

HDC

ADMINISTRATIVE APPROVALS

August 11, 2021

- | | | |
|----|----------------------|------------------------|
| 1. | 37 Whidden Street | - Recommended Approval |
| 2. | 202 Court Street | - TBD |
| 3. | 40 Howard Street | - Recommended Approval |
| 4. | 111 Maplewood Avenue | - TBD |

1. 37 Whidden Street - Recommended Approval

Background: The applicant is seeking approval for the removal of rotted tongue and groove wood around the rear of the house/cold storage area and replace with a composite tongue and groove material.

Staff Comment: Recommended Approval

Stipulations:

1. _____
2. _____
3. _____

**LUHD-373**

Historic District Commission Work Session or Administrative Approval Application

Status: Active**Date Created:** Aug 2, 2021**Applicant**

Alison Zaeder
azaeder@gmail.com
37 Whidden Street
Portsmouth, NH 03801
609-571-7378

Location

37 WHIDDEN ST
Portsmouth, NH 03801

Owner:

GREEN JOHN F & ZAEDER ALISON L
37 WHIDDEN STREET PORTSMOUTH, NH 03801

Application Type**Please select application type from the drop down menu below**

Administrative Approval

Alternative Project Address

--

Project Information**Brief Description of Proposed Work**

Remove rotten tongue and groove wood underneath deck/cold storage and replace with composite tongue and groove to avoid future rot

Description of Proposed Work (Planning Staff)

--

Project Representatives**Relationship to Project**

Owner

If you selected "Other", please state relationship to project.

--

Full Name (First and Last)

Alison Zaeder

Business Name (if applicable)

--

Mailing Address (Street)

37 Whidden Street

City/Town

Portsmouth

State

NH

Zip Code

03801

Phone

--

Email Address

--

Acknowledgement**I certify that the information given is true and correct to the best of my knowledge.****By checking this box, I agree that this is equivalent to a handwritten signature and is binding for all purposes related to this transaction****I hereby certify that as the applicant for permit, I am**

Owner of this property

37 Whidden Street
Portsmouth, NH 03801

Project Proposal

Significant rot has made it necessary to replace the rotten wood and install new boards at the rear of my home to keep out rain, rodents and prevent future rot. This area leads is below the deck and enters into a cold storage area.

Project: To remove all rotten tongue and groove boards enclosing the cold storage area at the rear of the home. Replace all boards with composite tongue and groove lumber.

Enclosed in file for this proposal:

Proposal

Drawing with dimensions

Photos of back of home and rotten wood

Thank you

Alison Zaeder

Alison Zaeder

Homeowner

azaeder@gmail.com

609-571-7378







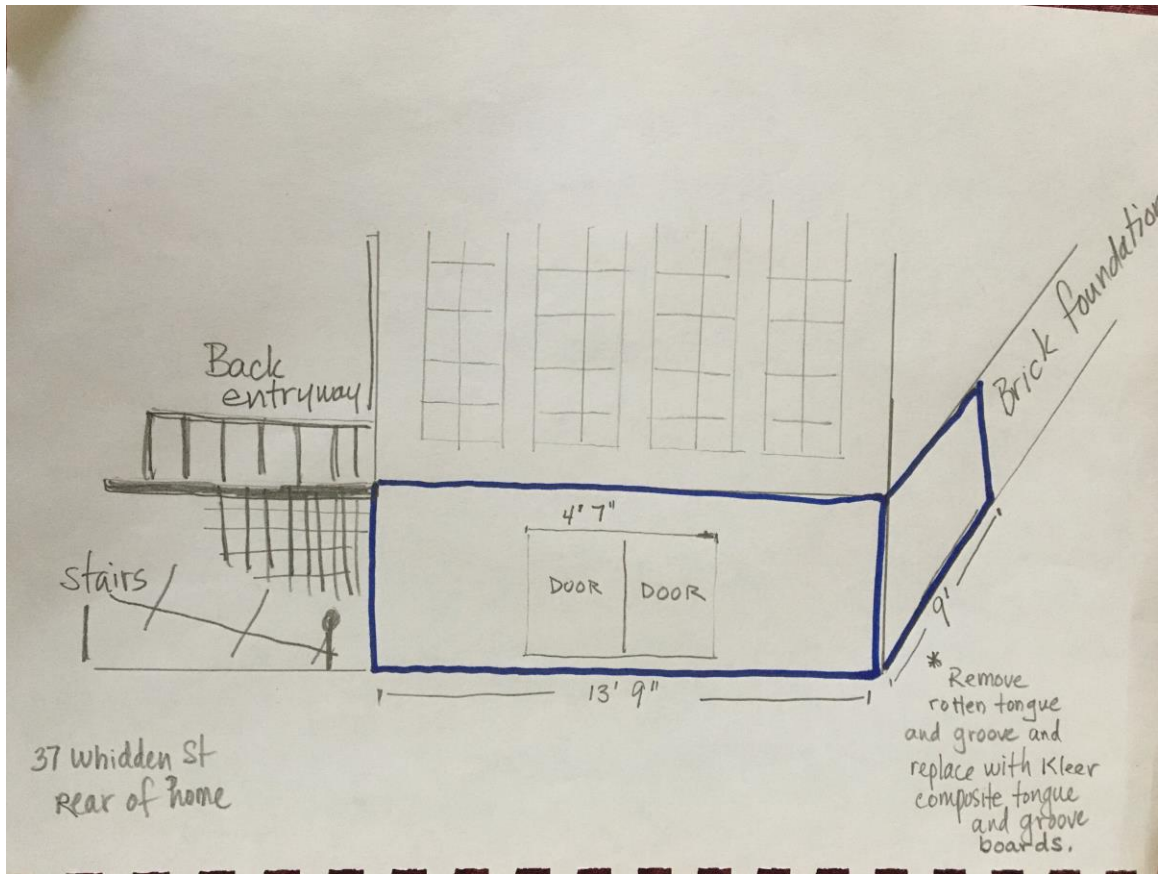












2. 202 Court Street - TBD

Background: The applicant is seeking approval for changes to a previously approved design.

Staff Comment: TBD

Stipulations:

1. _____
2. _____
3. _____

**LUHD-374**

Historic District Commission Work Session or Administrative Approval Application

Status: Active**Date Created:** Aug 5, 2021**Applicant**

Matt Silva
matt@profilehomesnh.com
31 County Farm Rd
Dover, NH 03820
603-765-6648

Location

202 COURT ST
Portsmouth, NH 03801

Owner:

Matthew Silva Silva
ONE MIDDLE ST SUITE 4 PORTSMOUTH, NH 03801

Application Type**Please select application type from the drop down menu below**

Administrative Approval

Alternative Project Address

--

Project Information**Brief Description of Proposed Work**

Revision to planned selective demolition due to code compliance and structural defects found upon demolition

Description of Proposed Work (Planning Staff)

--

Acknowledgement**I certify that the information given is true and correct to the best of my knowledge.****By checking this box, I agree that this is equivalent to a handwritten signature and is binding for all purposes related to this transaction****I hereby certify that as the applicant for permit, I am**

Owner of this property

If you selected "Other" above, please explain your relationship to this project. Owner authorization is required.

--

INTERNAL USE ONLY -- Historic District Commission Review and Approval**HDC Certificate of Approval Granted****HDC Approval Date**

--

Planning Staff Comments

--

INTERNAL USE ONLY -- Letter of Decision Information**Owner Addressee Full Name and Title**

--

Owner Addressee Prefix and Last Name

--

Owner Organization / Business Name**Owner Contact Street Address**

Date: 8/4/21

**Profile Homes NH
953 Islington St, Unit 22C
Portsmouth, NH 03801
603-433-2464**

City of Portsmouth Historical District Commission

RE: 202 Court St Request for Administrative approval

Dear Members of the Historical District Commission,

Please see the attached request for administrative approval dated 8/4/21.

In response to an onsite meeting with Building Inspector Garand, Land Use Compliance Agent Hayes, and Planner Cracknell we are presenting you with the findings of the structure that has been approved through the HDC for construction previously.

Upon selective demolition of this building and working with building code and engineering we have discovered the need to selectively demolish and rebuild in exact size, scope and scale, areas of the building that are damaged, rotted or not on a proper foundation.

As these photos show and the building has areas of sever rot, a previous fire, and an original structure of the back portion of the building has multiple areas that are not on an adequate foundation. In order to pass the required building code we need to have a transparent discussion in order to remove and replace these areas noted in the engineers report and suggested by the inspector.

It is still out intention to rebuild the structure with the character of the renovation we aimed to achieved originally. We will be reusing materials from the building which will be replaced and reinstalled to meet the intention of telling the appealing story of this historic building though doing so in a manner that remains code compliant and maintains the welfare and best building practices available to the structure.

We appreciate the opportunity for discussion related to this property so we may comfortably continue construction and rebuilding.

Thank you,

Matt Silva
Profile Homes of NH

Attached is the description for these documents which relative to the exterior improvements which include:

- New Windows
- Solar Panels
- New siding/trim
- New Garage Doors
- Railings of the building
- New Front Façade
- Fencing for shielding of the utilities and disposal areas

Introduction:

The property is located in the CD4-L1 zoning district within downtown. It is commonly known as the Wright Baker Auto Garage for the last 90 years, but for many others, the original Portsmouth Fire station prior to the current Portsmouth fire station built in 1920.

The proposed improvements to the site consist of converting the building from an existing auto mechanic garage with approved residential living above and into a 3 family condominium. Upon complete review of the plans in order to work within the restrictions of the variance relief we have received we are working to begin construction with improvement to revive the history of this structure.

SPECIFICATIONS:

Windows: The existing windows of the structure have been damaged or left without repair. While original to the building these windows do not appear to hold a significant amount of character to the

details of the building. The tradition aspects of wavy glass seen from this time period are not available for these.

With the advice of the board our company has elected to purchase Green Mountain Windows for there historical character aspects and details throughout the building and rebuild the windows with full size trim and sils as seen in the original time period of the building

Solar Panels: Our company has a long standing history of energy efficient improvements to historical and new construction buildings. In the method of the energy efficiency improvements to the air sealing and added insulation to the building we are seeking to allow owners of the building the rights to install solar panels on the southern side of the building. All panels will be a “full black Panel” with not aluminum edging shown.

Siding: The original wood siding of the building has been covered over with a aluminum siding which is in complete disrepair. We have elected to strip all layers of siding off the building. Installed a weather air barrier (WRB) against new sheathing of the building. Provide an added layer of exterior insulation and install new wood Clapboards to be painted on the structure. Trim details will be done in wood to match the existing or original on the structure and from the historical photo's made available.

Garage Doors: The existing garage doors will be replaced with new garage doors similar to the fire station located next door. Above the doors we will locate the names of the previous fire equipment on the front of the building and above the rear unit garage doors. These include The Kearsarge, The Sampson and The Dearborn.

Lighting on the exterior of the building will be located above these doors and traditional to the age of the structure.

Front Façade and Shielding:

We will be removing the brick façade on the building now and re establishing the original look of the building with a enhanced corner board

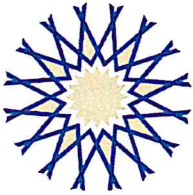
The utility Shielding will be natural wood custom fencing

Metal Railings will be a standard all black posts and top rail.

Please note all photo's attached for representation and discussion

Thank you,

Matt Silva
Profile Homes



ATTAR

ENGINEERING, INC

CIVIL ♦ STRUCTURAL ♦ MARINE

Profile Homes
Matt Silva
371A Islington Street
Portsmouth, NH 03801

August 4, 2021
Project No. C016-21

Email: matt@profilehomesnh.com

RE: Foundation Observation
202 Court Street
Portsmouth, NH 03801

Dear Mr. Silva:

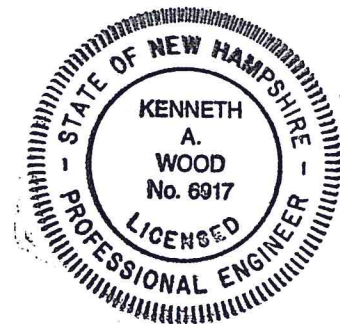
As requested, yesterday afternoon I visited the referenced site to observe the conditions of the existing foundation.

The foundation consists of a variety of construction methods; cast-in-place concrete, brick and mortar and laid up rock and rubble stone. My main observations were concentrated on the rear of the building. A non-reinforced CMU wall had previously been constructed above the existing slab; this wall had failed during construction and was removed. It appears that the existing foundation walls in this area were also constructed on top of the slab – all the areas are deteriorated and do not meet any current building codes (*International Building Code - IBC*) requirements. The concrete is loose, crumbling and spalling and cannot be constructed on. The rock-rubble foundation wall is in a similar condition and should be removed prior to any additional construction in this area. Both of these areas will require a new foundation to support the design loads.

Representative photographs and a sketch of the subject areas are attached; please contact me for any additional information required.

Sincerely;

Kenneth A. Wood, P.E.
President





202 COURT STREET – EXISTING CONCRETE FOUNDATION



202 COURT STREET – EXISTING ROCK-RUBBLE FOUNDATION



PROFILE
HOMES
A LITTLE MODERN LIVING

FIREHOUSE CONDOS

ISSUED FOR DESIGN #1
MARCH 11, 2019
ISSUED FOR DESIGN #2
APRIL 18, 2019
ISSUED FOR DESIGN #3
MAY 15, 2019
ISSUED FOR DESIGN #4
MAY 28, 2019
ISSUED FOR STRUC. REVIEW
MARCH 26, 2020
ISSUED FOR STRUC. REVIEW #2
MAY 5, 2020
ISSUED FOR CONSTRUCTION
MAY 18, 2020

GENERAL NOTES:

1. All dimensions are in feet and inches, unless otherwise noted.
2. All work shall be in accordance with the latest edition of the International Building Code (IBC) and the International Residential Code (IRC).
3. All materials shall be of good quality and shall be installed in accordance with the manufacturer's instructions.
4. All work shall be completed in a timely manner and shall not cause any damage to the existing structure or other property.
5. All work shall be completed in a safe manner and shall not create any safety hazards.
6. All work shall be completed in a clean manner and shall not create any mess or debris.
7. All work shall be completed in a professional manner and shall reflect well on the contractor.

