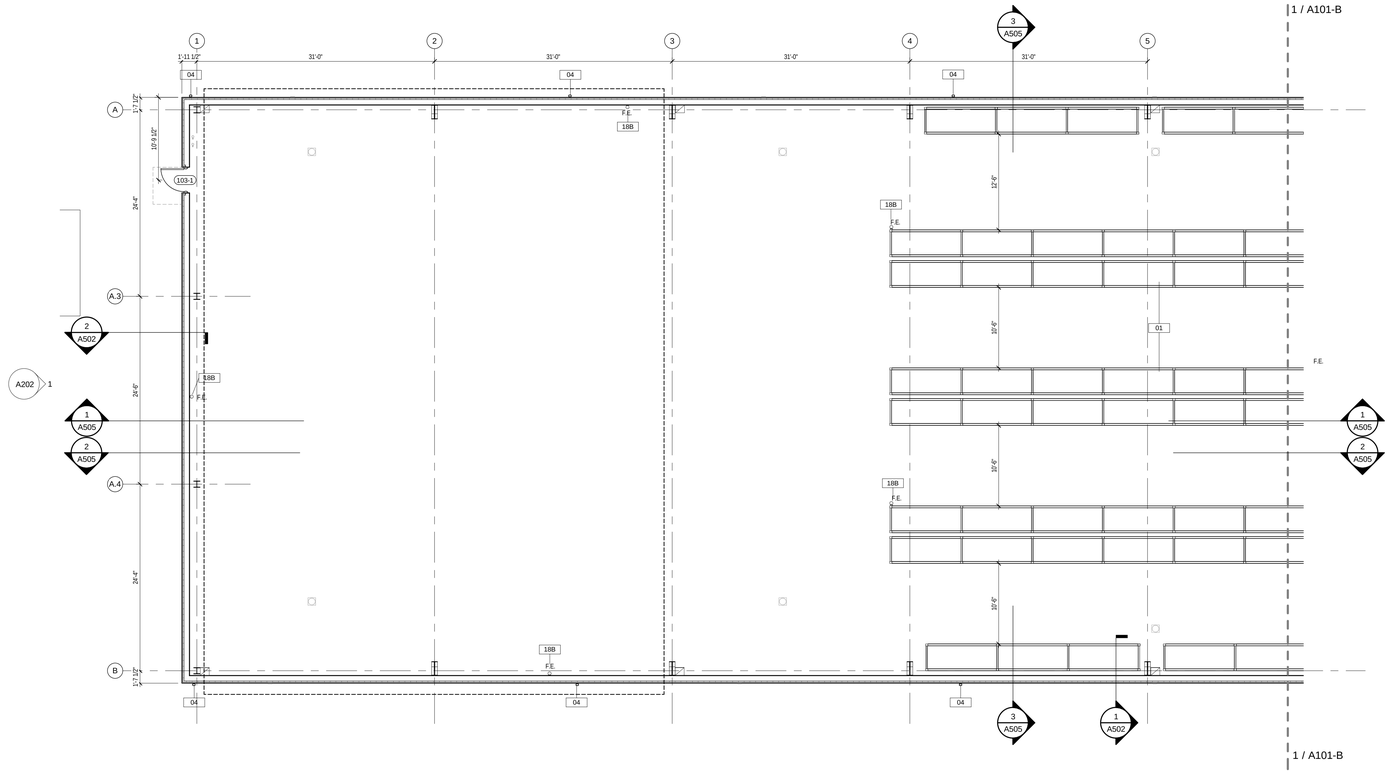
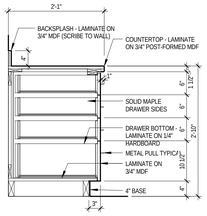
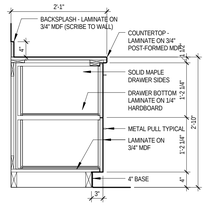


1 FIRST FLOOR - SIDE A
1/8" = 1'-0"

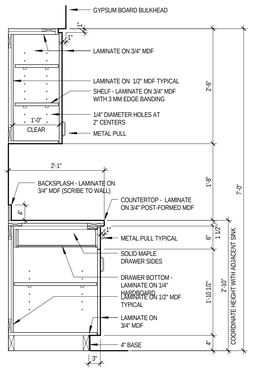


2 CASEWORK - 4 DRAWERS
3/4" = 1'-0"

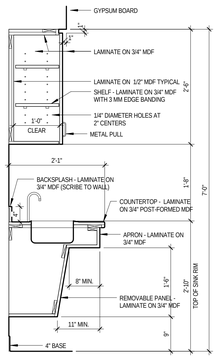


3 CASEWORK - TWO DRAWERS
3/4" = 1'-0"

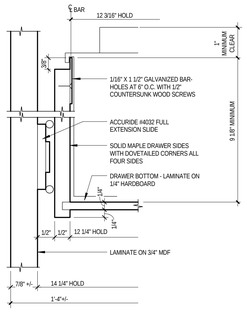
4 CASEWORK - DOOR
3/4" = 1'-0"



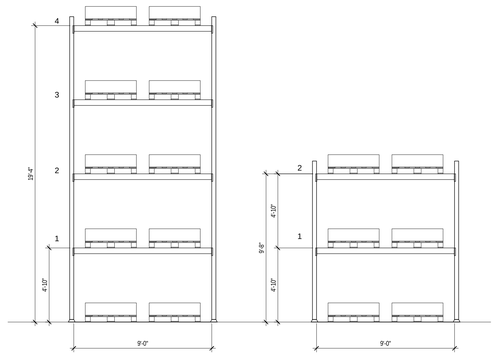
5 CASEWORK - DRAWER AND DOOR
3/4" = 1'-0"



6 CASEWORK - ADA SINK
3/4" = 1'-0"

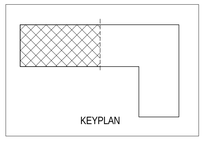


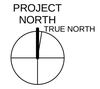
7 TYPICAL FILE DRAWER
6" = 1'-0"



8 RACK ELEVATIONS
1/4" = 1'-0"

FLOOR PLAN KEY NOTES	
NUMBER	DESCRIPTION
01	HIGH BAY PALLET RACK - 22' TALL W/ (7) SHELVES OR 20' TALL W/ (4) SHELVES. COORDINATE WITH OWNER. (ALTERNATE NO. 3 - RACKS TO BE N.I.C.)
02	LOW BAY PALLET RACK - 10' TALL W/ (2) SHELVES (ALTERNATE NO. 3 - RACKS TO BE N.I.C.)
03	CANOPY ABOVE ENTRANCE DOOR (ALTERNATE NO. 1 - DEDUCT CANOPY AND STRUCTURAL COMPONENTS FROM DESIGN. PROVIDE STANDARD DRIP EDGE AT DOOR)
04	MANUFACTURER'S STANDARD RECTANGULAR DOWNSPOUT. 2 3/4" x 4 1/4" MINIMUM, SPACED A MAXIMUM 50'-0" APART.
05	FORKLIFT TRUCK BATTERY STORAGE AND CHARGING AREA
06	CONCRETE RETAINING WALL - 16" ABOVE TOP GRADE
07A	OSHA STANDARD GUARD RAIL - TOP MOUNTED
08	8'-0" x 10'-0" INSULATED COILING DOOR
09	10'-0" x 14'-0" INSULATED COILING DOOR
10	RECESSED DOCK LEVELER
11	DOCK SEAL, BUMPER TRACK GUARD AND TRUCK LOCK TYPICAL AT ALL LOADING DOCKS
12	RECESSED WALK-OFF MAT - SEE DETAIL 5/A602. SIZE TO BE 6" FROM EACH SIDE OF VESTIBULE.
13	STEEL ENCASED CONCRETE BOLLARD
14A	INTERIOR SECURITY CAGING
14B	INTERIOR SECURITY CAGING - INSTALL CAGING TO UNDERSIDE OF STRUCTURE
14C	6'-0" x 8'-0" GATE W/ PADLOCK HASP
14D	6'-0" x 8'-0" GATE MAGNETIC LOCK, CARD ACCESS, AND FLOOR BOLT
15	TRANSPIRATION SOLAR WALL ASSEMBLY - SEE ELEVATION AND SPEC. SECTION 07 42 13 (ALTERNATE NO. 3 - REMOVE ASSEMBLY FROM BID. PROVIDE TYPICAL METAL WALL PANEL)
16	MOBILE PACKAGE PROCCESSING CARTS, INSTALLED AND PROVIDED BY OWNER
17	ALL FURNITURE AND COMPUTER SYSTEMS TO BE PROVIDED AND INSTALLED BY OWNER. FURNITURE IN PROCESSING AREA TO HAVE EXPOSED BACKS FOR ELECTRICAL ACCESS.
18A	SEMI-RECESSED FIRE EXTINGUISHER CABINET
18B	FIRE EXTINGUISHER BRACKET, TYP.
19	SURFACE MOUNTED AED CABINET - MOUNT ON CMU
20	WORKBENCHES PROVIDED AND INSTALLED BY OWNER
21	4" SLAB DEPRESSION FOR PALLET SCALE. SCALE NOT IN CONTRACT.
22	LOCATION FOR FUTURE BAILER
23	PARTIAL HEIGHT MASONRY WALL - 3'-4" (ALTERNATE NO. 4 - EXTEND GWB AND METAL STUD WALL ASSEMBLY TO FLOOR)
24	EMERGENCY EYE WASH AND SHOWER





FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

HOPE FURRER ASSOCIATES
STRUCTURAL ENGINEERING

CLARK SURVEYING + ENGINEERING
CIVIL ENGINEERING

MOORE DESIGN ASSOCIATES
LANDSCAPE ARCHITECTURE

SEAL

ARCHITECTS/ENGINEERS:

AE WORKS

6587 Hamilton Avenue
Pittsburgh, Pennsylvania 15206
Ph: 412.287.7333 Fax: 412.287.7334
www.ae-works.com

AE Works Project Number: 13025

Drawing Title
FIRST FLOOR PLAN - SIDE A

Approved: Project Director

Project Title:
NEW WAREHOUSE

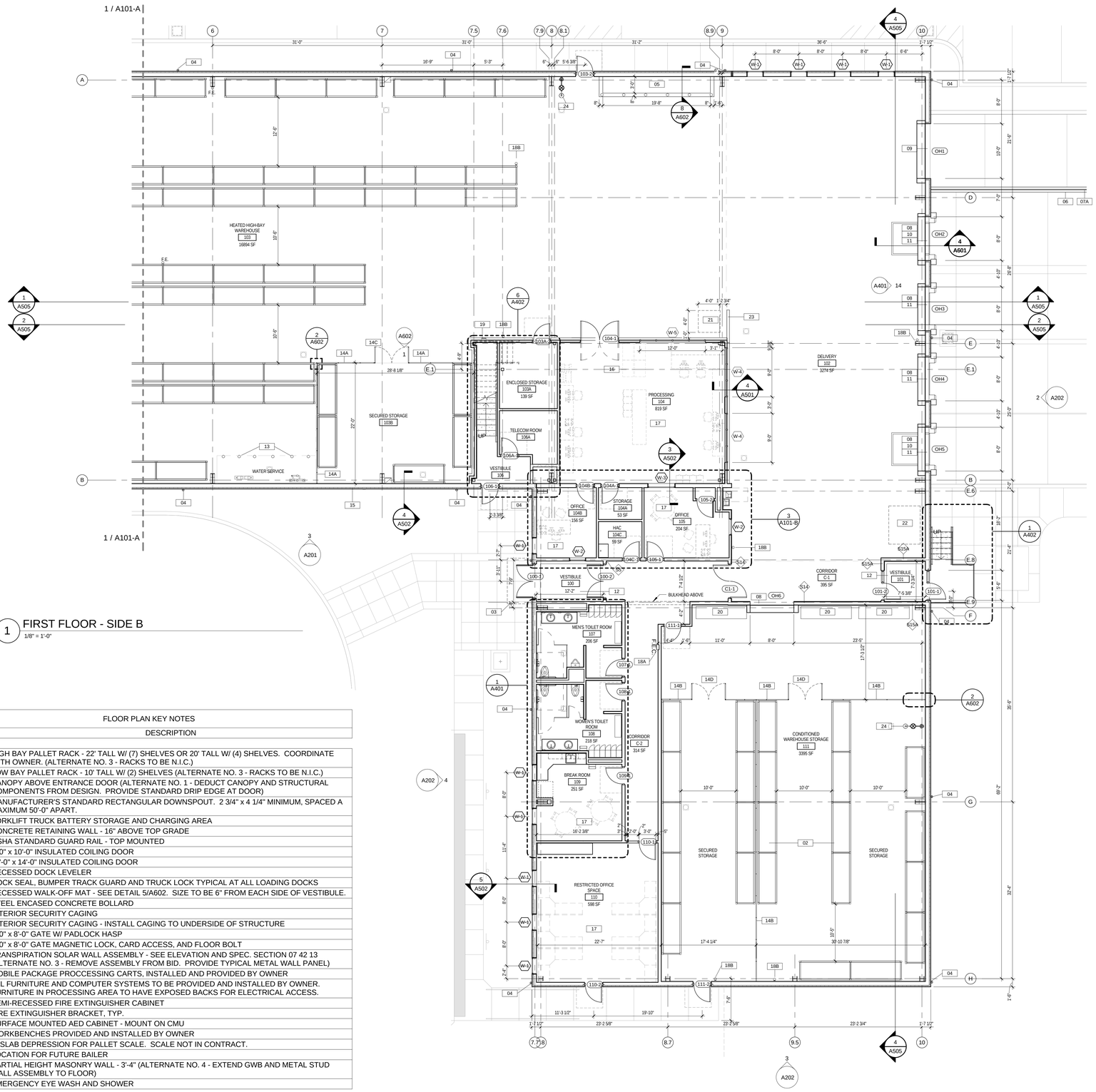
Location: 510 BUTLER AVENUE, MARTINSBURG, WV 25405

Date: 06/24/2015
Checked: JD
Drawn: PR

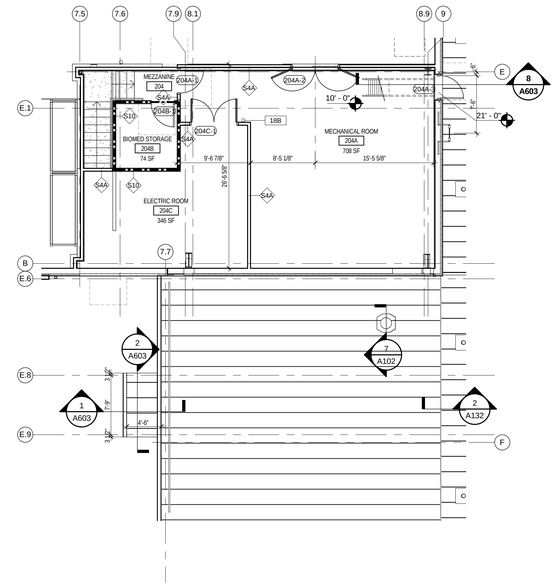
Project Number #613-116
Building Number #519
Drawing Number A101-A

