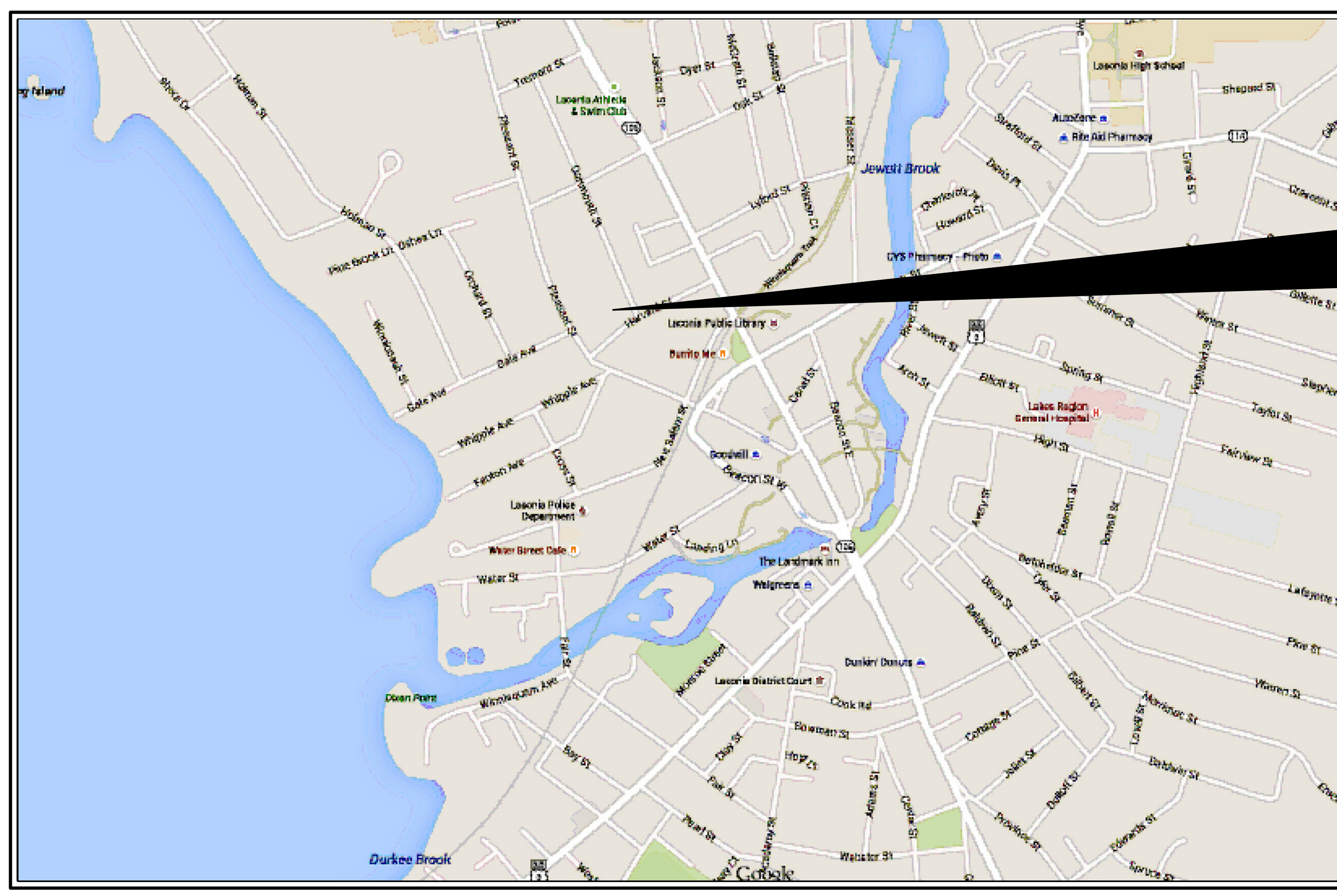
# LACONIA SCHOOL DISTRICT
# SAU #30
# ADMINISTRATIVE OFFICES
# HEATING SYSTEM REPLACEMENT

## LACONIA, NEW HAMPSHIRE

**RFS# 15 - 7841**

## JUNE 8, 2015



PROJECT LOCATION

# CONSTRUCTION DOCUMENTS

LIST OF DRAWINGS


| | |
|---|---|
| TS | TITLE SHEET |
| MECHANICAL | |
| M1.0 | NOTES, LEGEND & SCHEDULE |
| M2.0 | MECHANICAL PLANS |
| M3.0 | MECHANICAL DETAILS |
| M4.0 | MECHANICAL SPECIFICATIONS |


## RFS GENERAL NOTES

THE FOLLOWING GENERAL NOTES APPLY TO ALL RIST-FROST-SHUMWAY ENGINEERING, P.C., DRAWINGS AND TRADES ASSOCIATED WITH THOSE DRAWINGS INVOLVED ON THIS PROJECT:

1. RIST-FROST-SHUMWAY ENGINEERING, P.C., WAIVES ANY AND ALL RESPONSIBILITY AND LIABILITY FOR PROBLEMS WHICH ARISE FROM FAILURE TO FOLLOW THESE PLANS, SPECIFICATIONS, AND/OR THE DESIGN INTENT THEY CONVEY, OR FOR PROBLEMS WHICH ARISE FROM OTHERS' FAILURE TO OBTAIN AND/OR FOLLOW THE GUIDANCE OF RIST-FROST-SHUMWAY ENGINEERING, P.C., GUIDANCE WITH RESPECT TO ANY ERRORS, OMISSIONS,INCONSISTENCIES, AMBIGUITIES, OR CONFLICTS WHICH ARE DISCOVERED OR ALLEGED.
2. ALL WORK SHALL CONFORM TO ALL FEDERAL, STATE, AND LOCAL CODES AND STANDARDS INCLUDING, BUT NOT LIMITED TO, NFPA, INTERNATIONAL BUILDING CODE, UL, SMACNA, OSHA, AND NEC.
3. CONTRACTOR AND ALL SUBCONTRACTORS SHALL PROTECT THE WORK SITE, SURROUNDING AREAS AND OCCUPANTS FROM DAMAGE AND INJURY.
4. CONTRACTOR AND ALL SUBCONTRACTORS SHALL FAMILIARIZE THEMSELVES WITH THE CONTRACT DOCUMENTS. ALL DRAWINGS OF ANY PARTICULAR TRADE SHALL BE USED IN CONJUNCTION WITH DRAWINGS OF ALL OTHER TRADES TO COORDINATE ALL CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER BEFORE PROCEEDING WITH THE AFFECTED WORK. ANY PROPOSED CHANGES, VARIATIONS, OR SUBSTITUTIONS MUST BE REVIEWED AND ACCEPTED BY THE ENGINEER PRIOR TO IMPLEMENTATION.
5. ALL DRAWINGS ARE INTENDED TO SHOW THE GENERAL ARRANGEMENT, DESIGN INTENT AND EXTENT OF THE WORK. THEY SHALL BE CONSIDERED PARTLY DIAGRAMMATIC. THEY ARE NOT INTENDED TO BE SCALED FOR ROUGHING-IN MEASUREMENTS OR TO SERVE AS SHOP DRAWINGS.
6. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL DIMENSIONS (AS-BUILT OR OTHERWISE) BEFORE COMMENCING FABRICATION, AND/OR ORDERING MATERIALS.
7. DETAILS SHOWN ON ANY DRAWING ARE TO BE CONSIDERED TYPICAL FOR ALL SIMILAR CONDITIONS, UNLESS OTHERWISE INDICATED.
8. IN THE EVENT THE CONTRACTOR ENCOUNTERS MATERIAL REASONABLY BELIEVED TO BE HAZARDOUS WHICH HAS NOT BEEN RENDERED HARMLESS, THE CONTRACTOR SHALL IMMEDIATELY STOP WORK IN THE AREA AFFECTED AND REPORT THE CONDITION TO THE OWNER AND ARCHITECT/ENGINEER IN WRITING. THE WORK IN THE AFFECTED AREA SHALL NOT BE RESUMED UNTIL WRITTEN VERIFICATION BY THE OWNER THAT THE MATERIAL HAS BEEN REMOVED OR OTHERWISE RENDERED HARMLESS.
9. EXCAVATE TO LINES AND GRADES AS REQUIRED TO ACHIEVE THE SPECIFIED BEARING CONDITIONS. ALL EXCAVATION, CONSTRUCTION, CONCRETE PLACEMENT, AND BACKFILL FOR CONCRETE FOOTINGS, WALLS, AND SLABS SHALL BE PERFORMED IN THE DRY. CONTRACTOR TO PERFORM DEWATERING AS REQUIRED. ALL EXCAVATIONS SHALL BE PROTECTED FROM FREEZING.
10. GENERAL CONTRACTOR SHALL REVIEW SHOP DRAWINGS FOR CONFORMITY WITH CONTRACT DRAWINGS, ERECTION PROCEDURES, CONSTRUCTION SCHEDULE, ACTUAL FIELD DIMENSIONS, AND COORDINATION WITH OTHER TRADES PRIOR TO SUBMITTING THEM TO ENGINEER. SHOP DRAWINGS MUST POSSESS GENERAL CONTRACTOR'S APPROVAL STAMP AND ANY COMMENTS. SHOP DRAWINGS NOT REVIEWED BY THE GENERAL CONTRACTOR WILL BE REJECTED.

Engineer:


RFS engineering

**Rist-Frost Shumway Engineering, P.C.**
**71 Water Street**
**Laconia, New Hampshire 03246**
**(603) 524-4647 Fax (603) 528-7653**
**E-mail: rfs@rfsengineering.com**




# TS

DATE JUNE 8, 2015

CADD FILE NO 7841 TS

## MECHANICAL LEGEND

| | |
|---|---|
| (NAME) | NEW PIPING (BOLD) |
| (NAME) | EXISTING PIPING (LIGHT) |
| HWS | HOT WATER SUPPLY, LOW TEMPERATURE |
| HWR | HOT WATER RETURN, LOW TEMPERATURE |
| | BRANCH OUT OF TOP OF MAIN |
| | BRANCH OUT OF BOTTOM OF MAIN |
| | COMBINATION PRESSURE/ TEMPERATURE PORT |
| | FLANGE |
| | PIPE RISING |
| | PIPE TURNING DOWN |
| | TEE TURNED DOWN |
| | TEE TURNED UP |
| | CAP |
| | UNION |
| | COMBINATION CALIBRATED BALANCING/ SHUTOFF VALVE |
| | BALL VALVE |
| | CHECK VALVE |
| | CONTROL VALVE, 2-WAY |
| | GATE VALVE |
| | CONTINUE |
| | AIR VENT MANUAL |
| S OR T | TEMPERATURE SENSOR OR THERMOSTAT (REFER TO BAS SPECIFICATION) |
| | DESIGNATES EQUIPMENT WITH POWER |
| OR | DESIGNATES EQUIPMENT WITHOUT POWER |

## MECHANICAL ABBREVIATIONS

| | |
|---|---|
| AS | AIR SEPARATOR |
| AVG | AVERAGE |
| B | BOILER |
| BP | BOILER PUMP |
| CUH | CABINET UNIT HEATER |
| CW | COLD WATER |
| °F | DEGREES FAHRENHEIT |
| DN | DOWN |
| EXIST | EXISTING |
| ET | EXPANSION TANK |
| FT | FEET |
| GAL | GALLONS |
| GPM | GALLONS PER MINUTE |
| HP | HORSEPOWER |
| HW | HOT WATER |
| HWP | HOT WATER PUMP |
| HWR | HOT WATER RETURN |
| HWS | HOT WATER SUPPLY |
| IN | INCHES |
| MAX | MAXIMUM |
| MBH | BTU PER HOUR (THOUSAND) |
| MECH | MECHANICAL |
| MIN | MINIMUM |
| NO | NUMBER |
| NTS | NOT TO SCALE |
| PUH | PROPELLER UNIT HEATER |
| R | RADIATOR |
| RPM | REVOLUTIONS PER MINUTE |
| SP | STATIC PRESSURE |
| SQ | SQUARE |
| TSP | TOTAL STATIC PRESSURE |
| TYP | TYPICAL |
| VOL | VOLUME |
| W | WIDTH |
| W/ | WITH |
| WC | WATER COLUMN |

## MECHANICAL DEMOLITION NOTES

1 EXCEPT WHERE NOTED OTHERWISE ON THE DRAWINGS, MECHANICAL SYSTEM AND EQUIPMENT AND APPURTENANCES ARE TO BE REMOVED. THE OWNER MAY ALSO WISH TO SALVAGE SOME ITEMS; CONSULT OWNER FOR FURTHER INSTRUCTIONS. ITEMS IDENTIFIED TO BE SALVAGED ARE TO BE CAREFULLY DISASSEMBLED AND REMOVED, AND TURNED OVER TO THE OWNER AS DIRECTED.

