GENERAL NOTES
(APPLY TO ALL SHEETS)

1. FIRE DEPARTMENT CONNECTION SHOWN ON CIVIL DRAWINGS. FINAL APPROVAL BY FIRE MARSHALL, UNDERWRITER, AND LOCAL AUTHORITY.
2. ALL COLD WATER, VENT, AND GAS PIPING SHALL BE RUN INSIDE JOISTS ABOVE BOTTOM CORD OF JOISTS. COORDINATE WITH STRUCTURAL AND OWNERS REP.
3. COORDINATE FINAL LOCATIONS OF ALL NFWH WITH BUILDING OWNERS REP, ARCHITECT, ETC.
4. ALL HORIZONTAL SANITARY, WASTE, & STORM PIPING SHALL BE SLOPED AT 1/8" PER FOOT, UNLESS OTHERWISE NOTED, IN DIRECTION OF FLOW.
6. REFER TO ARCHITECTURAL FOR ALL STORM DRAINAGE.
7. REFER TO PLUMBING SPECIFICATIONS FOR FCO SPECIFICATION.
8. FIRE PROTECTION SYSTEM SHALL BE DESIGNED AROUND ESFR PROTECTION AS PER SPECIFICATION SECTION 21-13-00.
9. ALL PIPING SHALL BE BRACED AS REQUIRED BY LOCAL CODES AND SIESMIC LOADING.
10. ALL ENTERING GAS PIPE SHALL CONTAIN A MAIN SHUTOFF VALVE. THE VALVE SHALL BE TAGGED AND AN IDENTIFICATION SIGN INSTALLED ON THE WALL ABOVE THE VALVE.
11. PIPE SUPPORT ATTACHMENT TO BRIDGING OR METAL ROOF DECK IS STRICTLY PROHIBITED. REFER TO STRUCTURAL FOR ADDITIONAL INFORMATION.
12. REFER TO STRUCTURAL DRAWINGS FOR ALL DROPPED FOOTINGS ASSOCIATED WITH PLUMBING BELOW GRADE.
13. THE SIZE, NUMBER AND LOCATION OF THE FIRE PROTECTION RISERS SHALL BE DETERMINED BY THE FIRE PROTECTION SUBCONTRACTOR. THE FIRE PROTECTION RISER INSTALLATION SHALL BE PER NFPA GUIDELINES AND APPROVED BY LOCAL AUTHORITY, FIRE MARSHALL, AND ALL PREVAILING CODES.
14. LOUVERS SHALL BE GREENHECK LOUVERS WITH A 6" DEEP FRAME AND A MINIMUM WATER ENTRAINMENT RATE OF 1,107 FT/MIN.

KEYNOTES:
(APPLY THIS PAGE ONLY)

(1) PROVIDE A STORM PROOF LOUVER WITH BIRD SCREEN WITH THE FREE AREA AS INDICATED. COORDINATE FINAL SIZING AND LOCATION WITH ARCHITECT. COORDINATE FINISH WITH ARCHITECT. PROVIDE WITH A SEPARATE MOD INTERLOCKED TO FAN AS SHOWN. MOD SHALL FULLY OPEN PRIOR TO FAN ENERGIZING. LOUVERS SHALL BE GREENHECK EHH-501X, HURRICANE RATED FOR MISSILE IMPACT, 200PSF, AND WIND DRIVEN RAIN RATED WITH WELDED CONSTRUCTION, OR APPROVED EQUAL.

(2) PROVIDE 2½" CW STUB FOR FUTURE TENANT USE. PROVIDE TAP WITH SHUT-OFF VALVE.

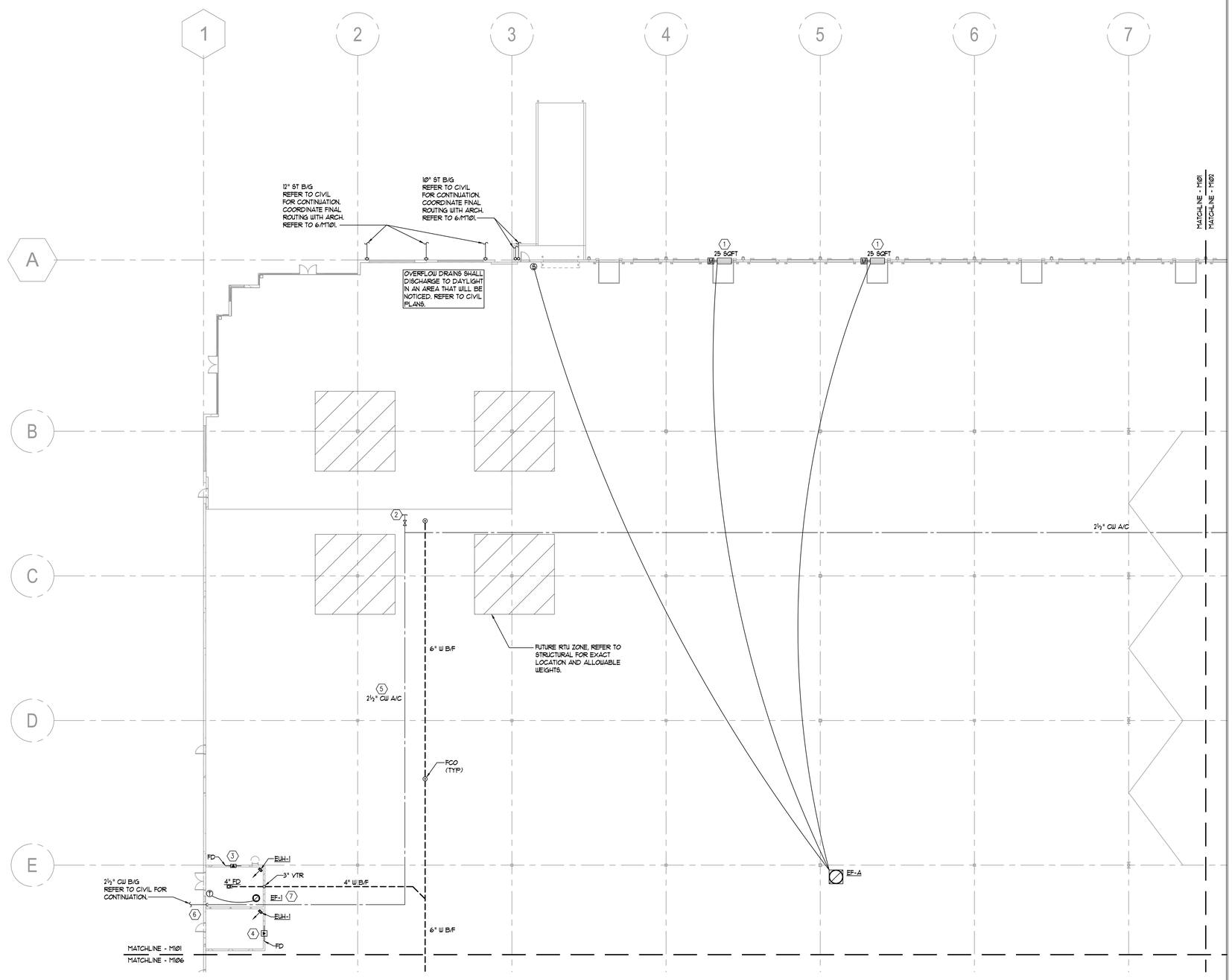
(3) PROVIDE RETURN AIR OPENING WITH MINIMUM 4.0 SQ. FT. OF FREE AREA AND A FIRE DAMPER. MOUNT AS HIGH AS POSSIBLE. PROVIDE WITH MOTOR OPERATED DAMPER WHICH SHALL BE NORMALLY CLOSED AND SHALL OPEN WHENEVER EF-1 IS ENERGIZED.

(4) PROVIDE TWO (2) AIR OPENINGS WITH 1.0 SQ. FT OF FREE AREA EACH. PROVIDE ½" MESH HARDWARE CLOTH AND FRAME ON BOTH SIDES OF OPENINGS. MOUNT ONE (1) 6" A.F.F. AND ONE (1) 6" BELOW CEILING. COORDINATE CLOSELY WITH DIV. 16. DO NOT VIOLATE ANY NEC CLEARANCES.

(5) RUN CW LINE DIRECTLY ABOVE SANITARY LINE. CW LINE SHALL BE RUN INSIDE JOISTS ABOVE BOTTOM CORD OF JOISTS. COORDINATE WITH STRUCTURAL FOR SPACE REQUIREMENTS INSIDE OF JOISTS.

(6) REFER TO 3/M701 FOR THE INCOMING WATER RISER.

(7) ROUTE 22X16 DUCT DOWN FROM EXHAUST FAN AND STUB INTO PUMP ROOM. RROVIDE PENETRATION WITH FIRE DAMPER AND ½" MESH HARDWARE CLOTH. COORDINATE PENETRATION WITH ARCH AND STRUCTURAL.



1 M101 PARTIAL FLOOR PLAN 'A' – MECHANICAL
1/16" = 1'-0"

RANDALL PAULSON architects

STATE OF FLORIDA REGISTRATION NUMBER
AA-0003296

SHELLY MARIE BARRETT LICENSED ARCHITECT No. 0039273 STATE OF FLORIDA REGISTERED PROFESSIONAL ARCHITECT

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1/10/2019

BW&A Barrett, Woodyard & Associates, Inc.

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Norcross, GA 30092
Phone (770) 810-8800
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Job #181002

