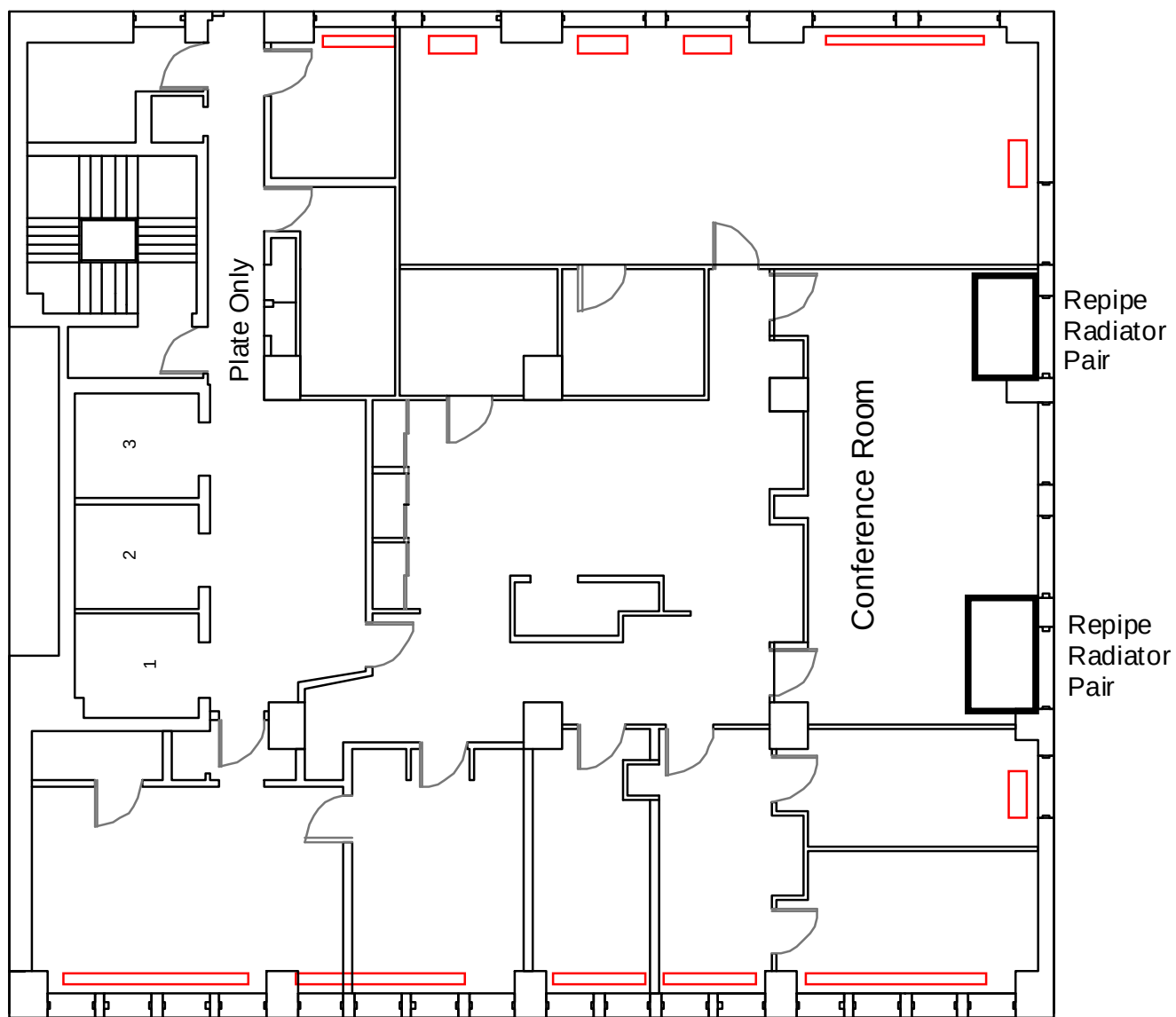
Seventh Floor Plan



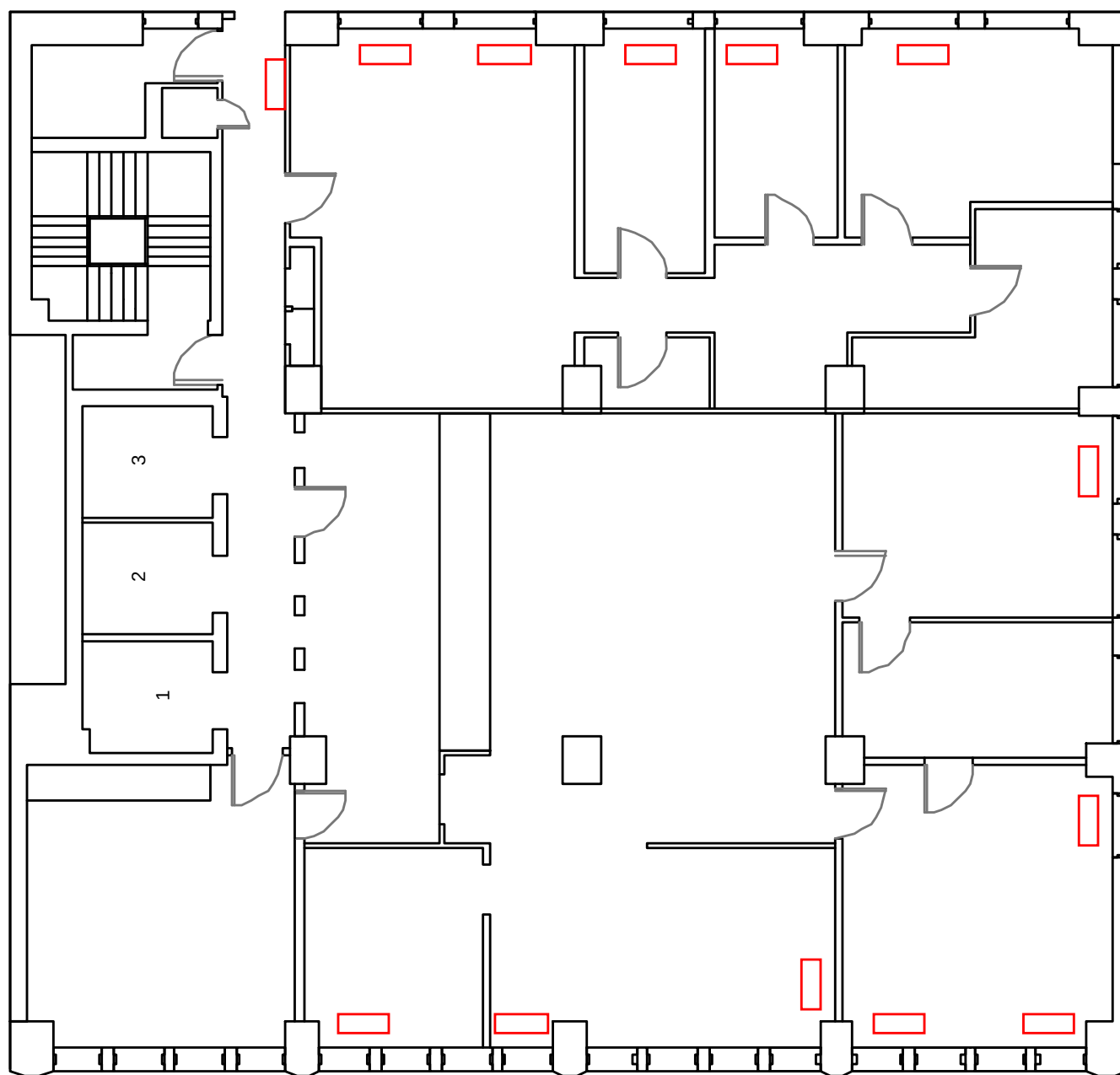
Eight Floor Plan