2 NO EXISTING MECHANICAL EQUIPMENT, SYSTEMS, OR APPURTENANCES SHALL BE ABANDONED IN PLACE.

4 WHERE EQUIPMENT OR APPURTENANCES ARE REMOVED WHICH WERE BUILT-IN TO EXISTING CONSTRUCTION, COORDINATE, PATCH AND/OR REPAIR ALL SUCH AREAS IN ACCORDANCE WITH APPROVED CONSTRUCTION METHODS AND FINISHES.

5 COORDINATE WITH THE OWNER TO DETERMINE OVERALL PROJECT PHASING AND DEMOLITION WORK SEQUENCING. COORDINATE REQUIRED DEMOLITION BY OTHER TRADES RESULTING FROM MECHANICAL SYSTEMS DEMOLITION.

6 PROTECT ALL EXISTING FINISHES WHICH ARE TO REMAIN.

7 WHEN EXISTING CONSTRUCTION WHICH IS TO REMAIN IS DAMAGED DURING THE COURSE OF CONSTRUCTION AS A RESULT OF CONTRACTOR'S WORK, CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRS.

9 MECHANICAL CONTRACTOR SHALL COORDINATE THE DISCONNECTION AND REMOVAL OF ALL MECHANICAL EQUIPMENT TO BE REMOVED WITH THE ELECTRICAL CONTRACTOR. ALL WIRING AND CONDUIT SHALL BE REMOVED BACK TO SOURCE.

10 WHERE THE MECHANICAL CONTRACTOR MAY HAVE A QUESTION REGARDING WHETHER OR NOT EXISTING MECHANICAL EQUIPMENT IS TO REMAIN, BE REPAIRED, OR WHETHER IT IS TO BE REMOVED, THE CONTRACTOR SHALL BE REQUIRED TO OBTAIN VERIFICATION FROM THE ENGINEER PRIOR TO ANY COMMENCEMENT OF ASSOCIATED WORK.

11 FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO BID. NO ALLOWANCE WILL BE MADE FOR ADDITIONAL COSTS DUE TO THE CONTRACTOR'S FAILURE TO FIELD VERIFY EXISTING CONDITIONS AND DIMENSIONS.

## MECHANICAL TRADE NOTES

M-1 REVIEW ALL PROJECT CONSTRUCTION DOCUMENTS TO BECOME FAMILIAR WITH ENTIRE PROJECT SCOPE.

M-2 COORDINATE LOCATION OF ALL MECHANICAL EQUIPMENT AND SYSTEM COMPONENTS WITH ALL OTHER TRADES.

M-3 MAINTAIN MINIMUM REQUIRED WORKING CLEARANCES ADJACENT TO ELECTRICAL EQUIPMENT PER NATIONAL ELECTRIC CODE (LATEST EDITION).

M-4 PROVIDE APPROPRIATE TYPE SLEEVES WHEREVER PIPING PENETRATES ANY WALL, FLOOR, CEILING, OR ROOFING.

M-5 ALL PENETRATIONS THROUGH EXISTING WALLS, FLOORS AND CEILINGS ROOFING SHALL BE EITHER CORE DRILLED OR SAW CUT, CHISELED OR HAMMERED PENETRATIONS SHALL NOT BE ALLOWED.

M-6 ALL PIPING SHALL BE INSTALLED AS HIGH AS POSSIBLE, UNLESS OTHERWISE INDICATED.

M-7 INSTALL ALL PIPING AND WIRING NEATLY AND SQUARE WITH ALL BUILDING FEATURES.

M-8 PROVIDE ACCESS DOORS OR PANELS WHERE REQUIRED IN WALLS, CEILING AND FLOORS TO PROVIDE READY ACCESS TO ALL VALVES AND OTHER OTHER DEVICES OR EQUIPMENT.

## GENERAL NOTES

THE FOLLOWING GENERAL NOTES APPLY TO ALL RIST-FROST-SHUMWAY ENGINEERING, P.C., DRAWINGS AND TRADES ASSOCIATED WITH THOSE DRAWINGS INVOLVED ON THIS PROJECT:

G-1 RIST-FROST-SHUMWAY ENGINEERING, P.C., WAIVES ANY AND ALL RESPONSIBILITY AND LIABILITY FOR PROBLEMS WHICH ARISE FROM FAILURE TO FOLLOW THESE PLANS, SPECIFICATIONS, AND/OR THE DESIGN INTENT THEY CONVEY, OR FOR PROBLEMS WHICH ARISE FROM OTHERS' FAILURE TO OBTAIN AND/OR FOLLOW THE GUIDANCE OF RIST-FROST-SHUMWAY ENGINEERING, P.C., GUIDANCE WITH RESPECT TO ANY ERRORS, OMISSIONS, INCONSISTENCIES, AMBIGUITIES. OR CONFLICTS WHICH ARE DISCOVERED OR ALLEGED.

G-2 ALL WORK SHALL CONFORM TO ALL FEDERAL, STATE, AND LOCAL CODES AND STANDARDS INCLUDING, BUT NOT LIMITED TO, NFPA, IBC, UL, SMACNA, OSHA, AND NEC.

G-3 CONTRACTOR AND ALL SUBCONTRACTORS SHALL PROTECT THE WORK SITE, SURROUNDING AREAS AND OCCUPANTS FROM DAMAGE AND INJURY.

G-4 CONTRACTOR AND ALL SUBCONTRACTORS SHALL FAMILIARIZE THEMSELVES WITH THE CONTRACT DOCUMENTS. ALL DRAWINGS OF ANY PARTICULAR TRADE SHALL BE USED IN CONJUNCTION WITH DRAWINGS OF ALL OTHER TRADES TO COORDINATE ALL CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER BEFORE PROCEEDING WITH THE AFFECTED WORK. ANY PROPOSED CHANGES, VARIATIONS, OR SUBSTITUTIONS MUST BE REVIEWED AND ACCEPTED BY THE ENGINEER PRIOR TO IMPLEMENTATION.

G-5 ALL DRAWINGS ARE INTENDED TO SHOW THE GENERAL ARRANGEMENT, DESIGN INTENT AND EXTENT OF THE WORK. THEY SHALL BE CONSIDERED PARTLY DIAGRAMMATIC. THEY ARE NOT INTENDEND TO BE SCALED FOR ROUGHING-IN MEASUREMENTS OR TO SERVE AS SHOP DRAWINGS.

G-6 THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL DIMENSIONS (AS-BUILT OR OTHERWISE) BEFORE COMMENCING FABRICATION, AND/OR ORDERING MATERIALS.

G-7 DETAILS SHOWN ON ANY DRAWING ARE TO BE CONSIDERED TYPICAL FOR ALL SIMILAR CONDITIONS, UNLESS OTHERWISE INDICATED.

G-8 INFORMATION ON THESE DRAWINGS PERTAINING TO AS-BUILT CONSTRUCTION AND OTHER EXISTING CONDITIONS HAS BEEN OBTAINED BY FIELD INVESTIGATION. THIS INFORMATION IS PROVIDED FOR THE CONTRACTOR'S BENEFIT IN PERFORMANCE OF THE WORK.

G-9 IN THE EVENT THE CONTRACTOR ENCOUNTERS MATERIAL REASONABLY BELIEVED TO BE HAZARDOUS WHICH HAS NOT BEEN RENDERED HARMLESS, THE CONTRACTOR SHALL IMMEDIATELY STOP WORK IN THE AREA AFFECTED AND REPORT THE CONDITION TO THE OWNER AND ENGINEER IN WRITING. THE WORK IN THE AFFECTED AREA SHALL NOT BE RESUMED UNTIL WRITTEN VERIFICATION BY THE OWNER THAT THE MATERIAL HAS BEEN REMOVED OR OTHERWISE RENDERED HARMLESS.

## BOILER SCHEDULE — B

| SYMBOL | LOCATION | FUEL | MIN INPUT MBH | MAX INPUT MBH | MAX OUTPUT MBH | EFF. | FLUE SIZE DIA | BURNER MOTOR DATA | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | FLA | VLT | PH | |
| B-1 | MECH RM. | NAT. GAS | 40 | 199 | 184 | 92.5% | 3" | 2.75 | 115 | 1 | 1, 2, 3, MODEL KN2 |
| B-2 | MECH RM. | NAT. GAS | 40 | 199 | 184 | 92.5% | 3" | 2.75 | 115 | 1 | 1, 2, 3, MODEL KN2 |
| | | | | | | | | | | | |

1. SELECTION BASED ON KN SERIES CAST IRON BOILER BY ADVANCED THERMAL HYDRONICS .
2. WITH HEATNET 3.0 INTEGRATED BOILER MANAGEMENT SYSTEM.
3. WITH ALL REQUIRED BOILER TRIM.