COPYRIGHT NOTE:

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REGISTRATION:



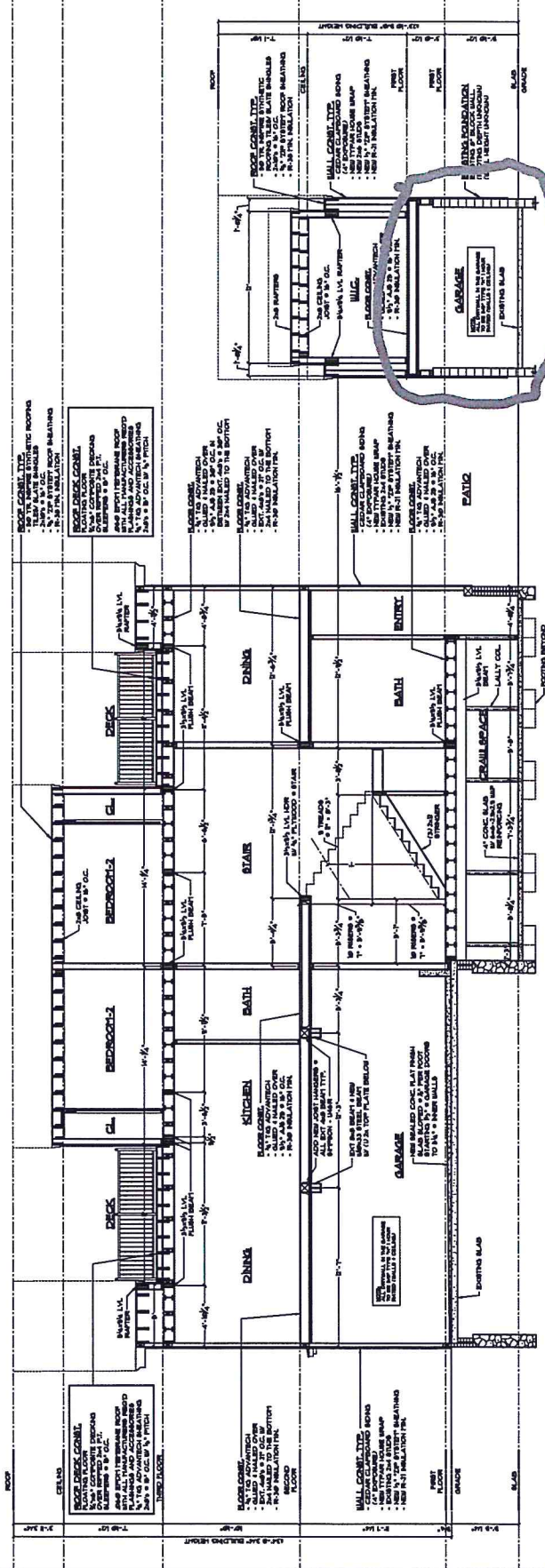
BUILDING SECTIONS & NOTES

DATE	5/18/2020
DESIGNED BY	DAVID L. COOK
CHECKED BY	JOHN J. SMITH
SCALE	AS SHOWN

A-3.5

DRAWING SCALE: 1/4" = 1'-0"

1 BUILDING SECTION





**FIREHOUSE
CONDOS**

ISSUED DATES & REVISIONS

ISSUED FOR DESIGN #1	MARCH 13, 2019
ISSUED FOR DESIGN #2	MARCH 20, 2019
ISSUED FOR DESIGN #3	APRIL 10, 2019
ISSUED FOR DESIGN #4	APRIL 25, 2019
ISSUED FOR STRUC. REVIEW	MAY 9, 2019
ISSUED FOR STRUC. REVIEW #2	MARCH 28, 2020
ISSUED FOR CONSTRUCTION	MAY 5, 2020
	MAY 19, 2020

GENERAL NOTES:

1. The first group of respondents, consisting of 100 individuals, was selected from a random sample of the general population. This group was used to determine the overall distribution of responses for each item on the scale. The second group, consisting of 100 individuals, was selected from a random sample of the general population. This group was used to determine the overall distribution of responses for each item on the scale. The third group, consisting of 100 individuals, was selected from a random sample of the general population. This group was used to determine the overall distribution of responses for each item on the scale.

COPYRIGHT NOTICE:

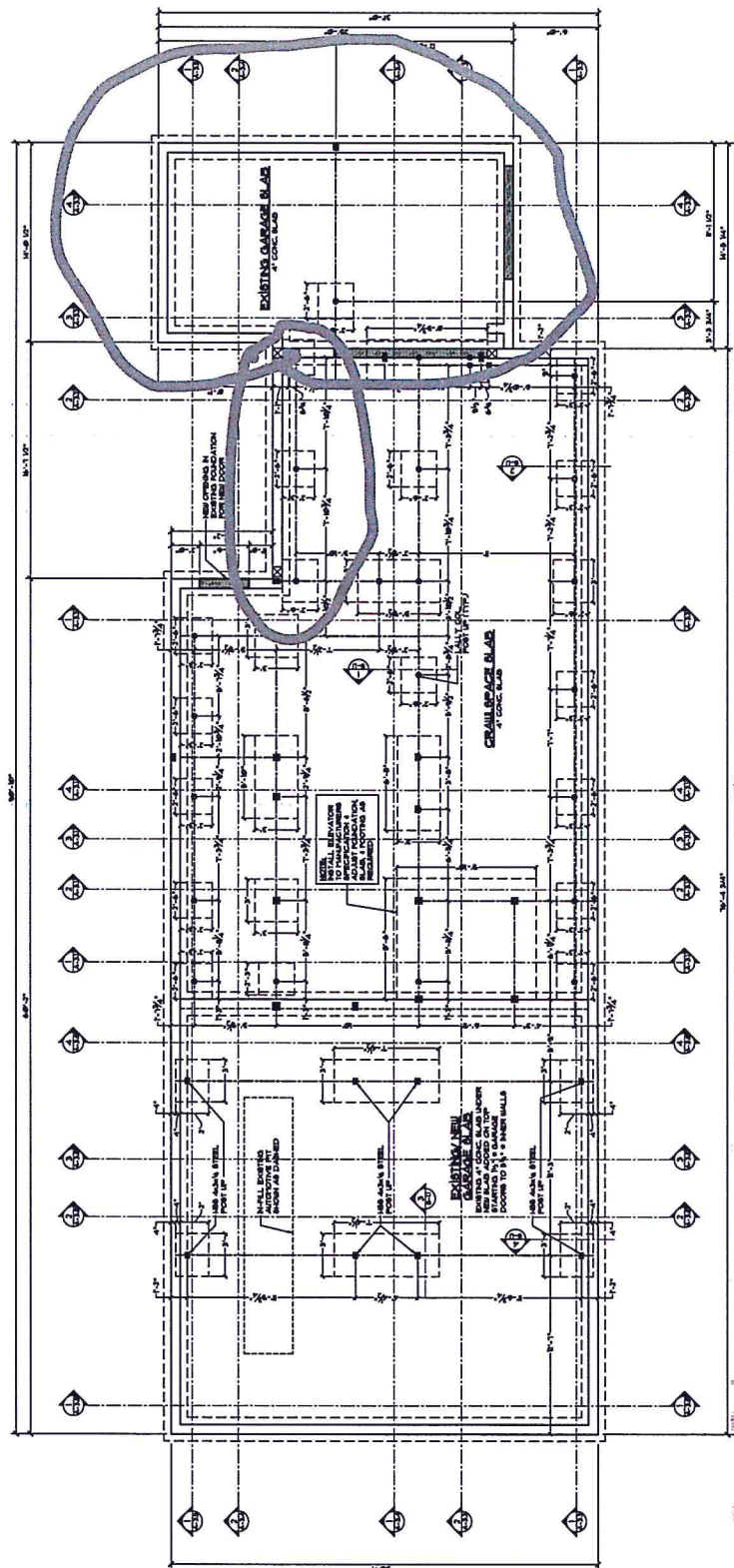
REGISTRATION:



FOUNDATION
PLAN
& DETAILS

ISSUE DATE:	5/18/2020
DRAWN BY:	Jeremy Shoff
CHECKED BY:	Matt Silva
SCALE:	As Noted

S-1.0

DRAWING SCALE: $1/4" = 1'-0"$

① FOUNDATION PLAN



PREVIOUS FIRE DAMAGE



INTERIOR VIEW

A photograph of a concrete foundation wall. The wall is made of large, rectangular concrete blocks with visible mortar joints. A prominent vertical crack runs down the center of the wall, starting from the top and extending nearly to the bottom. Several smaller, horizontal and diagonal cracks are also visible across the surface. The text "SPLIT FOUNDATION" is overlaid in red, bold, capital letters in the center-right portion of the image. At the bottom of the wall, there is a dark, mulched area with some small green plants growing from it.

SPLIT FOUNDATION



REAR ROTTED STRUCTURE

3. 40 Howard Street - Recommended Approval

Background: The applicant is seeking approval for modifications to a previously approved landscape design.

Staff Comment: Recommended Approval

Stipulations:

1. _____
2. _____
3. _____

**LUHD-127**

Historic District Commission Work Session or Administrative Approval Application

Status: Complete**Date Created:** Mar 13, 2020**Applicant**

Kenneth Sullivan
kensullivan72@gmail.com
40 Howard St
Portsmouth, NH 03801
617-733-0471

Location

40 HOWARD ST
Portsmouth, NH 03801

Owner:

SULLIVAN KENNETH CHARLES
40 Howard St 40 HOWARD ST PORTSMOUTH, NH 3801

Application Type**Please select application type from the drop down menu below**

Administrative Approval

Project Information**Brief Description of Proposed Work**

Lower existing grade of driveway for safety and ease of use. Construct 27 inch, back mortared, colonial era-like stone retaining wall with granite wall cap at top of driveway, along and in front of existing wooden fence. Construct granite steps from existing back yard gate landing to the excavated driveway. Replace existing cobblestone driveway surface with brick pavers. Add three flower boxes and four dark sky lighting fixtures onto the existing fence above the proposed stone wall. The proposed stone wall, granite steps, brick pavers, flower boxes and dark sky light fixtures shall closely match those already existing in the back yard, and approved by the HDC, previously.

Description of Proposed Work (Planning Staff)

several landscape-related features to the side and rear yards of the property (stone retaining wall, granite steps, add flower boxes and dark sky lighting fixtures)

Acknowledgement**I certify that the information given is true and correct to the best of my knowledge.****By checking this box, I agree that this is equivalent to a handwritten signature and is binding for all purposes related to this transaction****I hereby certify that as the applicant for permit, I am**

Owner of this property

If you selected "Other" above, please explain your relationship to this project. Owner authorization is required.

--

INTERNAL USE ONLY -- Historic District Commission Review and Approval**HDC Certificate of Approval Granted****HDC Approval Date**

--

Planning Staff Comments

--

INTERNAL USE ONLY -- Letter of Decision Information**Owner Addressee Full Name and Title**

--

Owner Addressee Prefix and Last Name

Mr. Sullivan

Kenneth Sullivan
40 Howard Street
Portsmouth, NH 03801
617-733-0471
Kensullivan72@gmail.com

Vince Lombardi, Chair
Historic District Commission
1 Junkins Ave.
Portsmouth, NH 03801

April 7, 2020

**RE: ADDENDUM to March 13, 2020 Request for HDC administrative approval of
modifications to driveway area at 40 Howard Street**

Dear Chairman Lombardi,

This is an addendum to my March 13, 2020 filing for HDC administrative approval for proposed changes to the driveway area at my 40 Howard Street home. The purpose of the addendum is to provide more detail through an additional sketched driveway plan (here at **Tab-9**), which includes some revision to the specifications for the proposed granite steps.

In summary, I seek approval to install four things in the driveway area, each of which is consistent with those already approved by the HDC for my back yard. They are:

1. a stone retaining wall;
2. a set of granite steps;
3. four dark sky light fixtures to be located on the existing fence at the top of the driveway. The fixtures will replace the single, stark floodlight on the side of my house that lights the driveway; and
4. three wooden flower boxes to be located on the fence between the proposed dark sky lights.

At **Tab-10**, I include here a wide shot of my back yard. The photo includes a similar stone retaining wall, granite steps, flower boxes, dark sky lights, and raised flower bed, all previously installed with HDC approval.

As part of the plan, the existing cobble stones in the driveway will be replaced by the same brick pavers installed in the back yard, and the driveway grade will be reduced to a pitch more consistent with driveways on my street. There will be no changes to the house itself.

Sincerely,



Kenneth C. Sullivan

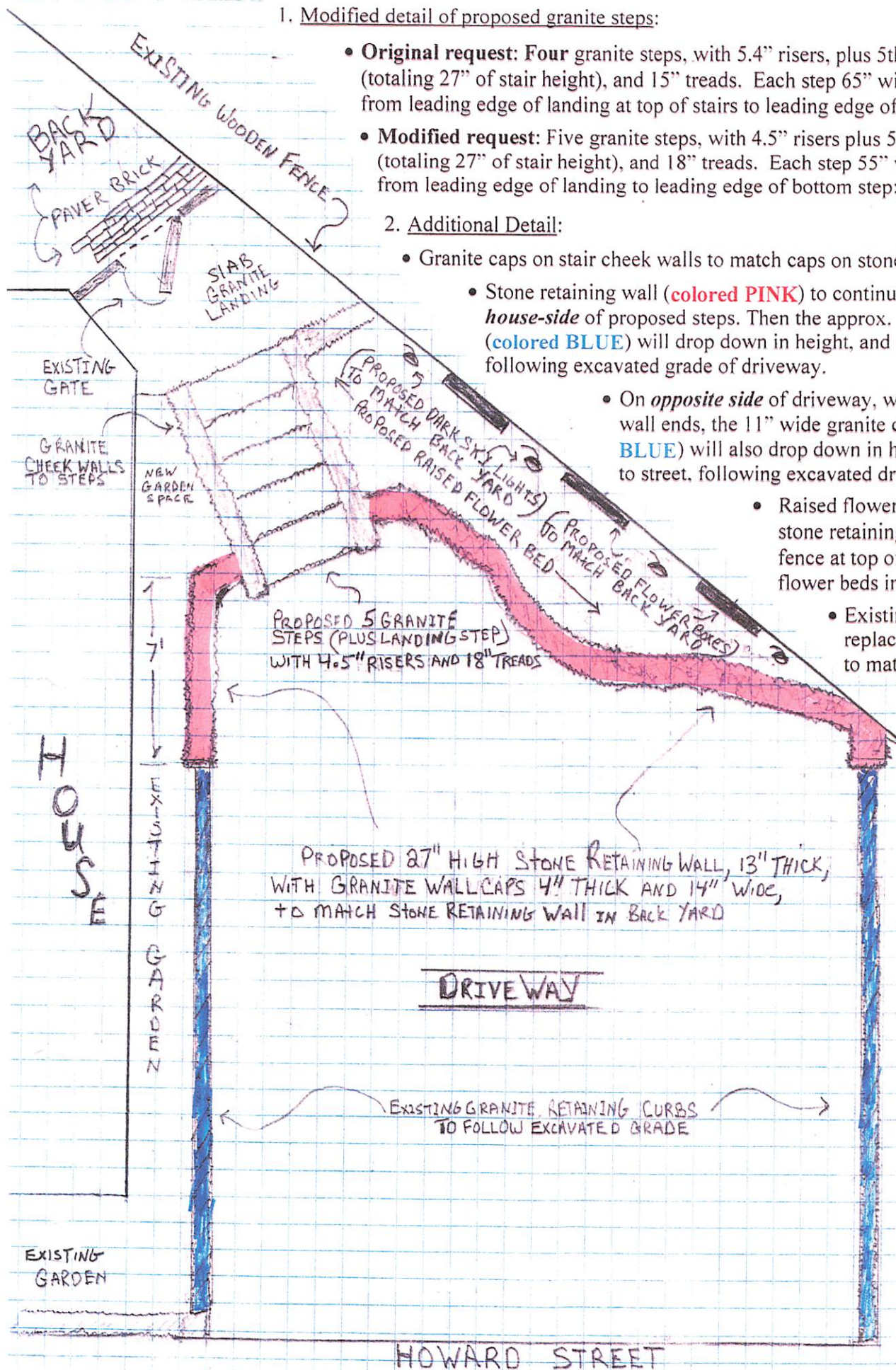
TAB-9 .