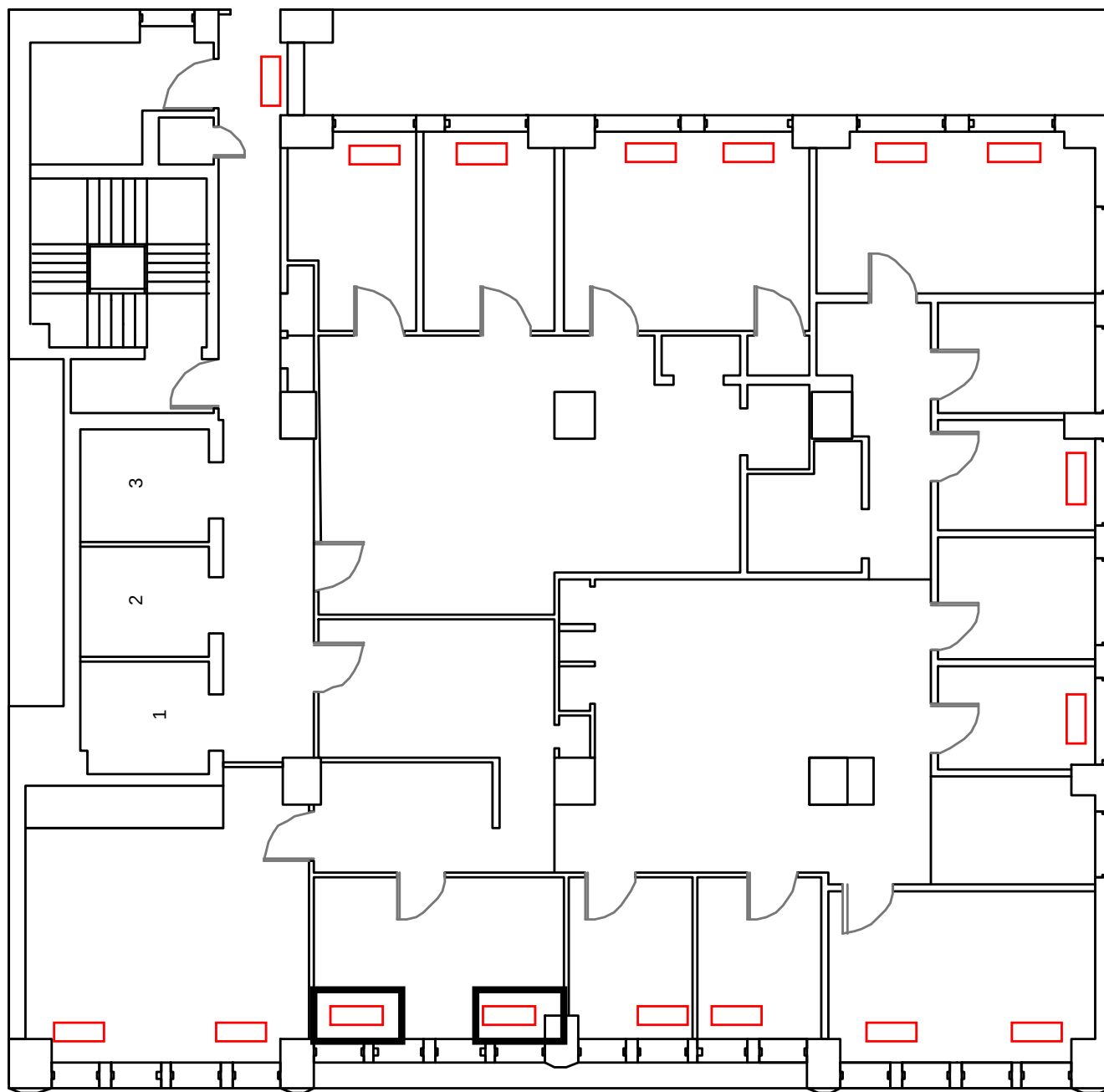
Ninth Floor Plan



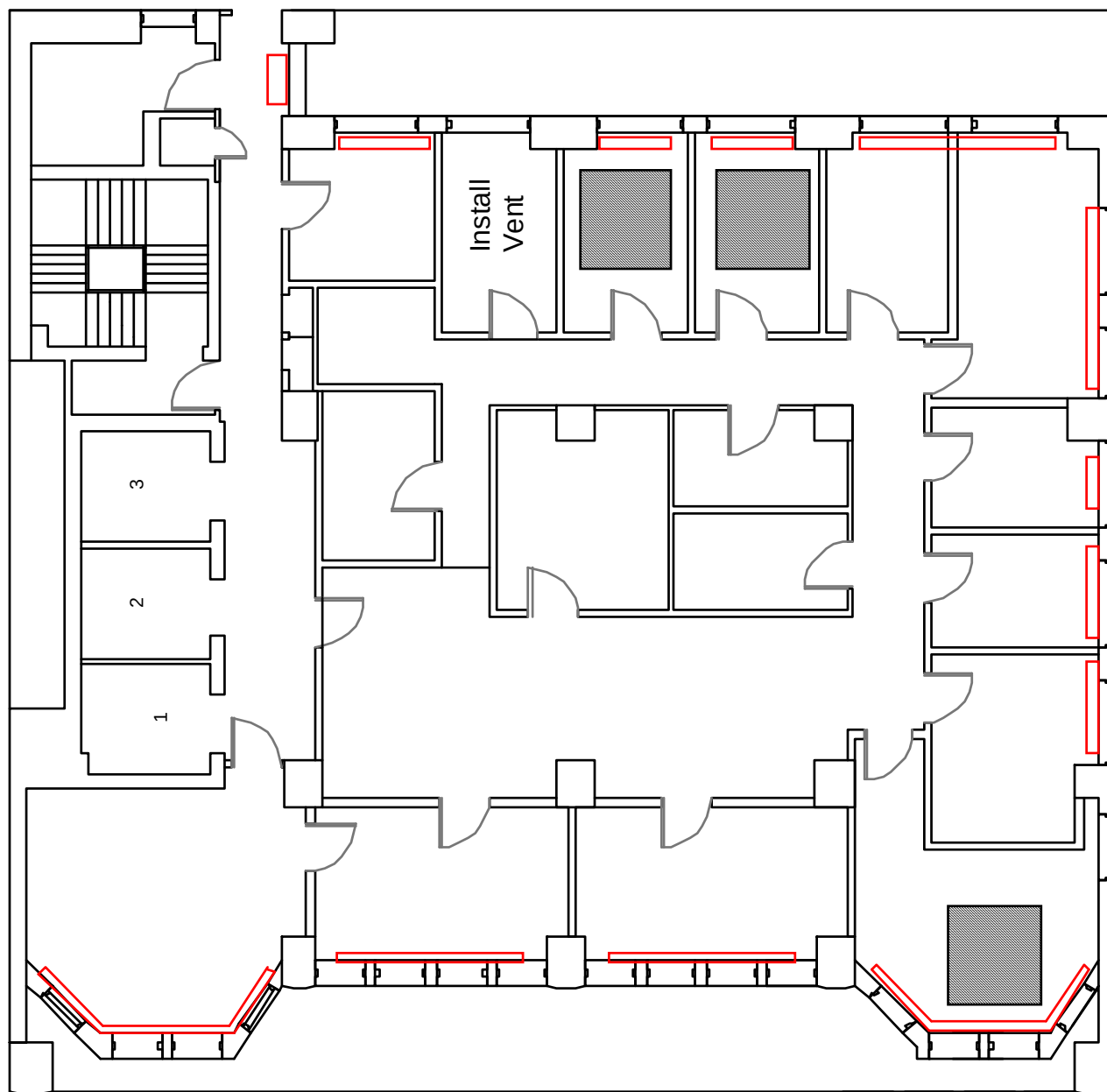
Tenth Floor Plan