## PUMP SCHEDULE — HWP

| SYMBOL | SERVES | LOCATION | TYPE | GPM | TOTAL HEAD (W.C.) | MOTOR DATA | | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | HP | VOLT | PHASE | AMPS | |
| HWP-1 | HEATING HW SYSTEM | BASEMENT | IN-LINE | 30 | 40 | .035-1.088 | 110-240 | 1 | 3.5-6.0 | 1, 2, VIRIDIAN MODEL VR20 |
| HWP-2 | HEATING HW SYSTEM | BASEMENT | IN-LINE | 30 | 40 | .035-1.088 | 110-240 | 1 | 3.5-6.0 | 1, 2, VIRIDIAN MODEL VR20 |
| HWP-1 | HEATING HW SYSTEM | BASEMENT | IN-LINE | 20 | 15 | 1/6 | 115 | 1 | 1.9 | 1, MODEL 2400-30-3P - 3450 RPM |
| HWP-2 | HEATING HW SYSTEM | BASEMENT | IN-LINE | 20 | 15 | 1/6 | 115 | 1 | 1.9 | 1, MODEL 2400-30-3P - 3450 RPM |
| | | | | | | | | | | |

1. SELECTION BASED ON TACO.
2. WITH ECM MOTOR, VARIABLE SPEED CONTROL, AND WEB CONNECTIVITY.

## EXPANSION TANK AND AIR SEPARATOR SCHEDULE — ET/AS

| SYMBOL EXP TANK | SYMBOL AIR SEP | SERVES | LOCATION | EXPANSION TANK | | | AIR SEPARATOR | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | | | | TYPE | VOL (TANK/ ACCEPT) GAL | APPROX DIMENSION | TYPE | CAPACITY GPM | |
| ET-1 | AS-1 | HEATING SYSTEM | BASEMENT | VERTICAL BLADDER | 53 / 53 | 24"Øx 37" | 2" IN-LINE | 70 | 1, ET-1 MODEL B-200<br>2, AS-1 MODEL EAS-2 |
| | | | | | | | | | |

1. ET-1 SELECTION BASED ON BELL & GOSSETT.
2. AS-1 SELECTION BASED ON BELL & GOSSETT.

## PROPELLER UNIT HEATER SCHEDULE — PUH

| SYMBOL | LOCATION | AIR SIDE | | | | | WATER SIDE | | | | MOTOR DATA | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CFM | EAT °F | MTG. HGT. (MAX.) | THROW (MAX.) | MBH | GPM | PD FT WC | EWT °F | LWT °F | HP | VOLT | PHASE | |
| PUH-1 | BOILER ROOM | 395 | 60 | 8' | 20' | 8.4 | 1.3 | 1.0 | 160 | 140 | 16 WATT | 115 | 1 | 1, 2, 3, MODEL HV-18 |
| PUH-2 | BASEMENT STORAGE | 750 | 60 | 9' | 30' | 22.4 | 3.5 | 1.0 | 160 | 140 | 1/20 | 115 | 1 | 1, 2, 3, MODEL HV-48 |
| | | | | | | | | | | | | | | |

1.SELECTION BASED ON VULCAN.
2.MANUAL RESET TOGGLE SWITCH STARTER W/THERMAL OVERLOAD.
3.PROVIDE UNIT MOUNTED LINE VOLTAGE THERMOSTAT.

## CABINET UNIT HEATER SCHEDULE — CUH

| SYMBOL | LOCATION | AIR SIDE | | | WATER SIDE | | | | MOTOR DATA | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CFM | EAT °F | MBH | GPM | PD FT WC | EWT °F | LWT °F | HP | VOLT | PHASE | |
| CUH-1 | FIRST FL. ENTRY | 430 | 60 | 20.7 | 2.5 | 1.0 | 160 | 140 | 1/10 | 115 | 1 | 1, 2, MODEL F-1020-04 |
| | | | | | | | | | | | | |

1. SELECTION BASED ON VULCAN.
2. WITH MANUAL RESET TOGGLE SWITCH STARTER W/THERMAL OVERLOAD.

## FINTUBE RADIATION SCHEDULE — FT

| SYMBOL | ELEMENT | | | | | | ENCLOSURE | | | AVG HOT WATER TEMP °F | CAPACITY BTUH/LF | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TUBE SIZE | TUBE TYPE | ROWS | FIN SIZE | FIN TYPE | FIN/ FT | TYPE | SIZE | MTG HGT | | | |
| FT-1 | 3/4" | CU | 1 | 4-1/4x3-5/8 | AL | 50 | LVS | 14" | 4" | 150 | 830 | 1, 2, 3, MODEL VC3/4-435 STYLE LVS SLOPE TOP |
| FT-2 | 1" | CU | 1 | 4-1/4" SQ | AL | 50 | LVX | 6" | 72" | 150 | 770 | 1, MODEL VC45 STYLE LVX EXPANDED METAL WITH STYLE XC CEILING COVER |
| FT-3 | 3/4" | CU | 2 | 4-1/4x3-5/8 | AL | 50 | LVS | 20" | 4" | 150 | 1270 | 1, 2, 3, MODEL VC3/4-435 STYLE LVS SLOPE TOP |
| | | | | | | | | | | | | |

1. SELECTION BASED ON VULCAN LINOVECTOR II.
2. WITH BRACKETS AND SUPPORTS FOR SUPPLY AND RETURN PIPING WITHIN ENCLOSURE.
3. BRACKETS AND SUPPORTS SHALL HAVE BALL BEARINGS INSERTED INTO NYLON ISOLATORS TO PROVIDE FRICTION FREE LATERAL MOVEMENT.

RFS engineering

Rist Frost Shumway Engineering, P.C.
71 Water St
Laconia, NH 03246
P: 603.524.4647
F: 603.528.7653
www.rfsengineering.com



# HEATING SYSTEM REPLACEMENT

# SAU #30

**Laconia, New Hampshire**

Consultants

**CONSTRUCTION DOCUMENTS**

Date: June 8, 2015

Key Plan

Revisions

| Rev. | Issued | Date |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

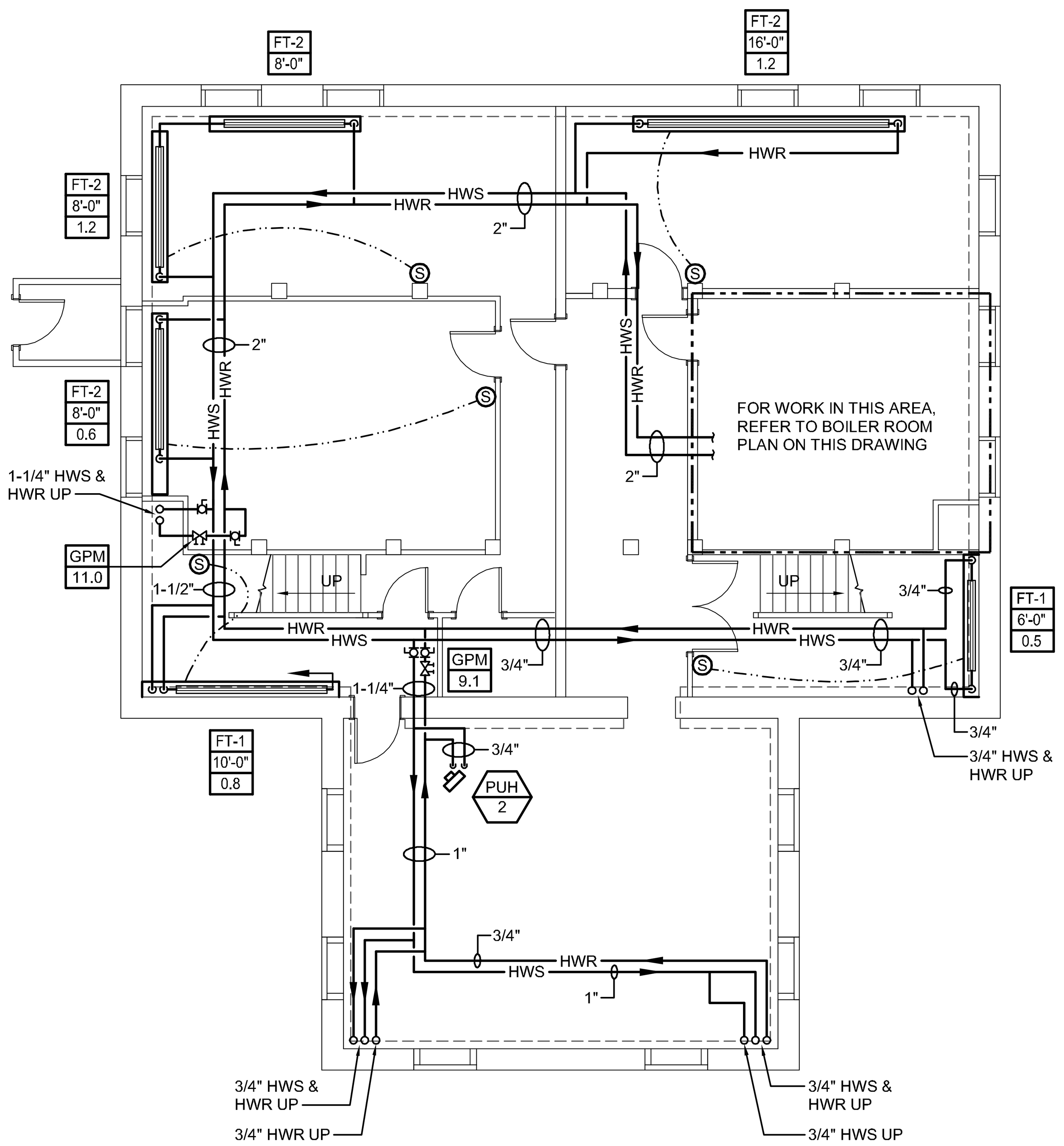
Title

NOTES, LEGEND, & SCHEDULES

| | |
|---|---|
| Project No. | 7841.001 |
| Drawn By | M. CILLEY |
| Checked By | T. LEMPKA |
| Project Mgr. | C. MONTEROSE |
| File Name | 7841M1.0 |
| Date | 08 JUNE, 2015 |
| Scale | NO SCALE |

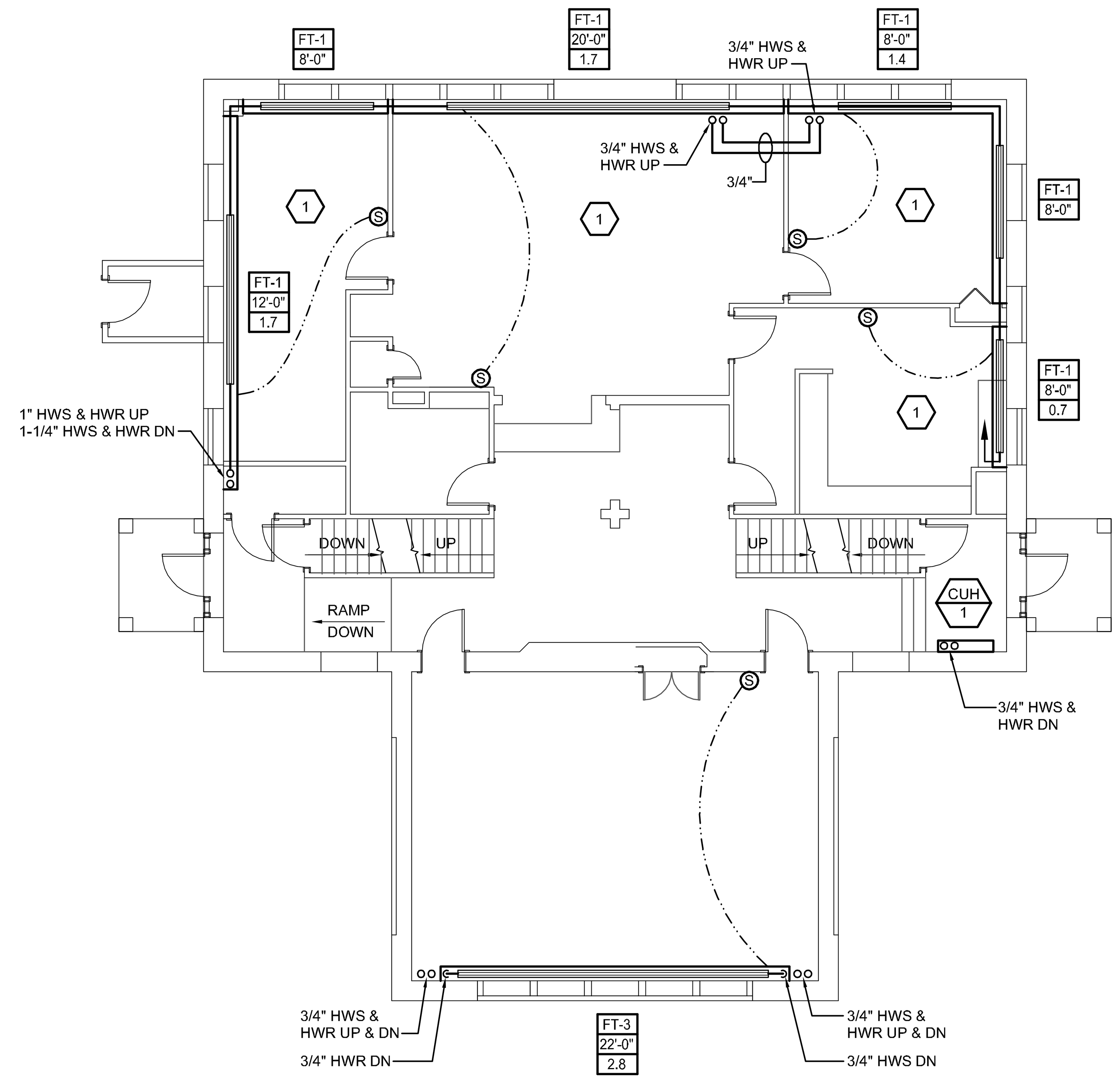
DRAWING NO.