1. Modified detail of proposed granite steps:

- **Original request:** Four granite steps, with 5.4" risers, plus 5th riser to landing (totaling 27" of stair height), and 15" treads. Each step 65" wide. Total distance from leading edge of landing at top of stairs to leading edge of bottom step: 60"
- **Modified request:** Five granite steps, with 4.5" risers plus 5th riser to landing (totaling 27" of stair height), and 18" treads. Each step 55" wide. Total distance from leading edge of landing to leading edge of bottom step: 90"

2. Additional Detail:

- Granite caps on stair cheek walls to match caps on stone retaining wall.
- Stone retaining wall (**colored PINK**) to continue for about 7' off house-side of proposed steps. Then the approx. 11" wide curb (**colored BLUE**) will drop down in height, and continue to street, following excavated grade of driveway.
- On *opposite side* of driveway, where stone retaining wall ends, the 11" wide granite curb (**colored BLUE**) will also drop down in height, and continue to street, following excavated driveway grade.
- Raised flower bed to be between stone retaining wall and existing fence at top of driveway, like flower beds in back yard.
- Existing cobblestones replaced by brick pavers to match backyard.



TAB-10



4. 111 Maplewood Avenue - TBD

Background: The applicant is seeking approval for mechanical equipment on the roof (that is already installed).

Staff Comment: TBD

Stipulations:

1. _____
2. _____
3. _____









DOWLING CORP

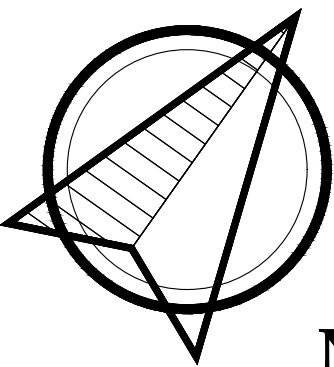
363 EXETER RD
HAMPTON, NH 03842



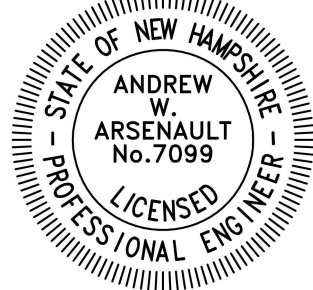
THE PROJECT MANAGER FOR THIS PROJECT IS NOTED BELOW. PLEASE REFER ALL QUESTIONS, SUBMITTALS AND CORRESPONDENCE TO THE PROJECT MANAGER.

HVAC PROJECT MANAGER:

MATHILDE KREBS
SOUTH BERWICK, MAINE
PHONE: (207)-475-2451
EMAIL: MATHILDEK@DESIGNDAY1MECH.COM



NORTH



STAMP

NEDA

111 MAPLEWOOD AVE.
PORTSMOUTH, NH

REVISIONS

#	Date	Description

PERMIT SET

DDMI Project Number:	21038
Scale:	1/4" = 1'-0"
Designed By:	MBK
Drawn By:	SMF
Checked By:	AWA
Date:	04/20/2021

DUCTWORK DEMOLITION
PLAN

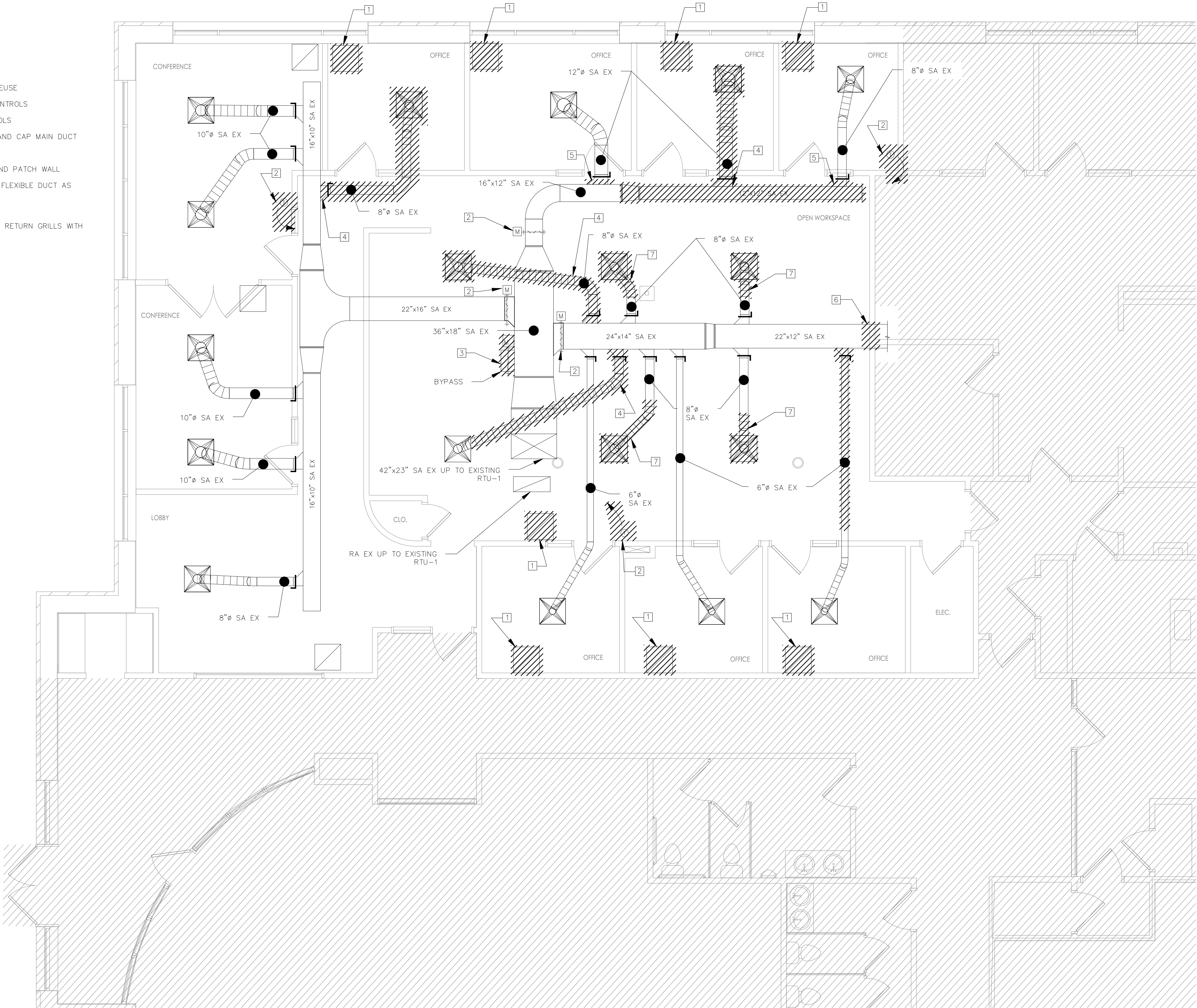
H1.0

DEMOLITION KEYNOTES:

- 1 REMOVE PLENUM RETURN GRILLE, KEEP ONE FOR REUSE
- 2 REMOVE MOTORIZED DAMPERS AND ASSOCIATED CONTROLS
- 3 REMOVE BYPASS DAMPER AND ASSOCIATED CONTROLS
- 4 REMOVE BRANCH AS INDICATED ON THE DRAWING AND CAP MAIN DUCT
- 5 REMOVE BOOT ONLY AND CAP MAIN DUCT
- 6 REMOVE PORTION OF DUCT, CAP ON BOTH ENDS AND PATCH WALL
- 7 RELOCATE AS SHOWN ON DWG H2.0 AND REPLACE FLEXIBLE DUCT AS NEEDED

DEMOLITION GENERAL NOTES:

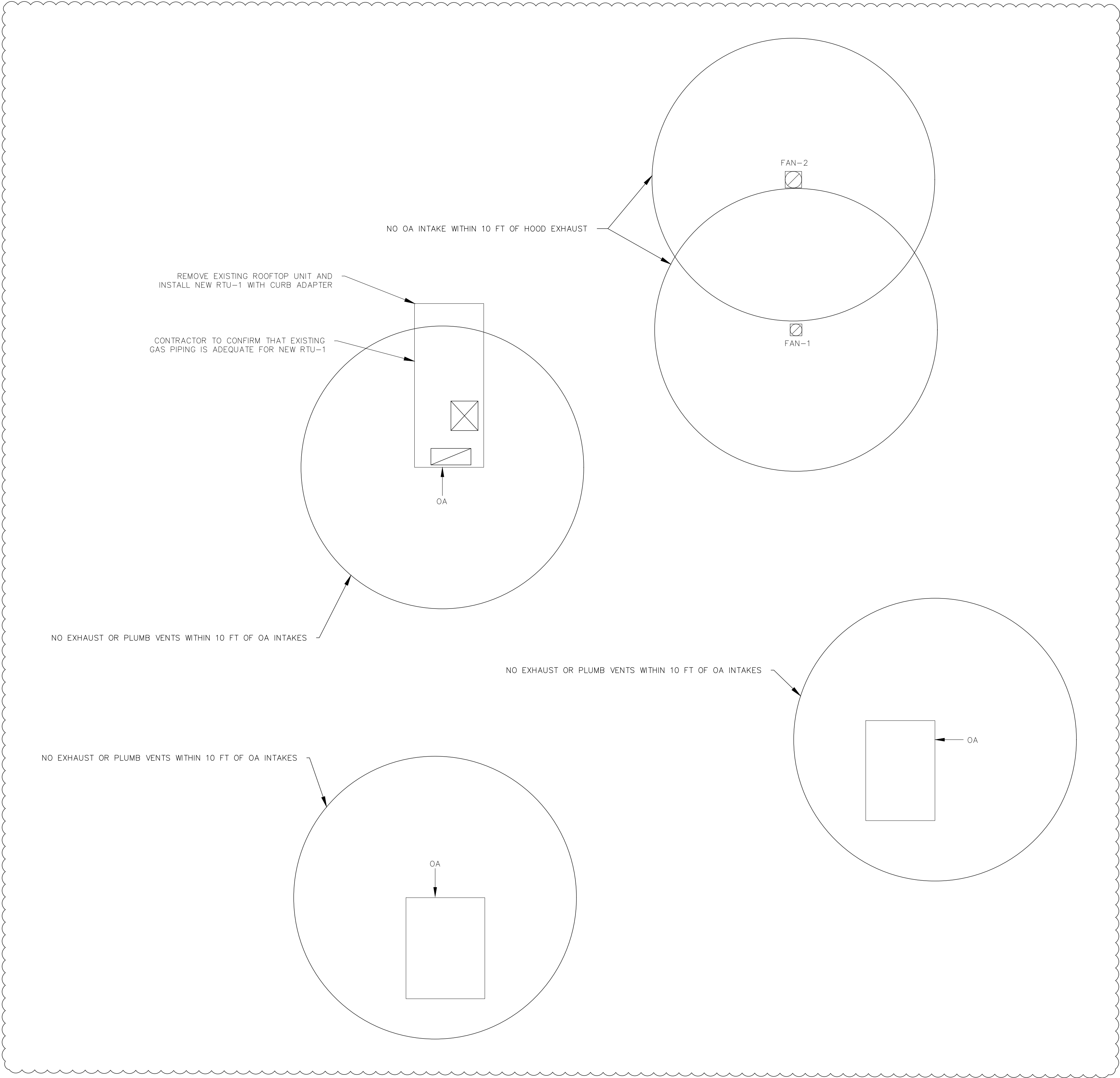
1. COORDINATE WITH ARCHITECT TO REPLACE REMOVED RETURN GRILLS WITH NEW CEILING TILES



1
H1.0 DUCTWORK DEMOLITION PLAN
1/4" = 1'-0"

NEW ROOF WORK GENERAL NOTES:

- PER IMC 501.3:
- A. FAN-1 & FAN-2 SHALL NOT BE DIRECTED ONTO WALKWAYS OR CAUSE PUBLIC NUISANCE
 - B. FAN-1 OUTLET SHALL BE AT LEAST 30' FROM PROPERTY LINES, 10' FROM OPERABLE OPENING INTO BUILDING (INCLUDING RTU OA INTAKES), 30' FROM COMBUSTIBLE WALLS AND OPERABLE OPENINGS INTO THE BUILDING THAT ARE IN THE DIRECTION OF THE DISCHARGE (WINDS ARE PREDOMINATELY EAST-WEST), 6' FROM EXTERIOR WALLS AND ROOFS AND 10' ABOVE ADJOINING GRADE
 - C. FAN-2 OUTLET SHALL BE AT LEAST 10' FROM PROPERTY LINES, 10' FROM OPERABLE OPENINGS INTO BUILDING, 3' FROM EXTERIOR WALLS AND ROOFS AND 10' ABOVE ADJOINING GRADE



1
H2.1

ROOF PLAN

1/4"=1'-0"

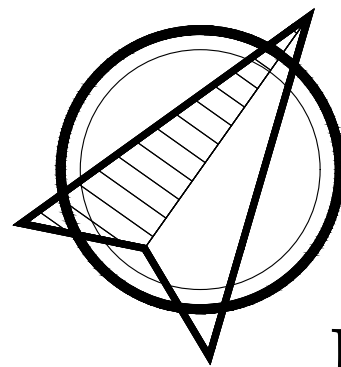
DOWLING CORP

363 EXETER RD
HAMPTON, NH 03842

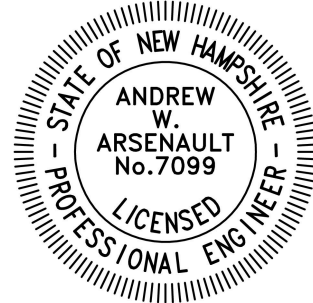


THE PROJECT MANAGER FOR THIS PROJECT IS NOTED BELOW. PLEASE REFER ALL QUESTIONS, SUBMITTALS AND CORRESPONDENCE TO THE PROJECT MANAGER.