STATE OF FLORIDA
CERTIFICATE OF AUTHORIZATION
NO. 27536

A SPECULATIVE WAREHOUSE AT WESTLAKE 3

DEVELOPED BY

PATTILLO Industrial Real Estate

Duval County, Florida

Print Record

08 NOVEMBER 2019	90% REVIEW SET
09 JANUARY 2019	ISSUED FOR PERMIT

Revision Record

Date 09 JANUARY 2019 *Project No.* 2018245.00

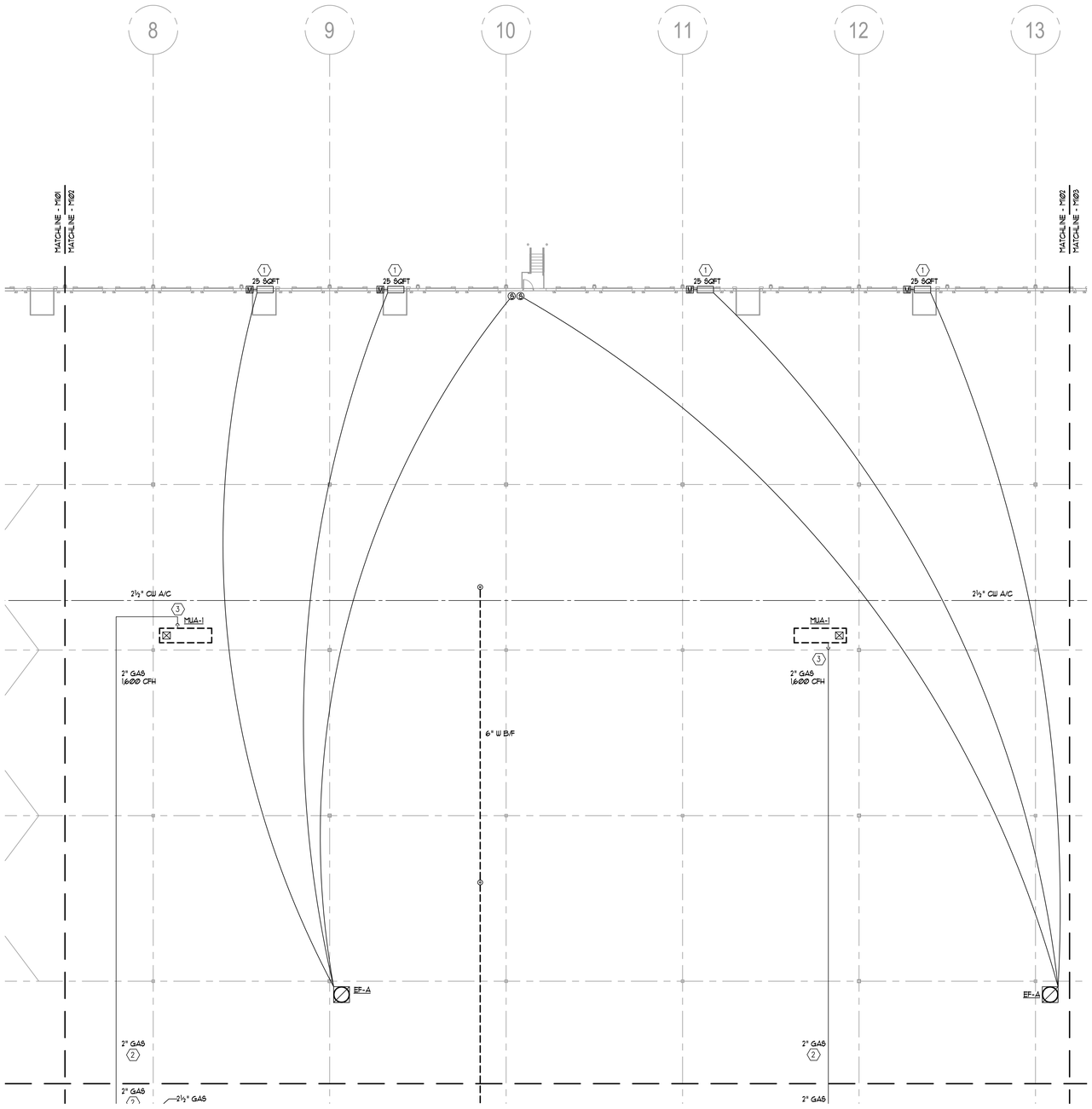
Sheet Title
PARTIAL FLOOR PLAN 'A' - MECHANICAL

Sheet No.
M101

■ Released for Construction
□ Not Released for Construction

KEYNOTES:
(APPLY THIS PAGE ONLY)

1. PROVIDE A STORM PROOF LOUVER WITH BIRD SCREEN WITH THE FREE AREA AS INDICATED. COORDINATE FINAL SIZING AND LOCATION WITH ARCHITECT. COORDINATE FINISH WITH ARCHITECT. PROVIDE WITH A SEPARATE MOD INTERLOCKED TO FAN AS SHOWN. MOD SHALL FULLY OPEN PRIOR TO FAN ENERGIZING. LOUVERS SHALL BE GREENHECK EHH-501X, HURRICANE RATED FOR MISSILE IMPACT, 200PSF, AND WIND DRIVEN RAIN RATED WITH WELDED CONSTRUCTION, OR APPROVED EQUAL.
2. GAS PIPING SIZED AT 2.0 PSI. ROUTE BELOW ROOF.
3. ROUTE GAS LINE UP THROUGH ROOF TO MUA. PROVIDE GAS CONNECTION TO MUA WITH GAS COCK, DIRT LEG, AND TEST T, REFER TO 2/M701 FOR ALL REQUIRED ACCESSORIES.



1 M102 PARTIAL FLOOR PLAN 'B' – MECHANICAL
1/16" = 1'-0"

RANDALL PAULSON architects

STATE OF FLORIDA REGISTRATION NUMBER
AA-0003296

SHELLY CARNEY LICENSE No. 0039278 STATE OF FLORIDA PROFESSIONAL ENGINEER

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A SPECULATIVE WAREHOUSE AT

WESTLAKE 3

DEVELOPED BY

PATTILLO Industrial Real Estate

Duval County, Florida

Print Record

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Revision Record

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Sheet Title
PARTIAL FLOOR PLAN 'B' - MECHANICAL

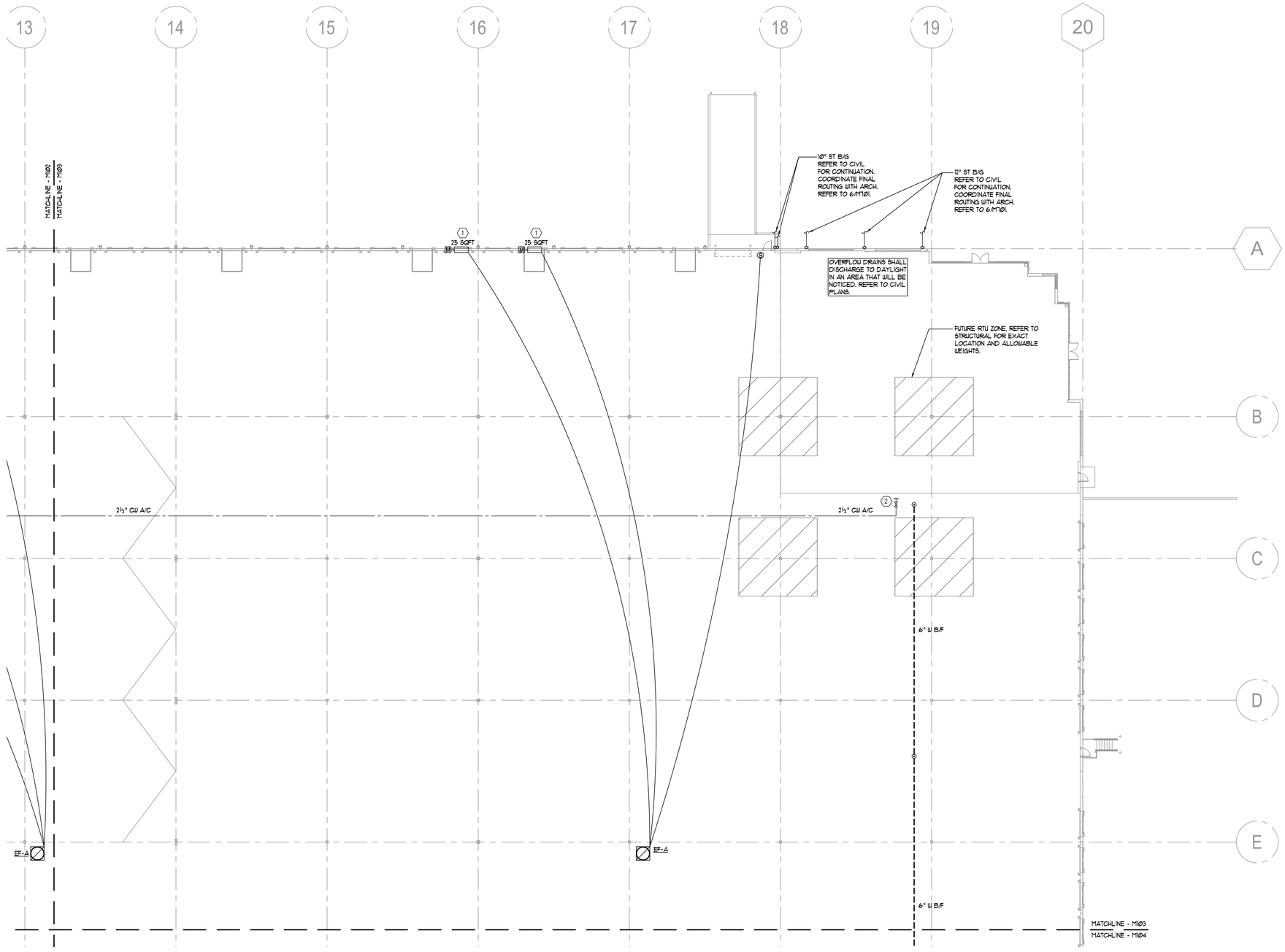
Sheet No.
M102

■ Released for Construction
□ Not Released for Construction

KEYNOTES:
(APPLY THIS PAGE ONLY)

1. PROVIDE A STORM PROOF LOUVER WITH BIRD SCREEN WITH THE FREE AREA AS INDICATED. COORDINATE FINAL SIZING AND LOCATION WITH ARCHITECT. COORDINATE FINISH WITH ARCHITECT. PROVIDE WITH A SEPARATE MOD INTERLOCKED TO FAN AS SHOWN. MOD SHALL FULLY OPEN PRIOR TO FAN ENERGIZING. LOUVERS SHALL BE GREENHECK EHH-501X, HURRICANE RATED FOR MISSILE IMPACT, 200PSF, AND WIND DRIVEN RAIN RATED WITH WELDED CONSTRUCTION, OR APPROVED EQUAL.

2. PROVIDE 2" CW STUB FOR FUTURE TENANT USE. PROVIDE TAP WITH SHUT-OFF VALVE.



1 / M103 PARTIAL FLOOR PLAN 'C' – MECHANICAL
1/16" = 1'-0"

RANDALL PAULSON architects

STATE OF FLORIDA REGISTRATION NUMBER
AA-0003296

SHELLY CARNETT LICENSED ARCHITECT No. 0039279 STATE OF FLORIDA PROFESSIONAL ENGINEER

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A SPECULATIVE WAREHOUSE AT WESTLAKE 3

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Sheet Title
PARTIAL FLOOR PLAN 'C' - MECHANICAL