M1.0



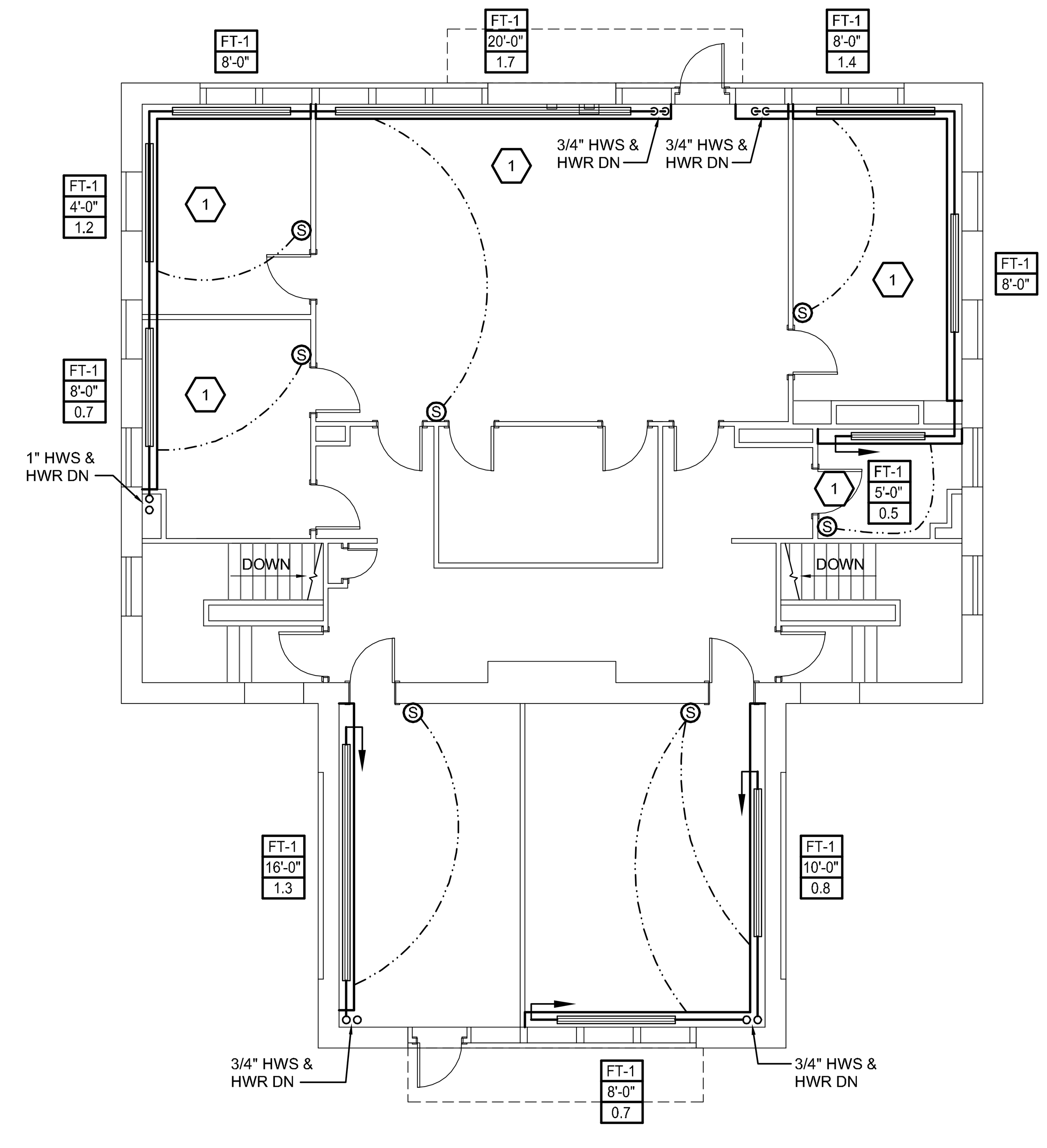

BASEMENT PLAN

1/8"=1'-0"



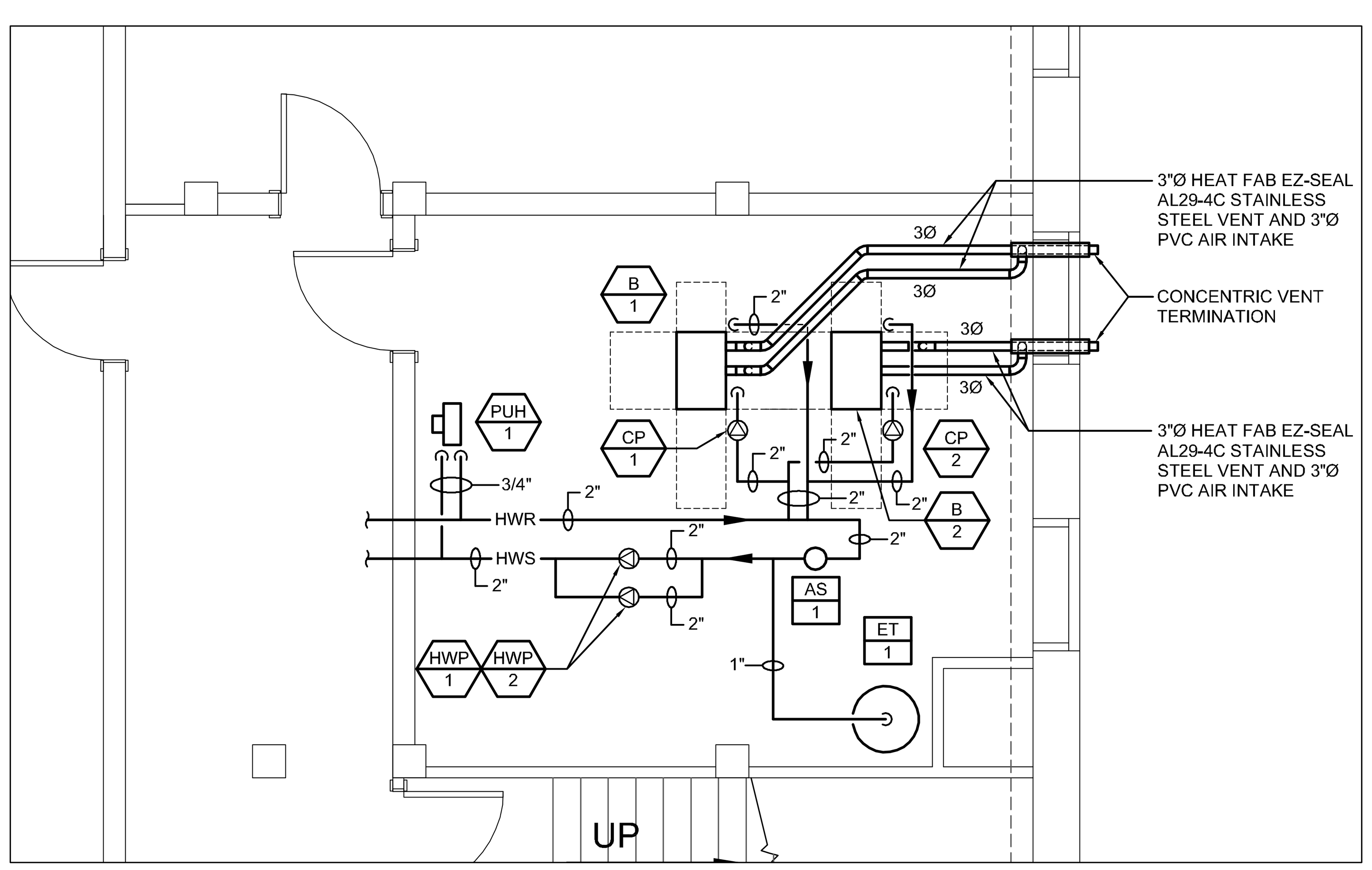

FIRST FLOOR PLAN

1/8"=1'-0"



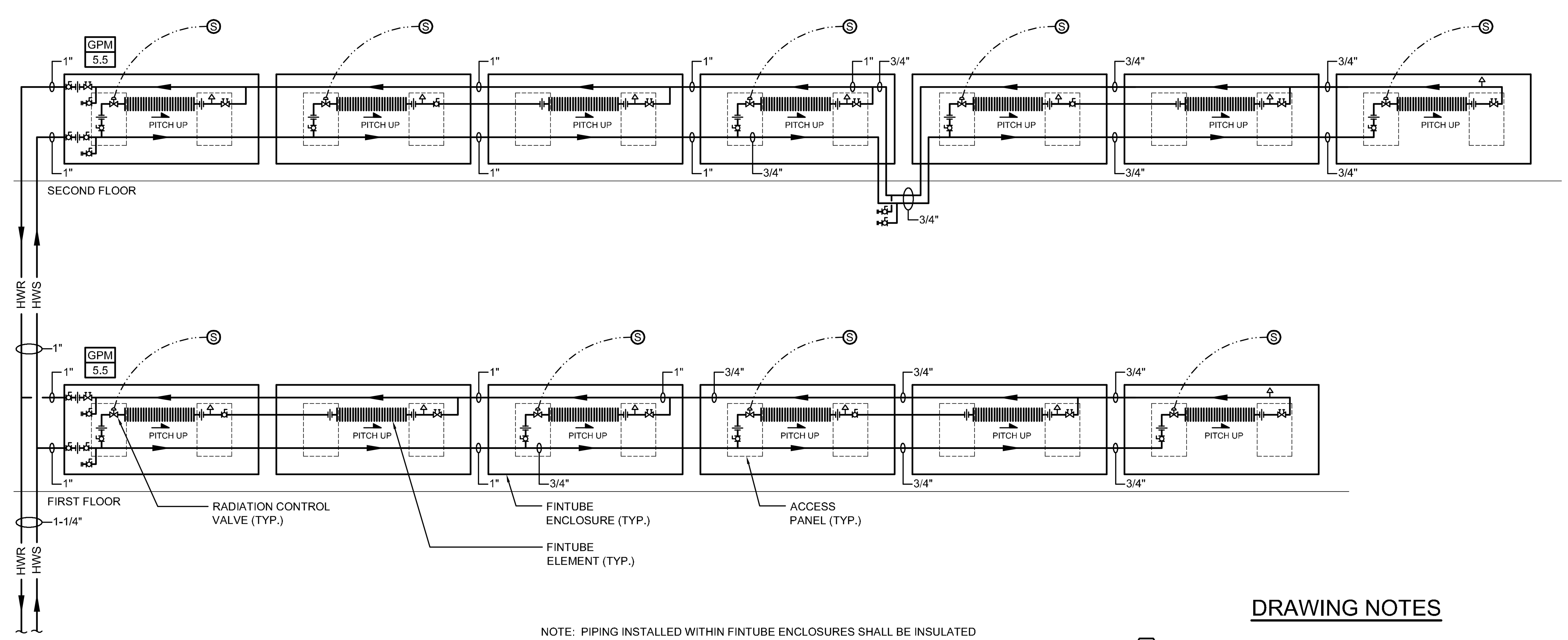

SECOND FLOOR PLAN

1/8"=1'-0"




BOILER ROOM PLAN

1/4"=1'-0"




NOTE: PIPING INSTALLED WITHIN FINTUBE ENCLOSURES SHALL BE INSULATED WITH 1" WHITE/GRAY AEROCEL INSULATION. OMIT INSULATION FOR PIPING LOCATED DIRECTLY ABOVE OR BELOW ACTIVE FINTUBE ELEMENT.