HVAC PROJECT MANAGER:
MATHILDE KREBS
SOUTH BERWICK, MAINE
PHONE: (207)-475-2451
EMAIL: MATHILDEK@DESIGNDAYMECH.COM



NORTH



STAMP

NEDA

111 MAPLEWOOD AVE.
PORTSMOUTH, NH

REVISIONS

#	Date	Description
1	5/6/2021	OA / EA CLEARANCE

PERMIT SET

DDMI Project Number:	21038
Scale:	1/4" = 1'-0"
Designed By:	MBK
Drawn By:	SMF
Checked By:	AWA
Date:	05/06/2021

ROOF PLAN

H2.1

DOWLING CORP

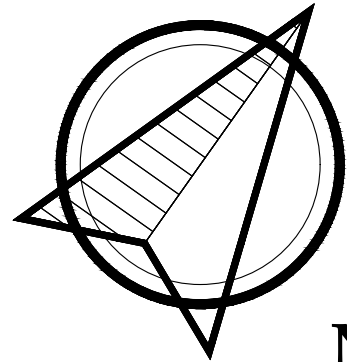
363 EXETER RD
HAMPTON, NH 03842



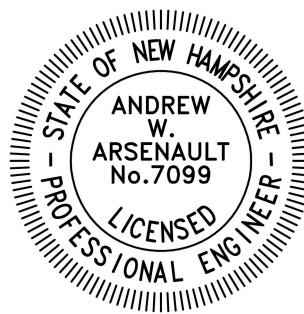
THE PROJECT MANAGER FOR THIS PROJECT IS NOTED BELOW. PLEASE REFER ALL QUESTIONS, SUBMITTALS AND CORRESPONDENCE TO THE PROJECT MANAGER.

HVAC PROJECT MANAGER:

MATHILDE KREBS
SOUTH BERWICK, MAINE
PHONE: (207)-475-2451
EMAIL: MATHILDEK@DESIGNDAYMECH.COM



NORTH



STAMP

NEDA

111 MAPLEWOOD AVE.
PORTSMOUTH, NH

REVISIONS

#	Date	Description

PERMIT SET

DDMI Project Number:	21038
Scale:	1/4" = 1'-0"
Designed By:	MBK
Drawn By:	SMF
Checked By:	AWA
Date:	04/20/2021

NEW DUCTWORK PLAN

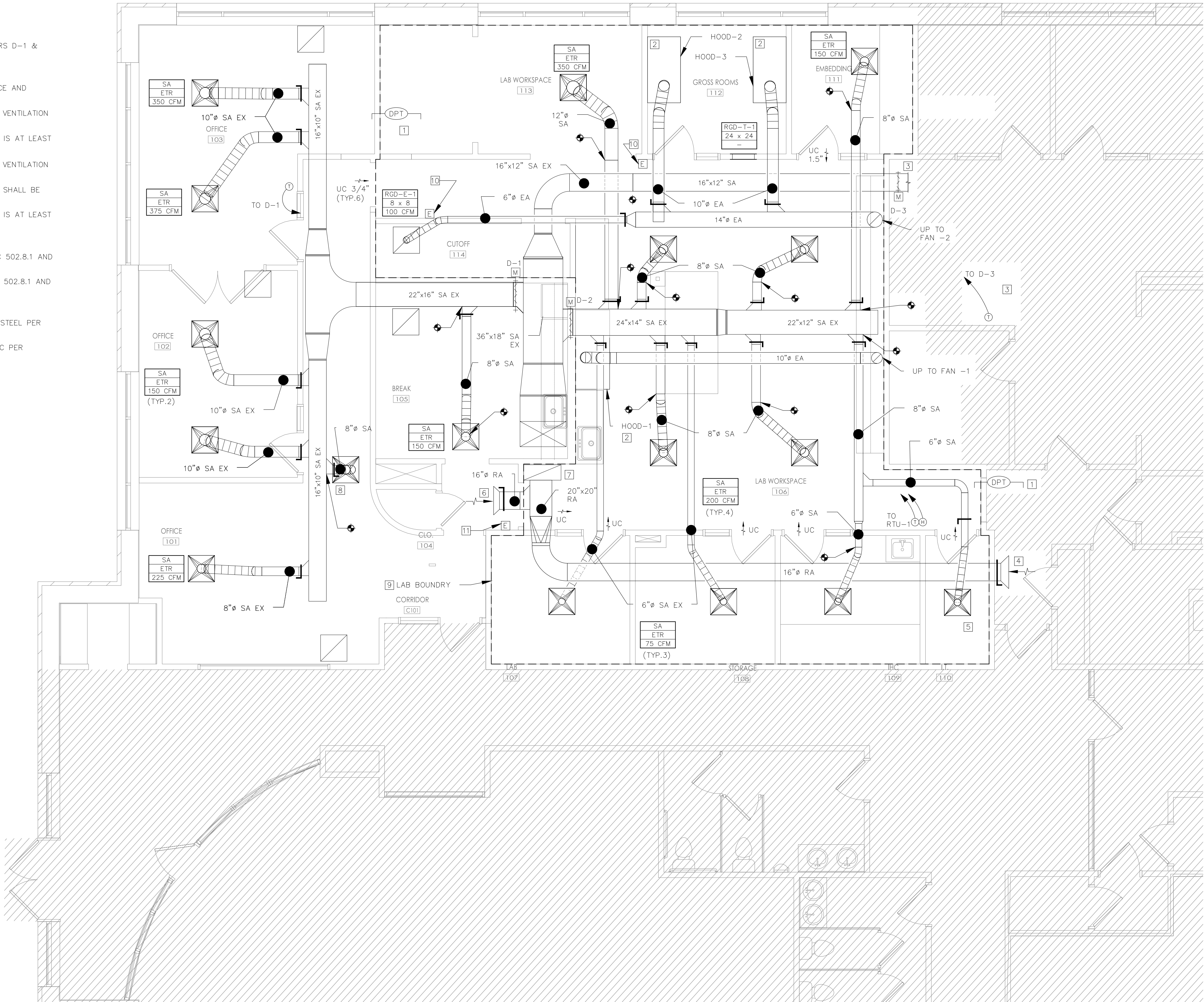
H2.0

NEW WORK KEYNOTES:

- 1 DIFFERENTIAL PRESSURE TRANSDUCER ACROSS THE LAB BOUNDARY CONTROL DAMPERS D-1 & D-3 TO MAINTAIN A MINIMUM -0.02" W.C. IN THE LAB
- 2 DUCT CONNECTIONS TO COVER ALL EXHAUST OPENINGS ON HOODS
- 3 HVAC CONTRACTOR IS RESPONSIBLE FOR RECONFIGURING DUCTWORK IN TENANT SPACE AND LOCATE THERMOSTAT. DDMI DID NOT DESIGN TENANT SPACE.
- 4 INSTALL IN PLENUM 26" DIAMETER BELL MOUTH WITH WIRE MESH AND BALANCE PER VENTILATION CALCULATIONS ON DWG H3.0
- 5 REUSE, EXISTING DIFFUSER THAT HAD BEEN REMOVED FROM OTHER SPACE AND THAT IS AT LEAST 6"x 6". BALANCE TO 75 CFM
- 6 INSTALL IN PLENUM .30" DIAMETER BELL MOUTH WITH WIRE MESH AND BALANCE PER VENTILATION CALCULATIONS ON DWG H3.0
- 7 ALL NEW AND EXISTING SUPPLY AND RETURN DUCTWORK INSIDE THE LAB BOUNDARY SHALL BE SEALED TO SMACNA SEAL CLASS A
- 8 REUSE EXISTING DIFFUSER THAT HAD BEEN REMOVED FROM OTHER SPACE AND THAT IS AT LEAST 9"x 9". BALANCE TO 200 CFM
- 9 LAB BOUNDARY WALLS EXTEND TO THE DECK AND MUST BE MADE AIRTIGHT
- 10 MANUAL EMERGENCY SHUTOFF OF FAN-2 WITH AUDIBLE AND VISIBLE ALARM PER IMC 502.8.1 AND NFPA 30
- 11 MANUAL EMERGENCY SHUTOFF OF FAN-1 WITH AUDIBLE AND VISIBLE ALARM PER IMC 502.8.1 AND NFPA 30

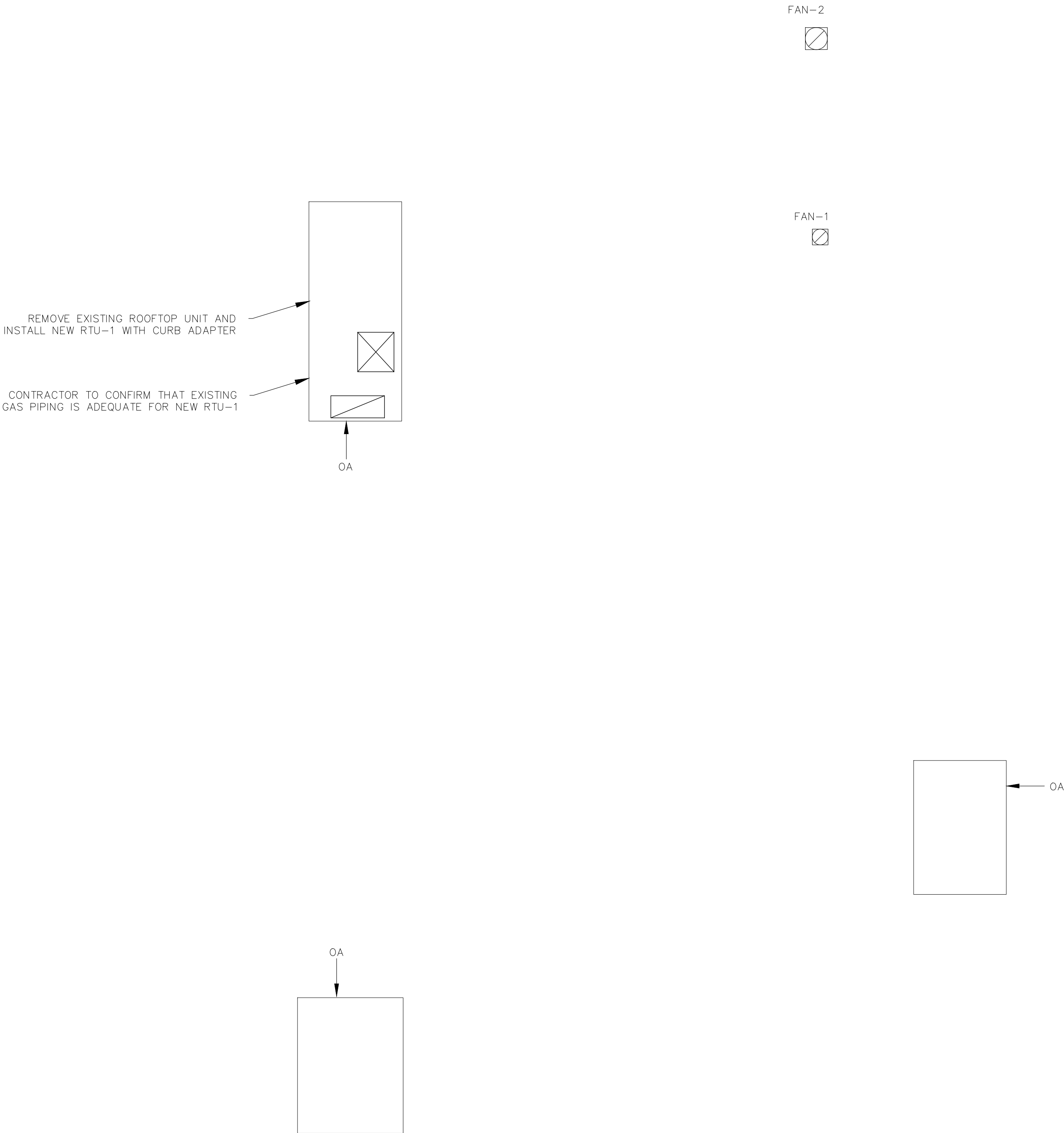
NEW WORK GENERAL NOTES:

1. FAN-1 EXHAUSTS FLAMMABLE MATERIAL AND DUCTWORK SHALL BE G90 GALVANIZED STEEL PER SPECIFICATIONS ON H5.0
2. FAN-2 EXHAUSTS NON-FLAMMABLE CORROSIVE MATERIAL AND ITS DUCT SHALL BE PVC PER SPECIFICATIONS ON H5.0



NEW ROOF WORK GENERAL NOTES:

- PER IMC 501.3:
- A. FAN-1 & FAN-2 SHALL NOT BE DIRECTED ONTO WALKWAYS OR CAUSE PUBLIC NUISANCE
 - B. FAN-1 OUTLET SHALL BE AT LEAST 30' FROM PROPERTY LINES, 10' FROM OPERABLE OPENING INTO BUILDING (INCLUDING RTU OA INTAKES), 30' FROM COMBUSTIBLE WALLS AND OPERABLE OPENINGS INTO THE BUILDING THAT ARE IN THE DIRECTION OF THE DISCHARGE (WINDS ARE PREDOMINATELY EAST-WEST), 6' FROM EXTERIOR WALLS AND ROOFS AND 10' ABOVE ADJOINING GRADE
 - C. FAN-2 OUTLET SHALL BE AT LEAST 10' FROM PROPERTY LINES, 10' FROM OPERABLE OPENINGS INTO BUILDING, 3' FROM EXTERIOR WALLS AND ROOFS AND 10' ABOVE ADJOINING GRADE



1
H2.1

ROOF PLAN

1/4"=1'-0"

DOWLING CORP

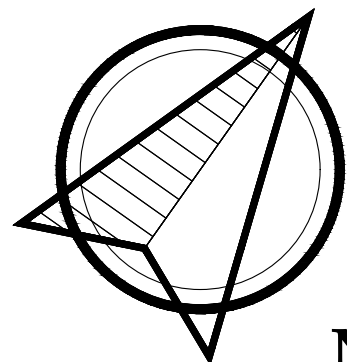
363 EXETER RD
HAMPTON, NH 03842



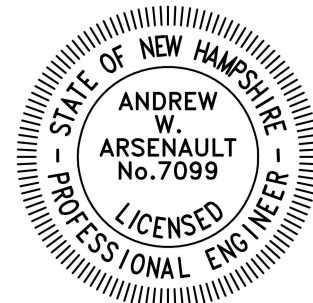
THE PROJECT MANAGER FOR THIS PROJECT IS NOTED BELOW. PLEASE REFER ALL QUESTIONS, SUBMITTALS AND CORRESPONDENCE TO THE PROJECT MANAGER.