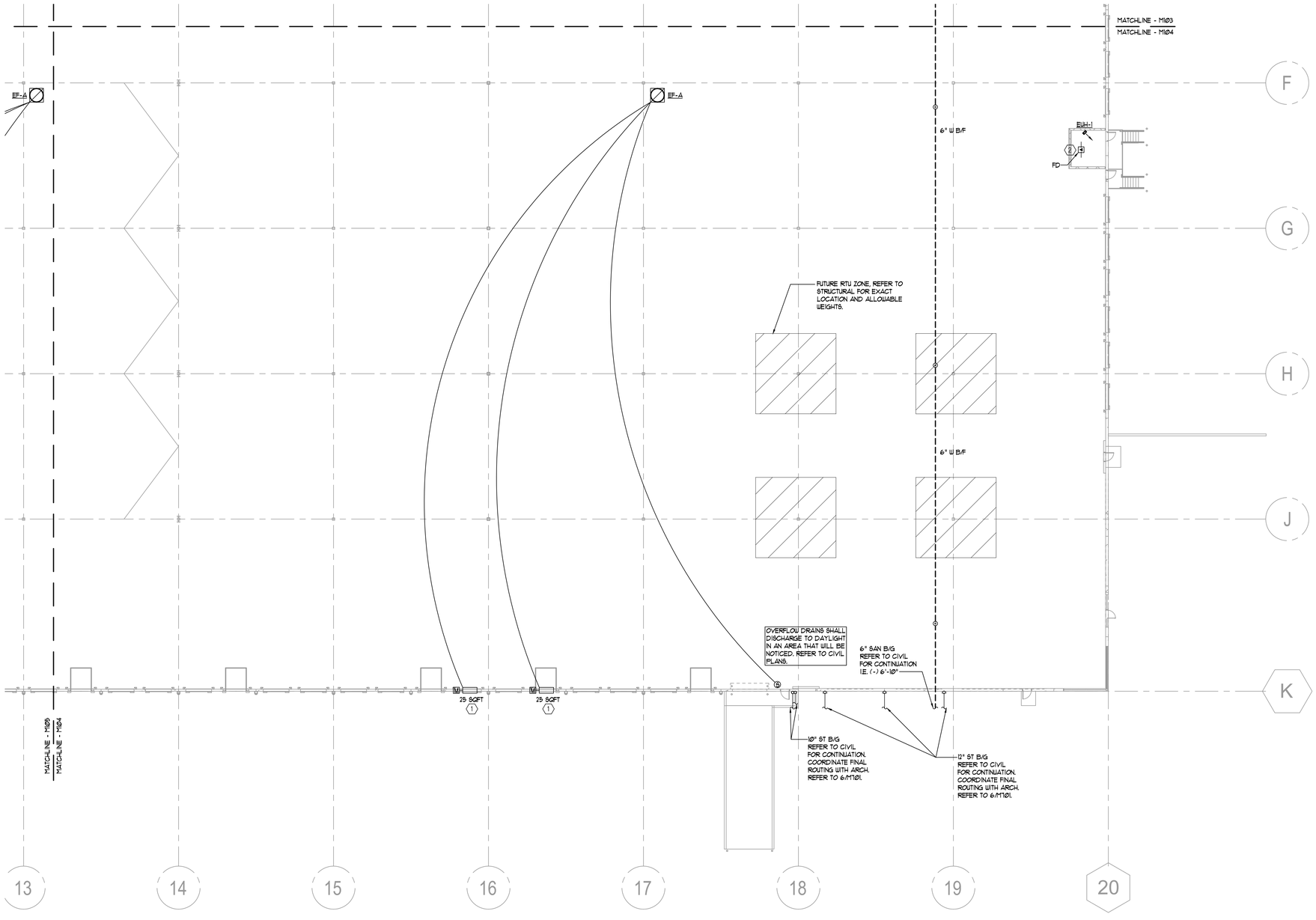
Sheet No.
M103

■ Released for Construction
□ Not Released for Construction

KEYNOTES:
(APPLY THIS PAGE ONLY)

1. PROVIDE A STORM PROOF LOUVER WITH BIRD SCREEN WITH THE FREE AREA AS INDICATED. COORDINATE FINAL SIZING AND LOCATION WITH ARCHITECT. COORDINATE FINISH WITH ARCHITECT. PROVIDE WITH A SEPARATE MOD INTERLOCKED TO FAN AS SHOWN. MOD SHALL FULLY OPEN PRIOR TO FAN ENERGIZING. LOUVERS SHALL BE GREENHECK EHH-501X, HURRICANE RATED FOR MISSILE IMPACT, 200PSF, AND WIND DRIVEN RAIN RATED WITH WELDED CONSTRUCTION, OR APPROVED EQUAL.

2. PROVIDE TWO (2) AIR OPENINGS WITH 1.0 SQ. FT OF FREE AREA EACH. PROVIDE ½" MESH HARDWARE CLOTH AND FRAME ON BOTH SIDES OF OPENINGS. MOUNT ONE (1) 6" A.F.F. AND ONE (1) 6" BELOW CEILING. COORDINATE CLOSELY WITH DIV. 16. DO NOT VIOLATE ANY NEC CLEARANCES.



1 / M104 PARTIAL FLOOR PLAN 'D' – MECHANICAL
1/16" = 1'-0"

RANDALL PAULSON architects

STATE OF FLORIDA REGISTRATION NUMBER
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A SPECULATIVE WAREHOUSE AT

WESTLAKE 3

DEVELOPED BY

PATTILLO Industrial Real Estate

Duval County, Florida

Print Record

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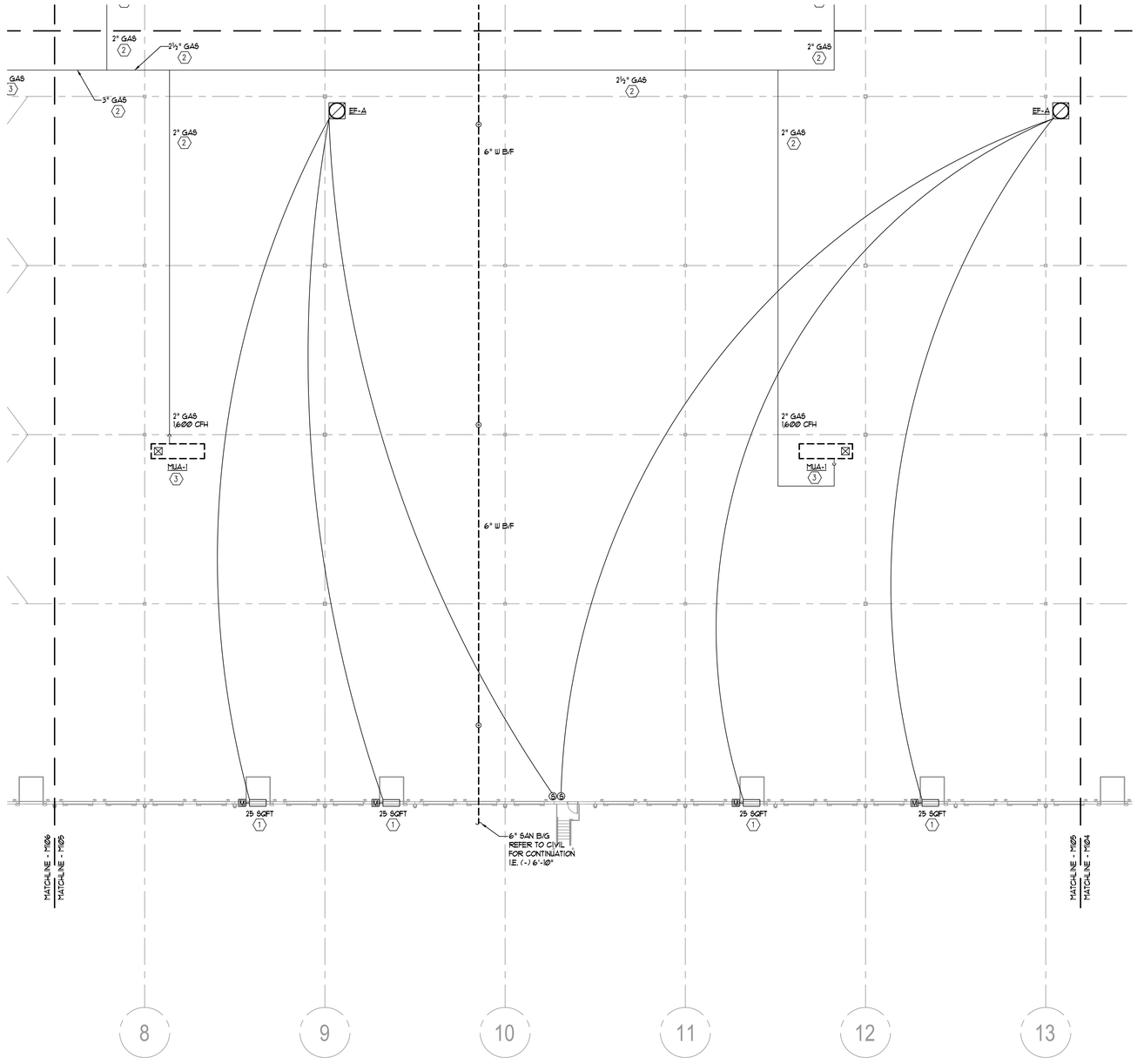
Sheet Title
PARTIAL FLOOR PLAN 'D' - MECHANICAL

Sheet No.
M104

■ Released for Construction
□ Not Released for Construction

KEYNOTES:
(APPLY THIS PAGE ONLY)

1. PROVIDE A STORM PROOF LOUVER WITH BIRD SCREEN WITH THE FREE AREA AS INDICATED. COORDINATE FINAL SIZING AND LOCATION WITH ARCHITECT. COORDINATE FINISH WITH ARCHITECT. PROVIDE WITH A SEPARATE MOD INTERLOCKED TO FAN AS SHOWN. MOD SHALL FULLY OPEN PRIOR TO FAN ENERGIZING. LOUVERS SHALL BE GREENHECK EHH-501X, HURRICANE RATED FOR MISSILE IMPACT, 200PSF, AND WIND DRIVEN RAIN RATED WITH WELDED CONSTRUCTION, OR APPROVED EQUAL.
2. GAS PIPING SIZED AT 2.0 PSI. ROUTE BELOW ROOF.
3. ROUTE GAS LINE UP THROUGH ROOF TO MUA. PROVIDE GAS CONNECTION TO MUA WITH GAS COCK, DIRT LEG, AND TEST T, REFER TO 2/M701 FOR ALL REQUIRED ACCESSORIES.



1 / M105 PARTIAL FLOOR PLAN 'E' – MECHANICAL
1/16" = 1'-0"

RANDALL PAULSON architects

STATE OF FLORIDA REGISTRATION NUMBER
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A SPECULATIVE WAREHOUSE AT WESTLAKE 3

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Duval County, Florida

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Sheet Title
PARTIAL FLOOR PLAN 'E' - MECHANICAL

Sheet No.
M105

■ Released for Construction
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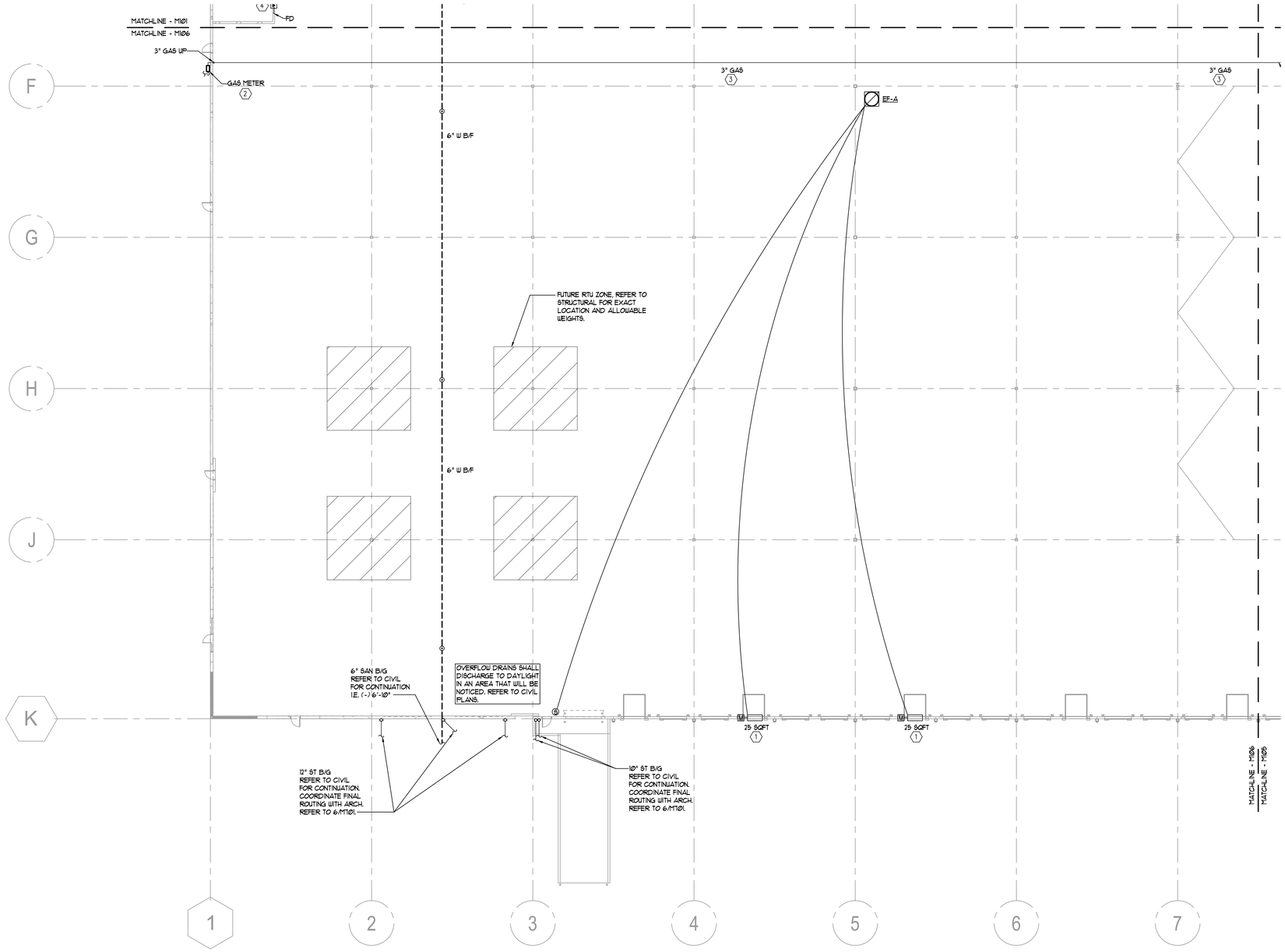
KEYNOTES:
(APPLY THIS PAGE ONLY)