Office of Construction and Facilities Management
Department of Veterans Affairs

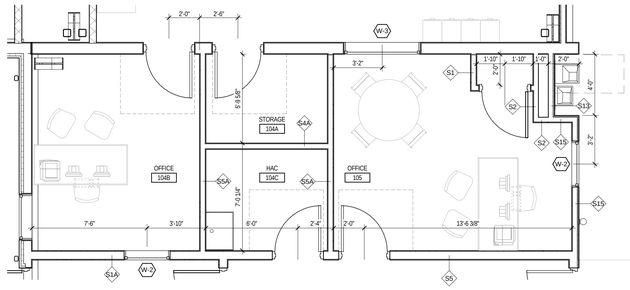
VA FORM 08-6231



1 FIRST FLOOR - SIDE B
1/8" = 1'-0"



2 MEZZANINE PLAN
1/8" = 1'-0"



3 ENLARGED PLAN - OFFICE AREA
1/4" = 1'-0"

FLOOR PLAN KEY NOTES	
NUMBER	DESCRIPTION
01	HIGH BAY PALLET RACK - 22' TALL W/ (7) SHELVES OR 20' TALL W/ (4) SHELVES. COORDINATE WITH OWNER. (ALTERNATE NO. 3 - RACKS TO BE N.I.C.)
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18A	SEMI-RECESSED FIRE EXTINGUISHER CABINET
18B	FIRE EXTINGUISHER BRACKET, TYP.
19	SURFACE MOUNTED AED CABINET - MOUNT ON CMU
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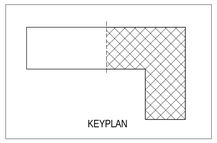
24	EMERGENCY EYE WASH AND SHOWER



FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

HOPE FURRER ASSOCIATES
STRUCTURAL ENGINEERING

CLARK SURVEYING + ENGINEERING
CIVIL ENGINEERING

MOORE DESIGN ASSOCIATES
LANDSCAPE ARCHITECTURE

SEAL

ARCHITECTS/ENGINEERS:

AE WORKS

6587 Hamilton Avenue
Pittsburgh, Pennsylvania 15206
Ph: 412.287.7333 Fax: 412.287.7334
www.ae-works.com

AE Works Project Number: 13025

Drawing Title
FIRST FLOOR PLAN - SIDE B

Approved: Project Director

Project Title:
NEW WAREHOUSE

Location: 510 BUTLER AVENUE, MARTINSBURG, WV 25405

Date: 06/24/2015 **Checked:** JD **Drawn:** PR

Project Number #613-116

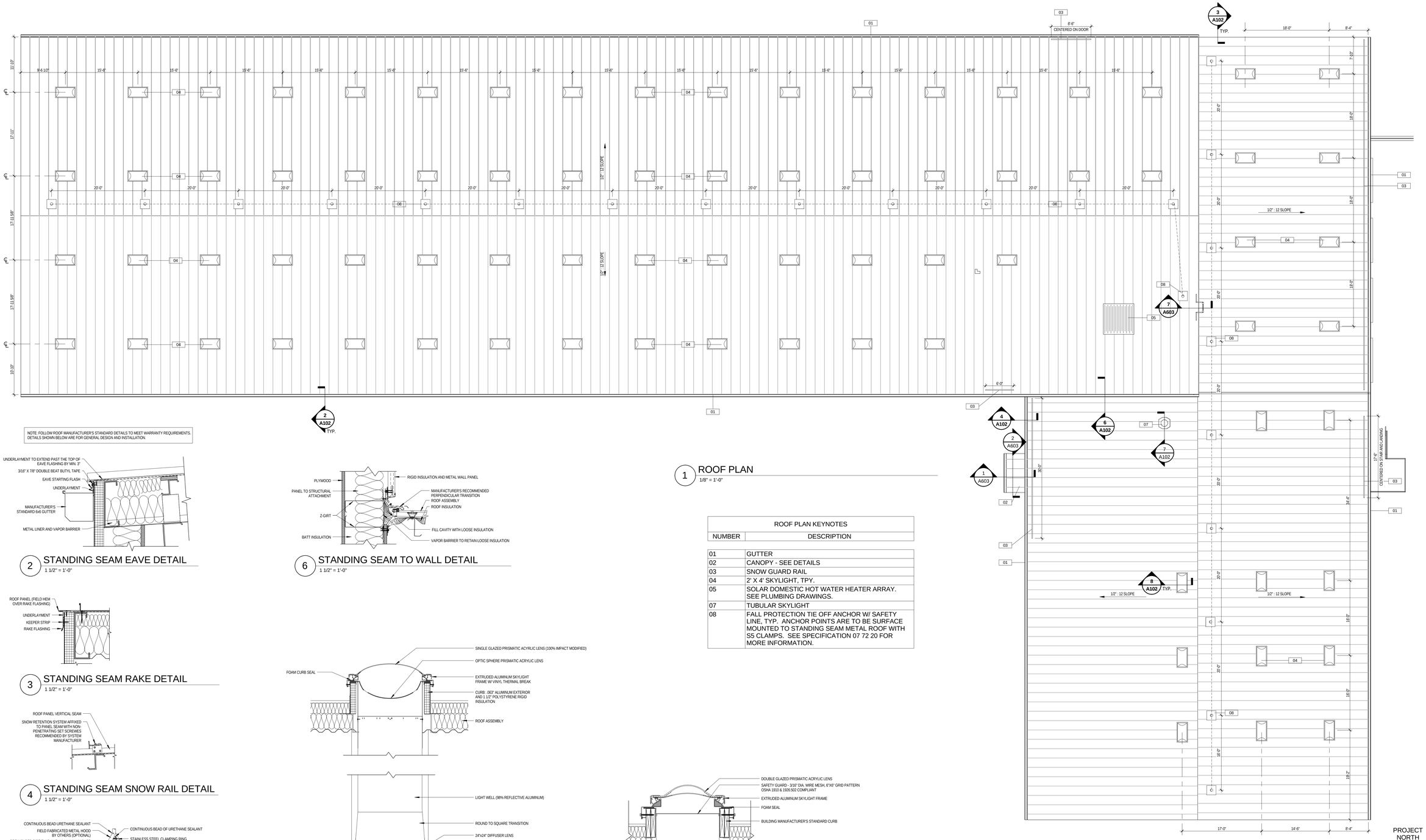
Building Number #519

Drawing Number A101-B

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231



1 ROOF PLAN
1/8" = 1'-0"

ROOF PLAN KEYNOTES	
NUMBER	DESCRIPTION
01	GUTTER
02	CANOPY - SEE DETAILS
03	SNOW GUARD RAIL
04	2' X 4' SKYLIGHT, TPY.
05	SOLAR DOMESTIC HOT WATER HEATER ARRAY. SEE PLUMBING DRAWINGS.
07	TUBULAR SKYLIGHT
08	FALL PROTECTION TIE OFF ANCHOR W/ SAFETY LINE, TYP. ANCHOR POINTS ARE TO BE SURFACE MOUNTED TO STANDING SEAM METAL ROOF WITH S5 CLAMPS. SEE SPECIFICATION 07 72 20 FOR MORE INFORMATION.

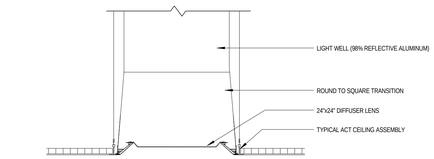
NOTE: FOLLOW ROOF MANUFACTURER'S STANDARD DETAILS TO MEET WARRANTY REQUIREMENTS. DETAILS SHOWN BELOW ARE FOR GENERAL DESIGN AND INSTALLATION.

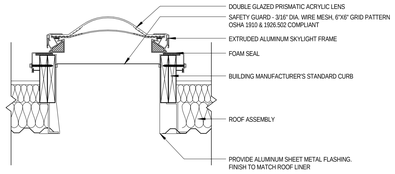
2 STANDING SEAM EAVE DETAIL
1 1/2" = 1'-0"

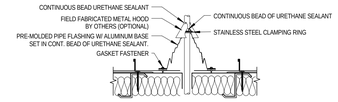
6 STANDING SEAM TO WALL DETAIL
1 1/2" = 1'-0"

3 STANDING SEAM RAKE DETAIL
1 1/2" = 1'-0"

4 STANDING SEAM SNOW RAIL DETAIL
1 1/2" = 1'-0"







5 STANDING SEAM PENETRATION DETAIL
1 1/2" = 1'-0"

NOTE: TYPICAL DETAIL - REFER TO PLUMBING AND MECHANICAL SHEETS FOR ROOF PENETRATION LOCATIONS.

7 TUBULAR SKYLIGHT DETAIL
1" = 1'-0"

8 SKYLIGHT DETAIL
1" = 1'-0"

PROJECT NORTH
TRUE NORTH

FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

HOPE FURRER ASSOCIATES
STRUCTURAL ENGINEERING

CLARK SURVEYING + ENGINEERING
CIVIL ENGINEERING

MOORE DESIGN ASSOCIATES
LANDSCAPE ARCHITECTURE

SEAL

ARCHITECTS/ENGINEERS:

AE WORKS

6587 Hamilton Avenue
Pittsburgh, Pennsylvania 15206
Ph: 412.287.7333 Fax: 412.287.7334
www.ae-works.com

AE Works Project Number: 13025

Drawing Title
ROOF PLAN - OVERALL

Approved: Project Director

Project Title:
NEW WAREHOUSE

Location: 510 BUTLER AVENUE, MARTINSBURG, WV 25405

Date: 06/24/2015
Checked: JD
Drawn: PR

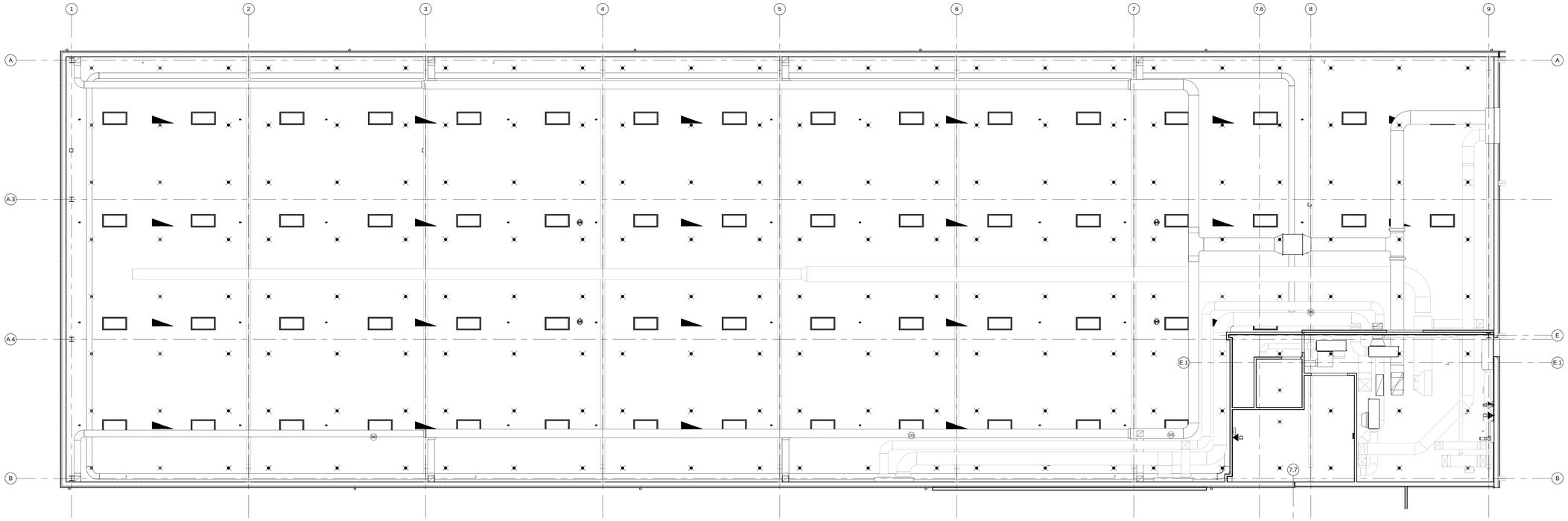
Project Number
#613-116

Building Number
#519

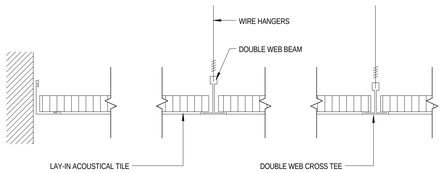
Drawing Number
A102

Office of Construction and Facilities Management
Department of Veterans Affairs

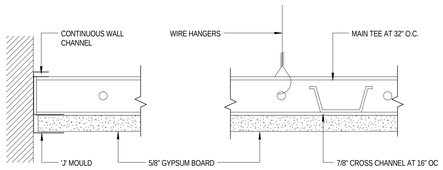
VA FORM 08-6231



1 REFLECTED CEILING PLAN - HIGH BAY
1/8" = 1'-0"



2 ACOUSTICAL CEILING TILE INSTALL DETAIL
3" = 1'-0"



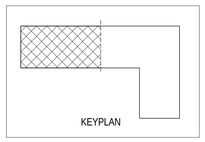
3 GYPSUM BOARD CEILING INSTALL DETAIL
3" = 1'-0"

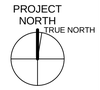
REFLECTED CEILING PLAN SYMBOL LEGEND	
	SUPPLY AIR DIFFUSER
	RETURN AIR GRILLE
AP	ACCESS PANEL
	SKYLIGHT
	RECESSED LIGHT FIXTURE
	SUSPENDED LIGHT FIXTURE
	EXIT SIGN
OS	CEILING MOUNTED OCCUPANCY SENSOR
	PENDANT SPRINKLER HEAD

REFLECTED CEILING PLAN SYMBOL LEGEND	
	2' X 4' LAY-IN ACOUSTICAL TILE CEILING SYSTEM. SEE ROOM FINISH SCHEDULE FOR SPECIFIC TYPE
	2' X 2' LAY-IN ACOUSTICAL TILE CEILING SYSTEM. SEE ROOM FINISH SCHEDULE FOR SPECIFIC TYPE
	GYPSUM BOARD BULKHEAD/ SUSPENDED GYPSUM BOARD SYSTEM
X' - X"	CEILING/ BULKHEAD HEIGHT A.F.F.