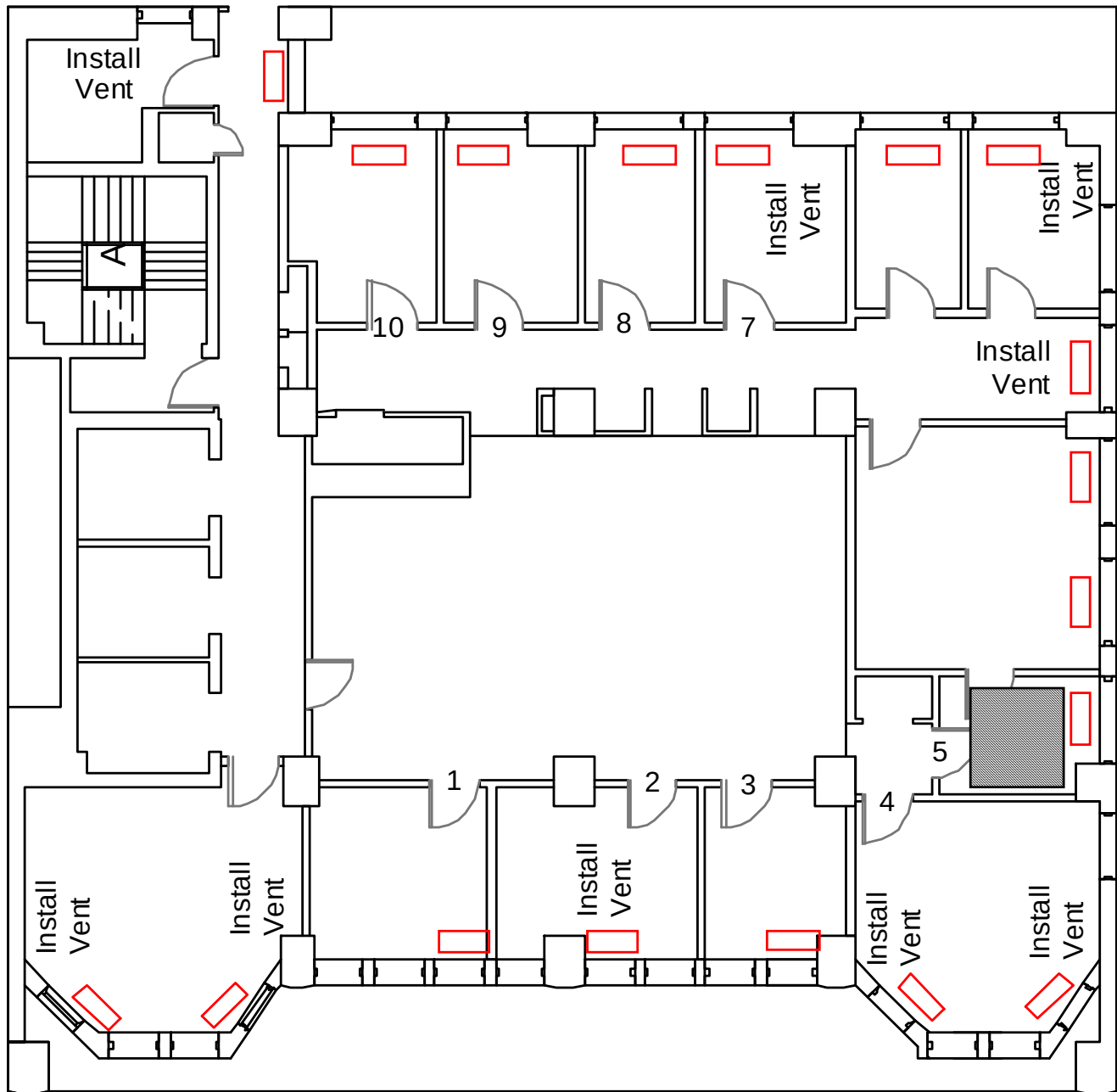
Eleventh Floor Plan



Twelfth Floor Plan



Thirteenth floor Floor Plan



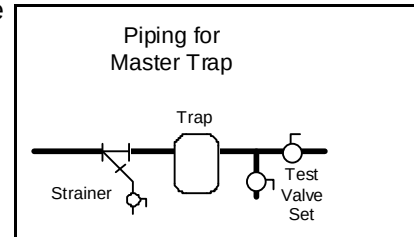
Fourteenth Floor Plan

Basement & Control Work

Master Trap at Bathroom Return Riser

A master-trap will be cut into a return line (this isn't best practice, but only the bathrooms are affected).