1. PROVIDE A STORM PROOF LOUVER WITH BIRD SCREEN WITH THE FREE AREA AS INDICATED. COORDINATE FINAL SIZING AND LOCATION WITH ARCHITECT. COORDINATE FINISH WITH ARCHITECT. PROVIDE WITH A SEPARATE MOD INTERLOCKED TO FAN AS SHOWN. MOD SHALL FULLY OPEN PRIOR TO FAN ENERGIZING. LOUVERS SHALL BE GREENHECK EHH-501X, HURRICANE RATED FOR MISSILE IMPACT, 200PSF, AND WIND DRIVEN RAIN RATED WITH WELDED CONSTRUCTION, OR APPROVED EQUAL.

2. GAS SERVICE, METER, RIG, AND PIPING TO BE PROVIDED AND INSTALLED BY CONTRACTOR PER UTILITY COMPANY REQUIREMENTS. ROUTE @ 2 PSI AND REGULATE AS REQUIRED TO EQUIPMENT. (LONGEST RUN IS APPROX 775 FT. AND CFH TOTAL IS 6,400) NOTE: GAS PIPING MANIFOLD SHALL BE SIZED AND INSTALLED TO ACCOMMODATE FUTURE TENANT GAS LOAD AND METERS.

3. GAS PIPING SIZED AT 2.0 PSI. ROUTE BELOW ROOF.



1 / M106 PARTIAL FLOOR PLAN 'F' – MECHANICAL
1/16" = 1'-0"

RANDALL PAULSON architects

STATE OF FLORIDA REGISTRATION NUMBER AA-0003296

SHELLY ANNE BARRETT LICENSED No. 0039278 STATE OF FLORIDA PROFESSIONAL ENGINEER

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NO. 27536

A SPECULATIVE WAREHOUSE AT

WESTLAKE 3

DEVELOPED BY

PATTILLO Industrial Real Estate

Duval County, Florida

Print Record

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09 JANUARY 2019	ISSUED FOR PERMIT

Revision Record

Date 09 JANUARY 2019
Project No. 2018245.00

Sheet Title
PARTIAL FLOOR PLAN 'F' - MECHANICAL

Sheet No.
M106

■ Released for Construction
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ABBREVIATIONS

A/C	ABOVE CEILING
AD	ACCESS DOOR
ADJ	ADJUSTABLE
AFF	ABOVE FINISHED FLOOR
AUTO	AUTOMATIC
AC	AIR CONDITIONING
AHU	AIR HANDLING UNIT
BAL	BALANCING
BDD	BACKDRAFT DAMPER
B/F	BELOW FLOOR
B/G	BELOW GRADE
B'FLY	BUTTERFLY
BHP	BRAKE HORSEPOWER
BCO	BASE CLEANOUT
CFM	CUBIC FEET PER MINUTE
CBCR	CURVED BLADE CEILING REGISTER
CD	CEILING DIFFUSER
CU	CONDENSING UNIT
CW	COLD WATER (DOMESTIC)
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
CWS	CONDENSER WATER SUPPLY
CWR	CONDENSER WATER RETURN
CON	CONCENTRIC
CO	CLEANOUT
COND	CONDENSATE
db	DRY BULB
DN	DOWN
DR	DRAIN
do	DITTO
dB	DECIBELS
DWG	DRAWING
EA	EACH
EAT	ENTERING AIR TEMPERATURE
ECC	ECCENTRIC
EF	EXHAUST FAN
EOD	EMERGENCY OVERFLOW DRAIN
ER	EXHAUST REGISTER
ESP	EXTERNAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
EFF	EFFICIENCY
F	FAHRENHEIT
FCO	FLOOR CLEANOUT
FCU	FAN COIL UNIT
FSD	FIRE/SMOKE DAMPER
FD	FIRE DAMPER OR FLOOR DRAIN
FL DR	FLOOR DRAIN (only)
FLR	FLOOR
FOB	FLAT ON BOTTOM
FOR	FUEL OIL RETURN
FOS	FUEL OIL SUPPLY
FOT	FLAT ON TOP
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FT	FEET
G	GATE
GA	GAUGE
GPM	GALLONS PER MINUTE
GL	GLOBE
GCO	GRADE CLEANOUT
HD	HUB DRAIN
HP	HORSEPOWER
HTG	HEATING
HW	HOT WATER (DOMESTIC)
HWR	HOT WATER RETURN
HWRR	HOT WATER REVERSE RETURN
HWS	HOT WATER SUPPLY
Hz	HERTZ
ID	INSIDE DIMENSION
IN	INCHES
KW	KILOWATTS
LAT	LEAVING AIR TEMPERATURE
LB	POUNDS
LG	LINEAR GRILLE
LRG	LINEAR RETURN GRILLE
LWR	LOOP WATER RETURN
LWS	LOOP WATER SUPPLY
MIN	MINIMUM
MAX	MAXIMUM
MD	MANUAL DAMPER
MOD	MOTOR OPERATED DAMPER
MFR	MANUFACTURER
NC	NORMALLY CLOSED
NG	NATURAL GAS
NFWH	NON-FREEZE WALL HYDRANT
NO	NORMALLY OPEN
NOM	NOMINAL
OA	OUTSIDE AIR
OD	OUTSIDE DIMENSION
OBD	OPPOSED BLADE DAMPER
PIU	POWERED INDUCTION UNIT
PSI	POUNDS PER SQUARE INCH
RA	RETURN AIR
RAD	RADIUS
RAG	RETURN AIR GRILLE
RED	REDUCER
RL	REFRIGERANT LIQUID
RS	REFRIGERANT SUCTION
RTU	ROOFTOP UNIT
RAR	RETURN AIR REGISTER
SP	STATIC PRESSURE
SPS	STATIC PRESSURE SENSOR
SA	SUPPLY AIR
SAN	SANITARY
SD	SMOKE DAMPER
SEN	SENSIBLE
SQ	SQUARE
SR	SUPPLY REGISTER
ST	STORM
SS	SPLIT SYSTEM
TEMP	TEMPERATURE
TG	TRANSFER GRILLE
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
V	VENT
VA	VALVE
VTR	VENT THRU ROOF
VAV	VARIABLE AIR VOLUME
wb	WET BULB
WC	WATER COLUMN
WHA	WATER HAMMER ARRESTOR
WT	WEIGHT
W	WASTE

LEGEND

	CEILING DIFFUSER
	CEILING RETURN AIR GRILLE or EXHAUST GRILLE
	SIDE-WALL or DUCT MOUNTED REGISTER
	SLOT DIFFUSER
	MANUAL VOLUME DAMPER
	FIRE DAMPER, FIRE SMOKE DAMPER
T	THERMOSTAT
H	HUMIDISTAT
CO2	CO2 MONITOR
M	MOTOR OPERATED DAMPER
	EXISTING WORK
	NEW WORK
	WORK TO BE REMOVED
SD	SMOKE DETECTOR
R	PRESSURE REGULATOR VALVE 5 PSI TO 7" WATER GAUGE

LEGEND

	COLD WATER
	HOT WATER
	HOT WATER RETURN
	VENT
	SANITARY WASTE
	GAS
	WORK TO BE REMOVED
R	FLOOR DRAIN
	HOSE BIBB
	FLOOR CLEAN-OUT
	WALL CLEAN-OUT

FAN SCHEDULE

I.D. TAG	CAPACITY (CFM)	S.P. (IN. WG)	MOTOR H.P.	DRIVE	VOLTS/ PHASE	MAXIMUM FAN RPM	MAXIMUM NOISE	TYPE OF FAN	BASIS OF DESIGN	REMARKS
EF-1	2,000	0.50	1/2	BELT	115/1	1293	11.9 SONES	CENTRIFUGAL ROOF	GREENHECK GB-141-5	① ② ③ ④
EF-A	30,000	0.25	5.0	BELT	460/3	548	77 dBA	UPBLAST FAN	GREENHECK RBU-3L54-100	② ③ ⑤

① PROVIDE FAN WITH A WALL MOUNTED THERMOSTAT
② PROVIDE FAN WITH A STARTER AND A MATCHED MOTOR STARTER SHALL HAVE A 24 V OR 120 V OUTPUT TO CONTROL THE ASSOCIATE MOD.
③ PROVIDE FAN WITH A BACKDRAFT DAMPER.
④ PROVIDE FAN WITH A MOTOR GUARD AND A BIRDSCREEN.
⑤ PROVIDE FAN WITH A ALUMINUM ROOF CURB AND DAMPER LATCHES.

MAKE UP AIR UNIT SCHEDULE

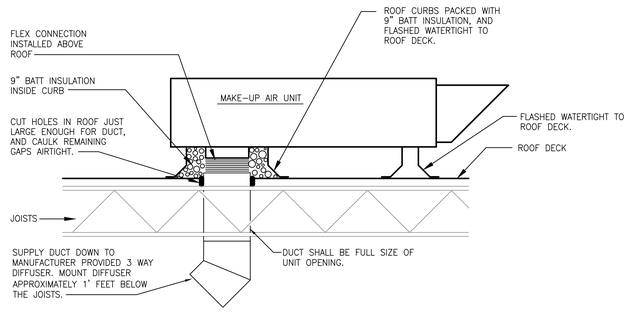
	FAN SECTION						HEATING SECTION				
I.D. TAG	AIRFLOW (CFM)	EXT. SP. (IN. WG)	MAX H.P.	FAN RPM	DRIVE	VOLTS/ PHASE	TYPE	CAPACITY (MBH) INPUT	CAPACITY (MBH) OUTPUT	BASIS OF DESIGN	REMARKS
MUA-1	11,021	0.05	7.5	667	BELT	460/3	DIRECT GAS	1,600	1,472	GREENHECK DGX-120-H32-GH100-1600	① ②

① PROVIDE WITH FACTORY SUPPLIED THREE (3) ADJUSTABLE DISCHARGE NOZZLE WITH A 45 DEGREE ELBOW.
② PROVIDE WITH A TEMPERATURE REMOTE CONTROL SYSTEM.