FINTUBE PIPING RISER DIAGRAM

NTS

## DRAWING NOTES

1. FOR GENERAL ARRANGEMENT AND PIPE SIZES FOR PIPING IN THIS AREA, REFER TO FINTUBE PIPING RISER DIAGRAM ON THIS DRAWING.
2. FURNISH AND INSTALL PVC JACKETING FOR ALL PIPING LOCATED IN THE BASEMENT AND FOR EXPOSED PIPING RISERS LOCATED ON THE FIRST FLOOR.


RFS engineering

Rist Frost Shumway Engineering, P.C.
71 Water St
Laconia, NH 03246
P: 603.524.4647
F: 603.528.7653
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# HEATING SYSTEM REPLACEMENT

# SAU #30

Laconia, New Hampshire

Consultants

## CONSTRUCTION DOCUMENTS

Date: June 8, 2015

Key Plan

Revisions

| Rev. | Issued | Date |
|---|---|---|

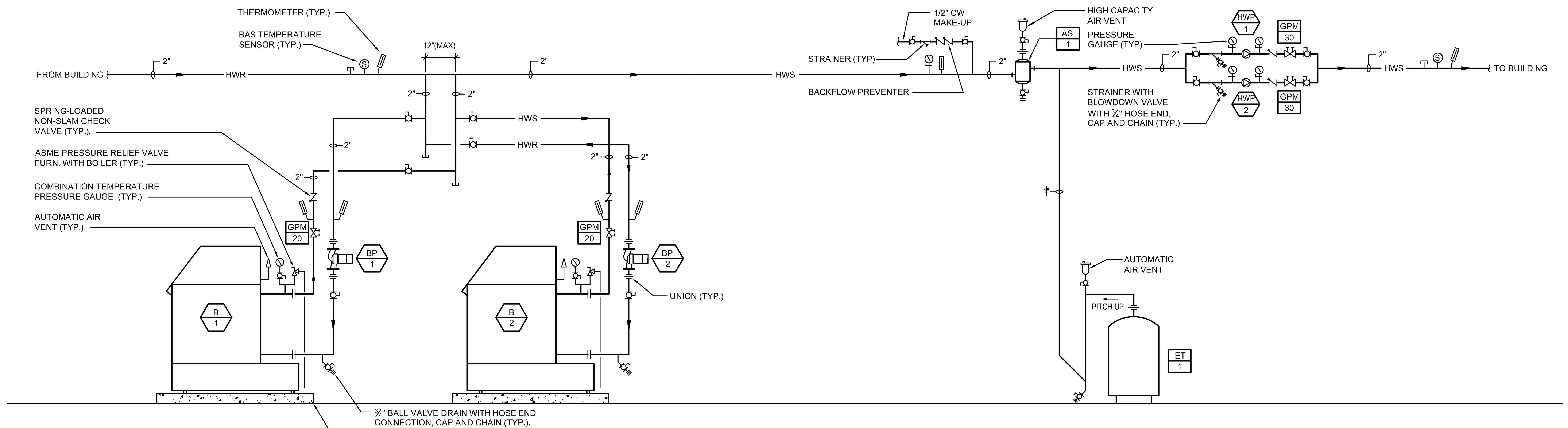
Title

MECHANICAL PLAN

| | |
|---|---|
| Project No. | 7841.001 |
| Drawn By | M. CILLEY |
| Checked By | T. LEMPKA |
| Project Mgr. | C. MONTEROSE |
| File Name | 7841M2.0 |
| Date | 08 JUNE, 2015 |
| Scale | 1/8" = 1'-0" |

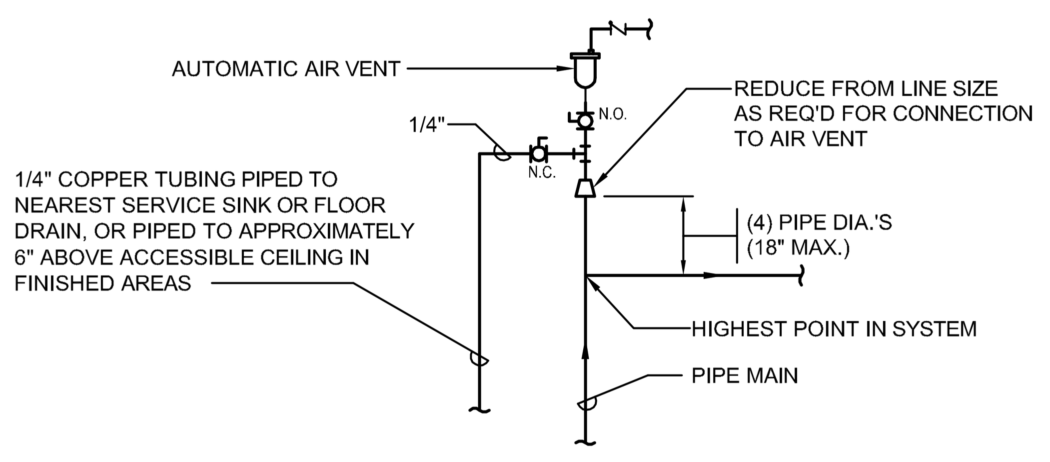
DRAWING NO.

M2.0

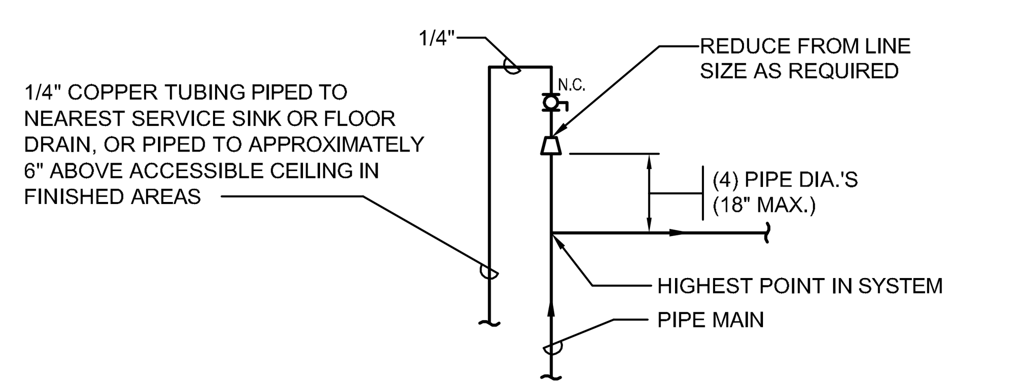



## HOT WATER GENERATION SCHEMATIC

NTS



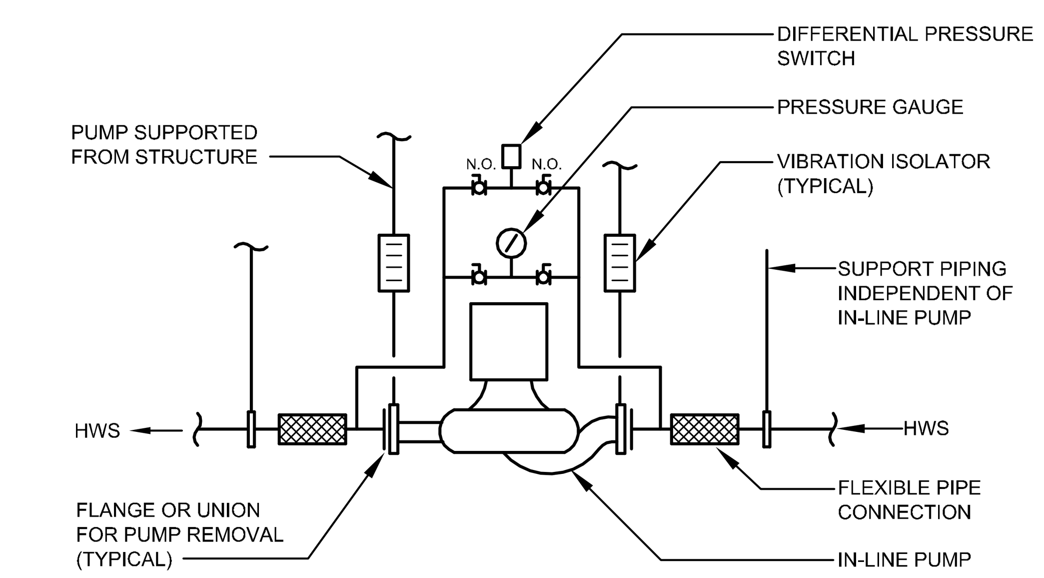

NOTE: 1. DETAIL APPLIES TO ALL PIPING 1 1/2 " AND LARGER.




NOTE: 1. DETAIL APPLIES TO ALL PIPING SMALLER THAN 1 1/2".

## WATER SYSTEM HIGH POINT VENT DETAIL

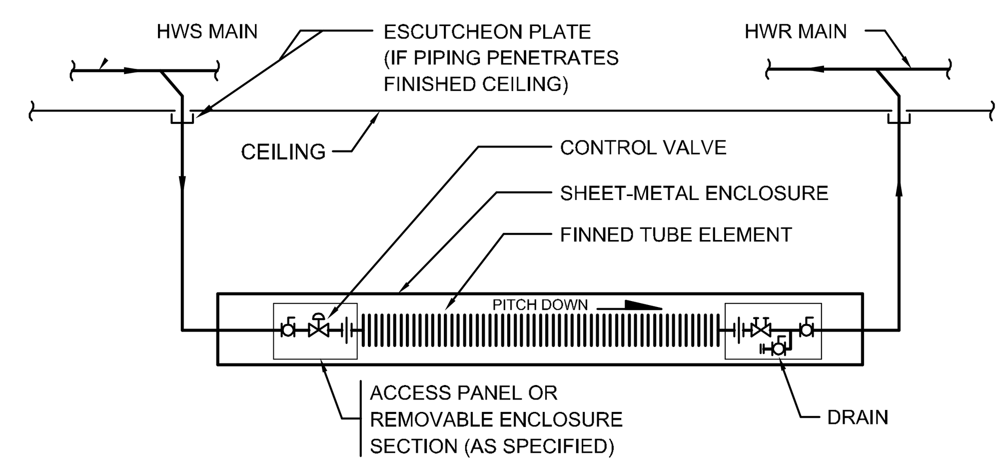
NTS




NOTES:
1. REFER TO AIR HANDLING UNIT HOT WATER COIL PIPING DETAIL FOR MORE INFORMATION REGARDING INSTALLATION OF COIL CIRCULATING PUMPS.
2. A CURRENT TRANSDUCER ON THE PUMP MOTOR MAY BE SUBSTITUTED FOR A DIFFERENTIAL PRESSURE SWITCH IN ORDER TO PROVIDE FLOW INDICATION TO THE AUTOMATIC CONTROL SYSTEM.