In the Northwest corner of the Building Staff Area, cut a trap into the $\pm 1\frac{1}{4}$ " takeoff to the return riser in the corner. Trap shall be Hoffman #B1015A-3 $\frac{3}{4}$ ". Pipe a test-valve set after the trap, and a valved strainer before it.



Install Plates into Radiator Supply Takeoffs

- Cut unions into the 1" supply takeoffs to three of the ground floor front convectors. Cut the unions into vertical pipes where possible, otherwise cut them into diagonal pipes.
- At all five supply takeoffs, install 1" plates with 1/16" orifices into the unions.

Remove 2" Master-Trap in Boiler Room

Next to the boiler, remove the 2" trap and all associated piping, valves, and strainers. Pipe the inlet piping directly to the outlet piping, with no valves.

Digispan

- Install a Heat-Timer SPC-Elite Digispan 929150-UA. Mount it on or near the boiler-room control panel. Install a Heat-Timer #904220-00 temperature sensor out-of-doors, and connect it to the Digispan.
- Connect the Digi-Span's EXT+ and EXT- terminals to the Multi-Mod's EMS INPUT terminals.
- In the Multi-Mod, set "EMS INPUT MODE" to "Setback", and set "SETBACK" to 2 PSI.
- In the Dig-Span, set "CONTROL MODE" to "Cool-MakeOnRise", and set "Set Point" to 30°.

Additional General Conditions

Owner to Ensure Reasonable Access

Owner shall facilitate reasonable access to the heaters, such that work crews are not forced to spend significant time waiting. Owner is responsible for moving all furniture, effects, and other obstructions away from heaters so that the work can be performed.

Restoration

Restoration of finished surfaces is excluded.

Insurance And Worker's Compensation:

Contractor shall have general-liability and workman's-compensation insurance. The Owner and Jonathan Flothow shall each be named as additionally insured parties. Original copies of certificates of insurance shall be delivered prior to the commencement of work.

Service and Warranty

All materials are warranted to be new and of recognized first-class commercial-quality. All labor and materials will be warranted for a period of one year commencing with receipt of all signoffs.

All Manufacturer's warranties in excess of one year shall also apply and be honored.

Warranted repair work shall be complete in every respect. All work performed under warranty must conform to the various manufacturers' instructions and to this specification. All repairs will be effected within a reasonable time from notification.

Waiver of Mechanic's Lien

A Waiver of Mechanic's Lien shall be delivered to the Owner upon receipt of final payment by the Contractor.

Conformance with Manufacturers' Instructions

All equipment shall be installed in strict conformance with the manufacturers' recommendations, requirements, and instructions.

Conformance to Applicable Regulations

The work shall conform to all applicable laws, codes, and standards.

Construction Manager

The construction manager shall be as designated by the Owner.

General provisions

All work will be done in a neat and workmanlike manner by mechanics skilled in their trades. The job site will be maintained in a neat and orderly manner.

Remove Debris

Remove and cart from the premises all debris generated by the work.

Equipment Takeoff

This information is given to assist the Contractor in bidding, and is not to be considered a comprehensive list of contractually required materials. Pipe, tubing, fittings, ball-valves, wire, conduit, paint, and general supplies are not included.

<u>Count</u>	<u>Item</u>	<u>Make</u>	<u>Model</u>
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TRV Materials:

On angle body valves, operator mount must be opposite tailpiece

±110	¾" Angle Valve-Body	Danfoss or equal	013G8018	_____
±80	½" Angle Valve-Body	Danfoss or equal	013G8013	_____
±18	¾" Straight Valve Body	Danfoss or equal	013G8020	_____
±2	½" Straight Valve Body	Danfoss or equal	013G8015	_____
±80	Direct-Mount Operator	Danfoss or equal	013G8564	_____
±135	3-Part Operator	Danfoss or equal	013G8564	_____

Other Materials:

17	Main-Line Vent-Valve	Gorton	#2	_____
1	Bucket Trap	Hoffman	#B1015A-3	_____
1	0-10 PSI Gauge	Ashcroft	35 1490 A 02 L 0/10 PSI	_____
1	Digi-Span	Heat-Timer	929150-UA	_____
1	Temp. Sensor	Heat-Timer	904220-00	_____