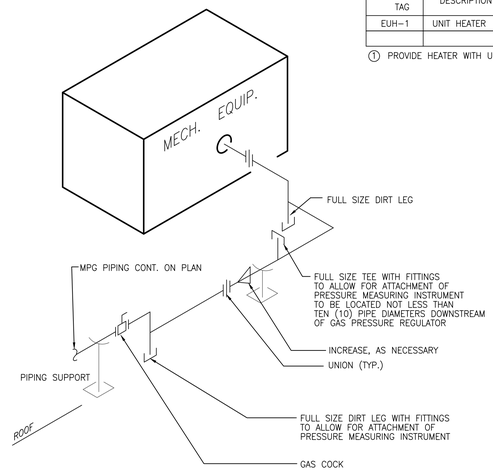
ELECTRIC HEATER SCHEDULE

I.D. TAG	DESCRIPTION	CAPACITY KW	MIN CFM	FAN HP	S.P. (IN. WG)	VOLTS/ PHASE	BASIS OF DESIGN	REMARKS
EUH-1	UNIT HEATER	5.0	400	–	–	460/3	REDDI UH05	①

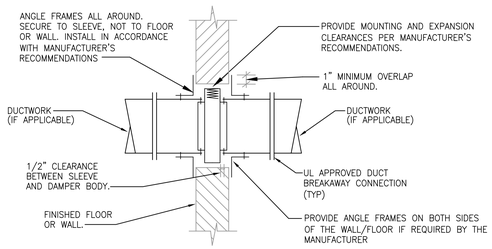
① PROVIDE HEATER WITH UNIT MOUNTED THERMOSTAT AND INTEGRAL DISCONNECT.



1 M701 MAKE UP AIR UNIT DETAIL
NO SCALE

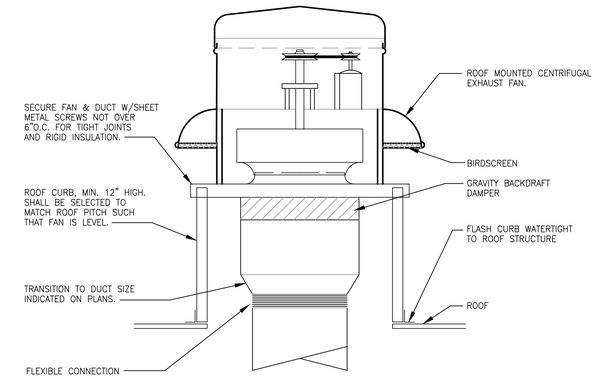


2 M701 GAS CONNECTION DETAIL
NO SCALE

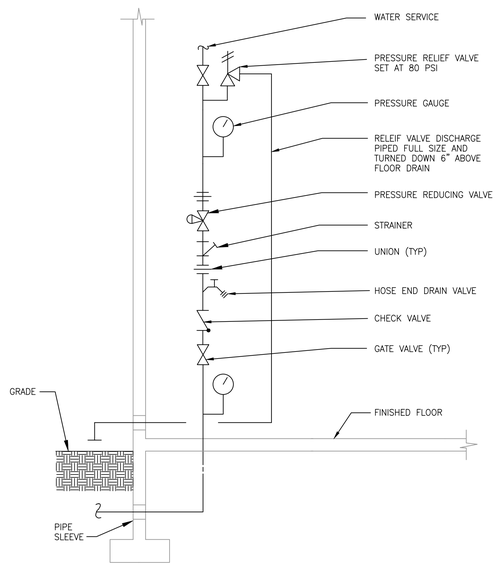


4 M701 FIRE DAMPER DETAIL
NO SCALE

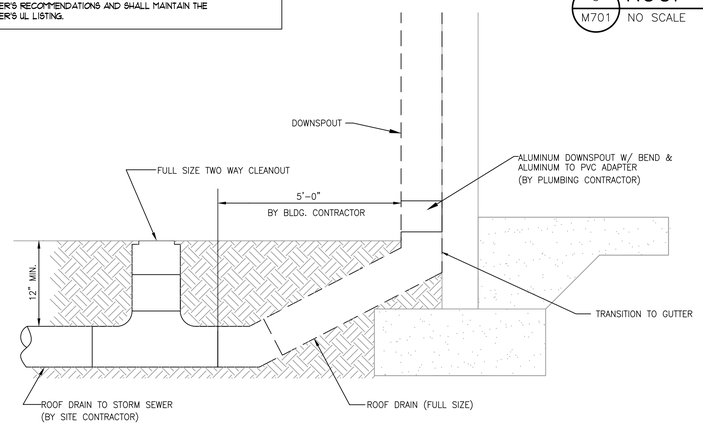
NOTES:
INSTALLATION SHALL SHALL BE IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND SHALL MAINTAIN THE MANUFACTURER'S UL LISTING.



5 M701 ROOF MOUNTED CENTRIFUGAL EXHAUST FAN
NO SCALE



3 M701 WATER SERVICE RISER
NO SCALE



6 M701 DOWNSPOUT CONNECTION DETAIL
NO SCALE

RANDALL PAULSON architects
STATE OF FLORIDA REGISTRATION NUMBER AA-0003296
SHELLY BARRETT LICENSE No. 0039279 STATE OF FLORIDA PROFESSIONAL ENGINEER
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Job #181002
STATE OF FLORIDA CERTIFICATE OF AUTHORIZATION NO. 27536

A SPECULATIVE WAREHOUSE AT WESTLAKE 3 DEVELOPED BY PATTILLO Industrial Real Estate

Duval County, Florida

Print Record

09 NOVEMBER 2018	90% REVIEW SET
09 JANUARY 2019	ISSUED FOR PERMIT

Revision Record

Date 09 JANUARY 2019 *Project No.* 2018245.00

Sheet Title
ABBREVIATIONS, SCHEDULES, & DETAILS - MECHANICAL

Sheet No.
M701

■ Released for Construction
□ Not Released for Construction

SECTION 15010

MECHANICAL GENERAL

1.0 GENERAL

1.01 DESCRIPTION

A. This Division 15 and the accompanying drawings cover the provision of all labor, equipment, appliances, and materials and performing all operations in connection with the construction of the air conditioning, ventilating, heating, fire suppression and plumbing systems as specified herein and as shown.

B. The General Provisions and Division 1 including the general, supplementary and other conditions and other Divisions, as appropriate, apply to work specified in this Division.

1.02 EXISTING CONDITIONS

A. Attention is called to the fact that the work is to be performed within an existing, operational facility. Prior to the submission of bids, each bidder shall visit the project site, thoroughly investigate and be familiar with all existing conditions which will affect their works especially the work to be performed above the existing ceilings.

B. Connect new work to existing work in a neat and workmanlike manner. Where an existing structure must be cut or existing utilities interfere, such obstructions shall be bypassed, removed, replaced or relocated, patched and repaired. Work disturbed or damaged shall be replaced or repaired to its prior condition.

1.03 INTENT OF DRAWINGS AND SPECIFICATIONS

A. The implied and stated intent of the drawings and specifications is to establish minimum acceptable standards for materials, equipment and workmanship, and to provide operable mechanical systems complete in every respect.

B. The engineering drawings are diagrammatic, intended to show general arrangement and sizes of system components, and shall not be scaled. Rather, the architectural and structural drawings shall govern space constraints, dimensions and finishes. All offsets and fittings which will be necessary to accomplish the finished installation shall be provided at no additional cost or increase in the Contract.

1.04 SPACE PRIORITY

A. Ensure optimum use of available space for materials and equipment installed above ceilings. Allocate space in the order of priority as listed below except as otherwise detailed. Items are listed in the order of priority, with items of equal importance listed under a single priority number.

1. Gravity flow piping systems
2. Vent piping systems
3. Recessed lighting fixtures
4. Concealed HVAC terminals and equipment
5. Air duct systems
6. Sprinkler piping systems
7. Pressurized piping systems
8. Electrical conduit, wiring, control air tubing

B. Order of space priority does not dictate installation sequence. Installation sequence shall be as required to install all affected trades.

C. The work of this Division 15 shall not obstruct access for installation, operation and maintenance of the work of any other Division.

D. All major items of equipment shall be arranged so as to provide a minimum of 28" clear aisle space. Additional space shall be provided between and around equipment for maintenance and proper operation as shown in the equipment manufacturer's literature.

1.05 COORDINATION

A. Coordinate all work under this Division 15 with work under all other Divisions, providing adjustment as necessary.

B. Coordination of space requirements with respect to Division 16 shall be performed such that:

1. No equipment, piping or ductwork, other than electrical, shall be installed within 42" of switchboards or panelboards.

2. No piping or ductwork which ever operates at a temperature in excess of 120 degrees F. shall be installed within 3" of any electrical conductor.

C. All items mounted in or below the ceiling, and all items penetrating the ceiling, shall be coordinated with the architectural reflected ceiling plans. If any items are not shown on these plans, or any items need to be relocated for coordination purposes, prepare a reflected ceiling plan and submit it to the Architect for approval.

1.06 CODE COMPLIANCE

A. All workmanship and materials provided under this Division 15 shall comply with all laws, ordinances, codes and regulations of all Federal, State and Local Authorities having jurisdiction.

B. All fire suppression, plumbing, heating, ventilating, and air conditioning materials and workmanship shall comply with all local and state codes and standards as minimum requirements.

C. Secure and pay all fees associated with all permits and licenses required for execution of the Contract. Arrange for all inspections required by city, county, state and other authorities having jurisdiction, and deliver certificates of approval to the Architect.

D. The code requirements are strictly a minimum and shall be met without incurring additions to the Contract. Where requirements of the drawings or specifications exceed the code requirements, the work shall be provided in accordance with these drawings or specifications. In the event of conflict or ambiguity between the various codes, the most stringent requirement shall govern.

1.07 ELECTRICAL REQUIREMENTS AND INTERFACE

A. All electrical equipment and wiring provided under this Division 15 shall comply with the electrical system characteristics indicated on the electrical drawings and specified in Division 16.

B. Electric controls, contactors, starters, pilot lights, push buttons, etc., shall be provided complete as part of the motor, heater or other equipment which it operates. All electrical components shall be in conformance with the requirements of the National Electrical Code and Division 16. Reference Division 16 and the electrical engineering drawings for those motor starters provided under that Division 16. All starters not shown shall be provided under this Division 15. Unless specified otherwise under other individual equipment Sections, motor starters shall conform to the following minimum requirements:

1. Starters for motors 1/3 horsepower or smaller shall be manual unless remote or automatic starting is required, in which case the starters shall be magnetic, full voltage, non-reversing, single-speed, unless otherwise indicated. All other starters shall be magnetic.

2. Each starter for a three-phase motor shall be furnished with three (3) overload relays sized for the full load running current of the motor actually provided. Provide an external "HAND-OFF-AUTO" selector switch with red "RUNNING" light. Provide a green pilot light to indicate motor "STOPPED". Each pilot light shall have a legend plate indicating reason for signal.

3. Each overload relay shall have a normally open alarm contact which will close only when actuated by an overload (not to be confused with N.O. or N.C. auxiliary contacts). These contacts shall be properly wired to their respective blue pilot light provided on the starter front cover and having a "TRIPPED" legend plate.

4. Individually mounted motor starters shall be in a NEMA Type 1 general purpose enclosure in unfinished areas and shall be flush mounted in all finished areas. All starters mounted in exterior areas shall have a NEMA 3R enclosure. Each starter shall have a laminated nameplate to indicate equipment unit number, function and circuit number.

5. All motor starters, push buttons and pilot lights shall be of the same manufacturer as the switchboard and shall be General Electric, Square D, Siemens I.T.E., or Westinghouse.