RCP NOTES:

1. REFER TO FIRE PROTECTION PLAN FOR SPRINKLER HEADS LOCATIONS IN CEILING
2. REFLECTED CEILING PLANS SHOW CEILING MOUNTED ITEMS ONLY. ADDITIONAL WALL MOUNTED LIGHTING, HVAC ITEMS, EXIT SIGNS, ETC. ARE INDICATED ON INDIVIDUAL ELECTRICAL AND HVAC FLOOR PLAN SHEETS.





FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

HOPE FURRER ASSOCIATES
STRUCTURAL ENGINEERING

CLARK SURVEYING + ENGINEERING
CIVIL ENGINEERING

MOORE DESIGN ASSOCIATES
LANDSCAPE ARCHITECTURE

SEAL

ARCHITECTS/ENGINEERS:

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6587 Hamilton Avenue
Pittsburgh, Pennsylvania 15206
Ph: 412.287.7333 Fax: 412.287.7334
www.ae-works.com

AE Works Project Number: 13025

Drawing Title
REFLECTED CEILING PLAN - SIDE A

Approved: Project Director

Project Title:
NEW WAREHOUSE

Location: 510 BUTLER AVENUE, MARTINSBURG, WV 25405

Date: 06/24/2015
Checked: JD
Drawn: PR

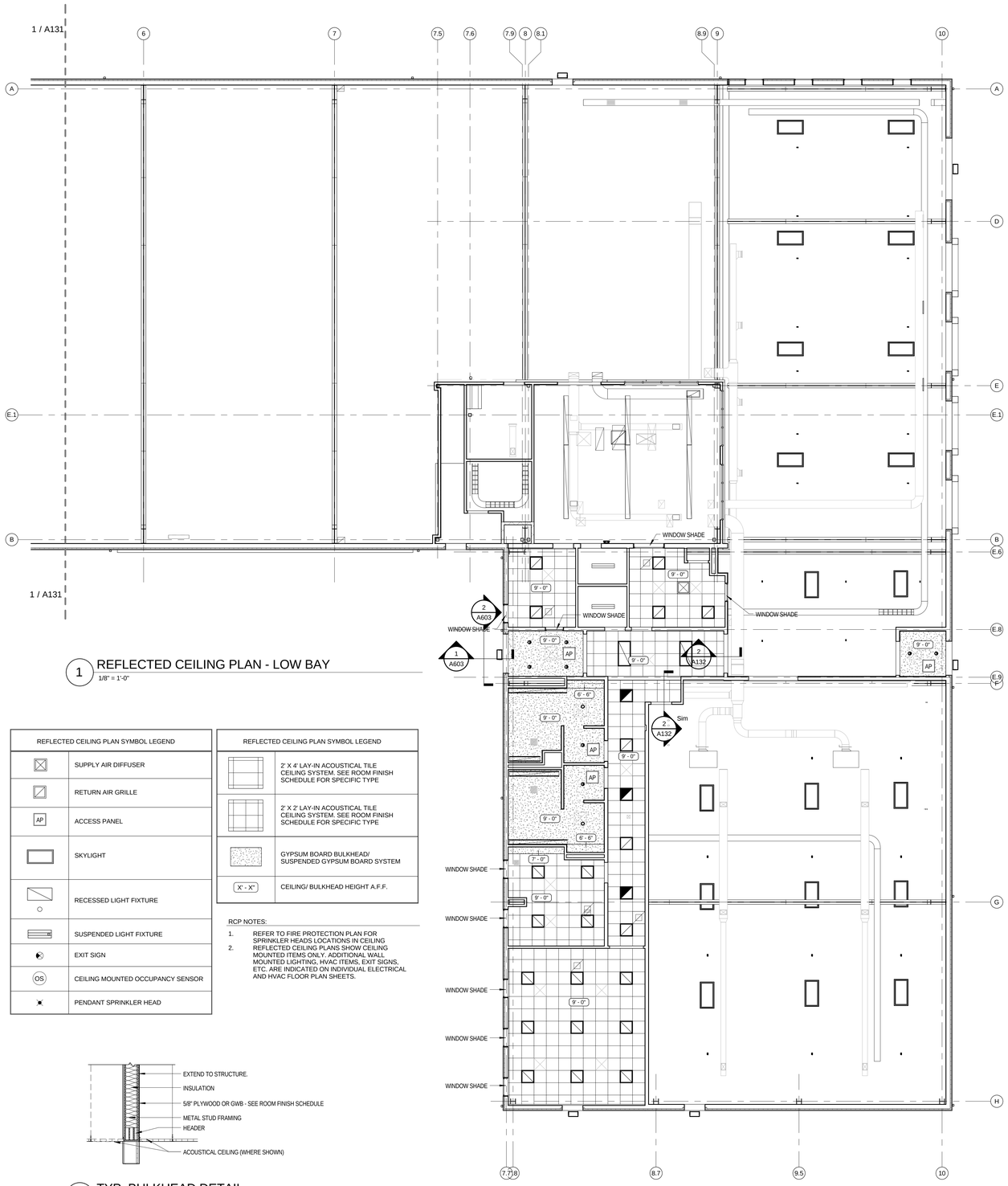
Project Number #613-116

Building Number #519

Drawing Number A131

Office of Construction and Facilities Management
Department of Veterans Affairs

VA FORM 08-6231



1 REFLECTED CEILING PLAN - LOW BAY
1/8" = 1'-0"

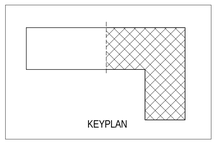
REFLECTED CEILING PLAN SYMBOL LEGEND	
	SUPPLY AIR DIFFUSER
	RETURN AIR GRILLE
AP	ACCESS PANEL
	SKYLIGHT
	RECESSED LIGHT FIXTURE
	SUSPENDED LIGHT FIXTURE
	EXIT SIGN
OS	CEILING MOUNTED OCCUPANCY SENSOR
	PENDANT SPRINKLER HEAD

REFLECTED CEILING PLAN SYMBOL LEGEND	
	2' X 4' LAY-IN ACOUSTICAL TILE CEILING SYSTEM. SEE ROOM FINISH SCHEDULE FOR SPECIFIC TYPE
	2' X 2' LAY-IN ACOUSTICAL TILE CEILING SYSTEM. SEE ROOM FINISH SCHEDULE FOR SPECIFIC TYPE
	GYPSUM BOARD BULKHEAD/ SUSPENDED GYPSUM BOARD SYSTEM
X' - X"	CEILING/ BULKHEAD HEIGHT A.F.F.

RCP NOTES:

1. REFER TO FIRE PROTECTION PLAN FOR SPRINKLER HEADS LOCATIONS IN CEILING
2. REFLECTED CEILING PLANS SHOW CEILING MOUNTED ITEMS ONLY. ADDITIONAL WALL MOUNTED LIGHTING, HVAC ITEMS, EXIT SIGNS, ETC. ARE INDICATED ON INDIVIDUAL ELECTRICAL AND HVAC FLOOR PLAN SHEETS.

2 TYP. BULKHEAD DETAIL
1/2" = 1'-0"



PROJECT NORTH
TRUE NORTH

FULLY SPRINKLERED
CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

HOPE FURRER ASSOCIATES
STRUCTURAL ENGINEERING

CLARK SURVEYING + ENGINEERING
CIVIL ENGINEERING

MOORE DESIGN ASSOCIATES
LANDSCAPE ARCHITECTURE

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Ph: 412.287.7333 Fax: 412.287.7334
www.ae-works.com

AE Works Project Number: 13025

Drawing Title
REFLECTED CEILING PLAN - SIDE B

Approved: Project Director

Project Title:
NEW WAREHOUSE

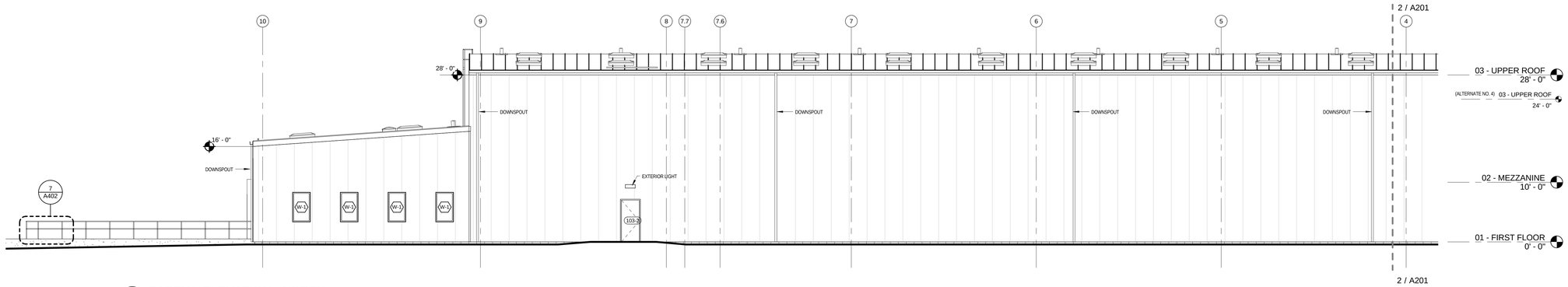
Location: 510 BUTLER AVENUE, MARTINSBURG, WV 25405

Date: 06/24/2015
Checked: JD
Drawn: PR

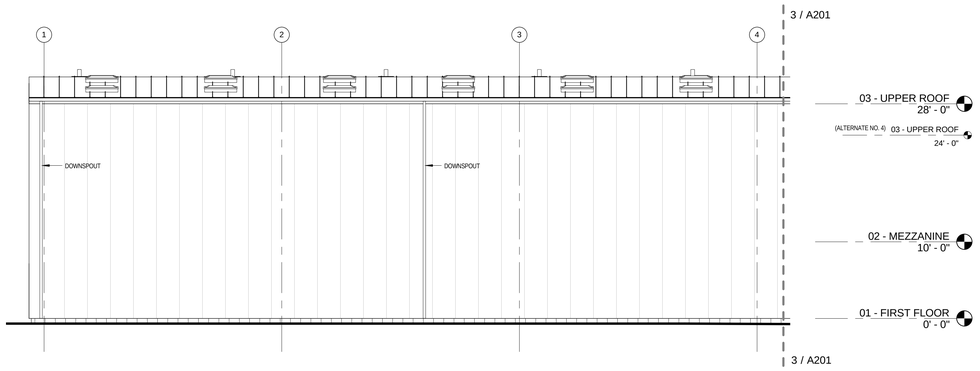
Project Number #613-116
Building Number #519
Drawing Number A132

Office of Construction and Facilities Management
Department of Veterans Affairs

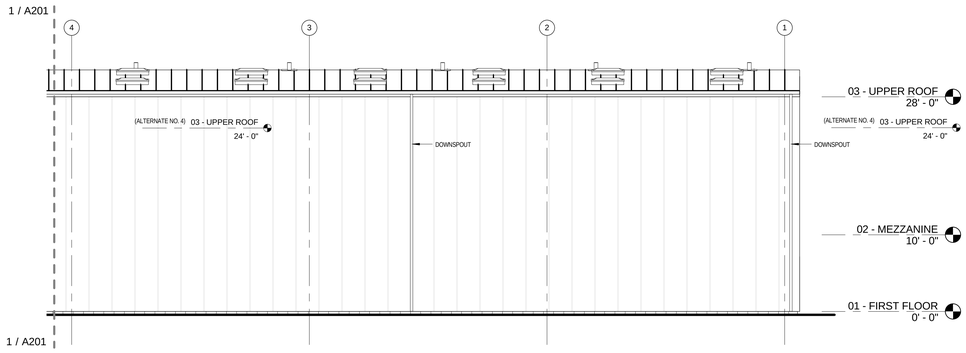
VA FORM 08-6231



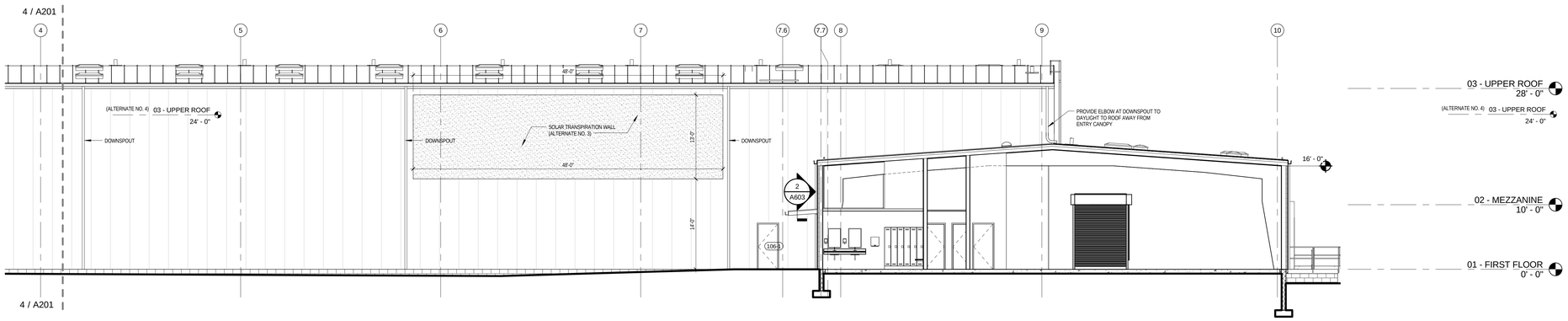
1 PARTIAL ELEVATION - NORTH
1/8" = 1'-0"



4 PARTIAL ELEVATION - SOUTH
1/8" = 1'-0"



2 PARTIAL ELEVATION - NORTH
1/8" = 1'-0"



3 PARTIAL ELEVATION - SOUTH
1/8" = 1'-0"

FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

HOPE FURRER ASSOCIATES
STRUCTURAL ENGINEERING

CLARK SURVEYING + ENGINEERING
CIVIL ENGINEERING

MOORE DESIGN ASSOCIATES
LANDSCAPE ARCHITECTURE

SEAL

REGISTERED ARCHITECT
COMMONWEALTH OF PENNSYLVANIA
Vincent Joseph Fiorillo
RA-047-7 AMERICA

ARCHITECTS/ENGINEERS:

AE WORKS

6587 Hamilton Avenue
Pittsburgh, Pennsylvania 15206
Ph: 412.287.7333 Fax: 412.287.7334
www.ae-works.com

AE Works Project Number: 13025

Drawing Title
EXTERIOR ELEVATIONS

Approved: Project Director

Project Title:
NEW WAREHOUSE

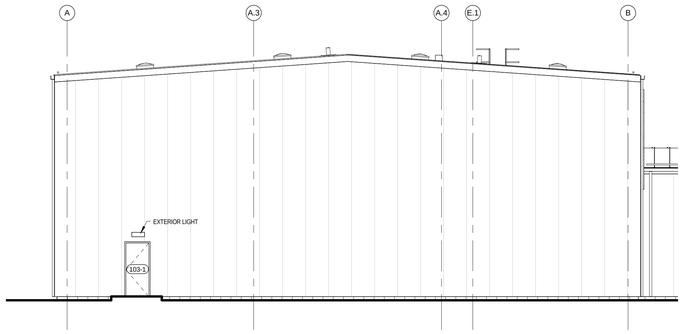
Location: 510 BUTLER AVENUE, MARTINSBURG, WV 25405