HVAC PROJECT MANAGER:

MATHILDE KREBS
SOUTH BERWICK, MAINE
PHONE: (207)-475-2451
EMAIL: MATHILDEK@DESIGNDAYMECH.COM



NORTH



STAMP

NEDA

111 MAPLEWOOD AVE.
PORTSMOUTH, NH

REVISIONS

#	Date	Description

PERMIT SET

DDMI Project Number:	21038
Scale:	1/4" = 1'-0"
Designed By:	MBK
Drawn By:	SMF
Checked By:	AWA
Date:	04/20/2021

ROOF PLAN

H2.1

NEDA - 111 Maplewood Ave, Portsmouth NH				Per 2015 IMC Chapter 4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
Ventilation Calculations & Airflows				Per ASHRAE Std 170-2013																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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Room #	Room Name	Space	Classification	cfm/p	# Occ	cfm	cfm/sf	Ft2	cfm	cfm	Ft	Ft3	ACH	cfm	ACH	cfm	cfm	Ez	cfm	cfm	Zp	cfm	cfm	cfm		Notes																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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105	Break		Break Room	5.0	6	30	0.06	218	13	43	11.00	2398					43	0.8	54	150	0.36	61	150																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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LAB PRESSURIZATION CALCULATIONS			
MARK	CFM	IN/OUT OF ROOM	NOTES
DOORS	150	IN	1
EMBEDDING	150	IN	2
IT	75	IN	2
IHC	75	IN	2
BLOCK/SLIDE STORAGE	75	IN	2
LAB OFFICE	75	IN	2
LAB WORKSPACE	1150	IN	2
HOOD-1	850	OUT	3
HOOD-2	400	OUT	4
HOOD-3	400	OUT	4
CUTOFF	100	OUT	4
NOTES:			
1. TWO CORRIDOR DOORS AT APPROXIMATELY 75 CFM EACH TRANSFER INTO LAB			
2. VOLUME OF AIR SUPPLIED TO MAINTAIN A NEGATIVE PRESSURE IN LAB OF -0.02" W.C.			
3. FAN-1			
4. FAN-2			

NEDA 111 Maplewood - Portsmouth NH				
Design Conditions				
ASHRAE Weather Station - Portsmouth, NH				
Climate Zone 6A				
Season	Value	Units	Description	Source
Winter	-16.0	*F	OA Temp	ASHRAE 50 Year Extreme DB
Winter	2.7	*F	OA Temp	ASHRAE 99.6% Heating DB
Winter	72.0	*F	Indoor Temp	2015 IECC Section C302.1
Summer	89.5	*F	OA Dry-Bulb Temp	ASHRAE 0.4% Cooling
Summer	72.5	*F	OA Wet-Bulb Temp	ASHRAE 0.4% Cooling
Summer	75.0	*F	Indoor Temp	2015 IECC Section C302.1

DOWLING CORP

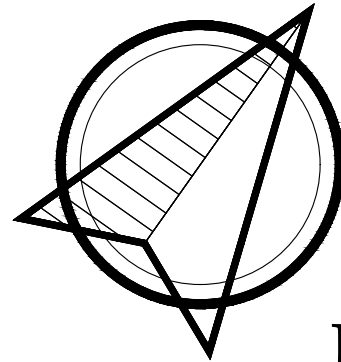
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HAMPTON, NH 03842



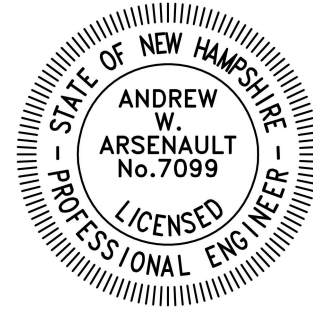
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PORTSMOUTH, NH

REVISIONS

#	Date	Description

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Designed By:	MBK
Drawn By:	SMF
Checked By:	AWA
Date:	04/20/2021

VENTILATION
CALCULATIONS, DESIGN
CONDITIONS &
PRESSURIZATION
CALCULATIONS

H3.0

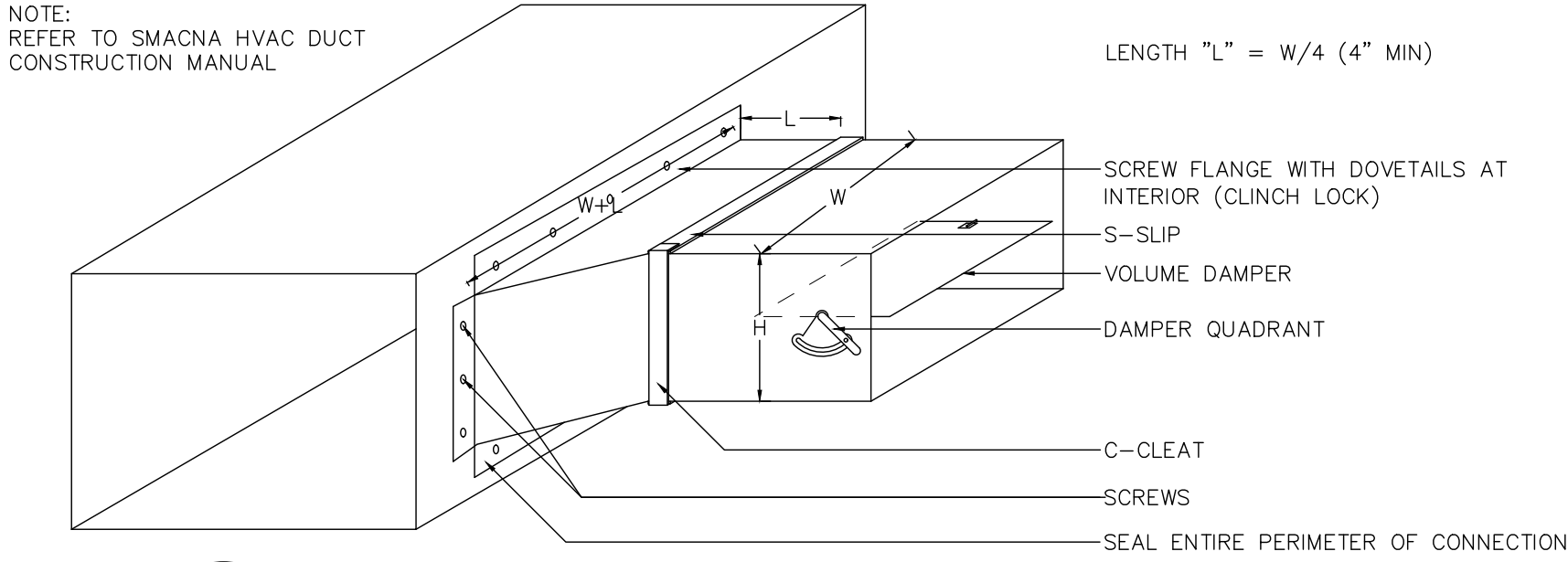
GAS/ELECTRIC ROOF TOP UNIT SCHEDULE (RTU)																											
MARK	SERVES	MAKE	MODEL	NOM TONS	SUPPLY (CFM)	ESP (IN. WC)	OA (CFM)	COOLING							HEATING						ELECTRICAL						NOTES
								TOTAL (MBH)	SENSIBLE (MBH)	EFFICIENCY	EDB	EWB	LDB	LWB	INPUT (MBH)	OUTPUT (MBH)	EFFICIENCY	FUEL	EAT	LAT	BHP	MHP	VOLT/PH	FLA	MCA	MOCP	
RTU-1	COMMON	CAPTIVEAIRE	CASRTU3-1.300-20-1ST-DOAS	15	4,300	1.00	1,750	185.0	130.8	18.8 IEER	81.4	67.3	51.7	51.7	300	240	80% TE	NG	33.5	89.5	3.31	5.00	230/3		71.6	80	1,2,3
NOTES:																											
1. DOUBLE WALL, SS DRAIN PAN, INVERTER COMPRESSOR & ECM CONDENSER FAN, MODULATING HGRH, SS HEAT EXCHANGER, 12:1 HEATING TURNDOWN, PERMATECTOR FINISH, LOW LEAKAGE OA MOD, BAROMETRIC RELIEF DAMPER, SA & RA SMOKE DETECTORS, POWERED GFCI, NON-FUSED DISCONNECT																											
2. AHRI & AMCA CERTIFIED, DDC CONTROLS WITH BACNET MONITORING AND CONTROL INTERFACE, ECONOMIZER ENABLE, TEMPERATURE SENSOR IN LAB, DIFFERENTIAL PRESSURE CONTROL, DIRTY FILTER SENSORS																											
3. BOTTOM SUPPLY, BOTTOM RETURN																											
4. PROVIDE CURB ADAPTER. CONSTRUCTION MANAGER TO CONFIRM WITH STRUCTURAL ENGINEER WHETHER NEW RTU REQUIRES ANY MODIFICATIONS TO THE EXISTING STRUCTURE																											

FAN SCHEDULE (FAN)											
MARK	SERVES	MAKE	MODEL	CFM	ESP (IN. WC)	RPM	BHP	MHP	VOLT/PH	dBA	NOTES
FAN-1	HOOD-1	GREENHECK	VEKTOR-H-9-7	850	0.75	2698	0.61	3/4	208/3	71.0	1
FAN-2	HOOD-2,3, STORAGE	GREENHECK	VEKTOR-H-9-7	900	1.5	3147	0.95	1	208/3	75.0	2
NOTES:											
1. CENTRIFUGAL HIGH PLUME FAN, SPARK-B CONSTRUCTION, STD 2 BELT DRIVE, EXPLOSION PROOF MOTOR, NEMA 7&9 DISCONNECT .											
2. CENTRIFUGAL HIGH PLUME FAN, STD 2 BELT DRIVE, CORROSION COATING.											

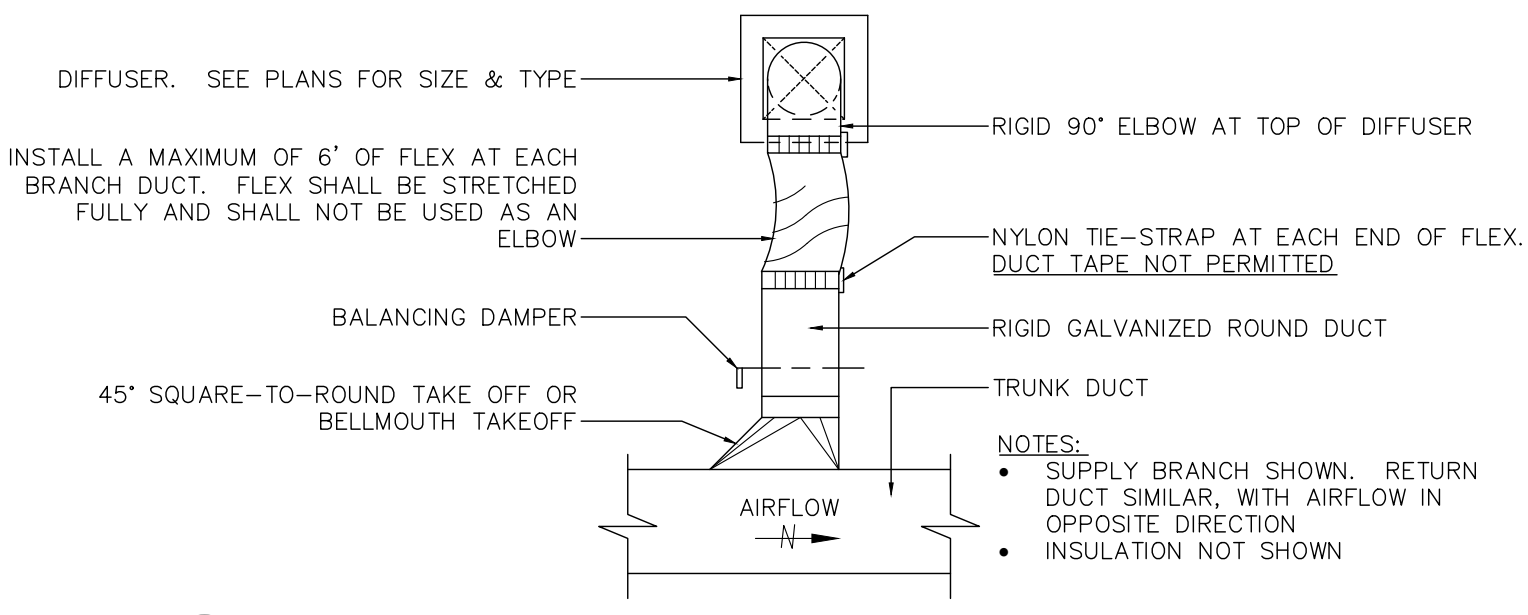
DAMPER SCHEDULE (D)										
MARK	MAKE	MODEL	SIZE (IN.) W x H	CFM	VELOCITY (FPM)	APD (IN WC)	BLADE ACTION	PURPOSE	MATERIAL	NOTES
D-1	GREENHECK	VCD-20	22X16	1,600	655	0.01	OPPOSED	ZONE CONTROL	STEEL	1
D-2	GREENHECK	VCD-20	24X14	1,600	686	0.01	OPPOSED	DIFFERENTIAL PRESSURE CONTROL	STEEL	2
D-3	GREENHECK	VCD-20	16X12	1,100	825	0.02	OPPOSED	ZONE CONTROL	STEEL	1
NOTES:										
1. 24V ACTUATOR, MODULATING, ZONE DAMPER CONTROL WITH DUCT TEMPERATURE SENSOR (ZONEX SAMOD)										
2. 24V ACTUATOR, MODULATING TO MAINTAIN MINIMUM -0.02 IN W.C. IN LAB BASED ON PRESSURE DIFFERENTIAL TRANSMITTERS										

HOOD SCHEDULE (HOOD)									
MARK	PURPOSE	MAKE	MODEL	LENGTH (IN)	DEPTH (IN)	HEIGHT (IN)	EXHAUST		NOTES
							CFM	SP (IN W.C.)	
HOOD-1	CHEMICALS	FISHER AMERICAN		6 FT	72	31	850	0.25	1
HOOD-2	GROSSING	THERMO ELECTRON CORP	SHANDON GROSSLAB JR	48	28	53	400	1.15	2
HOOD-3	GROSSING	THERMO ELECTRON CORP	SHANDON GROSSLAB JR	48	28	53	400	1.15	2
NOTES:									
1. 100 FPM FACE VELOCITY AT 18" OPENING									
2. DUCT CONNECTION TO COVER ALL EXHAUST OPENINGS									