C. Motor starters for the following equipment shall be provided under this Division 15 by the manufacturer of the equipment:

1. Packaged air conditioning equipment
2. Water chillers
3. Fire pumps
4. Packaged booster pump systems
5. Other equipment hereinafter specified in other Sections to be provided with integral starters.

D. Unless otherwise noted or specified in individual Sections, all 3-phase motors shall be standard NEMA continuous duty "B" type, with Class B insulation, open drip-proof frame for indoor service, TEFC for outdoor service and a service factor of 1.15. All motors 5 HP and larger shall be U.S. Motors Hi-Efficiency Model or Reliance XE Hi-Efficiency Model.

E. All power wiring and final connections to equipment shall be provided under Division 16.

F. Control components, all interlocks (motor-operated dampers, fire alarm motors, etc.) and control wiring (120 volt, single phase and less) shall be provided under this Division 15 as required to achieve the specified control sequences.

G. All control wiring over 30 volts shall be installed by a licensed electrician working under this Division 15.

1.08 SLEEVES, SEALS AND ESCUTCHEONS

A. Sleeves shall be provided through all pipe penetrations of concrete or masonry walls, elevated floors and roofs, except those plumbing piping penetrations for fixtures, vents, etc.

B. Sleeves shall be fabricated from Schedule 40 steel pipe through 10" and Standard Wall steel pipe for sleeve sizes 12" and larger. All sleeves penetrating exterior walls, underground walls, pit or vault walls shall be provided with a 3" x 3/8" thick waterstop ring welded completely to the midpoint of the sleeve.

C. All sleeves penetrating exterior walls, underground walls, pit or vault walls and elevated floors shall be packed and sealed watertight.

D. Sleeves through roofs shall extend above the roof surface and be flashed watertight.

E. Sleeves through walls shall be cut and finished flush with each surface of the wall in which they are installed.

F. Sleeves shall be sized to provide a minimum of 1/2" clearance between the inside surface of the sleeve and the outside finished surface of the pipe plus any insulation specified.

G. Fire-stops shall be provided as specified herein. All annular spaces between piping and sleeves, which do not require fire-stops, shall be packed with mineral wool and caulked.

H. Provide round, chrome-plated escutcheons on all exposed piping penetrations passing through walls, floors, partitions and ceilings.

1.09 FIRE-STOPS

A. Where ductwork, piping, conduit, etc. pass through fire partitions, fire walls and floors, a fire-stop shall be provided that will ensure an effective barrier against the spread of fire, smoke and gases. Fire-stop material shall be packed tight and completely fill gaps between the ductwork, piping, conduit, etc. and the perimeter of their rough openings.

B. Fire-stopping material shall maintain its dimensions and integrity while preventing the passage of flame, smoke and gases under conditions of installation and use when exposed to the ASTM E119 time-temperature curve for a time period equivalent to the rating of the assembly penetrated. Fire-stopping material shall be noncombustible as defined by ASTM E136-1 and, for insulation materials, melt point shall be a minimum of 1700 degrees F. for 1-hour protection and 1850 degrees F. for 2-hour protection. Fire-stopping material shall be Dow-Corning RTV Foam or 3M Fire Barrier Products or Sohio Carborundum Fyre Putty.

C. See Section 15400 for fire stopping of PVC piping.

1.10 CORE DRILLING

A. Cutting of holes through concrete and masonry shall be by diamond core or concrete saw. Pneumatic hammer, impact electric and hand or manual hammer type drills will not be allowed, except as permitted by the Architect where required by limited working space. Locate holes such that they will not affect structural sections such as ribs or beams. Holes shall be laid out well in advance of the installation. These layout locations shall be approved by the Architect prior to drilling.

2.0 PRODUCTS

2.01 BID BASIS AND SUBSTITUTION PROCEDURES

A. Manufacturers names, series and model numbers, as noted or specified, are for the purpose of describing type, capacity, and quality of equipment, materials and products to be used. Unless "or equal" is specifically stated, bids shall be based only on the specified "basis of design" manufacturer. The listing of a particular manufacturer as an "equal" or "acceptable substitute" manufacturer shall not be misconstrued as approving nor allowing the substitution of that manufacturer's standard product in place of the basis of design. No consideration will be given to a product, which would require dimensional, spatial or aesthetic changes to the project. "Acceptable substitute" and "equal" manufacturers shall only bid those products, which exactly match the size and other characteristics of the specified basis of design. Any changes to other disciplines and trades of work required by an "or equal" or "substitute" product shall be duly considered and priced accordingly prior to bidding or pricing. The decision as to whether or not a proposed substitute or "equal" product is actually equal to that specified shall rest solely with the Architect.

B. Requests to provide "equal" products in lieu of those specified shall be submitted to the Architect in writing at least ten (10) days prior to final pricing and execution of the Contract. No consideration will be given to substitute products after final pricing and execution of the Contract.

C. Any "or equal" product or proposed product substitution which will cause a change in the appearance, dimensions or design of any part of the building, it structure, electrical system or any other engineered systems shall be accompanied by a scaled drawing and written description of the required change(s) for approval by the Architect. If deemed necessary by the Architect, design changes shall be signed and sealed by a registered Professional Engineer, currently licensed in this State.

2.02 MINIMUM STANDARDS

A. Every piece of energy consuming equipment, all fire suppression products and life safety equipment shall comply with the following standards as applicable(at especially in regard to prevailing codes:

1. Factory Mutual Laboratories (FM)
2. Industrial Risk Insurers (IRI)
3. Underwriters Laboratories, Inc. (UL)
4. ADC: Air Diffusion Council
5. AGA: American Gas Association
6. AMCA: Air Moving and Conditioning Association, Inc.
7. ANSI: American National Standards Institute
8. API: American Petroleum Institute
9. ARI: American Refrigeration Institute
10. ASHRAE: American Society of Heating, Refrigerating and Air Conditioning Engineers
11. ASME: American Society of Mechanical Engineers
12. ASTM: American Society of Testing and Materials
13. AWWA: American Water Works Association
14. IBR: Institute of Boiler and Radiator Manufacturers
15. MSS: Manufacturers Standardization Society
16. NBBPVI: National Board of Boiler and Pressure Vessel Inspectors
17. NEMA: National Electrical Manufacturer's Association
18. OSHA: Occupational Safety & Health Administration
19. PDI: Plumbing Drainage Institute
20. PPI: Plastic Pipe Institute
21. SMACNA: Sheet Metal and Air Conditioning Contractors National Association, Inc.

3.0 EXECUTION

3.01 SUBMITTALS

A. Before preparing submittals, study all Contract Drawings and specifications in detail, obtain manufacturer's recommended instructions, and have submittals prepared based on specific equipment and material proposed for installation. An officer of the contracting firm shall sign all shop drawings (certifying conformance with plans and specifications) before submitting to the Architect or releasing to the field.

B. The submittal process shall not be utilized as an avenue to substitute products after the execution of the contract. Should an unspecified or unequal product be submitted, it will be rejected. If a second attempt at substitution is made during the resubmittal of the same product, then no more reviews of that product will be performed without direct compensation to the Engineer being paid for the additional services required for the third review and any further reviews.

C. All submittals shall be submitted electronically and shall be returned electronically.

D. Submittals will not be accepted for review unless they:

1. Comply with the requirements of Division 1.
2. Include complete information pertaining to all appurtenances and accessories.
3. Are submitted as complete packages which pertain to all related items in Division 15. Separate packages shall be submitted as follows:
   a. All HVAC equipment and components
   b. All plumbing equipment, fixtures and components
   c. The fire suppression system
   d. The automatic controls and EMS
4. Are properly marked with equipment, service or function identification as related to the project and are marked with pertinent specification paragraph number.

E. Submit catalog information, factory assembly drawings, field installation drawings and certifications as required for complete explanation and description of all items of equipment. The submittal data shall provide ample, unquestionable compliance with the Contract Documents.

F. Review of submittals shall not be construed as authorizing any deviations from the plans and specifications unless such deviations are clearly identified and separately submitted in the form of a letter that is enclosed with the submittals.

G. Submittals are required on all manufactured equipment, especially energy consuming equipment. Submittals shall include, but are not limited to, the following items of equipment:

1. Insulation
2. Pumps
3. Plumbing Fixtures
4. Fire Protection System
5. Air Distribution Devices
6. Ductwork Accessories
7. Fans

3.02 EXCAVATION, TRENCHING AND BACKFILLING

A. Perform all excavation, trenching and backfilling for underground work under this Division 15. During excavation, the excavated material shall be piled back from the banks of the trench to avoid overloading, slides or cave-ins. Do not exceed the angle of repose unless written approval is obtained in advance from the Architect for shoring, bracing or other alternate excavation methods. All excavated material not used for backfilling shall be removed from the building and disposed of as indicated or directed by the Architect. Take measures to prevent surface water from flowing into trenches and other excavations and any water accumulating therein shall be removed by pumping. All excavation shall be made by open cut. Tunneling shall not be allowed.

B. The bottom of all trenches shall be evenly graded to provide firm support and an even bearing surface. Pipe shall be laid on firm soil, laid in straight lines and on uniform grades. Provide bell holes so that the barrel of the pipe rests evenly on the bottom of the trench along the entire length of the pipe.

C. Pipe shall be inspected and tested prior to backfilling. Trench shall be handfilled to a minimum of 12" above the top of pipe with suitable earth (free of rocks, trash, large clods and organic material) and compacted to a minimum 95% proctor. After the first layer is completed, subsequent layers shall be filled and compacted the same as the first layer. Settling the backfill with water shall not be permitted.

3.03 INSTALLATION REQUIREMENTS

A. All equipment shall be installed in strict conformance with the recommendations of the equipment manufacturer, as indicated on the Drawings and as specified.

B. Provide installation manuals for each piece of equipment. Submit in separately bound volumes after review of submittals.

C. Provide supplementary steel framing and welded steel equipment support stands as required for proper hanging and support of the mechanical systems. Steel angles, channels and tubing utilized for such framing shall be selected for a maximum deflection of 1/360th of the span.

D. All roof curbs shall be a minimum of 12" high and selected for the various roof pitches. Curbs installed on roofs having pitches of not more than 1/4" per foot may be standard curbs shimmed level with steel channels or 2s to provide suitable support and flashing surfaces.

3.04 CLEANING, LUBRICATION AND ADJUSTMENT

A. The exterior surfaces of all mechanical equipment, piping, ductwork, conduit, etc., shall be cleaned and free of all dirt, grease, oil, paint splatter, and other construction debris.

B. Ducts, plenums, and air unit casings shall be cleaned of all debris and either vacuumed or blown free of all rubbish, dirt, and dust before installing grilles, registers or diffusers.

C. Bearings that require lubrication shall be lubricated in strict accordance with the manufacturers recommendations.

D. All control equipment shall be adjusted to the settings required for the performance specified.

E. Fans shall be adjusted to the speed indicated by the manufacturer to meet the installed final system pressure at the airflows indicated. Any additional sheaves and belts required for final adjustments shall be provided with no increase in the Contract amount.

F. Any fans operated during construction shall have temporary filters. Temporary filters shall be changed regularly to minimize contamination of the equipment and duct systems. Permanent filters shall be installed prior to final inspection.

G. All coils shall be thoroughly cleaned and combed prior to final inspection.

3.05 PAINTING

A. All uncoated and uninsulated steel surfaces exposed to sight inside the building, such as piping, equipment hangers and supports which are not provided with factory prime coat or galvanizing, shall be cleaned and painted with one coat of rust inhibiting primer. In addition, all surfaces in finished spaces shall also be painted with two coats of finish paint in a color selected by the Architect.