## IN-LINE CIRCULATING PUMP DETAIL

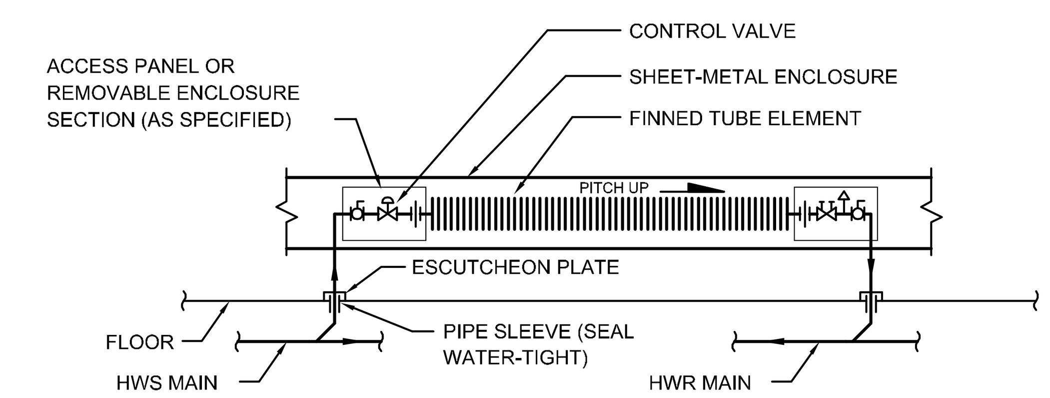
NTS




NOTES:
1. WHERE INDICATED ON THE DRAWINGS, ROUTE HWR PIPING BACK THROUGH ENCLOSURE & RISE ADJACENT TO HWS PIPING. OMIT INSULATION ON HWR PIPING WITHIN ENCLOSURE IN THIS INSTANCE.
2. ROUTE ALL PIPING CONCEALED (WHERE POSSIBLE). PROVIDE FULL PVC JACKETING WHERE PIPING MUST BE EXPOSED IN FINISHED AND/OR PUBLIC SPACES.
3. WHERE SPACIAL CONSTRAINTS DICTATE, VALVING AND HYDRONIC SPECIALTIES MAY BE INSTALLED CONCEALED IN THE CEILING OF THE SPACE SERVED, PROVIDED UNIONS AND CAPPED DRAINS ARE INSTALLED AS INDICATED. VALVING AND SPECIALTIES SHALL BE INSTALLED IN CLOSE PROXIMITY TO ASSOCIATED FINNED TUBE RADIATION. IN INSTANCES WHERE VALVING AND SPECIALTIES ARE INSTALLED REMOTE TO THE RADIATION SERVED, ACCESS PANELS OR SECTIONS SHALL BE OMITTED.

## FINNED TUBE RADIATION DETAIL (DOWN-FEED)

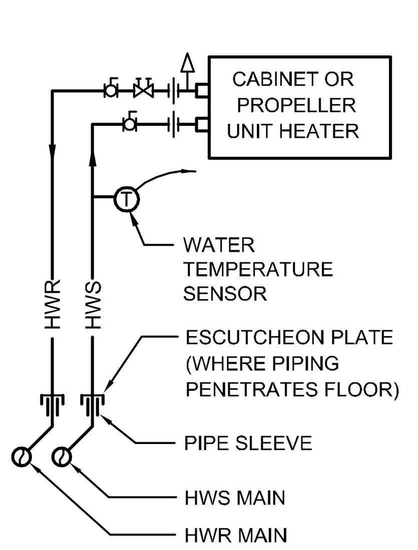
NTS



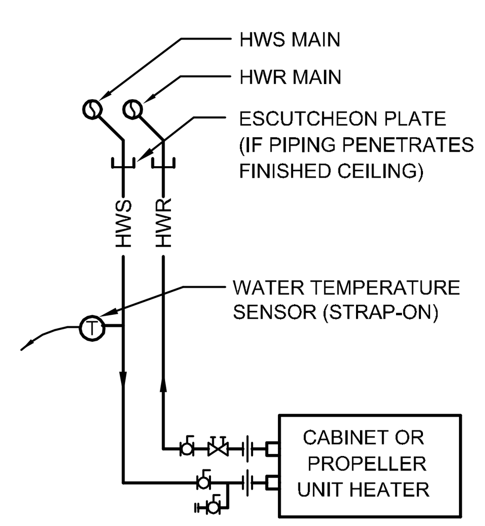

NOTES:
1. WHERE INDICATED ON THE DRAWINGS, ROUTE HWR PIPING BACK THROUGH ENCLOSURE & DROP ADJACENT TO HWS PIPING. OMIT INSULATION ON HWR PIPING WITHIN ENCLOSURE IN THIS INSTANCE.
2. ROUTE ALL PIPING CONCEALED (WHERE POSSIBLE). PROVIDE FULL PVC JACKETING WHERE PIPING MUST BE EXPOSED IN FINISHED AND/OR PUBLIC SPACES.
3. WHERE SPACIAL CONSTRAINTS DICTATE, VALVING AND HYDRONIC SPECIALTIES MAY BE INSTALLED CONCEALED IN THE CEILING OF THE SPACE BELOW, PROVIDED UNIONS AND AIR VENTS ARE INSTALLED AS INDICATED. VALVING AND SPECIALTIES SHALL BE INSTALLED IN CLOSE PROXIMITY TO ASSOCIATED FINNED TUBE RADIATION. IN INSTANCES WHERE VALVING AND SPECIALTIES ARE INSTALLED REMOTE TO THE RADIATION SERVED, ACCESS PANELS OR SECTIONS SHALL BE OMITTED.

## FINNED TUBE RADIATION DETAIL (UP-FEED)

NTS




## UP-FEED PIPING




## DOWN-FEED PIPING

NOTE: 1. ROUTE ALL PIPING CONCEALED (WHERE POSSIBLE).

## CABINET UNIT AND PROPELLER UNIT HEATER PIPING DETAIL

NTS

RFS engineering


Rist Frost Shumway Engineering, P.C.
71 Water St
Laconia, NH 03246
P: 603.524.4647
F: 603.528.7653
www.rfsengineering.com




# HEATING SYSTEM REPLACEMENT

## SAU #30

Laconia, New Hampshire

Consultants

## CONSTRUCTION DOCUMENTS

Date: June 8, 2015

Key Plan

Revisions

| Rev. | Issued | Date |
|---|---|---|
| | | |

Title

MECHANICAL DETAILS

| | |
|---|---|
| Project No. | 7841.001 |
| Drawn By | M. CILLEY |
| Checked By | T. LEMPKA |
| Project Mgr. | C. MONTEROSE |
| File Name | 7841M1.0 |
| Date | 08 JUNE, 2015 |
| Scale | NO SCALE |

DRAWING NO.

M3.0

DIVISION 15 - MECHANICAL SPECIFICATIONS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. ALL NEW MECHANICAL SYSTEMS WORK SHALL CONFORM TO THE 2009 INTERNATIONAL BUILDING CODE, THE 2009 INTERNATIONAL MECHANICAL CODE, THE 2009 INTERNATIONAL PLUMBING CODE (AS ADOPTED AND AMENDED BY THE STATE OF NEW HAMPSHIRE), LATEST NFPA REGULATIONS IN EFFECT.

B. WHERE MATERIALS OR EQUIPMENT ARE SPECIFIED BY PROPRIETARY NAME, SUCH SPECIFICATION IS TO ESTABLISH PERFORMANCE AND LEVEL OF QUALITY. PROPOSED SUBSTITUTES WILL BE CONSIDERED AT THE DISCRETION OF THE ENGINEER.

C. COORDINATE THE LOCATION OF ALL PIPING AND EQUIPMENT WITH THE REQUIREMENTS OF ALL OTHER TRADES.

D. COORDINATE THE INTERFACE OF ALL MECHANICAL/ELECTRICAL WORK WITH THE ELECTRICAL CONTRACTOR.

E. ALL PIPING SHALL BE RUN SQUARE WITH BUILDING FEATURES AND SHALL BE INSTALLED AS HIGH AS POSSIBLE AND IN CONCEALED SPACES WHERE PRACTICAL. ANY PIPING REQUIRED TO BE INSTALLED EXPOSED MUST BE REVIEWED AND APPROVED BY THE OWNER OR ENGINEER PRIOR TO INSTALLATION.

1.02 DESCRIPTION OF WORK

A. THIS SECTION COVERS THE GENERAL PROVISIONS WHICH ARE APPLICABLE TO ALL MECHANICAL WORK AND THE TESTING OF THE COMPLETE MECHANICAL SYSTEMS.

B. FURNISH ALL LABOR, MATERIALS, SERVICES, SUPPLIES, TOOLS, EQUIPMENT, TRANSPORTATION, FACILITIES, AND INCIDENTALS REQUIRED, AND PERFORM ALL OPERATIONS NECESSARY TO ACCOMPLISH AND COMPLETE INSTALLATION OF THE MECHANICAL HEATING SYSTEMS AS SHOWN ON THE CONTRACT DRAWINGS, SPECIFIED HEREIN OR AS REASONABLY MAY BE IMPLIED AS BEING INCIDENTAL TO THE INTENDED DESIGN.

C. THE CONTRACTOR IS TO MAKE SPECIAL NOTE OF THE FACT THAT PORTIONS OF THE DESIGN FOR THIS PROJECT ARE INDICATED ON THE DRAWINGS AND ARE SPECIFIED HEREIN.

1.03 MECHANICAL WORK:

A. SCOPE OF WORK INCLUDES FURNISHING AND INSTALLING EQUIPMENT, OTHER APPARATUS AND ACCESSORIES REQUIRED FOR COMPLETE MECHANICAL SYSTEMS.

B. SCOPE OF WORK ALSO INCLUDES THE REMOVAL OF MISCELLANEOUS MECHANICAL SYSTEM COMPONENTS AND EQUIPMENT.

1.04 QUALITY ASSURANCE

A. QUALIFICATION OF INSTALLERS

1. FOR THE ACTUAL FABRICATION, INSTALLATION, AND TESTING OF THE WORK OF THIS DIVISION, USE ONLY THOROUGHLY TRAINED AND EXPERIENCED PERSONNEL WHO ARE COMPLETELY FAMILIAR WITH THE CODES AND REQUIREMENTS FOR THIS WORK AND WITH THE INSTALLATION RECOMMENDATIONS OF THE MANUFACTURERS OF THE SPECIFIED ITEMS.

B. WORKMANSHIP

1. COMPLETE MECHANICAL INSTALLATION SHALL BE MADE IN A NEAT AND WORKMANLIKE MANNER AND TO THE FULL SATISFACTION AND APPROVAL OF THE OWNER AND ENGINEER.

2. WORK NOT MEETING THE OWNER'S STANDARD FOR ADEQUATE WORKMANSHIP SHALL BE REMOVED AND REPLACED AT ONCE, AT NO ADDITIONAL CONTRACT COST TO THE OWNER.

1.05 SUBMITTALS

A. SUBMIT COMPLETE CATALOG INFORMATION AND SHOP DRAWINGS FOR ALL MATERIALS AND EQUIPMENT FOR THE ENGINEER'S REVIEW AND APPROVAL. SUBMITTED MATERIALS SHALL BE SPECIFIC TO THIS PROJECT, GENERAL DATA WITHOUT JOB SPECIFIC INFORMATION SHALL NOT BE ACCEPTED. SIX (6) COPIES OF SHOP DRAWINGS SHALL BE SUBMITTED. REQUIRED SUBMITTALS INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING:

1. BOILERS
2. PUMPS
3. PIPING INSULATION
4. EXPANSION TANK
5. AIR SEPARATOR
6. FINTUBE RADIATION
7. CABINET UNIT HEATER
8. PROPELLER UNIT HEATERS
9. AUTOMATIC TEMPERATURE CONTROLS
10. BALANCING REPORT

B. UPON COMPLETION OF THE MECHANICAL INSTALLATION, PROVIDE THE OWNER WITH REPRODUCIBLE "AS-BUILT" DRAWINGS, FOR ALL INSTALLED MECHANICAL SYSTEMS ALONG WITH ALL WARRANTIES AND OPERATION AND MAINTENANCE INFORMATION.