Date: 06/24/2015
Checked: JD
Drawn: PR

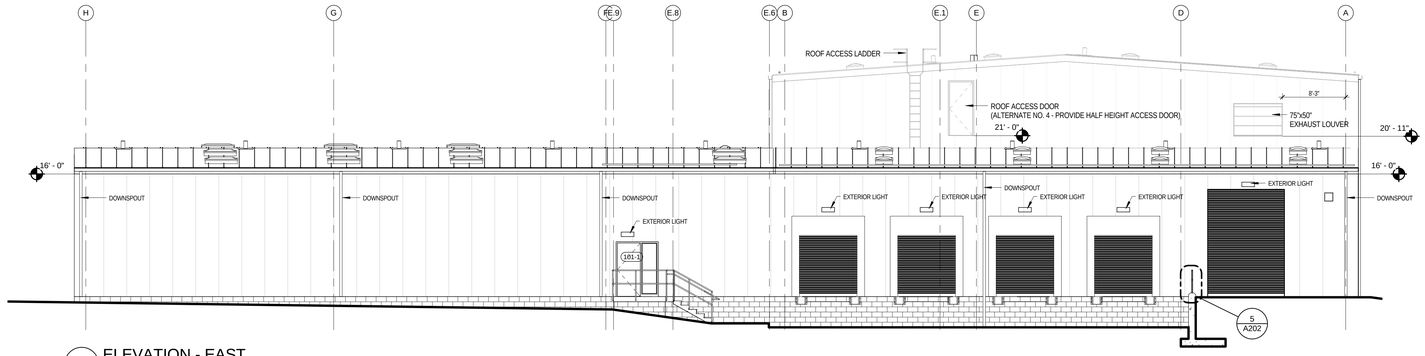
Project Number #613-116
Building Number #519
Drawing Number A201

Office of Construction and Facilities Management
Department of Veterans Affairs

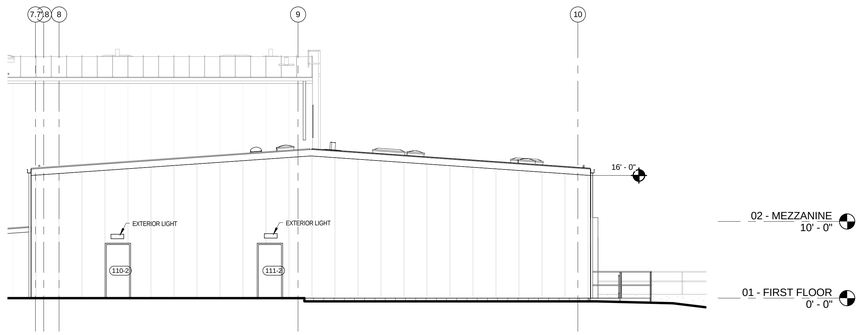
VA FORM 08-6231



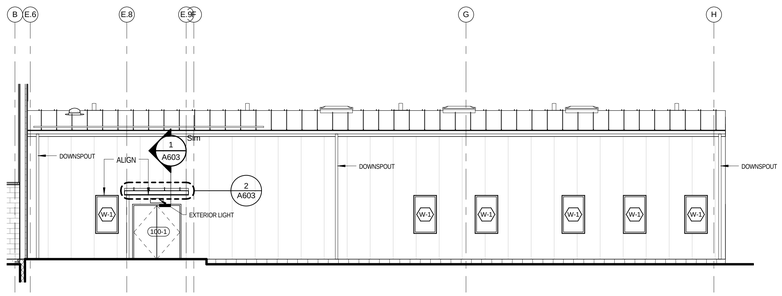
1 ELEVATION - WEST
1/8" = 1'-0"



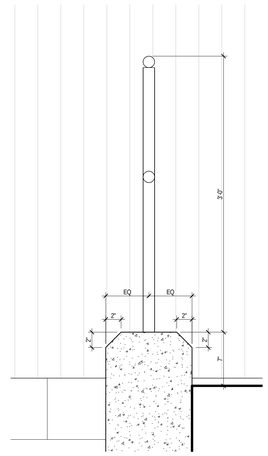
2 ELEVATION - EAST
1/8" = 1'-0"



3 PARTIAL ELEVATION - SOUTH
1/8" = 1'-0"



4 PARTIAL ELEVATION - WEST
1/8" = 1'-0"



5 RETAINING WALL CHAMFER DETAIL
1 1/2" = 1'-0"

FULLY SPRINKLERED
CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

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AE Works Project Number: 13025

Drawing Title
EXTERIOR ELEVATIONS

Approved: Project Director

Project Title:
NEW WAREHOUSE

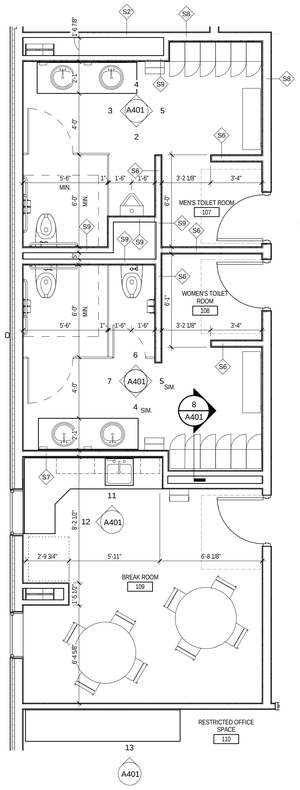
Location: 510 BUTLER AVENUE, MARTINSBURG, WV 25405

Date: 06/24/2015
Checked: JD
Drawn: PR

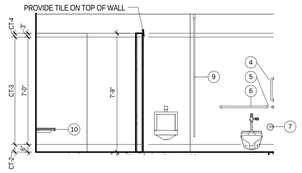
Project Number #613-116
Building Number #519
Drawing Number A202

Office of Construction and Facilities Management
Department of Veterans Affairs

VA FORM 08-6231



1 ENLARGED PLANS - TOILET ROOMS
1/4" = 1'-0"



2 ELEV. - MEN'S TOILET ROOM - SOUTH
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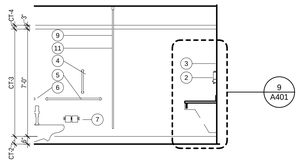
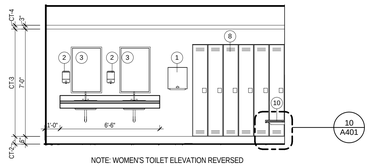


3 ELEV. - MEN'S TOILET ROOM - EAST
1/4" = 1'-0"



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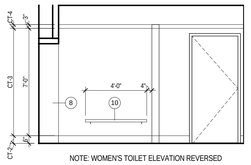
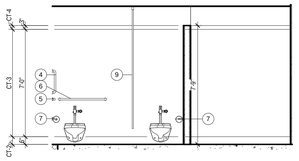
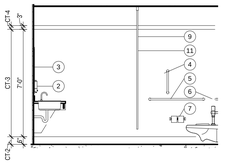
1/4" = 1'-0"



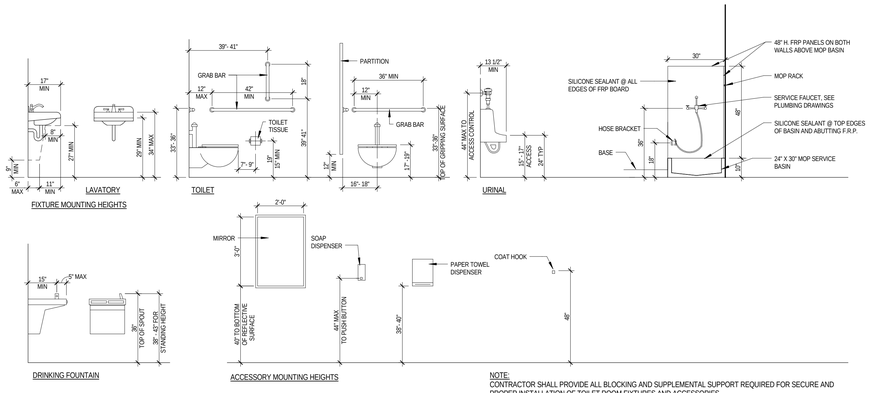
5 ELEV. - MEN'S TOILET ROOM - WEST
1/4" = 1'-0"



6 ELEV. - WOMEN'S TOILET ROOM - NORTH
1/4" = 1'-0"



7 ELEV. - WOMEN'S TOILET ROOM - WEST
1/4" = 1'-0"

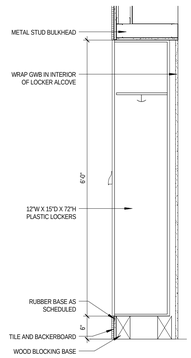


NOTE:
CONTRACTOR SHALL PROVIDE ALL BLOCKING AND SUPPLEMENTAL SUPPORT REQUIRED FOR SECURE AND PROPER INSTALLATION OF TOILET ROOM FIXTURES AND ACCESSORIES.

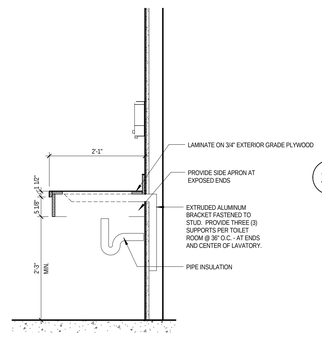
15 TYPICAL FIXTURE MOUNTING HEIGHTS
3/8" = 1'-0"

NEW WORK ACCESSORY KEYNOTES		
NUMBER	DESCRIPTION	SUPPLIED/INSTALLED
1	VA STANDARD PAPER TOWEL DISPENSER	V,C
2	VA STANDARD SOAP DISPENSER	V,C
3	24"X36" MIRROR WITH STAINLESS STEEL FRAME	C,C
4	18" VERTICAL GRAB BAR	C,C
5	42" GRAB BAR	C,C
6	36" GRAB BAR	C,C
7	VA STANDARD TOILET PAPER DISPENSER	V,C
8	12"W x 15"D x 72"H PLASTIC LOCKERS	C,C
9	CEILING MOUNTED TOILET PARTITION	C,C
10	FLUSH MOUNTED WOOD BENCH ON ALUMINUM BRACKETS	C,C
11	ROBE HOOK ON INTERIOR OF ALL TOILET PARTITION DOORS	C,C

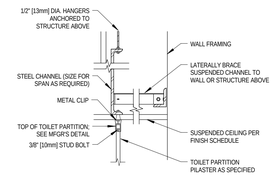
V,C = VA SUPPLIED, CONTRACTOR INSTALLED
C,C = CONTRACTOR SUPPLIED, CONTRACTOR INSTALLED
V,V = VA SUPPLIED, VA INSTALLED



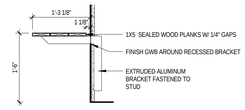
8 SECTION - LOCKERS
3/4" = 1'-0"



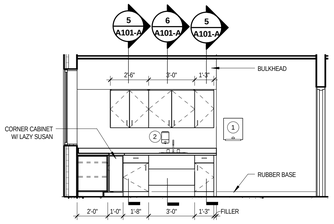
9 LAVATORY DETAIL
3/4" = 1'-0"



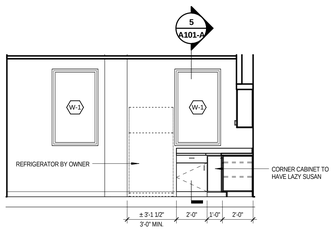
16 CEILING MOUNTED TOILET PARTITION DETAIL
1 1/2" = 1'-0"



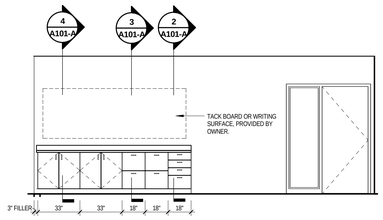
10 WALL MOUNTED BENCH DETAIL
3/4" = 1'-0"



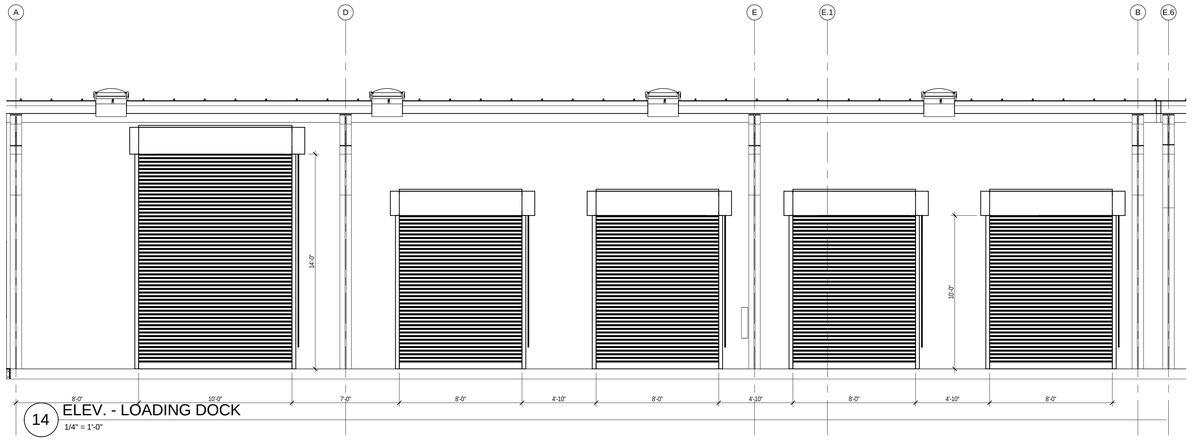
11 ELEV. KITCHENETTE NORTH
1/4" = 1'-0"



12 ELEV. - KITCHENETTE WEST
1/4" = 1'-0"



13 ELEVATION - WORK STATION
1/4" = 1'-0"



14 ELEV. - LOADING DOCK
1/4" = 1'-0"

PROJECT NORTH
TRUE NORTH

FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

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AE Works Project Number: 13025

Drawing Title
ENLARGED PLANS AND DETAILS

Approved: Project Director

Project Title:
NEW WAREHOUSE

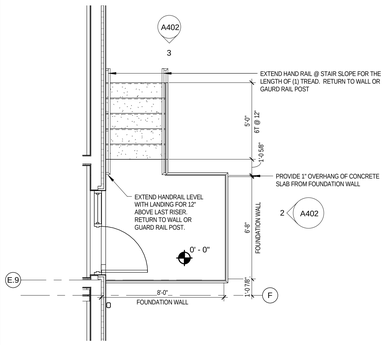
Location: 510 BUTLER AVENUE, MARTINSBURG, WV 25405