B. All ductwork surfaces visible through grilles, registers and diffusers in finished areas shall be painted flat black.

C. Steel items exposed outside the building, such as equipment supports, uninsulated piping and hangers, which are not factory painted or galvanized, shall be cleaned and painted with one coat of rust inhibiting primer and two coats of asphaltic base aluminum paint. Insulated steel pipes outside the building shall be cleaned and painted with one coat of rust inhibiting primer before installing insulation.

D. Factory painted equipment that has been scratched or marred shall be repainted to match the original factory color.

3.06 DUCTWORK AND PIPING LEAK TESTING

A. Underground, concealed and insulated ductwork and piping shall be tested for leaks in place before backfilling, concealing or covering. Tests shall be conducted in the presence of the Architect or his designated representative.

B. All low pressure ductwork (design operating pressure of 10" W.C. E.S.P. or less) shall be tested by the operation of the system to which it is connected.

C. All medium and high pressure ductwork (operating pressure of more than 10" W.C. E.S.P.) shall be tested at 1.5 times the design operating pressure of the system to which it is connected, or at the total fan pressure at shut-off, whichever is greater.

D. All visible and audible air leaks from the ductwork systems shall be repaired.

E. Soil, waste, storm and vent piping shall be tested with water before installing fixtures. Water test shall be applied to the system either in its entirety or to the individual sections. Each opening except the highest opening of the section under test shall be plugged, and the section shall be filled with water and tested with a head of water of at least ten (10) feet above the highest point in the system. The water shall be kept in the portion under test for at least thirty (30) minutes; no drop in the water level will be acceptable.

F. The water piping systems shall be tested at a minimum pressure of 125 psi and proved tight at this pressure for not less than thirty (30) minutes or longer if required to permit inspection of all joints. No loss in pressure will be permitted.

I. Chilled water and condenser water shall be hydrostatically tested at a pressure of 100 psig (60 psig for PVC piping) for a minimum of one hour. No loss in pressure shall be permitted.

K. All refrigerant piping shall be 100% tested with a halide torch leak detector.

L. All leaks shall be repaired by tightening, remaking joints, or replacing pipe and fittings. Caulking of joints shall not be permitted.

M. All gas piping shall be tested pneumatically and proved tight at a pressure of not less than 100 psi for a period of not less than two (2) hours. No loss in pressure will be permitted.

3.07 RECORD (AS-BUILT) DRAWINGS

A. At the completion of the project, provide a set of reproducible sepias to the Architect which reflect all changes, deviations and revisions made to the original design documents. Locations of all underground piping and utilities shall be clearly shown and dimensioned from permanent reference points such as building column lines.

3.08 OPERATING AND MAINTENANCE MANUALS AND INSTRUCTIONS

A. Complete operating and maintenance manuals shall be provided to the Owner. Four copies shall be provided. Each copy shall be bound in a separate 3-ring, loose-leaf notebook. Operating instructions shall be provided for each mechanical system, and shall each include a brief system description, a simple schematic and a sequence of operation. Operating and maintenance instructions shall be provided for each piece of equipment. A control system wiring diagram shall be included in each operating and maintenance manual.

B. Prior to final acceptance or beneficial occupancy, provide the services of a competent technician for not less than two (2) hours to instruct the Owner in the operation of the mechanical systems.

3.09 TESTING AND BALANCING

A. Testing and balancing of the HVAC system shall be performed in accordance with the standards of AABC or NEBB and shall be performed under the direct supervision of a Certified Test and Balance Engineer. Note that this work is to be performed under a separate Contract directly under the General Contractor. Submit four (4) copies of the test and balance report directly to the Architect.

3.10 WARRANTY

A. All work provided under this Division 15 shall be subject to a minimum one year warranty. The warranty shall include prompt repair or replacement of equipment or system failures and shall include all parts and labor. In addition, all reciprocating air conditioning compressors shall carry an additional four year parts-only warranty. Extended warranties shall be provided on all other equipment so specified in other Sections.

END OF SECTION

SECTION 15400

PLUMBING SYSTEMS

1.0 GENERAL

1.01 DESCRIPTION

A. All work specified in this Section is governed by the Mechanical General Section 15010.

B. This Section 15400 and the accompanying drawings cover the provision of all labor, equipment, appliances, and materials and performing all operations in connection with the construction of the plumbing systems as specified herein and as shown. These systems include, but are not limited to, the following:

1. Sanitary waste and vent systems.
2. Domestic water systems.
3. Storm drainage systems.
4. Natural gas systems

C. Provide all final plumbing connections to all equipment furnished by Owner.

D. Provide gate valve and reduced pressure backflow preventer or vacuum breaker at the service entrance and at those connections (especially to kitchen equipment) required by local plumbing code.

1.02 INTENT

A. It is the intent of this Section of the specifications to provide complete and operable plumbing systems as shown and specified which are free of leaks, properly vented, free of unreasonable noise, vibration and sweating, and fabricated so as to fit the space allotted and to exhibit a minimum resistance to fluid flow.

B. The word "piping" is defined to mean all piping, fittings, joints, hangers, coatings, valves, cocks, insulation and accessories necessary for the plumbing systems described, shown and specified.

1.03 GENERAL REQUIREMENTS

A. Provide all reducing fittings, flanges, couplings and unions of the size and type of material to match the piping connections at each fixture, piece of equipment, valve and accessory.

B. Union joints, couplings or flanges shall be provided in each pipe line connected to each piece of equipment, fixture and elsewhere as indicated and specified. Unions shall match the piping system in which they are installed.

1. Unions or flanges shall be provided between all copper to steel connections. These unions shall be dielectric, insulating type.

C. All changes in direction and branches shall be made with manufactured fittings.

D. The use of offset-type reducers is strictly prohibited in any piping system.

E. In all water piping systems, changes in horizontal pipeline sizes shall be made with eccentric reducers installed flat on top for proper air venting. Reducing tees, reducing elbows and concentric reducers shall only be allowed in water piping systems for changing pipe sizes in vertical risers and for making connections to equipment and accessories from vertical risers.

F. All pipe joints shall be cut square and all burrs shall be removed.

G. Open ends of pipelines not currently being handled shall be plugged during installation to keep dirt, water and foreign material out of the system.

H. Sanitary waste and storm drainage piping shall slope down in the direction of flow as shown on the drawings or as prescribed by Code, but not less than 1 percent.

I. All vents through roof (VTR'S) shall be offset just below the roof such that their termination points are at least 10 ft. from any outside air intake of any HVAC units special attention is called to packaged rooftop units.

J. Trap primers shall be provided at all floor drains and hub drains.

1.04 IDENTIFICATION OF PIPING

A. All aboveground plumbing systems piping and valves sized 3/4" and larger which are installed in accessible locations (including piping above removable ceilings and behind access panels) shall be identified in strict conformance with the "Scheme for the Identification of Piping Systems" (ANSI A13.1 - 1981).

B. Each identification marker shall include the following:

1. Proper color-coded background.
2. Proper color of legend in relation to background color.
3. Proper legend letter size.
4. Proper marker length.
5. Direction of flow arrow shall be included on each marker.

C. Locations for pipe markers shall be as follows:

1. Adjacent to each valve and fitting.
2. At each branch and riser take off.
3. At each pipe passage through walls, floors and ceilings.
4. On all straight pipe runs every 25 feet.

D. Identification markers may be stenciled or shall be Setmark Pipe Markers, as manufactured by Seton Name Plate Corporation.

E. All valves shall be identified with the appropriate service designation and valve number brass valve tags. Each valve tag shall be 19 gauge brass with 1/4" black-filled letters over 1/2" black-filled numbers. Tags shall be fastened to valves with brass "S" hooks or brass jack chain. Brass tags and fasteners shall be as manufactured by Seton Name Plate Corporation

F. Provide charts of all valves. Valve charts shall include the following items:

1. Valve Identification Number
2. Location
3. Purpose/Material

2.0 PRODUCTS

2.01 SANITARY WASTE AND VENT SYSTEMS

A. All underground sanitary waste and vent piping shall be PVC, DWV Schedule 40 with socket-type, solvent welded joints in sizes up to 12"; all 15" piping shall be cast iron soil pipe with lead and oakum or neoprene double-seal compression gaskets.

B. Cleanouts shall be provided at the locations indicated and, as a minimum, where required by Code. Floor cleanouts shall be a minimum of 4" and shall be complete with a flush plug and removable, scoriated bronze floor plate. Provide carpet buttons in carpeted areas.

C. All above ground sanitary waste and vent piping shall be Schedule 40 PVC.

D. Joints on hubless cast iron soil pipe shall be made with neoprene couplings and stainless steel clamps.

F. Floor drains in toilets and finished areas shall be J. R. Smith 2000 Series with 6" Type B square adjustable strainers finished in satin nickel bronze or equal products by Josam or Zurn. Provide vandalproof secured tops. All floor drains shall be provided with a trap primer.

G. Floor drains in mechanical rooms and unfinished concrete floors shall be J. R. Smith 2131 Series with round 11 3/4" cast iron grate, sediment bucket and deep-seal P-traps or equal products by Josam or Zurn. Provide vandalproof secured tops. All floor drains shall be provided with a trap primer.

2.02 STORM PIPING SYSTEMS

A. Storm piping systems shall be of the same materials specified above in 2.01 for the sanitary waste and vent systems; note that all aboveground storm piping located within plenums shall be service weight, hubless cast iron soil pipe.

B. Wall cleanouts shall be threaded cleanout tees and plugs with polished stainless steel coverplate with countersunk screw.

C. The roof drains shall be selected for the insulated roof decks indicated. The roof drain bodies and receivers shall be of cast iron construction; domes shall be cast iron or aluminum and the roof drains shall be complete with flashing clamps having integral gravel stops, deck clamps, gaskets and trim. Roof drains shall be J. R. Smith 1080 or 1015 Series or approved equal products as manufactured by Josam, Zurn.

D. Emergency overflow drains shall be similar to the roof drains except they shall be water dam type. J.R. Smith 1080 or approved equal.

E. Emergency overflow piping termination shall be J.R. Smith 50-B-2333. Finish shall be brass.

2.03 DOMESTIC WATER SYSTEM

A. Underground domestic water service entrance piping 2-1/2" and smaller in size shall be schedule 40 PVC with 125 psig minimum working pressure.

B. Underground domestic water service entrance piping above 3" in size shall be Class 150 ductile iron pipe with mechanical joints.

C. Aboveground domestic water system piping shall be Type L or K hard drawn copper tubing with wrought copper fittings and bronze fittings with 125 psig minimum working pressure.

D. Gate valves 3" or less in size shall be constructed with a bronze body, non-rising stem. Stem to be bronze ASTM B-62 or silicon bronze ASTM B-371 with malleable iron handwheels. Valve shall meet MSS-SP80. Valve shall be manufactured by Milwaukee, Hammond, Nibco or Stockham.

E. Ball valves 2 inch and smaller:

1. Ball valves shall be two piece bronze body, large port with solid, smooth bore chrome plated brass ball, meeting MSS-SP110. Seats shall be reinforced TFE with Teflon packing ring and threaded adjustable packing nut. Valves on insulated lines will be provided with stem extensions to provide clearance for two inches of pipe insulation. Valves to be Apollo 70, Hammond 8501 or Watts B-6000.