1.06 PRODUCT HANDLING

A. PROTECTION: USE ALL MEANS NECESSARY TO PROTECT MECHANICAL MATERIALS BEFORE, DURING, AND AFTER INSTALLATION AND TO PROTECT THE INSTALLED WORK AND MATERIALS OF ALL TRADES UNTIL TESTING AND FINAL ACCEPTANCE.

B. REPLACEMENTS: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORK OF OTHER TRADES THAT MAY BE DAMAGED OR DISTURBED IN THE COURSE OF HIS WORK. IN THE EVENT OF DAMAGE, IMMEDIATELY MAKE ALL REPAIRS AND REPLACEMENTS NECESSARY TO THE APPROVAL OF THE ARCHITECT WITHOUT ADDITIONAL COST TO THE OWNER.

1.07 HVAC PIPING

A. HVAC PIPING SHALL BE FABRICATED AND INSTALLED AS SPECIFIED HEREIN, AND IN ACCORDANCE WITH THE REFERENCED CODES AND STANDARDS. HVAC PIPING SHALL ALSO BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS' RECOMMENDATIONS AND REQUIREMENTS.

PART 2 - PRODUCTS

2.01 PIPING HANGERS AND SUPPORTS

A. HANGERS AND SUPPORTS SHALL BE MANUFACTURED BY GRINNEL, MASON, CRANE, OR CARPENTER-PATERSON.

B. HANGERS FOR ALL INSULATED PIPES SHALL BE SIZED AND INSTALLED SO THEY ARE OUTSIDE THE INSULATION JACKET.

C. HANGERS FOR PIPE SIZES 1/2" TO 1-1/2": CARBON STEEL, ADJUSTABLE SWIVEL, RING TYPE OR ADJUSTABLE, CLEVIS.

D. HANGERS FOR PIPE SIZES 2" TO 4": CARBON STEEL, ADJUSTABLE, CLEVIS.

E. VERTICAL SUPPORT FOR PIPES: STEEL RISER CLAMP, PROVIDE SHEET LEAD INSERTS FOR ALL COPPER PIPE RISERS.

F. SHIELDS FOR INSULATED PIPES: GALVANIZED STEEL SHIELDS OVER INSULATION IN 180° SEGMENTS; 18-GAUGE MINIMUM THICKNESS AND 6" MINIMUM LENGTH.

G. HANGER RODS: THREADED BOTH ENDS OR THREADED CONTINUOUSLY, SUPPORTED WITH CLAMPS, CINCH OR SLUG-IN EXPANSION BOLTS, OR COACH SCREWS.

H. HANGER SPACING: 1/2" TO 1-1/4" PIPE SIZE, MAXIMUM SPACING OF 6'-6".

I. HANGER SPACING: 1-1/2" TO 2" PIPE SIZE, MAXIMUM SPACING OF 10'-0".

J. INSTALL PIPE SLEEVES WHERE PIPING PENETRATES ANY WALL OR FLOOR. SLEEVES SHALL BE 18-GAUGE GALVANIZED STEEL. WHERE APPLICABLE, SIZE SLEEVES TO ALLOW FOR CONTINUATION OF INSULATION THROUGH PENETRATION.

K. WHERE PIPING PENETRATES FLOORS, CEILINGS, OR WALLS, CLOSE OFF SPACE BETWEEN PIPE AND ADJACENT PIPE SLEEVE WITH FIRESTOPPING INSULATION AND CAULK SEAL AIR TIGHT. PROVIDE CHROME FINISHED STEEL ESCUTCHEONS AT FINISHED SURFACES.

2.02 PIPING INSULATION

A. INSULATION SHALL BE MANUFACTURED BY MANVILLE, OWENS-CORNING, ARMSTRONG, OR CERTAINTEED. INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

B. PIPING INSULATION SHALL BE FIBERGLASS; "K" VALUE OF 0.24 AT 75°F, NONCOMBUSTIBLE, WITH ALL-PURPOSE JACKET AND SELF-SEALING ADHESIVE JOINTS.

C. CONTINUE INSULATION THROUGH PENETRATIONS. NEATLY FINISH INSULATION AT SUPPORTS, PROTRUSIONS, AND INTERRUPTIONS. INSULATE PIPE FITTINGS, JOINTS, AND VALVES WITH INSULATION OF LIKE MATERIAL AND FINISH WITH PVC FITTING COVERS.

D. INSULATE ALL NEW PIPING AS APPROPRIATE.

E. INSULATION THICKNESS SHALL BE:

HOT WATER PIPING: 1-1/2 INCH

HOT WATER PIPING WITHIN FINTUBE ENCLOSURES:

1 INCH AEROCEL BY AEROFLEX

2.03 PIPING IDENTIFICATION

A. PIPING IDENTIFICATION MARKERS SHALL BE MANUFACTURED BY SETON, NATIONAL OR IDEAL.

B. PROVIDE VINYL OR STENCILED PIPE MARKERS FOR ALL PIPING INSTALLED UNDER THIS PROJECT.

2.04 PIPING AND PIPING APPURTENANCES

A. HEATING HOT WATER PIPING:

1. STEEL PIPE: ASTM A53 GRADE B OR ERW, CARBON STEEL, SCHEDULE 40 WITH MALLEABLE IRON OR FORGED STEEL FITTINGS AND SCREWED JOINTS.

2. COPPER TUBING: ASTM B88 TYPE L HARD DRAWN COPPER WITH CAST BRASS OR WROUGHT COPPER FITTINGS. JOINTS SHALL BE SOLDERED WITH GRADE 95TA SOLDER.

B. FLANGES AND UNIONS: 150 PSIG MALLEABLE IRON, FORGED STEEL, OR BRONZE CONSTRUCTION, AS APPROPRIATE FOR PIPING IN WHICH INSTALLED.

C. BALL VALVES: BRONZE TWO-PIECE BODY, STEEL PLATED BALL, TEFLON SEATS AND STUFFING BOX RING, LEVER HANDLE AND SOLDERED ENDS. APOLLO MODEL 70-100.

D. BALANCING VALVES: BRONZE BODY/BRASS BALL, DIFFERENTIAL PRESSURE READ-OUT PORTS ACROSS VALVE SEAT AREA, MEMORY STOP, BUBBLE-TIGHT SHUTOFF AT 120", RATED AT 250° F. BALANCING VALVES SHALL BE EQUAL TO BELL & GOSSETT MODEL CB.

E. DIELECTRIC FITTINGS: CONNECTION OF PIPING OF DISSIMILAR METALS SHALL BE MADE WITH DIELECTRIC FITTINGS.

F. STRAINERS: BRASS BODY RATED FOR 125 PSI, "Y" PATTERN WITH 1/32-INCH STAINLESS STEEL PERFORATED SCREEN. STRAINERS SHALL BE MANUFACTURED BY WATTS, SARCO, OR MUELLER.

2.05 SCHEDULED EQUIPMENT, AS FOLLOWS:

A. THE FOLLOWING EQUIPMENT SHALL BE AS SCHEDULED ON THE DRAWINGS:

1. BOILERS
2. PUMPS
3. EXPANSION TANK
4. AIR SEPARATOR
5. FINTUBE RADIATION
6. CABINET UNIT HEATER
7. PROPELLER UNIT HEATERS

2.07 AUTOMATIC TEMPERATURE CONTROLS (BAS)

A. THIS CONTRACTOR SHALL FURNISH AND INSTALL ALL COMPONENTS NECESSARY TO ACHIEVE COMPLETE CONTROL OF THE MECHANICAL SYSTEMS INDICATED ON THE DRAWINGS AND AS HERIN SPECIFIED.

B. THE AUTOMATIC TEMPERATURE CONTROL SYSTEM SHALL BE INVENSYS CONTROLS OR SIEMENS CONTROLS, AND SHALL BE DESIGNED AND INSTALLED BY CONTROL TECHNOLOGIES, INC. (INVENSYS), OR SIEMENS CONTROLS.

C. THE BAS CONTRACTOR SHALL FURNISH AND INSTALL A COMPLETE AND FULLY INTEGRATED AUTOMATIC TEMPERATURE CONTROL SYSTEM, INCORPORATING DIRECT DIGITAL CONTROL (DDC) AND ELECTRIC DEVICES FOR MECHANICAL EQUIPMENT MONITORING AND CONTROL. THE BAS SHALL FULLY INTERFACE WITH THE EXISTING LACONIA SCHOOL DISTRICT BAS WORKSTATION.

D. THE BAS CONTRACTOR SHALL BE RESPONSIBLE FOR THE WIRING AND CONTROL WIRING REQUIRED TO PUT THESE SYSTEMS IN OPERATION.

E. PROVIDE SHOP DRAWING SUBMITTALS TO THE ENGINEER FOR REVIEW.

F. SEQUENCES OF OPERATION:

1. HEATING SYSTEM CIRCULATORS (HWP-1 AND HWP-2):

A. A LEAD/LAG PROGRAM SHALL CONTROL THE PUMPS. STATUS SHALL BE MONITORED BY A DIFFERENTIAL PRESSURE SENSOR ACROSS EACH PUMP. THE LEAD PUMP SHALL START WHEN THE OUTDOOR TEMPERATURES FALLS BLOW 60°F (ADJ.). IF THE LEAD PUMP FAILS, THE LAG PUMP SHALL START, AND AN ALARM SHALL SOUND AT THE OPERATORS' WORKSTATION.

B THE LEAD PUMP SHALL ALTERNATE WEEKLY.

2. BOILER AND HOT WATER RESET CONTROL:

A. THE BOILER'S HIGH LIMIT AQUASTAT SHALL BE SET AT 200°F.

B. BOILER SAFETIES SHALL INCLUDE HIGH HOT WATER SUPPLY (200°F -ADJ.) AND LOW BOILER ENTERING WATER TEMPERATURE (90 °F -ADJ.). FAILURE TO DETECT PUMP OPERATION AND/OR FAILURE TO DETECT BOILER OPERATION WHEN COMMANDED TO OPERATE, AN ALARM SHALL BE INITIATED AT THE BAS WORKSTATION IF ANY OF THE ABOVE SAFETIES ARE TRIPPED.

C. WHEN THE OUTSIDE TEMPERATURE SENSOR'S TEMPERATURE DROP BELOW 60°F (ADJUSTABLE), THE BOILER SHALL BE ENERGIZED.

D. WHEN THE OUTSIDE TEMPERATURE IS BELOW 60°F, THE HOT WATER HEATING SYSTEM SHALL BE CONTROLLED BY HEATING LOOP RETURN WATER RESET CONTROL. THE RESET SCHEDULE SHALL BE: O.A. 60 °F, SUPPLY WATER TEMPERATURE 120°F, O.A. 0°F, RETURN WATER TEMPERATURE 160°F (ADJUSTABLE).

3. FINTUBE RADIATION

A. THE BAS SHALL MODULATE THE HEATING TERMINAL CONTROL VALVE IN ORDER TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.