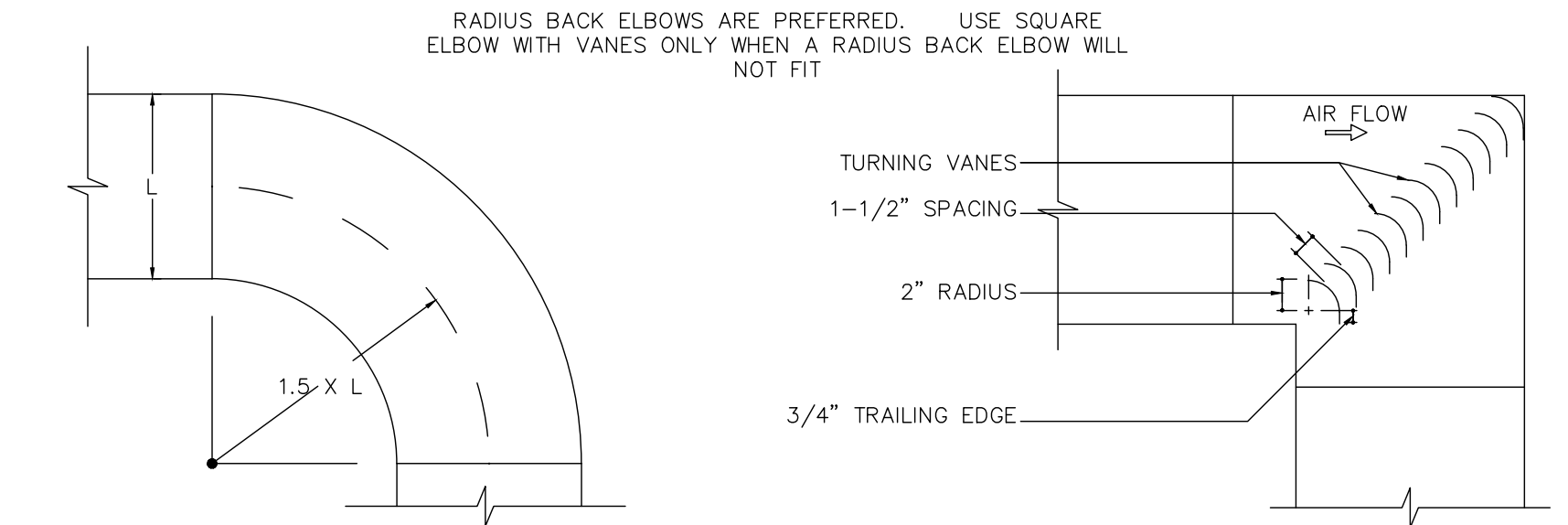
REGISTER GRILLE DIFFUSER SCHEDULE (RGD)									
MARK	MAKE	MODEL	DAMPER	PATTERN	NECK SIZE	FRAME STYLE	MATERIAL	DESCRIPTION	NOTES
RGD-E-1	PRICE	630D	YES	45° FIXED	SEE DWGS	AS NEEDED	ALUMINUM	EXHAUST	1
RGD-T-1	PRICE	ATG1	NO	CHEVRON	SEE DWGS	AS NEEDED	ALUMINUM	TRANSFER	2, 3
NOTES:									
1. RGD MOUNTED DAMPERS ARE TO BE USED FOR TRIM ONLY. PRIMARY VOLUME DAMPERS ARE TO BE INSTALLED IN THE DUCTS.									
2. MOUNT TRANSFER GRILLE WITH BOTTOM EDGE AT 12" AFF, WHERE AIRFLOW WILL BE UNOBSTRUCTED.									
3. TRANSFER GRILLES INSTALLED IN FIRE-RATED WALLS SHALL INCLUDE A STATIC TYPE B FIRE DAMPER.									



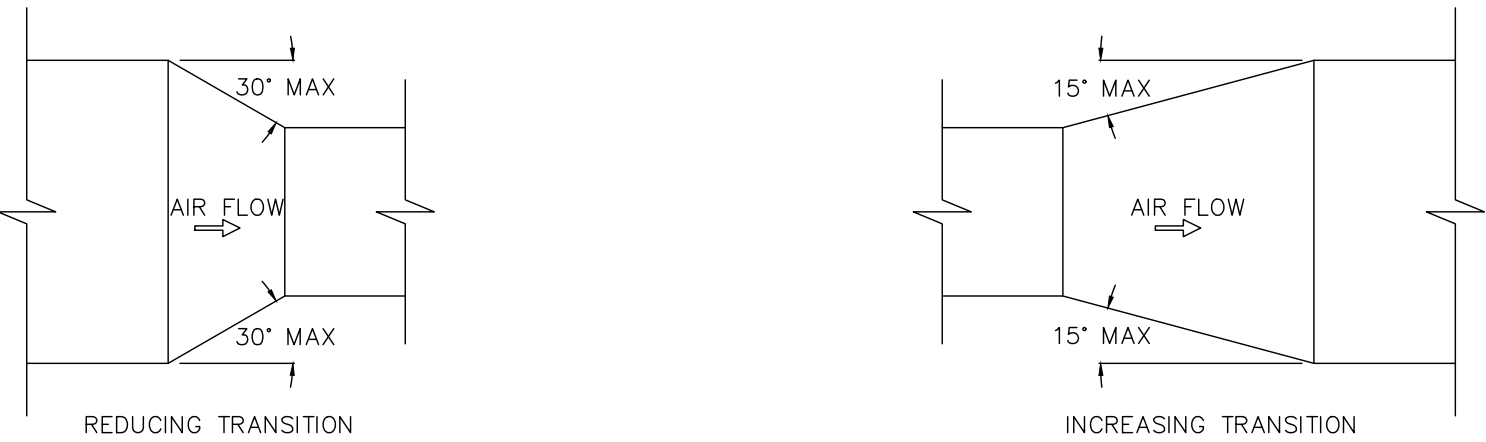
1
H4.0
TYPICAL RECTANGULAR BRANCH TAKEOFF
NOT TO SCALE



2
H4.0
TYPICAL ROUND BRANCH DUCT & DIFFUSER
NOT TO SCALE



3
H4.0
TYPICAL RECTANGULAR ELBOW
NOT TO SCALE



4
H4.0
TYPICAL DUCT TRANSITION
NOT TO SCALE

MECHANICAL ABBREVIATIONS							
AFF	ABOVE FINISHED FLOOR	EAT	ENTERING AIR TEMPERATURE	HRV	HEAT RECOVERY VENTILATOR	MPT	MALE PIPE THREAD
AMP	AMPACITY	EC	ELECTRICAL CONTRACTOR	HW	HOT WATER	NA	NOT APPLICABLE
APD	AIR PRESSURE DROP	EER	ENERGY EFFICIENCY RATIO	HWJH	HOT WATER UNIT HEATER	NC	NORMALLY CLOSED
ATC	AUTOMATIC TEMP. CONTROL	EFT	ENTERING FLUID TEMPERATURE	HWCUH	HOT WATER CABINET HEATER	NO	NORMALLY OPEN
BTU/H	BRITISH THERMAL UNITS/HOUR	ERV	ENERGY RECOVERY VENTILATOR	HWR	HOT WATER RETURN	OA	OUTSIDE AIR
CAP	CAPACITY	ESP	EXTERNAL STATIC PRESSURE	HWS	HOT WATER SUPPLY	OD	OUTSIDE DIAMETER
CH	CHILLED	ET	EXPANSION TANK	HX	HEAT EXCHANGER	PD	PRESSURE DROP
CHW	CHILLED WATER	EW	ENTERING WATER TEMPERATURE	ID	INSIDE DIAMETER	PG	PROPYLENE GLYCOL
C/HWR	CHILLED & HOT WATER RETURN	F	FAHRENHEIT	IN	INCHES	PSI	POUNDS PER SQUARE INCH
C/HWS	CHILLED & HOT WATER SUPPLY	FA	FRESH AIR	KW	KILOWATTS	PH/ø	PHASE
CHWR	CHILLED WATER RETURN	FPD	FLUID PRESSURE DROP	LAT	LEAVING AIR TEMPERATURE	R	RETURN
CHWS	CHILLED WATER SUPPLY	FPM	FEET PER MINUTE	LB/#	POUNDS	RA	RETURN AIR
COND	CONDENSATE	FPT	FEMALE PIPE THREAD	LFT	LEAVING FLUID TEMPERATURE	RTU	ROOFTOP UNIT
CONN	CONNECT OR CONNECTION	FT HD	FEET HEAD	LPS	LOW PRESSURE STEAM	SF	SQUARE FEET
CONV	CONVECTOR	FTR	FIN TUBE RADIATION	LWT	LEAVING WATER TEMPERATURE	SQ IN	SQUARE INCHES
CP	CIRCULATOR PUMP	FW	FRESH WATER	M	MINUTES	S	SUPPLY
CW	COLD WATER	GC	GENERAL CONTRACTOR	MAX	MAXIMUM	SA	SUPPLY AIR
CWR	CONDENSER WATER RETURN	GHWS	GLYCOL & WATER SUPPLY	MBH	THOUSANDS OF BTU/H	TEMP	TEMPERATURE
CWS	CONDENSER WATER SUPPLY	GHWR	GLYCOL & WATER RETURN	MC	MECHANICAL CONTRACTOR	V	VOLTS
DB	DRY BULB	GPM	GALLONS PER MINUTE	MCA	MINIMUM CIRCUIT AMPACITY	W	WATTS
DN	DOWN	HP	HORSEPOWER	MIN	MINUTE OR MINIMUM	WPD	WATER PRESSURE DROP
DX	DIRECT EXPANSION	HPS	HIGH PRESSURE STEAM	MOCP	MAX OVERCURRENT PROTECTION	WB	WET BULB
EA	EXHAUST AIR	HR	HOUR	MPS	MEDIUM PRESSURE STEAM	WC	WATER COLUMN

LEGEND OF PIPING SYMBOLS			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	PIPE ELBOW UP		BALL VALVE
	PIPE ELBOW DOWN		BUTTERFLY VALVE
	PIPE TEE UP		GATE VALVE
	PIPE TEE DOWN		OS&Y GATE VALVE
	PIPE CROSS OVER		CHECK VALVE
	UNION		BACK FLOW PREVENTER
	FLEXIBLE PIPE CONNECTOR		TRIPLE-DUTY VALVE
	END CAP		TRIPLE-DUTY VALVE WITH MEASUREMENT PORTS
	PETE'S PLUG		2-WAY MOTORIZED VALVE
	HOSE THREAD DRAIN VALVE WITH CAP AND CHAIN		3-WAY MOTORIZED VALVE
	CIRCUIT SETTER		TEMPERING VALVE
	STRAINER		PRESSURE REDUCING VALVE
	STRAINER WITH BLOWDOWN		TEMPERATURE & PRESSURE RELIEF VALVE
	CIRCULATOR PUMP		DIFFERENTIAL PRESSURE BYPASS VALVE
	MANUAL AIR VENT		SOLENOID VALVE
	AUTOMATIC AIR VENT		GAS COCK
	AIR SCOOP		DIRECTION OF FLOW
	AIR SCOOP WITH VENT		DIRECTION OF PITCH
	AIR SEPARATOR WITH VENT		CONNECT TO EXISTING
	FIN TUBE IDENTIFICATION TAG		PIPE CONTINUES
	FIN TUBE IDENTIFICATION TAG		THERMOMETER
	FIN TUBE IDENTIFICATION TAG		PRESSURE GAUGE WITH SHUTOFF & PIGTAIL
	FIN TUBE IDENTIFICATION TAG		VACUUM BREAKER
	FIN TUBE IDENTIFICATION TAG		ELECTRIC HEAT TRACING
LEGEND OF DUCT SYMBOLS			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	MANUAL BALANCING DAMPER		RECTANGULAR RETURN OR EXHAUST DUCT UP
	FIRE DAMPER		ROUND RETURN OR EXHAUST DUCT UP
	SMOKE DAMPER		RECTANGULAR RETURN OR EXHAUST DUCT DOWN
	SMOKE & FIRE DAMPER		ROUND RETURN OR EXHAUST DUCT DOWN
	CABLE OPERATED DAMPER		RECTANGULAR SUPPLY DUCT UP
	BACK DRAFT DAMPER		ROUND SUPPLY DUCT UP
	MOTORIZED DAMPER		RECTANGULAR SUPPLY DUCT DOWN
	SUPPLY AIRFLOW		ROUND SUPPLY DUCT DOWN
	RETURN / EXHAUST AIRFLOW		REGISTER, GRILLE AND DIFFUSER IDENTIFICATION TAG
	CONNECT TO EXISTING		
LEGEND OF CONTROL SYMBOLS			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	THERMOSTAT		HUMIDISTAT
	TEMPERATURE SENSOR		PRESSURE SENSOR
	CARBON MONOXIDE SENSOR		SMOKE DETECTOR
	CARBON DIOXIDE SENSOR		INDICATOR LAMP

DOWLING CORP

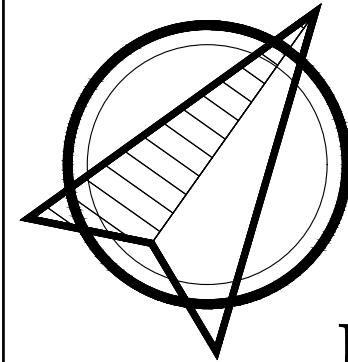
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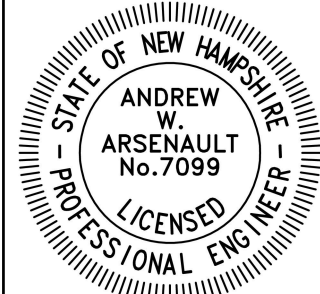
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Date:	04/20/2021

HVAC LEGEND &
ABBREVIATIONS, DETAILS,
AND SCHEDULES

H4.0

DIVISION 23 - HVAC SPECIFICATIONS

1) GENERAL

A) WORK INCLUDED:

- 1) THESE SPECIFICATIONS INCLUDE GENERAL REQUIREMENTS FOR ALL WORK REPRESENTED ON THESE DRAWINGS. NOT ALL SYSTEMS OR SYSTEM COMPONENTS DESCRIBED IN THESE SPECIFICATIONS ARE NECESSARILY INCLUDED AS A PART OF THIS PROJECT.
- 2) THE HEATING, VENTILATING, AND AIR CONDITIONING (HVAC) CONTRACTOR SHALL HEREAFTER BE DESCRIBED AS "THE CONTRACTOR" IN THIS HVAC SPECIFICATION. THE CONTRACTOR SHALL PROVIDE, INSTALL, PIPE, DUCT, AND WIRE, AS REQUIRED, HVAC SYSTEMS AS DESCRIBED BELOW, AND SHOWN OR DESCRIBED ON THESE PLANS AND SPECIFICATIONS.
- B) QUALITY ASSURANCE:
 - 1) THE INTERNATIONAL MECHANICAL CODE (IMC) 2015, AND THE INTERNATIONAL ENERGY CONSERVATION CODE (IEEC) 2015 ARE THE GOVERNING CODES FOR ALL HVAC WORK. THE CODES AND STANDARDS REFERENCED IN THE MECHANICAL CODE SHALL BE CONSIDERED A PART OF THE REQUIREMENTS OF CODE TO THE PRESCRIBED EXTENT OF EACH SUCH REFERENCE. WHERE DIFFERENCES OCCUR BETWEEN PROVISIONS OF THE CODE AND THE REFERENCED STANDARDS, THE PROVISIONS OF THE CODE SHALL APPLY. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO BE FAMILIAR WITH THE REQUIREMENTS OF ALL CODES AS THEY HAVE BEEN ADOPTED BY THE STATE AND LOCAL JURISDICTIONS.
 - 2) EXCEPT AS SPECIFICALLY DESCRIBED OTHERWISE IN THESE SPECIFICATIONS, ALL COMPONENTS ALLOWED WITHIN THE ABOVE REFERENCED CODES SHALL BE ALLOWED AS A PART OF THE WORK.
 - 3) THE WORKMANSHIP AND MATERIALS COVERED BY THESE SPECIFICATIONS SHALL CONFORM TO ALL ORDINANCES AND REGULATIONS OF ALL AUTHORITIES HAVING JURISDICTION, INCLUDING BUT NOT LIMITED TO, ALL APPLICABLE REGULATIONS OF THE CITY, COUNTY, AND STATE.
 - 4) THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND PAYING FOR HVAC PERMITS, TAXES, CONNECTION AND INSPECTION FEES AS REQUIRED FOR THE COMPLETE INSTALLATION OF THE HVAC SYSTEM. THE CONTRACTOR SHALL PROVIDE TO THE OWNER ALL CERTIFICATES OF INSPECTION ISSUED BY THE JURISDICTION.
 - 5) THE CONTRACTOR SHALL VISIT THE SITE AND EXAMINE ALL CONDITIONS AFFECTING THE PROPER EXECUTION OF THE CONTRACT, VERIFY ALL EXISTING CONDITIONS IN THE FIELD AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK.
 - 6) DURING THE PROGRESS OF THE WORK, THE CONTRACTOR SHALL MAINTAIN AN ACCURATE RECORD OF ALL CHANGES MADE IN THE HVAC INSTALLATION FROM THE LAYOUT AND MATERIALS CONTAINED IN THE APPROVED DRAWINGS AND SPECIFICATIONS.
 - 7) DRAWINGS AND CATALOG CUTS, SHOWING ALL HVAC EQUIPMENT AND SYSTEM COMPONENTS, SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL. FIELD MEASURE AND COORDINATE WITH ARCHITECTURAL AND STRUCTURAL DRAWINGS AND ALL OTHER TRADES THE PROPOSED LOCATIONS FOR NEW EQUIPMENT AND COMPONENTS BEFORE PRODUCING SUBMITTALS. NO ITEMS SHALL BE PURCHASED OR ORDERED BEFORE APPROVAL IS GIVEN BY THE ENGINEER IN WRITING.
 - 8) THE CONTRACTOR SHALL COORDINATE HIS WORK WITH ALL OTHER TRADES.

B) PRODUCTS

A) GENERAL MECHANICAL MATERIALS:

- 1) SLEEVES: GALVANIZED SHEET METAL, SCHEDULE 40 STEEL PIPE, OR PVC AS APPROPRIATE FOR THE WALL CONSTRUCTION.
- 2) FIRESTOPPING/FIRE-RESISTANT SEALANT: WHERE REQUIRED, PROVIDE A FIRESTOP SYSTEM APPROPRIATE FOR THE ASSEMBLY PENETRATED AND THE PENETRATING ELEMENT. USE ONLY FIRESTOP PRODUCTS THAT HAVE BEEN UL 1479 OR ASTM E 814 TESTED FOR SPECIFIC FIRE-RATED CONDITIONS CONFORMING TO CONSTRUCTION ASSEMBLY TYPE, PENETRATING ITEM TYPE, ANNULAR SPACE REQUIREMENT AND FIRE-RATING INVOLVED FOR EACH SEPARATE INSTANCE. SUBMIT MANUFACTURER'S SPECIFIC DETAIL FOR EACH TYPE OF PENETRATION.
- 3) ACCESS DOORS: WHERE REQUIRED FOR PROPER SERVICE AND MAINTENANCE OF ALL MECHANICAL COMPONENTS, PROVIDE STEEL ACCESS DOORS AND FRAMES, FACTORY-FABRICATED AND ASSEMBLED UNITS, COMPLETE WITH ATTACHMENT DEVICES AND FASTENERS SUITABLE FOR THE SERVICE.
- 4) ROOF PENETRATIONS SHALL BE THROUGH 12" (MIN.) HIGH CURBS OR TALL CONE FLASHINGS.

B) ELECTRICAL REQUIREMENTS OF MECHANICAL WORK:

- 1) BASIC ELECTRICAL COMPONENTS INCLUDE, BUT ARE NOT LIMITED TO ALL REQUIRED STARTERS, DISCONNECT SWITCHES, CONTROL DEVICES, AND MOTORS. IT INCLUDES MOTORS THAT ARE FACTORY-INSTALLED AS PART OF EQUIPMENT AND APPLIANCES AS WELL AS FIELD-INSTALLED MOTORS.
- 2) STARTERS AND DISCONNECTS: WHERE AVAILABLE, PROVIDE FACTORY MOUNTED DISCONNECTS AND STARTERS. OR, WHEN FACTORY MOUNTED STARTERS AND DISCONNECTS ARE NOT AVAILABLE PROVIDE COMBINATION STARTERS AND DISCONNECT SWITCHES, OR, WHERE COMBINATION STARTERS AND DISCONNECT SWITCHES ARE NOT SUITABLE OR AVAILABLE, PROVIDE SEPARATE STARTERS AND DISCONNECTS FOR ALL HVAC EQUIPMENT, AS REQUIRED FOR PROPER INSTALLATION AND OPERATION OF EQUIPMENT.

C) MECHANICAL IDENTIFICATION:

- 1) PROVIDE EQUIPMENT MARKERS COMPLYING WITH ANSI A13.1 FOR LETTERING SIZE, LENGTH OF COLOR FIELD, COLORS, AND INSTALLED VIEWING ANGLES OF IDENTIFICATION DEVICES.
- 2) PLASTIC EQUIPMENT MARKERS: PROVIDE MANUFACTURER'S STANDARD LAMINATED PLASTIC, COLOR CODED EQUIPMENT MARKERS.
- 3) LETTERING AND GRAPHICS: COORDINATE NAMES, ABBREVIATIONS AND OTHER DESIGNATIONS USED IN MECHANICAL IDENTIFICATION WORK, WITH CORRESPONDING DESIGNATIONS SHOWN, SPECIFIED OR SCHEDULED. PROVIDE NUMBERS, LETTERING AND WORDING AS INDICATED OR, IF NOT OTHERWISE INDICATED, AS RECOMMENDED BY MANUFACTURERS OR AS REQUIRED FOR PROPER IDENTIFICATION AND OPERATION/MAINTENANCE OF MECHANICAL SYSTEMS AND EQUIPMENT.

D) DUCTWORK:

- 1) UNLESS OTHERWISE SPECIFIED, ALL RIGID DUCTWORK SHALL BE SHEET METAL MATERIALS AS SPECIFIED IN ASTM A700, WITH GALVANIZED SHEET STEEL. LOOK-FORMING QUALITY, ASTM A527, COATING DESIGNATION G60; MILL PHOSPHATIZED FINISH.
- 2) PRESSURE CLASS AND SEAL CLASS (PER SMACNA):
 - (a) 2" PRESSURE CLASS, SEAL CLASS A (ALL TRANSVERSE JOINTS, LONGITUDINAL SEAMS AND DUCT WALL PENETRATIONS).
- 3) RECTANGULAR DUCT FABRICATION: FABRICATE RECTANGULAR DUCTS WITH GALVANIZED SHEET STEEL, IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS", TABLES 1-13 THROUGH 1-19, INCLUDING THEIR ASSOCIATED DETAILS. CONFORM TO THE REQUIREMENTS IN THE REFERENCED STANDARD FOR METAL THICKNESS, REINFORCING TYPES AND INTERVALS, TIE ROD APPLICATIONS, AND JOINT TYPES AND INTERVALS.
- 4) WHERE DUCT SUPPORTS ARE REQUIRED BETWEEN THE BUILDING STRUCTURAL FRAMING, SUITABLE INTERMEDIATE STEEL FRAMING SHALL BE PROVIDED BY THE CONTRACTOR.
- 5) WATER BASED LIQUID RUBBER DUCT SEALANT OR FLANGED JOINT MASTICS SHALL BE ONE-PART, AOID-CURING, SILICONE ELASTOMERIC JOINT SEALANTS, COMPLYING WITH ASTM C820, TYPE S, GRADE NS, CLASS 25, USE 0.
- 6) FLEXIBLE DUCT CONNECTORS SHALL BE INSTALLED AT POINTS AS CLOSE AS POSSIBLE TO AIR HANDLERS. THE CONNECTOR SHALL BE AT LEAST FOUR (4") INCHES WIDE AND FABRICATED SPECIFICALLY FOR USE AS A FLEXIBLE CONNECTOR. ALL CONNECTIONS SHALL BE AIR TIGHT AND MADE SO THE CONNECTOR IS UNDAMAGED WHEN THE JOINT IS REMOVED.
- 7) FLEXIBLE DUCTS: LIMITED TO 6 FEET MAXIMUM STRAIGHT AND FULLY STRETCHED. DO NOT USE FLEX AS AN ELBOW.
- 8) INTERNAL FABRIC SHALL BE ACOUSTICALLY RATED BLACK RESILIENT CALENDERED FILM WITH COATED STEEL WIRE HELIX, 2" FIBERGLASS BLANKET (R-6.0), AND FIBERGLASS SCIRM REINFORCED ALUMINIZED POLYESTER FILM VAPOR BARRIER AS EXTERIOR FACING. LISTED AND LABELED AS A CLASS 1 AIR DUCT PER UL STD 181. RATED FOR PRESSURE CLASS LISTED ABOVE. EQUIVALENT TO THERMAFLEX M-KE.
- 9) BELLMOUTH OR 45 DEGREE TAKEOFFS SHALL BE USED FOR DUCT TAKEOFFS TO MINIMIZE PRESSURE DROP.
- 10) MANUAL VOLUME DAMPERS SHALL BE INSTALLED AT ALL DUCT TAKEOFFS AND AS NEEDED ELSEWHERE TO PROPERLY BALANCE THE SYSTEMS.
- 10) DUCT LINER:
 - (a) ACOUSTICAL DUCT LINER SHALL BE FIBER GLASS WITH REINFORCED COATING SIMILAR TO JOHNS MANVILLE LINACUSTIC RC.
 - (b) SUPPLY AIR DUCTS SHALL BE LINED WITH 1-1/2" THICK LINER (R-6.3):
 - (1) FOR THE DUCT DROP FROM THE RTU.
 - (c) RETURN AIR DUCTS SHALL BE LINED WITH 1" THICK LINER:
 - (1) FOR THE DUCT DROP FROM THE RTU.
 - (d) TRANSFER DUCTS SHALL BE LINED WITH 1" THICK LINER.
 - (e) ADDITIONAL LINER REQUIREMENTS MAY BE SHOWN ON THE DRAWINGS.
- 11) FIRE, SMOKE, COMBINATION FIRE/SMOKE DAMPERS AND CEILING RADIATION DAMPERS:
 - (a) FIRE DAMPERS: UL 555 LISTED TYPE "B" (OUT OF AIRSTREAM) 1-1/2 HOUR RATED FOR LESS THAN 3-HOUR FIRE-RESISTANCE RATED ASSEMBLIES AND 3 HOUR RATED FOR 3-HOUR OR GREATER FIRE-RESISTANCE RATED ASSEMBLIES.
 - (1) DYNAMIC FIRE DAMPERS SHALL BE USED IN SYSTEMS DESIGNED TO OPERATE WITH FANS ON DURING A FIRE.
 - (2) STATIC FIRE DAMPERS MAY BE USED IN SYSTEMS NOT OPERATIONAL DURING A FIRE.
 - (b) SMOKE DAMPERS: UL 555S LISTED.
 - (1) VOLTAGE DETERMINED BY FIRE ALARM CONTRACTOR.
 - (c) COMBINATION FIRE/SMOKE DAMPERS: UL 555 AND UL 555S LISTED.
 - (1) VOLTAGE DETERMINED BY FIRE ALARM CONTRACTOR.
 - (d) CEILING RADIATION DAMPERS: UL 555C LISTED.
 - (e) REFER TO BOTH MECHANICAL AND ARCHITECTURAL DRAWINGS FOR THE LOCATION OF RATED ASSEMBLIES.
- 12) SMOKE DETECTORS IN AIR SYSTEMS GREATER THAN 2000 CFM SHALL BE FURNISHED AND INSTALLED BY THIS CONTRACTOR IN BOTH THE SUPPLY AND RETURN AIR DUCTWORK AS PER IMC AND NFPA 90A.
 - (a) IF THERE IS A FIRE ALARM SYSTEM IN THE BUILDING, THIS CONTRACTOR SHALL NOTIFY THE FIRE ALARM CONTRACTOR TO PROVIDE DUCT SMOKE DETECTORS WHERE REQUIRED.