F. Non-freeze wall hydrants (NFWH) shall be non-freeze, bronze box type with vacuum breaker, loose key and wall clamp. Finish shall be rough bronze. Wall hydrants shall be Smith 5509QTPB or approved equal by Josam or Zurn.

G. Backflow preventers shall be Watts Series 909 reduced pressure principle backflow preventers complete with strainer and shut-off valves. Air gap drain shall be piped into nearest floor drain or outside of building to a concrete splashblock.

H. Water pressure reducing valves (PRV) shall be the self-contained direct operating type with bronze body, stainless steel seat, stainless steel spring, and sealed spring cage. The strainer shall have bronze body with 20 mesh stainless steel screen. Strainer shall be attached with a bronze nipple. The unit shall be constructed in accordance with ASSE Standard 1003 and shall bear the seal of approval. The capacities shall be based on maximum reduced pressure fall-off, as defined in the ASSE Standard, of 10 pounds. Pressure regulators shall be Watts Regulator Company's Series 2236 or approved equal.

I. Soldered joints shall be made with tin-antimony/silver solder. Solder containing lead shall not be permitted.

2.04 NATURAL GAS PIPING

A. Natural gas piping 2" and smaller shall be Schedule 40 black steel external threaded type. Fittings to be Class 150 black malleable iron internal threaded type. Welded pipe spec is acceptable for 2" and below.

B. Natural gas piping 2-1/2" and larger shall be Schedule 40 black steel butt welded ends. Fittings to be standard weight butt welded type.

C. Gas cocks shall meet ANSI B16.33.

2.05 PLUMBING INSULATION

A. All pipe insulation products shall have a permanent composite insulation, jacket and adhesive fire and smoke hazard rating as tested by procedure ASTM-84, NFPA 255 and UL 723 not exceeding Flame Spread 25 or Smoke Developed 50.

B. Blanket-type insulation shall have an average thermal conductivity not to exceed 0.27 BTU-in. per sq. ft. per degrees F. per hour at a mean temperature of 75 degrees F. Insulation shall have a minimum density of 1 lb./cu.ft. and shall be 2" thick.

C. Preformed insulation for all domestic hot and cold water piping shall be minimum 1" thick preformed fiberglass pipe insulation with white all-service jacket. All longitudinal joints shall be lapped, self-sticking type with all butt joints, tears, etc. sealed with a matching white vapor barrier tape. Elbows shall be mitered or may be Zeston covers filled with equivalent fiberglass insulation. The maximum K value of the insulation shall be 0.23 at 75 degrees F.

2.06 PIPE HANGERS AND SUPPORTS

A. Pipe hangers, hanger rods, trapeze type hangers, upper attachments and other supports shall be selected based on pipe size (plus insulation of pipes specified to be insulated) and the weight of the medium being transported or the medium used for testing, whichever is greater. Provide all hangers and rods, turnbuckles, angles, channels, and other structural supports to support the piping systems. Rods for pipe hangers shall be full size of the hanger manufacturer's catalog listed rod size for each type hanger specified. Hangers and supports shall be Michigan, ITT Grinnell or B-Line.

B. All material utilized for the hanging and support of the piping systems shall be manufactured products which are specifically intended for the purpose of hanging piping systems. The use of wire, steel straps, plastic ties, etc. is strictly prohibited.

C. Pipe hangers selected for supporting horizontal insulated piping shall be sized to fit around the outside of the pipe insulation. Insulated piping shall be supported on galvanized shields.

1. Shields shall be as follows:
   a. Pipes 2" and smaller: 18 gauge x 12" long.
   b. Pipes 2 1/2" and larger: 16 gauge x 18" long.
2. Shields shall be 180 degrees around the lower half of the pipe at all pipe hangers, except that on trapeze hangers, pipe racks

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STATE OF FLORIDA REGISTRATION NUMBER AA-0003296

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STATE OF FLORIDA CERTIFICATE OF AUTHORIZATION NO. 27536

A SPECULATIVE WAREHOUSE AT WESTLAKE 3

DEVELOPED BY

PATTILLO Industrial Real Estate

Duval County, Florida

Print Record

09 NOVEMBER 2018	90% REVIEW SET
09 JANUARY 2019	ISSUED FOR PERMIT

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and floor supported horizontal pipes, shields shall be 360 degrees around the entire pipe.

D. Pipe hangers for copper piping shall be copper plated or the piping shall be dielectrically isolated from any steel hangers or clamps that are used.

E. Steel rods, framing and clamps shall be plated or primed to prevent rust formation.

3.0 EXECUTION

3.01 ARRANGEMENT

A. Follow the general piping layout, arrangement, schematics and details. Provide all offsets, vents, drains and connections necessary to accomplish the installation. Fabricate piping accurately to measurements established at the project site to avoid interference with ductwork, other piping, equipment, openings, electrical conduits and light fixtures. Make suitable provision for expansion and contraction with expansion loops and offsets.

B. Water hammer arresters shall be installed at the top of each riser and on each fixture branch in accordance with Plumbing and Drainage Institute Standard WH201.

C. Cleanouts shall be provided at the base of all sanitary and storm risers.

3.02 UNDERGROUND WATER PIPING

A. All underground domestic water piping shall have a minimum cover of 3'-0".

B. Provide concrete thrust blocks at all changes of direction and secure all mechanical joints with restraining rods.

C. All underground copper water lines shall be protected from corrosion with a continuous plastic sheathing or coating and wrapping. This sheathing or coating and wrapping shall be extended 6" to 12" above finished floor.

3.03 MINIMUM HANGER SPACING

A. Pipe hangers or supports shall be provided within 18" of each horizontal fitting, equipment connection, valve, etc. and at not more than 10 ft. spacings along horizontal runs of straight, plain piping.

B. Riser clamps shall be provided at each floor penetration.

3.04 FIRESTOPPING PVC PIPING

A. PVC storm, soil, waste and vent stacks penetrating fire-rated floors and walls shall be flamestopped, firestopped, and waterproofed using ProSet Systems, Inc. Series 45 "Firestop" couplings and Series 90 "Code Red" firestop devices. All other PVC drain, waste, and vent piping penetrating fire-rated floors shall be firestopped and waterproofed using ProSet Systems Series 48 closet stubs, tub boxes, floor drains, shower drains, and "E-Z Flex" flexible couplings. All shall be installed in accordance with the manufacturer's instructions.

B. ProSet "Firestop" couplings used in the DWV system shall be of type I PVC conforming to ASTM D2665 standard. ProSet "Code Red" stack fittings shall be of gray cast iron conforming to ASTM A-48 standard. ProSet "E-Z Flex" connector couplings shall be of flexible PVC conforming to ASTM C594 and ASTM F477 performance standards. Band used for compression joint on the "E-Z Flex" coupling shall be #300 stainless steel. IPS P-70 Primer and Weld-on 795 cement or equal shall be used for all solvent welds in the system.

3.05 INSULATION INSTALLATION

A. Provide blanket insulation over all horizontal roof drains including emergency over flow piping which is within the building and including the vertical risers to the roof drains and the underbody of the roof drains. All vertical risers exposed within the building shall be insulated.

1. Blanket insulation shall be wrapped around the piping and underbodies of roof drains. Ends of insulation shall overlap at least 2" and bottom of insulation shall overlap pipe insulation at pipe connection to roof drain at least 3". Adhere insulation to roof drain underbodies with 100% coverage of fire retardant adhesive and tape all joints with 3" wide foil reinforced kraft tape.

B. Provide insulation over all above ground hot and cold water piping, except that no insulation is required on cold water lines installed inside interior plumbing chases (those chases with no exterior wall).

1. All joints and tears shall be sealed with matching white vapor barrier tape.

3.06 DISINFECTION

A. All domestic water piping installed under this Division shall be disinfected with chlorine before it is placed into operation. The chlorinating material shall be liquid chlorine conforming to Federal Specification BB-C-120 and shall be introduced to the system by experienced operators only. The chlorine solution applied to the piping sections or system shall contain at least fifty parts per million of available chlorine and shall remain in the sections or system for a period of not less than sixteen (16) hours. During the disinfection period, all valves shall be opened and closed at least four times. After the disinfection period, the chlorinated water shall be flushed from the system with clear water until the residual chlorine content is not greater than two-tenths parts per million (0.2 PPM). Submit certification to the Architect that the system was disinfected.

END OF SECTION

SECTION 15880

LOUVERS, AIR INLET AND AIR OUTLET DEVICES

1.0 GENERAL

1.01 DESCRIPTION

A. All work specified in this section is governed by the Mechanical General Section 1500.

B. This Section 15880 and the accompanying drawings cover the provisions of all labor, equipment, appliances and materials, and performing all operations in connection with the fabrication, construction and installation of the louvers, air inlet and air outlet devices as specified herein and as shown.

1.02 INTENT

A. It is the intent of this Section of the specifications to provide complete, operable, finished louvers, air inlet and air outlet devices as shown and specified which are free of leaks.

1.03 BASIS OF DESIGN

A. The basis of design is as outlined for each louver and device in the PART 2 - PRODUCTS subsection. Any proposed substitutions shall be proven equal in all respects to the equipment specified as the basis of design.

2.0 PRODUCTS

2.01 STORMPROOF LOUVERS

A. Louvers shall be stormproof, 4" deep, and of all-welded construction fabricated from 12 gauge extruded aluminum alloy 6063-T5. Blades shall be slanted at 45 degrees and feature an integral water baffle.

B. Louvers shall be fitted with a 1/2" mesh 16 gauge aluminum birdscreen in an aluminum frame.

C. Finish shall be Duranar Kynar 500 in a color selected by the Architect at the time of submittal review.

D. The performance standards shall be certified by the manufacturer in accordance with the AMCA Certified Ratings Program and the louver shall carry the AMCA Seal.

E. Performance Standards

1. Maximum static pressure drop at 600 FPM velocity through the free area - 0.05" W.C.

2. No water penetration at up to 760 FPM velocity through the free area.

3. Minimum free area in relation to gross overall area - 53%.

F. The basis of design is Airolite K666. Acceptable equal manufacturers are Louvers & Dampers, Inc, Construction Specialties, Arrow United or Nailor Industries.

2.02 GRAVITY INTAKE AND RELIEF HOODS

A. Hoods shall be constructed from 0.063" thick aluminum sheets with rolled interlocking seams or all welded construction.

B. Relief hoods shall be fitted with a 1/2" x 1/2" galvanized birdscreen and backdraft damper.

C. Intake hoods shall be fitted with 1 inch thick cleanable filters.

D. All hoods shall be provided complete with 12" high roof curbs. Roof curbs shall be of aluminum construction, insulated , canted and complete with wood nailer strips. Insulation shall meet NFPA 25/50 flame spread/smoke developed ratings.

E. All hoods with a throat area of 12 sq. ft. or less shall have hinged hoods.

F. Performance Standards

1. Maximum total pressure drop at 600 FPM throat velocity through the free area.

a. Intake Hoods - 0.125" W.C.
b. Relief Hoods - 0.08" W.C.

G. The basis of design is Greenheck Fabra Hood. Acceptable equal manufacturers are Louvers & Dampers, Inc. and Carnes.

3.0 EXECUTION

3.01 INSTALLATION

A. Units shall be installed as indicated and in conformance with the manufacturer's recommendations. Coordinate the actual devices to be provided with all trades.

B. All devices shall be free of leaks, provided completely finished, trimmed, adjusted, cleaned and ready for use. They shall be properly secured to the structure.

C. Insulated sheetmetal blank-offs shall be provided over all inactive sections of louvers where the architectural size exceeds the mechanical requirements.

END OF SECTION

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