Date: 06/24/2015
Checked: JD
Drawn: PR

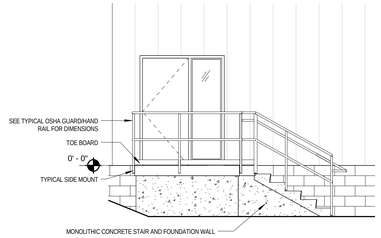
Project Number #613-116
Building Number #519
Drawing Number A401

Office of Construction and Facilities Management
Department of Veterans Affairs

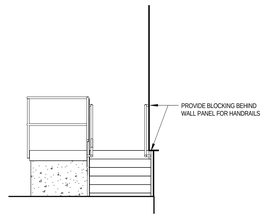
VA FORM 08-6231



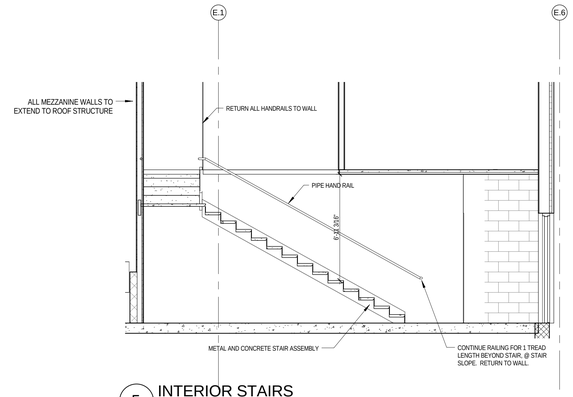
1 ENLARGED PLAN - EXTERIOR STAIR
1/4" = 1'-0"



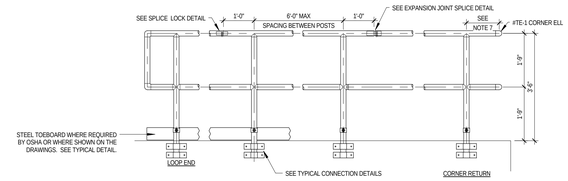
2 ELEVATION - STAIR - EAST
1/4" = 1'-0"



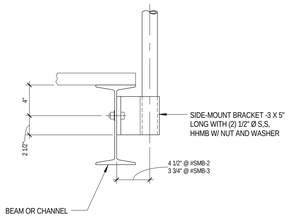
3 ELEVATION - STAIR - NORTH
1/4" = 1'-0"



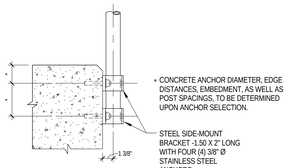
5 INTERIOR STAIRS
1/4" = 1'-0"



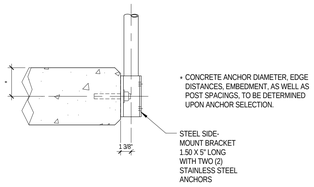
TYPICAL OSHA GUARDRAIL
GUARDRAILS SHALL BE TOP-MOUNTED OR SIDE-MOUNTED, AS SHOWN ON PLANS



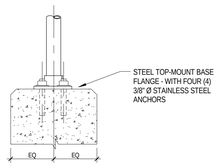
TYPICAL SIDE MOUNT CONNECTION TO BEAM



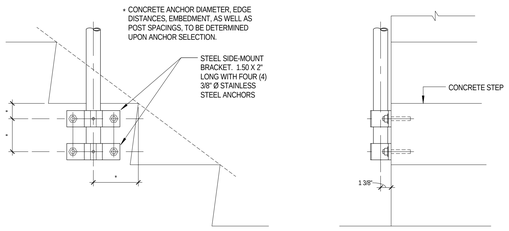
TYPICAL SIDE MOUNT CONNECTION TO CONCRETE WALL



TYPICAL SIDE MOUNT CONNECTION TO CONCRETE SLAB



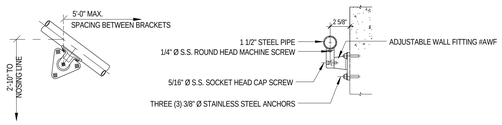
TYPICAL TOP MOUNT CONNECTION TO CONCRETE WALL



TYPICAL SIDE MOUNT CONNECTION TO CONCRETE STAIR

OSHA SUGGESTED DESIGN SPECIFICATIONS

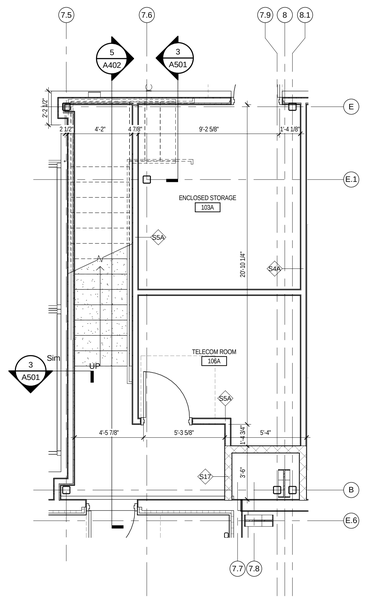
1. GUARDRAILS AND HANDRAILS SHALL BE THE PRODUCT OF A COMPANY NORMALLY ENGAGED IN THE MANUFACTURE OF PIPE RAILING. RAILING SHALL BE SHOP ASSEMBLED IN LENGTHS NOT TO EXCEED 24 FEET FOR FIELD ERECTION.
2. THE HANDRAIL SHALL BE MADE OF PIPES JOINED TOGETHER WITH COMPONENT FITTINGS. SAMPLES OF ALL COMPONENTS, BASES, TOE PLATE AND PIPE SHALL BE SUBMITTED FOR APPROVAL TO THE COR. COMPONENTS THAT ARE POP-RIVETED OR GLUED AT THE JOINTS WILL NOT BE ACCEPTABLE. ALL COMPONENTS MUST BE MECHANICALLY FASTENED WITH STAINLESS STEEL HARDWARE.
3. RAILINGS SHALL BE 1 1/2" SCHEDULE 40 STEEL PIPE. POSTS SHALL BE 1 1/2" SCHEDULE 40 STEEL PIPE OF THE SAME ALLOY. POST SPACING SHALL BE A MAXIMUM OF 6'-0".
4. GUARDRAILS AND HANDRAILS SHALL BE DESIGNED TO WITHSTAND A 200 LB CONCENTRATED LOAD APPLIED IN ANY DIRECTION AND AT ANY POINT ON THE TOP RAIL.
5. THE MANUFACTURER SHALL SUBMIT CALCULATIONS FOR APPROVAL TO THE COR. TESTING OF BASE CASTINGS OR BASE EXTRUSIONS BY AN INDEPENDENT LAB OR MANUFACTURER'S LAB (IF MANUFACTURER'S LAB MEETS THE REQUIREMENTS OF THE ALUMINUM ASSOCIATION) WILL BE AN ACCEPTABLE SUBSTITUTE FOR CALCULATIONS. CALCULATIONS WILL BE REQUIRED FOR APPROVAL OF ALL OTHER DESIGN ASPECTS.
6. POSTS SHALL NOT INTERRUPT THE CONTINUATION OF THE TOP RAIL AT ANY POINT ALONG THE RAILING, INCLUDING CORNERS AND END TERMINATIONS (OSHA 1910.23). THE TOP SURFACE OF THE TOP RAILING SHALL BE SMOOTH AND SHALL NOT BE INTERRUPTED BY PROJECTED FITTINGS.
7. THE MID-RAIL AT A CORNER RETURN SHALL BE ABLE TO WITHSTAND A 200 LB LOAD WITHOUT LOOSENING. THE MANUFACTURER IS TO DETERMINE THIS DIMENSION FOR THEIR SYSTEM AND PROVIDE PHYSICAL LABORATORY TESTS TO CONFIRM COMPLIANCE.
8. CONCRETE ANCHORS SHALL BE STAINLESS STEEL TYPE 303 OR 304 AND SHALL BE FURNISHED BY THE HANDRAIL MANUFACTURER. THE ANCHOR DESIGN SHALL INCLUDE THE APPROPRIATE REDUCTION FACTORS FOR SPACING AND EDGE DISTANCES IN ACCORDANCE WITH THE MANUFACTURER'S PUBLISHED DATA.
9. TOE PLATE SHALL CONFORM TO OSHA STANDARDS. TOE PLATE SHALL BE A MINIMUM OF 4" HIGH AND SHALL BE AN EXTRUSION THAT ATTACHES TO THE POSTS WITH CLAMPS THAT WILL ALLOW FOR EXPANSION AND CONTRACTION BETWEEN POSTS. TOE PLATES SHALL BE SET 1/4" ABOVE THE WALKING SURFACE. TOE PLATES SHALL BE PROVIDED ON HANDRAILS AS REQUIRED BY OSHA AND/OR AS SHOWN ON DRAWINGS. TOE PLATES SHALL BE SHIPPED LOOSE IN STOCK LENGTHS FOR FIELD INSTALLATION.
10. OPENINGS IN THE RAILING SHALL BE GUARDED BY A SELF-CLOSING GATE (OSHA 1910.23). SAFETY CHAINS SHALL NOT BE USED UNLESS SPECIFICALLY SHOWN ON THE DRAWINGS.
11. INTERIOR FINISH SHALL BE PAINT. EXTERIOR FINISH SHALL BE GALVANIZED.



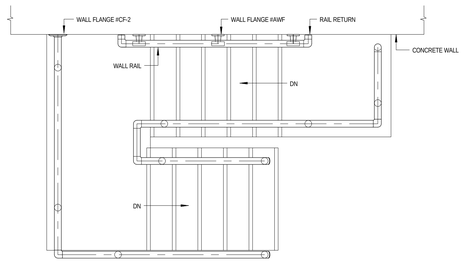
WALL RAIL ELEVATION

WALL RAIL SECTION

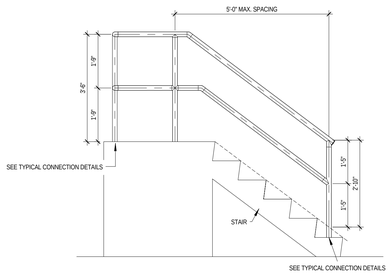
4 TYPICAL GUARD RAIL DETAILS
1 1/2" = 1'-0"



6 ENLARGED PLAN - INTERIOR STAIR
1/4" = 1'-0"



TYPICAL OSHA GUARDRAIL AND HANDRAIL AT STAIRWAYS
GUARDRAILS SHALL BE TOP-MOUNTED OR SIDE-MOUNTED, AS SHOWN ON PLANS



ELEVATION

NOTE: THE ABOVE ELEVATIONS SHOW TYPICAL ASSEMBLY OF RAILINGS PER OSHA GUIDELINESS. REFER TO PLAN AND ELEVATION DRAWINGS OF STAIRS FOR ADDITIONAL REQUIREMENTS INCLUDING HANDRAILS, HANDRAIL EXTENSIONS AND TOE PLATES

7 TYPICAL GUARD RAIL PLANS & ELEV.
1/2" = 1'-0"

PROJECT NORTH
TRUE NORTH

FULLY SPRINKLERED
CONSTRUCTION DOCUMENTS

Revisions:	Date

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AE Works Project Number: 13025

Drawing Title
ENLARGED STAIR PLANS AND DETAILS

Approved: Project Director

Project Title:
NEW WAREHOUSE

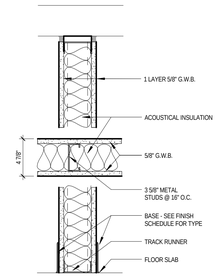
Location: 510 BUTLER AVENUE, MARTINSBURG, WV 25405

Date: 06/24/2015
Checked: JD
Drawn: PR

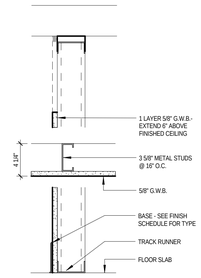
Project Number #613-116
Building Number #519
Drawing Number A402

Office of Construction and Facilities Management
Department of Veterans Affairs

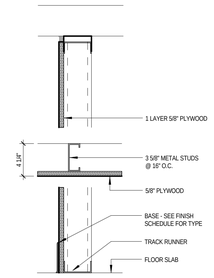
VA FORM 08-6231



S1	AS DETAILED	
S1A	SIMILAR TO S1 WITH 0" METAL STUDS	



S2	CHASE PARTITION 6" ABOVE CEILING	



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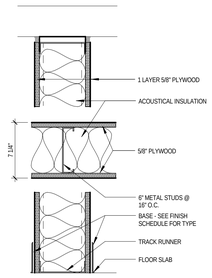
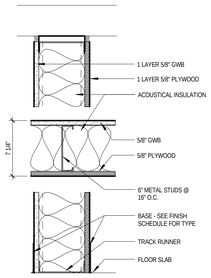
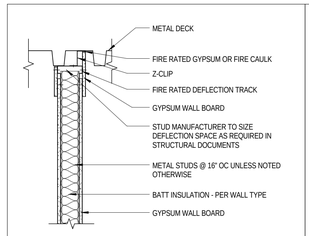


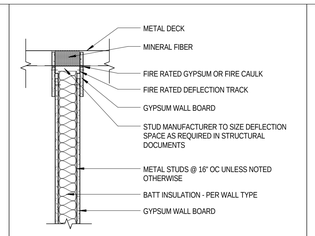
S4	AS DETAILED	
S4A	SIMILAR TO S4 WITH 3 5/8" METAL STUDS	



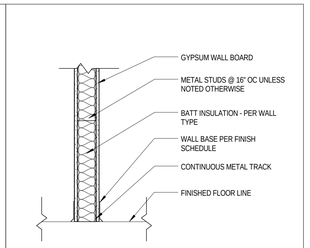
S5	AS DETAILED	
S5A	SIMILAR TO S5 W/ 3 5/8" METAL STUDS	



S-T-2	METAL STUD PARTITION TOP



S-T-3	METAL STUD PARTITION TOP

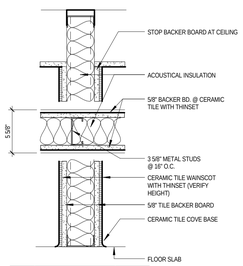


S-B-1	METAL PARTITION BOTTOM

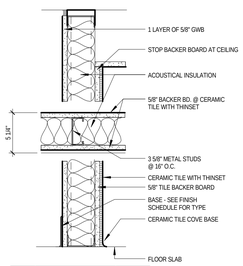
2 TOP & BOTTOM OF WALL DETAILS

1" = 1'-0"

NOTE: ALL WALLS ARE TO GO UP TO UNDERSIDE OF STRUCTURE AS SHOWN.