B. AT A MINIMUM, THE FOLLOWING INFORMATION SHALL BE MONITORED THROUGH THE OPERATOR'S WORKSTATION:

1. CONTROL VALVE POSITION
2. SPACE TEMPERATURE SETPOINT
3. ACTUAL SPACE TEMPERATURE

4. CABINET AND PROPELLER UNIT HEATERS

A. CONTROL SHALL BE LOCAL ONLY VIA LINE VOLTAGE THERMOSTAT.

B. WHEN SPACE TEMPERATURE IS BELOW SETPOINT AND HOT WATER IS AVAILABLE, THE FAN SHALL BE STARTED, WHEN SETPOINT IS ACHIEVED, THE FAN SHALL STOP.

C. A STRAP-ON AQUASTAT (PROVIDED BY THE BAS CONTRACTOR) ON THE HOT WATER SUPPLY PIPING SHALL PREVENT THE FAN FROM OPERATING WHEN THE HOT WATER SUPPLY TEMPERATURE IS BELOW 80 DEGREES F (ADJ.).

5. BOILERS AND BOILER PUMPS (B-1, B-2, BP-1 AND BP-2)

A. CONTROL SHALL BE VIA THE PACKAGED BOILER CONTROL SYSTEM.

B. THE BAS CONTRACTOR SHALL PROVIDE ALL WIRING BETWEEN BOILERS AND REMOTE SENSORS.

C. BOILER CONTROL SYSTEM SHALL BE PROVIDED WITH BACNET INTERFACE.

PART 3 - EXECUTION

3.01 WORKMANSHIP

A. ALL WORK SHALL BE PERFORMED IN A WORKMANLIKE MANNER AND IN ACCORDANCE WITH THE REFERENCED CODES AND STANDARDS AND THE PRACTICES OF THE VARIOUS TRADES. ALL WORK SHALL PRESENT A NEAT, FINISHED APPEARANCE WHEN COMPLETED.

B. INSPECTION

1. PRIOR TO PERFORMING WORK, CAREFULLY INSPECT ALL EXISTING CONDITIONS.

2. DO NOT PROCEED WITH THE WORK IN AREAS OF DISCREPANCY UNTIL ALL SUCH DISCREPANCIES HAVE BEEN FULLY RESOLVED.

3. SPECIAL CARE SHALL BE EMPLOYED NOT TO DAMAGE EXISTING TO REMAIN BUILDING COMPONENTS AND SYSTEMS WHEN WORKING ON THIS PROJECT. ANY DAMAGE THAT RESULTS SHALL BE REPAIRED OR REPLACED TO THE SATISFACTION OF THE OWNER.

C. DEMOLITION

1. THE MECHANICAL CONTRACTOR SHALL PERFORM ALL DISCONNECTIONS, RELOCATING AND REMOVAL OF MECHANICAL SYSTEMS AND EQUIPMENT FOR DEMOLITION, AND MAKE ALL ALTERATIONS NECESSARY TO FACILITATE THE INSTALLATION OF NEW MECHANICAL WORK AS INDICATED ON THE DRAWINGS AND AS SPECIFIED HEREIN.

2. ALL EQUIPMENT, PIPING, ACCESSORIES, ETC., REMOVED BY THE CONTRACTOR SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE PROJECT SITE.

D. PREPARATION

1. LAYOUT WORK AT THE SITE BY CONSULTATION WITH OTHER TRADES BEFORE INSTALLING WORK TO ELIMINATE ANY CONFLICT BETWEEN THIS WORK AND THE WORK OF OTHER TRADES.

2. COORDINATE MECHANICAL WORK, IN ADVANCE WITH OTHER WORK. THE INSTALLATION OF OPENINGS, SLEEVES, SUPPORTS, ETC., REQUIRED FOR MECHANICAL SYSTEMS AND EQUIPMENT, SHALL BE DONE AT SUCH TIME AS TO MINIMIZE THE NEED FOR SUBSEQUENT CUTTING AND PATCHING. PRIOR TO THE ORDERING OF ANY EQUIPMENT, VERIFY THE LOCATION, TYPE AND CHARACTERISTICS OF EQUIPMENT SERVICE REQUIRED.

E. PERFORMANCE

1. PERFORM ALL WORK WHICH IS BOTH REQUISITE AND ESSENTIAL IN COMPLETING THE INTENDED INSTALLATION IN THE PROPER MANNER.

2. THE DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF LOCATIONS OF DUCTWORK, PIPING, EQUIPMENT AND OTHER WORK. FIELD VERIFICATION OF ALL DIMENSIONS IS REQUIRED. PIPING AND DUCT RUNS AND LAYOUT ARE SHOWN DIAGRAMMATICALLY ONLY; EXACT LOCATIONS, DISTANCES AND LEVELS SHALL BE GOVERNED BY ACTUAL FIELD CONDITIONS. THE LOCATION OF INDICATED RUNS IS NOT NECESSARILY INTENDED TO SHOW THE ACTUAL ROUTING OF PIPING AND DUCTWORK.

3. IF ANY DEPARTURES FROM THE DRAWINGS ARE DEEMED NECESSARY BY THE CONTRACTOR IN ORDER TO FURNISH AN EFFICIENT, COMPLETE AND SATISFACTORY INSTALLATION, DETAILS OF SUCH DEPARTURES AND THE REASONS THEREFORE SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER. DO NOT MAKE DEPARTURES WITHOUT PRIOR APPROVAL OF THE ENGINEER.

4. AT THE END OF EACH WORKING DAY, THE CONTRACTOR SHALL LEAVE ALL EQUIPMENT AND MATERIALS IN A NEAT AND ORDERLY MANNER, AND SHALL NOT OBSTRUCT FREE MOVEMENT THROUGH THE WORK AREA.

5. WHENEVER OBSTRUCTIONS ARE ENCOUNTERED IN THE PATH OR COURSE OF THE WORK WHICH ARE NOT SHOWN NOR ANTICIPATED IN THE CONTRACT DOCUMENTS, DO NOT PROCEED WITH THE INSTALLATION OF THE WORK BEFORE ADVISING THE ARCHITECT AND RECEIVING DETAILED INFORMATION OR DRAWINGS, OR BOTH. FAILURE TO FOLLOW THIS PRECAUTION WILL OBLIGATE THE CONTRACTOR TO THE FULL EXTENT OF ALL NECESSARY CHANGES AND ADJUSTMENTS TO CONFORM TO THE REQUIREMENTS OF THE ENGINEER.

F. INSTALLATION

1. INSTALL ALL WORK AT THE LOCATIONS SHOWN ON THE DRAWINGS.

2. INSTALL ALL WORK PLUMB, LEVEL AND SQUARE.

3. INSTALL ALL WORK PER MANUFACTURER RECOMMENDATIONS AND REQUIREMENTS.

4. INSTALL SEISMIC BRACING ON ALL EQUIPMENT, PIPING, ETC. IN ACCORDANCE WITH THE REQUIREMENTS OF THE BUILDING CODE.

G. REPAIR OF EXISTING WORK

1. THE WORK SHALL BE CAREFULLY LAID OUT IN ADVANCE AND WHERE CUTTING, CHANNELING, DRILLING OF FLOORS, WALLS, PARTITIONS, CEILINGS, OR OTHER SURFACES IS NECESSARY FOR THE PROPER INSTALLATION OF THE WORK, THE CONTRACTOR SHALL PROVIDE ALL SUCH CUTTING, CHANNELING, OR DRILLING AND WILL BE RESPONSIBLE FOR ANY NECESSARY PATCHING AND REPAIRING RESULTING FROM THE CUTTING, CHANNELING, OR DRILLING, UNLESS NOTED OTHERWISE ON THE DRAWINGS. PATCHING SHALL MATCH OR EXCEED THE CONDITION OF ADJACENT EXISTING WORK.

2. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DRILLING FOR ANCHORS AND/OR SUPPORTS REQUIRED FOR PIPING, DUCTWORK OR OTHER MECHANICAL WORK.

3. ALL HOLES CUT OR DRILLED THROUGH FLOOR OR FIRE RATED WALLS SHALL BE CAULKED AND PROTECTED TO MEET THE REQUIREMENTS OF ALL LOCAL AND STATE CODES AND REGULATIONS.

4. ALL HOLES SHALL BE CUT OR DRILLED. JACK-HAMMERING, HAMMER DRILLING, AND SO FORTH SHALL NOT BE PERMITTED.

H. ANY DAMAGE THAT RESULTS SHALL BE REPAIRED OR REPLACED TO THE SATISFACTION OF THE ENGINEER AND OWNER.

3.02 TESTING, ADJUSTING, AND BALANCING

A. THIS CONTRACTOR SHALL CLEAN, TEST, ADJUST, AND PUT IN SERVICE ALL SYSTEMS AND MAKE ALL ADJUSTMENTS AS REQUIRED TO MAKE THEM OPERATE AS SPECIFIED. ALL MECHANICAL EQUIPMENT SPECIFIED HEREIN SHALL BE PUT IN OPERATION IN THE PRESENCE OF THE OWNER. PROVIDE ALL NECESSARY AND MAINTENANCE INSTRUCTIONS TO THE OWNER.

B. A BALANCING CONTRACTOR SHALL BALANCE THE WATER SYSTEMS TO THE QUANTITIES SHOWN ON THE PLANS TO WITHIN 10% OF THE SCHEDULED OR INDICATED QUANTITIES. A SYSTEM BALANCE REPORT SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW.

3.03 GUARANTEE

A. ALL MECHANICAL WORK SHALL BE GUARANTEED FOR ONE YEAR BEGINNING ON THE DATE OF FINAL ACCEPTANCE OF THIS PROJECT BY THE OWNER.

3.04 MAINTENANCE AND PART CATALOGS

A. THE CONTRACTOR SHALL PROVIDE TWO BOUND COPIES OF ALL MAINTENANCE AND PARTS CATALOG INFORMATION FOR THE EQUIPMENT INSTALLED UNDER THIS PROJECT.

3.05 CLEANING

A. CLEAN ALL EXPOSED MECHANICAL WORK AND REMOVE ALL UNNECESSARY LABELS, SOIL, MARKINGS AND FOREIGN MATERIALS. DO NOT REMOVE LABELS REQUIRED BY THE SPECIFICATIONS, LAWS, REGULATIONS AND CODES (E.G., UL LABELS) OR SPECIAL LABELS WARNING OF HAZARDS, DENOTING SPECIAL OPERATING AND MAINTENANCE PROCEDURES OR LABELS WITH IMPORTANT OR MEANINGFUL MESSAGES, DIRECTIONS OR WARNINGS.

B. CONTRACTOR SHALL REMOVE ALL DEBRIS RELATIVE TO HIS/HER TRADE AT THE END OF EACH WORK DAY AND PRACTICE GOOD HOUSEKEEPING.

C. THE IMMEDIATE CONSTRUCTION AREA IS TO BE LEFT CLEAR OF ALL DIRT, DUST AND DEBRIS.

RFS engineering

Rist Frost Shumway Engineering, P.C.
71 Water St
Laconia, NH 03246
P: 603.524.4647
F: 603.528.7653
www.rfsengineering.com



# HEATING SYSTEM REPLACEMENT

# SAU #30

## Laconia, New Hampshire

Consultants

## CONSTRUCTION DOCUMENTS

Date: June 8, 2015

Key Plan

Revisions

| Rev. | Issued | Date |
|---|---|---|
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Title

MECHANICAL SPECIFICATIONS

| | |
|---|---|
| Project No. | 7841.001 |
| Drawn By | M. CILLEY |
| Checked By | T. LEMPKA |
| Project Mgr. | C. MONTEROSE |
| File Name | 7841M1.0 |
| Date | 08 JUNE, 2015 |
| Scale | NO SCALE |

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