13) LAB EXHAUST DUCTS

- (a) DUCTS EXHAUSTING NONFLAMMABLE CORROSIVE VAPORS SHALL BE CONSTRUCTED OF POLYVINYL COATED STEEL WITH OUTSIDE COATING THICKNESS OF 4 MILS. AND INSIDE THICKNESS OF 4 MILS. POLYVINYL COATING SHALL HAVE A FLAME INDEX OF 25 OR LESS AND A SMOKE-DEVELOPED INDEX OF 50 OR LESS WHEN TESTED IN ACCORDANCE WITH ASTM E84 OR UL723, AND LISTED AND LABELED FOR THE APPLICATION PER IMC 510.9.
- (b) DUCTS EXHAUSTING VAPORS OTHER THAN NONFLAMMABLE CORROSIVE SHALL BE CONSTRUCTED OF 600 GALVANIZED STEEL SHEETS NOT LESS THAN 0.040 INCH (NO. 20 GAUGE) IN THICKNESS PER IMC 510.9.
- (c) JOINTS SHALL BE MADE TIGHT WITH A LAP JOINT HAVING A MINIMUM LAP OF 1 INCH OR MEET THE REQUIREMENTS OF ANSI/SMACNA ROUND OR RECTANGULAR INDUSTRIAL DUCT CONSTRUCTION STANDARDS.
- (d) DUCT-TO-EXHAUST FAN CONNECTIONS SHALL BE FLANGED AND GASKETED AT THE BASE OF THE FAN FOR LISTED AND LABELED VERTICAL DISCHARGE FANS. SHALL BE FLANGED, GASKETED, AND BOLTED TO THE INLET OF THE FAN FOR SIDE-INLET UTILITY FANS, AND SHALL BE FLANGED, GASKETED AND BOLTED TO THE INLET AND OUTLET OF THE FAN FOR INLINE FANS.
- (e) DUCT BRACING AND SUPPORTS SHALL BE OF NONCOMBUSTIBLE MATERIAL, SECURELY ATTACHED TO THE STRUCTURE, DESIGNED TO CARRY GRAVITY AND SEISMIC LOADS WITHIN THE STRESS LIMITATIONS OF THE INTERNATIONAL BUILDING CODE AND INSTALLED AT INTERVALS NOT EXCEEDING 10 FEET.
- (f) BOLTS, SCREWS RIVTS AND OTHER MECHANICAL FASTENERS SHALL NOT PENETRATE DUCT WALLS.
- (g) DUCT SYSTEMS SHALL HAVE A CLEARANCE TO COMBUSTIBLE CONSTRUCTION OF NOT LESS THAN 1 INCH.
- (h) FIRE AND SMOKE DAMPERS ARE PROHIBITED.
- E) AIR CONDITIONING CONDENSATE PIPING:
 - 1) AIR CONDITIONING CONDENSATE PIPING SHALL BE SCHEDULE 40 PVC.
 - (a) ROOF TOP UNITS SHALL DRAIN CONDENSATE ONTO ROOF.
- F) INSULATION:
 - 1) ALL INSULATION SHALL BE UL APPROVED FOR A FLAME SPREAD RATING OF NOT OVER 25 AND A SMOKE DEVELOPED RATING OF NOT OVER 50.
 - 2) ALL INSULATION SHALL CONFORM TO THE REQUIREMENTS OF THE ENERGY CODE.
 - 3) DUCTWORK:
 - (a) INSIDE THE BUILDING THERMAL ENVELOPE - SUPPLY AND OUTDOOR AIR DUCTS AND PLENUMS (INCLUDING THOSE INSTALLED IN RETURN AIR PLENUMS) SHALL BE INSULATED WITH FORMALDEHYDE-FREE FIBERGLASS WITH FSK JACKET WITH AN **INSTALLED** MINIMUM R-4 VALUE, SIMILAR TO JOHNS MANVILLE MICROLITE FSK TYPE 75, 2-1/2" THICK. **INTERNALLY LINED SUPPLY AIR DUCT WITH AN R-4 VALUE DOES NOT REQUIRE EXTERNAL INSULATION.**
 - (1) RETURN AIR DUCTS ARE NOT INSULATED.
 - (2) EXHAUST AIR DUCTS AND PLENUMS SHALL BE INSULATED WITH R-6 TO TEN (10) FEET BACK FROM BUILDING EXTERIOR.
 - (3) EXHAUST AIR DUCTS BEYOND TEN (10) FEET FROM BUILDING EXTERIOR ARE NOT INSULATED.
 - (b) OUTSIDE THE BUILDING THERMAL ENVELOPE - SUPPLY, OUTSIDE, RETURN AND EXHAUST AIR DUCTS AND PLENUMS SHALL BE INSULATED WITH FORMALDEHYDE-FREE FIBERGLASS WITH FSK JACKET WITH AN **INSTALLED** MINIMUM R-12 VALUE, SIMILAR TO JOHNS MANVILLE MICROLITE FSK TYPE 75, 4-25" THICK.
 - (c) ROOF MOUNTED SUPPLY, RETURN AND EXHAUST AIR DUCTS SHALL BE INSULATED WITH AN **INSTALLED** MINIMUM R-12 INSULATION, SIMILAR TO 2.5" THICK HUNTER H-SHIELD POLYISO OR JOHNS MANVILLE 614, 3" THICK, 3.0 PFC FIBERGLASS INSULATION BOARD WITH FSK JACKET.
 - (1) SLOPE TOP TO SHED WATER.
 - (2) COVER WITH VENTURECLAD 1577CW-E EMBOSSED ALUMINUM INSULATION JACKETING TAPE OR SIMILAR.
 - (d) ADDITIONAL DUCTWORK INSULATION REQUIREMENTS MAY BE SHOWN ON THE DRAWINGS.

III) EXECUTION

- A) THE CONTRACTOR SHALL PROVIDE ALL SUPERVISION, LABOR, EQUIPMENT, MATERIAL, MACHINERY, PLANS, RIGGING, AND ANY AND ALL OTHER ITEMS NECESSARY TO COMPLETE THE MECHANICAL SYSTEM. SMALL DETAILS NOT USUALLY INDICATED ON THE DRAWINGS OR SPECIFIED, BUT WHICH ARE NECESSARY FOR THE PROPER INSTALLATION AND OPERATION OF THE MECHANICAL SYSTEM SHALL BE INCLUDED IN THE WORK AND IN THE CONTRACTOR'S ESTIMATE THE SAME AS IF HEREIN SPECIFIED OR SHOWN ON THE DRAWINGS.
- B) THE CONTRACTOR SHALL INSTALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. THIS INCLUDES CHECKING THE MANUFACTURER'S INSTRUCTIONS TO DETERMINE WHAT TYPE OF GLYCOL SYSTEM MAY BE USED WITH EQUIPMENT SO AS NOT TO VOID THE WARRANTY OR IMPAIR THE OPERATION OF THE EQUIPMENT. WHERE THE DRAWINGS AND SPECIFICATIONS CONFLICT WITH THE MANUFACTURER'S RECOMMENDATIONS, IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO BRING THIS TO THE ATTENTION OF THE ENGINEER.
- C) THE HVAC EQUIPMENT MAY NOT BE USED FOR TEMPORARY HEAT DURING CONSTRUCTION. THE HVAC EQUIPMENT SHALL NOT BE STARTED AND TESTED UNTIL ALL CONSTRUCTION ACTIVITY THAT HAS THE POTENTIAL OF CREATING AIR BORNE PARTICULATES THAT COULD BE DRAWN INTO THE HVAC EQUIPMENT AND DUCTWORK SYSTEMS HAS BEEN COMPLETED. IN ADDITION, ALL DUCTWORK OPENINGS SHALL BE SEALED UNTIL THE TIME WHEN THE HVAC EQUIPMENT IS TO BE STARTED AND TESTED.
- D) DUCTWORK AND FITTINGS SHALL HAVE ENDS COVERED WITH PLASTIC AT ALL TIMES.
- E) UPON COMPLETION OF WORK, THE CONTRACTOR SHALL CLEAN, OIL AND GREASE (UNLESS FACTORY LUBRICATED) ALL FANS, PUMPS, MOTORS, ALL OTHER RUNNING EQUIPMENT AND APPARATUS AND MAKE CERTAIN THAT ALL SUCH APPARATUS AND MECHANISMS ARE IN PROPER WORKING ORDER AND MADE READY FOR TESTING.
- F) REPLACE ALL FILTERS USED DURING CONSTRUCTION.
- G) EQUIPMENT SHALL BE STARTED, TESTED, ADJUSTED AND PLACED IN SATISFACTORY OPERATING CONDITION BY THE CONTRACTOR.
- H) THE CONTRACTOR SHALL INSTRUCT OWNER IN THE PROPER OPERATION OF EQUIPMENT, EXPLAIN THE PROPER OPERATING AND MAINTENANCE PROCEDURES AND SHALL FURNISH THE OWNER WITH ALL INSTRUCTION PAMPHLETS, BOOKS AND OTHER MATERIAL FURNISHED BY THE VARIOUS MANUFACTURERS.
- I) ALL VIBRATING EQUIPMENT NOT MOUNTED ON THE GROUND FLOOR SHALL BE MOUNTED ON OR SUSPENDED FROM VIBRATION ISOLATORS.
- J) EQUIPMENT SHALL BE INSTALLED WITH CLEARANCE FOR PROPER MAINTENANCE. FILTERS, COILS, DRIVES, VALVES, AND CONTROLS SHALL BE ACCESSIBLE FOR SERVICING AND/OR REPLACEMENT.
- K) EQUIPMENT SHALL BE COVERED FOR ONE YEAR FROM THE REVIEWING ENGINEER'S DATE OF ACCEPTANCE AND/OR THE DURATION OF THE MANUFACTURER'S GUARANTEE OR WARRANTY, WHICH EVER IS LONGER. THE CONTRACTOR SHALL FURNISH THE OWNER WITH ALL MANUFACTURER'S GUARANTEES OR WARRANTIES.
- L) THE WATER AND AIR SYSTEMS SHALL BE BALANCED FROM -10% TO + 10% OF THE GPM AND CFM VALUES SHOWN ON THE APPROVED HVAC PLANS. BALANCING SHALL BE DONE IN ACCORDANCE WITH STANDARDS ESTABLISHED BY THE AABC OR NEBB USING REPORT SHEETS DEVELOPED BY THE AABC OR NEBB. SUBMIT REPORTS TO THE ENGINEER.

END OF DIVISION 23

DIVISION 25 - HVAC CONTROLS AND SEQUENCES OF OPERATION

1) GENERAL

- A) REFER TO SPECIFICATION DIVISION 23 - HVAC SPECIFICATIONS, ESPECIALLY GENERAL FOR WORK INCLUDED, QUALITY ASSURANCE AND RELATED DOCUMENTS.
- B) PROVIDE A COMPLETE ELECTROELECTRONIC CONTROL SYSTEM TO ACCOMPLISH ALL CONTROL SEQUENCES AS DESCRIBED BELOW.
- C) ALL LINE AND LOW VOLTAGE CONTROL WIRING, TRANSFORMERS, DISCONNECTS, ETC. REQUIRED FOR THE CONTROL SYSTEMS THAT IS NOT SHOWN ON THE ELECTRICAL DRAWINGS SHALL BE PROVIDED BY THE CONTROLS CONTRACTOR (HENCEFORTH CALLED "THE CONTRACTOR").
 - 1) LINE VOLTAGE POWER FROM CIRCUIT BREAKERS IN ELECTRICAL PANELS TO CONTROL TRANSFORMERS OR CONTROL DEVICES SHALL BE INSTALLED BY THE CONTRACTOR.
 - 2) COMPLY WITH DIVISION 26 REQUIREMENTS.
 - 3) CONNECT VARIABLE FREQUENCY DRIVES (VFD) AND DUCT & AREA SMOKE DETECTORS (FURNISHED BY OTHERS) INTO CONTROL CIRCUITS TO ACCOMPLISH THE SEQUENCES OF OPERATION.
- D) CONTROL DAMPERS SHALL BE LOW LEAKAGE DAMPERS WITH BLADE AND EDGE SEALS. CLASS 1 WITH LEAKAGE OF LESS THAN 4 CFM/SQFT AT 1" 0" W.G. AND 6 CFM/SQFT AT 4" 0" W.G.
- E) CONTROL VALVES SHALL BE SELECTED FOR FLUID TYPE, TEMPERATURE AND PRESSURE CLASS WHICH MATCH PIPING MATERIALS AND END CONNECTIONS. CONTROL VALVES MUST CLOSE OFF AGAINST MAXIMUM SYSTEM PRESSURE.
- F) DAMPER AND VALVE ACTUATORS SHALL BE ELECTRIC, SIZED TO SMOOTHLY OPERATE DAMPER OR VALVE WITH ADEQUATE TORQUE FOR TIGHT SHUTOFF AGAINST MAXIMUM SYSTEM PRESSURE.
 - 1) ACTUATION REQUIREMENTS SHALL BE PER THE SEQUENCES OF OPERATION.
- G) ROOM THERMOSTATS SHALL BE 7 DAY PROGRAMMABLE WITH A 5°F DEADBAND BETWEEN HEATING & COOLING AND SETBACK CAPABILITY (55°F HEATING & 65°F COOLING).
 - 1) USER ADJUSTABLE SETPOINTS SHALL BE PROVIDED UNLESS NOTED OTHERWISE ON THE DRAWINGS.
- H) DIFFERENTIAL PRESSURE SENSORS AND TRANSDUCERS SHALL COVER PRESSURE RANGES FROM 0.1" W.G. TO 1" W.G.

III) EXECUTION

- A) INSTALL SYSTEMS AND MATERIALS IN ACCORDANCE WITH MANUFACTURER INSTRUCTIONS AND ROUGH-IN DRAWINGS AND DETAILS ON THE DRAWINGS. INSTALL ELECTRICAL COMPONENTS AND USE ELECTRICAL PRODUCTS COMPLYING WITH REQUIREMENTS OF APPLICABLE DIVISION 26 SECTIONS. COORDINATE THE INSTALLATION IN ACCORDANCE WITH FINAL SHOP DRAWINGS, FIELD MEASUREMENTS, MANUFACTURER'S DATA AND AS SPECIFIED HEREIN.
- B) MOUNT CONTROLLERS AT CONVENIENT LOCATIONS AND HEIGHTS. COORDINATE WITH ARCHITECT AND OTHER TRADES.
- C) PROVIDE REMOTE CONTROL OF MANUAL RESET CONTROLLERS AS REQUIRED FOR USER ACCESSIBILITY. COORDINATE WITH OWNER.
- D) THE TERM "CONTROL WIRING" IS DEFINED TO INCLUDE PROVIDING OF WIRE, CONDUIT AND MISCELLANEOUS MATERIALS AS REQUIRED FOR MOUNTING AND CONNECTING ELECTRIC CONTROL DEVICES.

DOWLING CORP

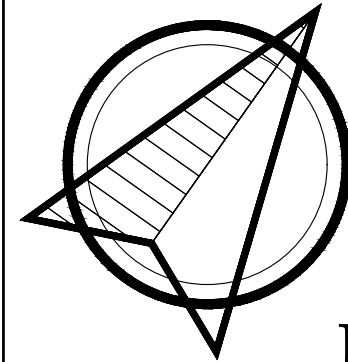
363 EXETER RD
HAMPTON, NH 03842



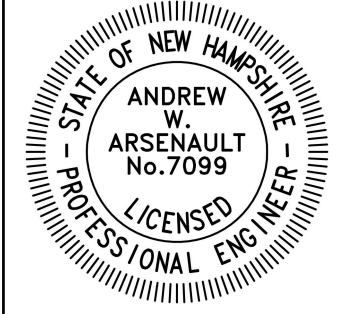
THE PROJECT MANAGER FOR THIS PROJECT IS NOTED BELOW. PLEASE REFER ALL QUESTIONS, SUBMITTALS AND CORRESPONDENCE TO THE PROJECT MANAGER.

HVAC PROJECT MANAGER:

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NORTH



STAMP

NEDA

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PORTSMOUTH, NH

REVISIONS

#	Date	Description

PERMIT SET

DDMI Project Number:	21038
Scale:	NTS
Designed By:	MBK
Drawn By:	SMF
Checked By:	AWA
Date:	04/20/2021

HVAC SPECIFICATIONS &
CONTROL SEQUENCE

H5.0