S6	AS DETAILED	



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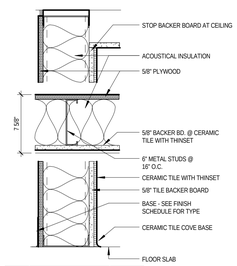
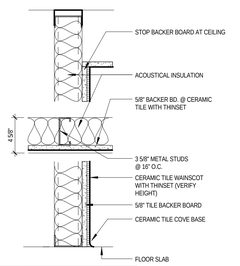
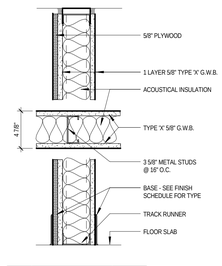


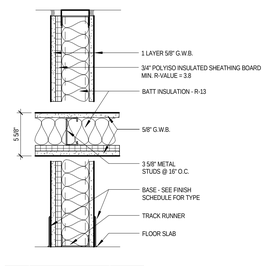
S8	AS DETAILED	



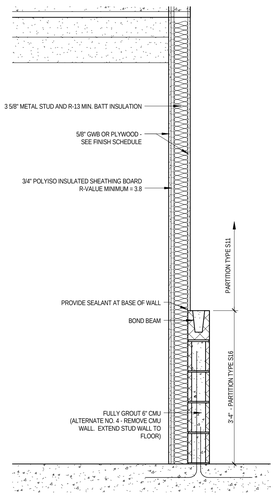
S9	CHASE W/ CERAMIC TILE TO CEILING	



S10	1 HR. PARTITION	UL # U423

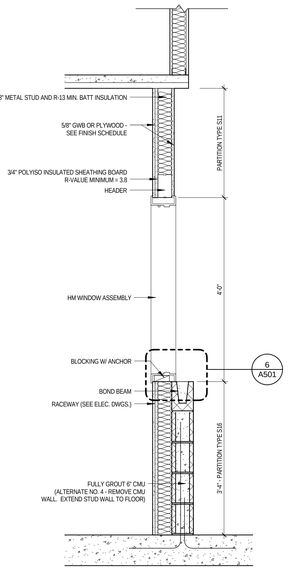


S11	NOT USED	



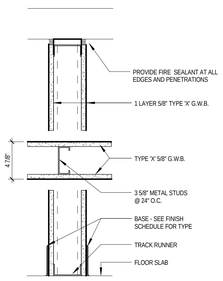
3 INT. STACKED WALL SECTION -TYP.

3/4" = 1'-0"

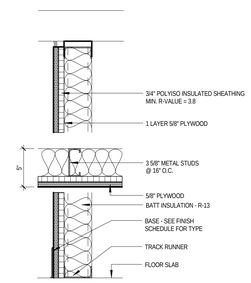


4 INT. STACKED WALL SECTION - WINDOW

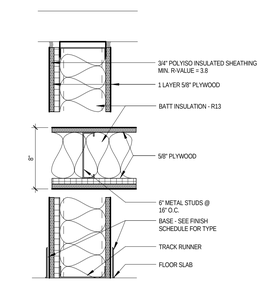
3/4" = 1'-0"



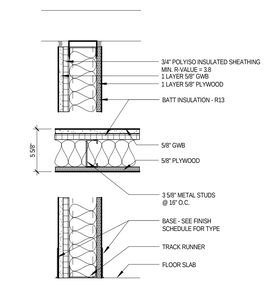
S12	INT. MTL BLDG PARTITION	UL # U419 1-HOUR



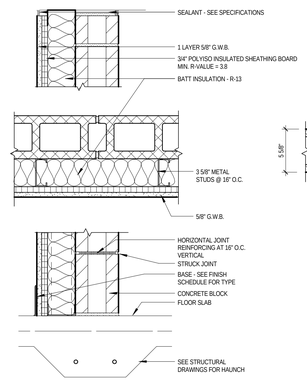
S13	CHASE PARTITION	



S14	AS DETAILED	

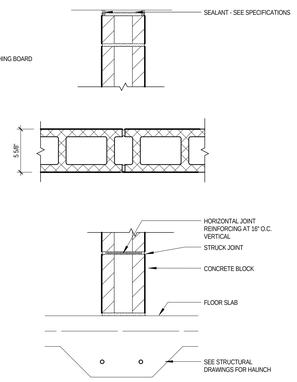


S15	AS DETAILED	
S15A	SIMILAR TO S15 BUT W/ 6" STUD	



S16	INT. MASONRY WALL	

NOTE: IF MASONRY WALL IS SPECIFIED TO A CERTAIN HEIGHT, PLACE BOND BEAM ON TOP COURSE



S17	INT. MASONRY WALL	1-HOUR

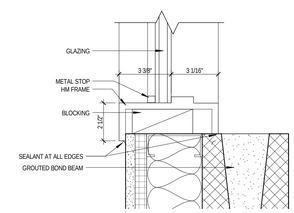
NOTE: IF MASONRY WALL IS SPECIFIED TO A CERTAIN HEIGHT, PLACE BOND BEAM ON TOP COURSE

1 INTERIOR PARTITION TYPES

1 1/2" = 1'-0"

NOTES:

1. ALL WALLS ARE TO GO UP TO UNDERSIDE OF STRUCTURE AS SHOWN.
2. ALL DRYWALL IN WET AREAS (H.A.C., TOILETS, MECHANICAL ROOM, ETC) SHALL BE MOISTURE AND MOLD RESISTANT



6 CMU AND FRAME DETAIL

3" = 1'-0"

FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

HOPE FURRER ASSOCIATES
STRUCTURAL ENGINEERING

CLARK SURVEYING + ENGINEERING
CIVIL ENGINEERING

MOORE DESIGN ASSOCIATES
LANDSCAPE ARCHITECTURE

SEAL

ARCHITECTS/ENGINEERS:

AE WORKS

6587 Hamilton Avenue
Pittsburgh, Pennsylvania 15206
Ph: 412.287.7333 Fax: 412.287.7334
www.ae-works.com

AE Works Project Number: 13025

Drawing Title
WALL TYPES AND DETAILS

Approved: Project Director

Project Title:
NEW WAREHOUSE

Location: 510 BUTLER AVENUE, MARTINSBURG, WV 25405

Date:	Checked:	Drawn:
06/24/2015	JD	PR

Project Number #613-116

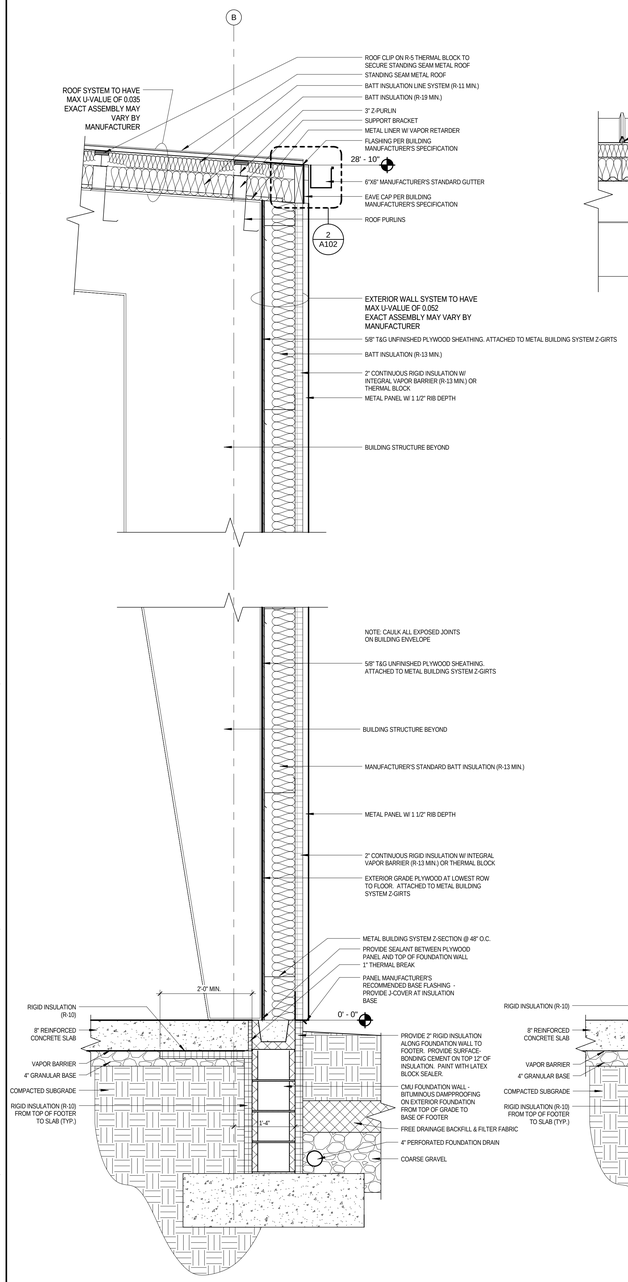
Building Number #519

Drawing Number A501

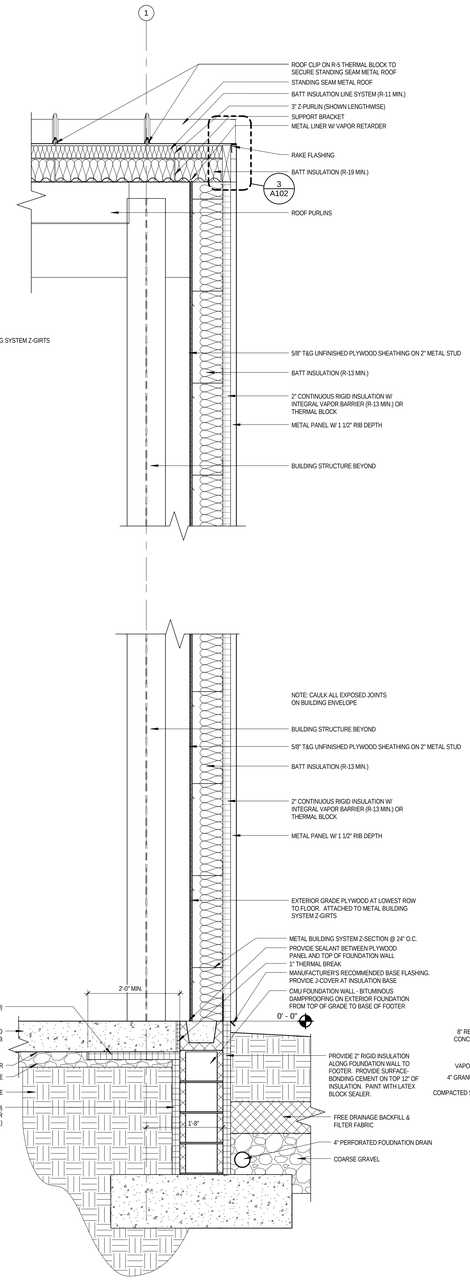
Office of Construction and Facilities Management

Department of Veterans Affairs

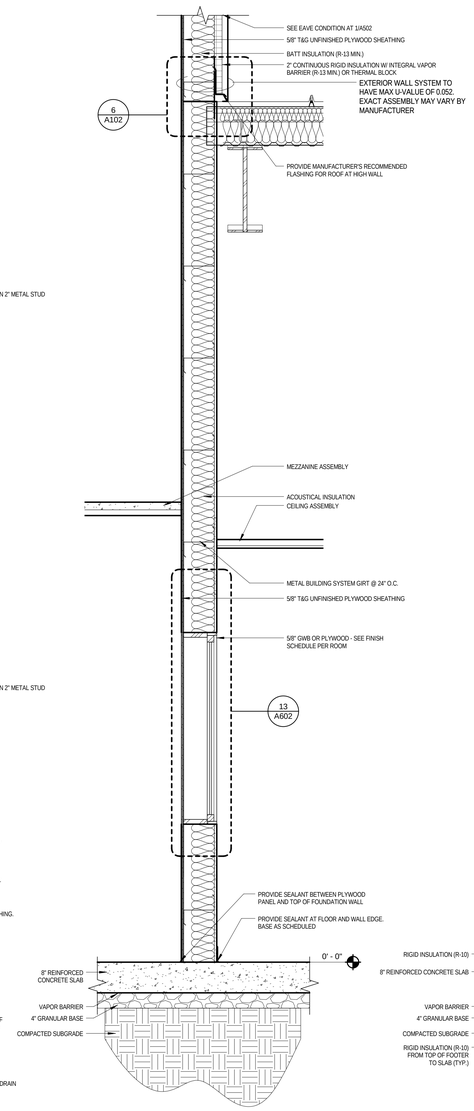
VA FORM 08-6231



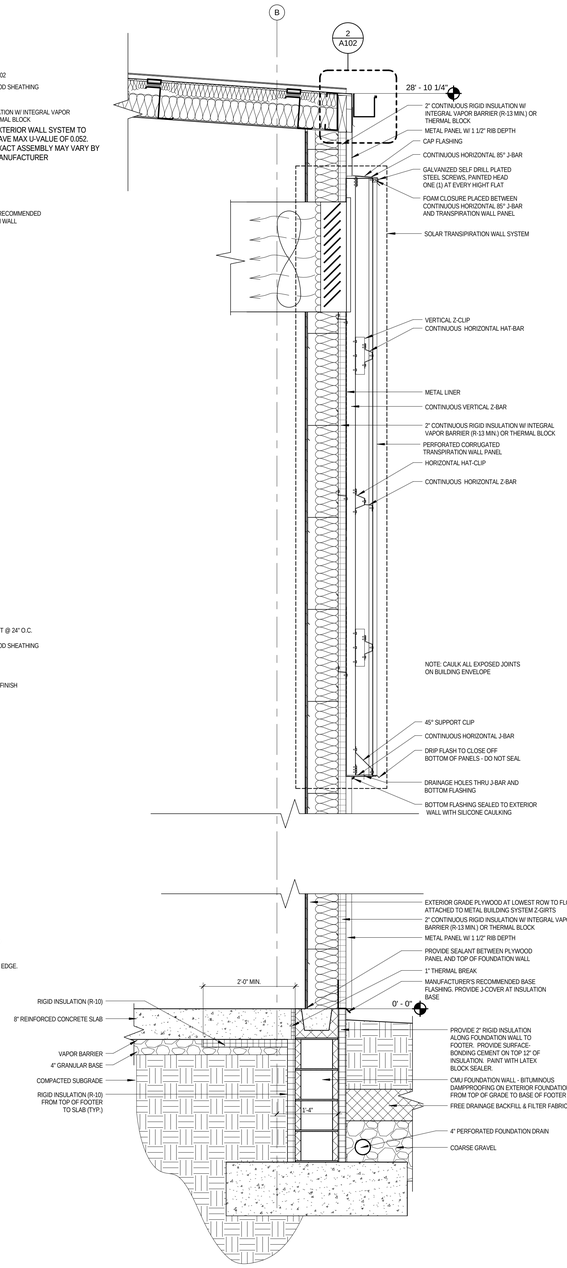
1 WALL SECTION @ COLUMN - SOUTH - TYP.
3/4" = 1'-0"



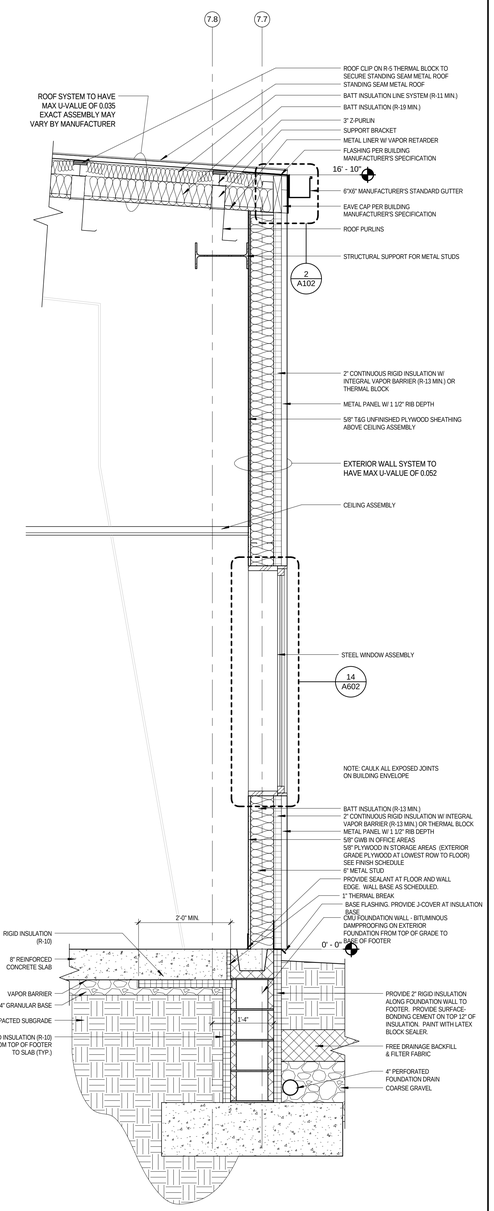
2 WALL SECTION @ END WALL
3/4" = 1'-0"



3 WALL SECTION @ INTERIOR PARTITION
3/4" = 1'-0"



4 WALL SECTION @ TRANSPIRATION WALL
3/4" = 1'-0"



5 WALL SECTION @ WINDOW - TYP.
3/4" = 1'-0"

FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions: | Date

CONSULTANTS:

HOPE FURRER ASSOCIATES
STRUCTURAL ENGINEERING

CLARK SURVEYING + ENGINEERING
CIVIL ENGINEERING

MOORE DESIGN ASSOCIATES
LANDSCAPE ARCHITECTURE

SEAL

ARCHITECTS/ENGINEERS:

AE WORKS

6587 Hamilton Avenue
Pittsburgh, Pennsylvania 15206
Ph: 412.287.7333 Fax: 412.287.7334
www.ae-works.com

AE Works Project Number: 13025

Drawing Title
WALL SECTIONS

Approved: Project Director

Project Title:
NEW WAREHOUSE

Location: 510 BUTLER AVENUE, MARTINSBURG, WV 25405

Date: 06/24/2015 | **Checked:** JD | **Drawn:** PR

Project Number #613-116

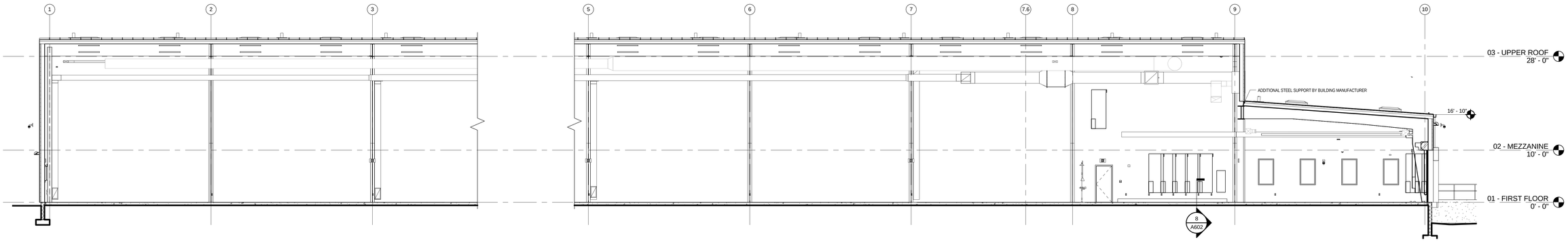
Building Number #519

Drawing Number A502

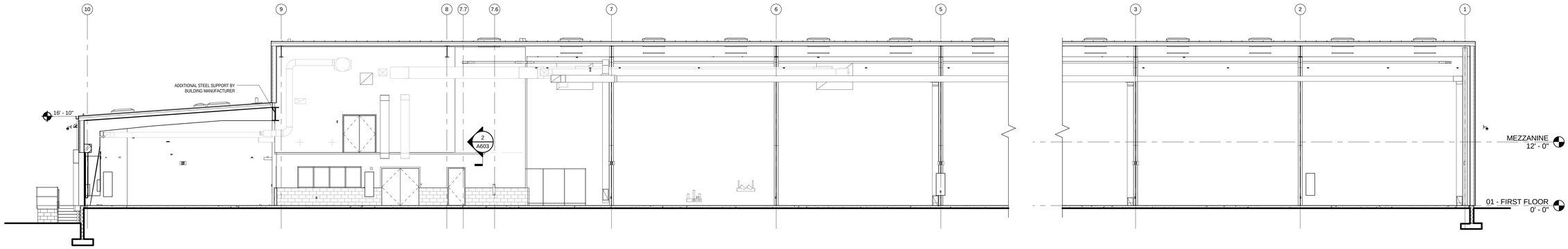
Office of Construction and Facilities Management

Department of Veterans Affairs

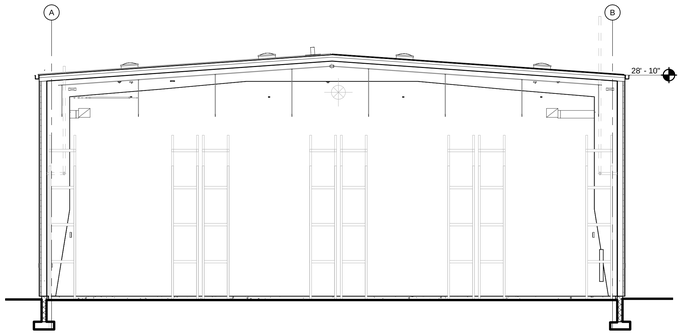
VA FORM 08-6231



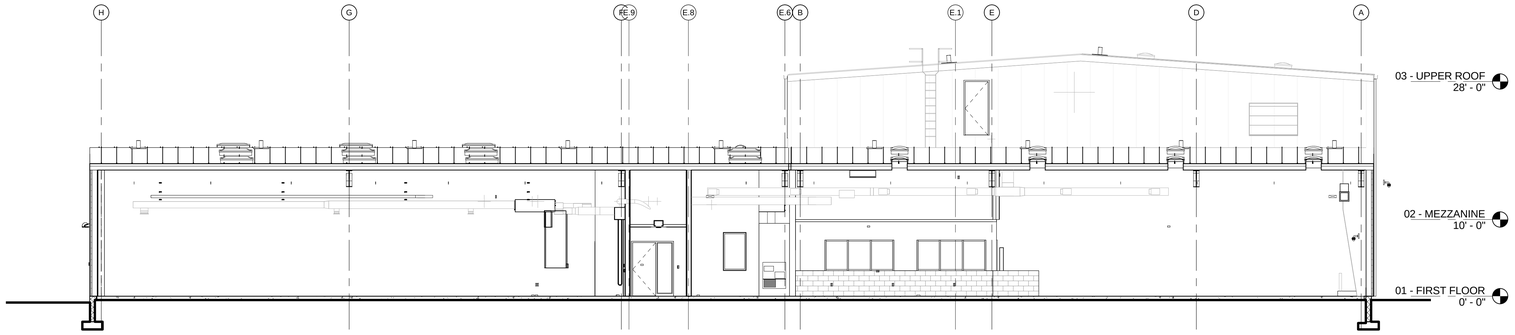
1 SECTION - WAREHOUSE - NORTH LONGITUDE
1/8" = 1'-0"



2 SECTION - WAREHOUSE - SOUTH LONGITUDE
1/8" = 1'-0"



3 SECTION - WAREHOUSE TRANSVERSE
1/8" = 1'-0"



4 SECTION - LOW BAY - LONGITUDINAL
1/8" = 1'-0"

FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

HOPE FURRER ASSOCIATES
STRUCTURAL ENGINEERING

CLARK SURVEYING + ENGINEERING
CIVIL ENGINEERING

MOORE DESIGN ASSOCIATES
LANDSCAPE ARCHITECTURE

SEAL

ARCHITECTS/ENGINEERS:

AE WORKS

6587 Hamilton Avenue
Pittsburgh, Pennsylvania 15206
Ph: 412.287.7333 Fax: 412.287.7334
www.ae-works.com

AE Works Project Number: 13025

Drawing Title
BUILDING SECTIONS

Approved: Project Director

Project Title:
NEW WAREHOUSE

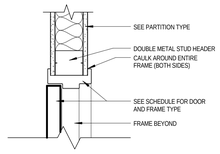
Location: 510 BUTLER AVENUE, MARTINSBURG, WV 25405

Date: 06/24/2015
Checked: JD
Drawn: PR

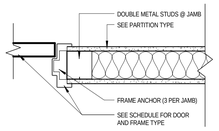
Project Number #613-116
Building Number #519
Drawing Number A505

Office of Construction and Facilities Management
Department of Veterans Affairs

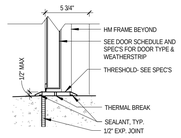
VA FORM 08-6231



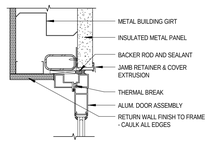
HEAD DETAIL - H-1



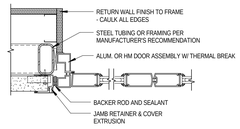
JAMB DETAIL - J-1



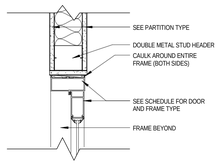
THRESHOLD DETAIL - S-1



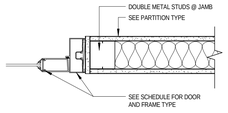
HEAD DETAIL - H-2



JAMB DETAIL - J-2



HEAD DETAIL - H-3

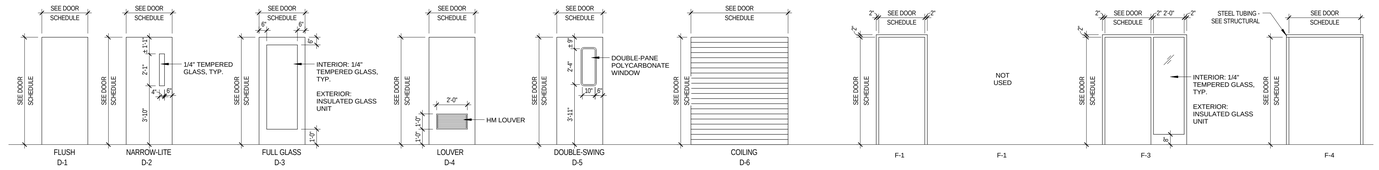


JAMB DETAIL - J-3

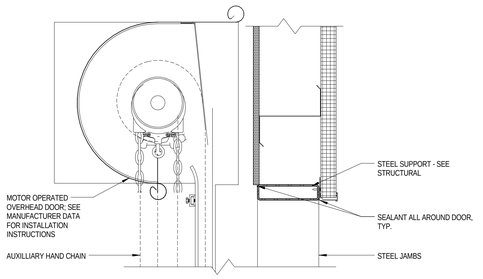
5 DOOR FRAME DETAILS
1 1/2" = 1'-0"

DOOR SCHEDULE

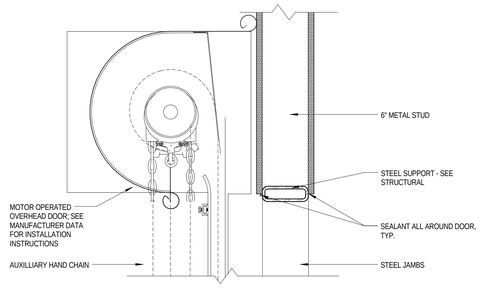
DOOR NUMBER	ROOM NAME	SIZE PAIR	SIZE WIDTH	SIZE HEIGHT	SIZE THICKNESS	DOOR TYPE	DOOR MATERIAL	DOOR FINISH	DOOR FIRE RATING	DOOR MAX U VALUE	FRAME TYPE	FRAME MATERIAL	FRAME HEAD	FRAME JAMB	FRAME SILL	HARDWARE SET	COMMENTS
100-1	VESTIBULE	PAIR	3' - 0"	7' - 0"	1 3/4"	D-3	ALUM	ANOD.		0.6	F-1	ALUM	H-2	J-2	S-1	8D	DOORS TO OPERATE VIA ACCESSIBLE PUSH BUTTON
100-2	VESTIBULE	PAIR	3' - 0"	7' - 0"	1 3/4"	D-3	ALUM	ANOD.			F-1	ALUM	H-3	J-3		SH-10A	DOORS TO OPERATE VIA ACCESSIBLE PUSH BUTTON
101-1	VESTIBULE		3' - 0"	7' - 0"	1 3/4"	D-3	ALUM	ANOD.		0.6	F-3	ALUM	H-2	J-2	S-1	4A	DOORS TO OPERATE VIA ACCESSIBLE PUSH BUTTON
101-2	VESTIBULE		3' - 0"	7' - 0"	1 3/4"	D-3	ALUM	ANOD.		0.6	F-3	ALUM	H-3	J-3		SH-4A	DOORS TO OPERATE VIA ACCESSIBLE PUSH BUTTON
103-1	HEATED HIGH-BAY WAREHOUSE		3' - 0"	7' - 0"	1 3/4"	D-1	HM	PT		0.6	F-1	HM	H-1	J-1	S-1	SH-4D	
103-2	HEATED HIGH-BAY WAREHOUSE		3' - 0"	7' - 0"	1 3/4"	D-1	HM	PT		0.6	F-1	HM	H-1	J-1	S-1	SH-4B	
103A-2	ENCLOSED STORAGE		3' - 0"	7' - 0"	1 3/4"	D-1	HM	PT		0.6	F-1	HM	H-1	J-1	S-1	5B	
104-1	PROCESSING	PAIR	3' - 6"	7' - 0"	2"	D-5	HM	ANOD./SS		0.6	F-1	HM	H-1	J-1		8C	STANDARD HDPE OR STAINLESS STEEL KICKPLATE
104A-1	STORAGE		3' - 0"	7' - 0"	1 3/4"	D-1	HM	PT			F-1	HM	H-1	J-1		5B	
104B-1	OFFICE		3' - 0"	7' - 0"	1 3/4"	D-2	HM	PT			F-1	HM	H-1	J-1		3E	
104C-1	HAC		3' - 0"	7' - 0"	1 3/4"	D-4	HM	PT			F-1	HM	H-1	J-1		5D	
105-1	OFFICE		3' - 0"	7' - 0"	1 3/4"	D-2	HM	PT			F-1	HM	H-1	J-1		3E	
105-2	OFFICE		3' - 0"	7' - 0"	1 3/4"	D-4	HM	PT			F-1	HM	H-1	J-1		5B	
106-1	VESTIBULE		3' - 0"	7' - 0"	1 3/4"	D-1	HM	PT		0.6	F-1	HM	H-2	J-2	S-1	SH-4B	
106A-1	TELECOM ROOM		3' - 0"	7' - 0"	1 3/4"	D-1	HM	PT			F-1	HM	H-1	J-1		SH-4C	
107-1	MEN'S TOILET ROOM		3' - 0"	7' - 0"	1 3/4"	D-1	HM	PT			F-1	HM	H-1	J-1		1	
108-1	WOMEN'S TOILET ROOM		3' - 0"	7' - 0"	1 3/4"	D-1	HM	PT			F-1	HM	H-1	J-1		1	
109-1	BREAK ROOM		3' - 0"	7' - 0"	1 3/4"	D-2	HM	PT			F-1	HM	H-1	J-1		1	
110-1	RESTRICTED OFFICE SPACE		3' - 0"	7' - 0"	1 3/4"	D-2	HM	PT			F-3	HM	H-1	J-1		SH-4C	
110-2	RESTRICTED OFFICE SPACE		3' - 0"	7' - 0"	1 3/4"	D-1	HM	PT		0.6	F-1	HM	H-2	J-2	S-1	SH-4D	
111-1	CONDITIONED WAREHOUSE STORAGE		3' - 0"	7' - 0"	1 3/4"	D-1	HM	PT			F-1	HM	H-1	J-1		SH-4C	
111-2	CONDITIONED WAREHOUSE STORAGE		3' - 0"	7' - 0"	1 3/4"	D-1	HM	PT		0.6	F-1	HM	H-2	J-2	S-1	SH-4B	
204A-1	MECHANICAL ROOM		3' - 0"	7' - 0"	1 3/4"	D-1	HM	PT			F-1	HM	H-1	J-1		SH-4C	
204A-2	MECHANICAL ROOM	PAIR	3' - 0"	7' - 0"	1 3/4"	D-1	HM	PT			F-1	HM	H-1	J-1		11	PROVIDE CHAIN ACROSS DOOR FOR VISUAL FALL PROTECTION
204A-3	MECHANICAL ROOM		3' - 0"	7' - 0"	1 3/4"	D-1	HM	PT			F-1	HM	H-2	J-2		E1	ROOF ACCESS DOOR
204B-1	BIOMED STORAGE		3' - 0"	7' - 0"	1 3/4"	D-1	HM	PT	45 MIN.		F-1	HM	H-1	J-1		SH-4C	
204C-1	ELECTRIC ROOM	PAIR	3' - 0"	7' - 0"	1 3/4"	D-1	HM	PT	45 MIN.		F-1	HM	H-1	J-1		SH-10B	
C1-1	CORRIDOR	PAIR	3' - 0"	8' - 0"	1 3/4"	D-2	HM	PT		0.6	F-1	HM	H-1	J-1		10-C	
OH1	DELIVERY		10'-0"	14' - 0"	1/2"	D-6	STEEL	GALV.		0.4	F-4	STEEL	6/A601	7/A601	8/A601		SEE 08 33 00 FOR MORE INFORMATION
OH2	DELIVERY		8'-0"	10' - 0"	1/2"	D-6	STEEL	GALV.		0.4	F-4	STEEL	6/A601	7/A601	11/A601		SEE 08 33 00 FOR MORE INFORMATION
OH3	DELIVERY		8'-0"	10' - 0"	1/2"	D-6	STEEL	GALV.		0.4	F-4	STEEL	6/A601	7/A601	11/A601		SEE 08 33 00 FOR MORE INFORMATION
OH4	DELIVERY		8'-0"	10' - 0"	1/2"	D-6	STEEL	GALV.		0.4	F-4	STEEL	6/A601	7/A601	11/A601		SEE 08 33 00 FOR MORE INFORMATION
OH5	DELIVERY		8'-0"	10' - 0"	1/2"	D-6	STEEL	GALV.		0.4	F-4	STEEL	6/A601	7/A601	11/A601		SEE 08 33 00 FOR MORE INFORMATION
OH6	CORRIDOR		8'-0"	10' - 0"	1/2"	D-6	STEEL	GALV.		0.4	F-4	STEEL	9/A601	10/A601	--		SEE 08 33 00 FOR MORE INFORMATION



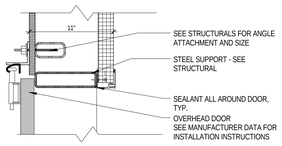
1 DOOR & FRAME TYPES
1/4" = 1'-0"



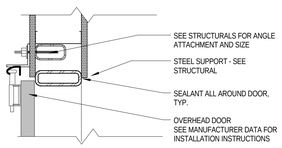
6 OVERHEAD DOOR HEAD - EXTERIOR
1 1/2" = 1'-0"



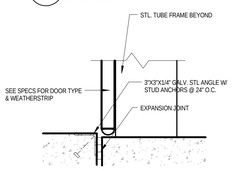
9 OVERHEAD DOOR HEAD - INTERIOR
1 1/2" = 1'-0"



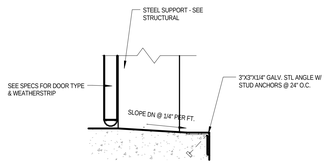
7 OVERHEAD DOOR JAM - EXTERIOR
1 1/2" = 1'-0"



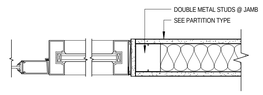
10 OVERHEAD DOOR JAM - INTERIOR
1 1/2" = 1'-0"



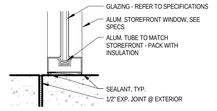
8 OVERHEAD DOOR THRESHOLD 1
1 1/2" = 1'-0"



11 OVERHEAD DOOR THRESHOLD 2
1 1/2" = 1'-0"

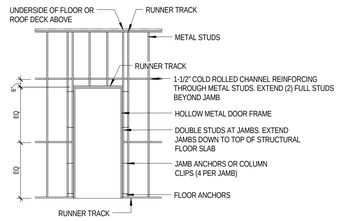


SIDE LIGHT JAMB DETAIL

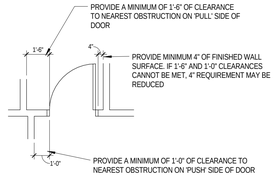


SIDE LIGHT SILL DETAIL

2 ALUMINUM SIDE LIGHT DETAIL
1 1/2" = 1'-0"

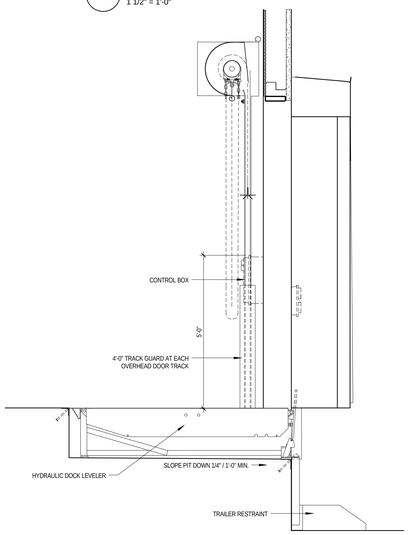


STUD WALL

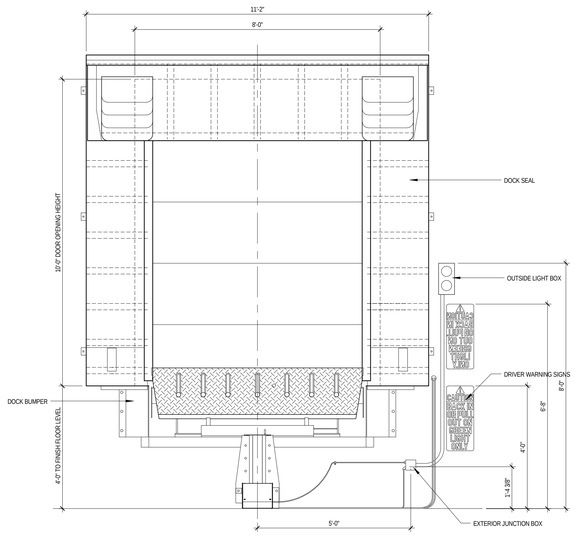


TYPICAL MINIMUM REQUIRED DOOR CLEARANCES

3 DOOR INSTALLATION DETAIL
1/4" = 1'-0"



4 OVERHEAD DOOR DETAILS
1/2" = 1'-0"



FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

HOPE FURRER ASSOCIATES
STRUCTURAL ENGINEERING

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LANDSCAPE ARCHITECTURE

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ARCHITECTS/ENGINEERS:

AE WORKS

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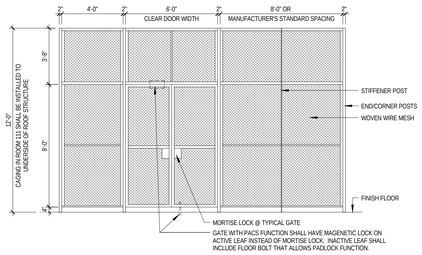
www.ae-works.com

AE Works Project Number: 13025

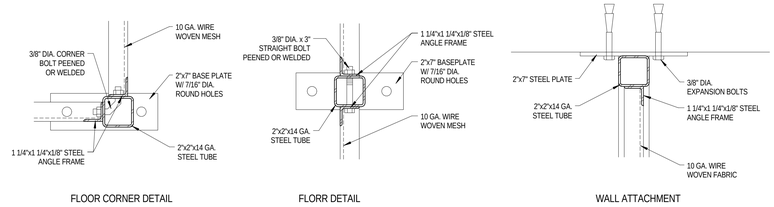
Drawing Title	DOOR SCHEDULE AND DETAILS
Approved: Project Director	
Project Title:	NEW WAREHOUSE
Project Number	#613-116
Building Number	#519
Location:	510 BUTLER AVENUE, MARTINSBURG, WV 25405
Date:	06/24/2015
Checked:	JD
Drawn:	PR
Drawing Number	A601

Office of Construction and Facilities Management
Department of Veterans Affairs

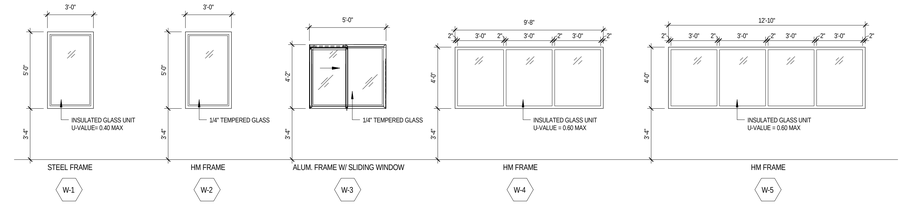
VA FORM 08-6231



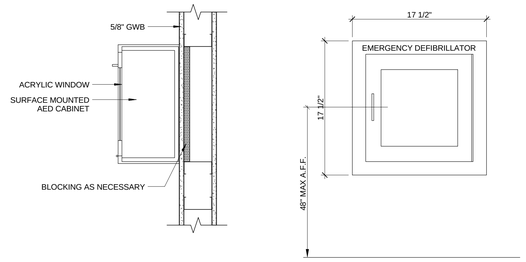
1 TYPICAL INTERIOR CAGING ELEVATION
1/4" = 1'-0"



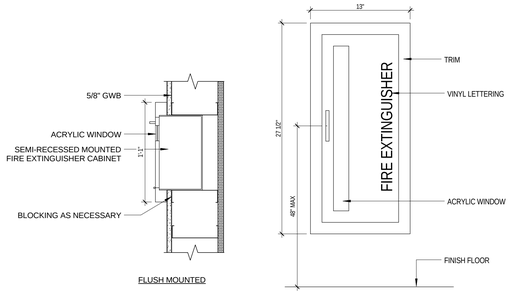
2 INTERIOR CAGING DETAILS
3" = 1'-0"



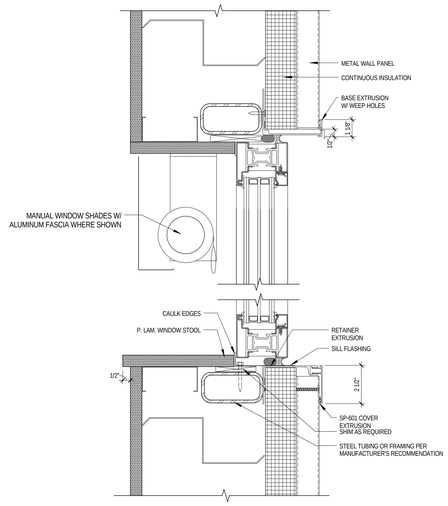
9 WINDOW TYPES
1/4" = 1'-0"



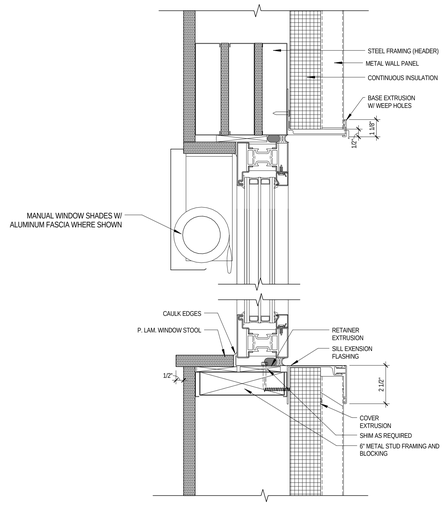
3 FLUSH MOUNTED AED CABINET DETAIL
1 1/2" = 1'-0"



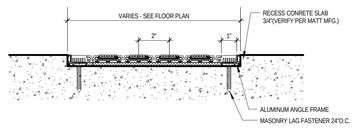
4 FIRE EXTINGUISHER CABINET DETAIL
1 1/2" = 1'-0"



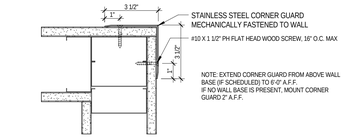
10 STEEL WINDOW HEAD & SILL @ GIRTS
3" = 1'-0"



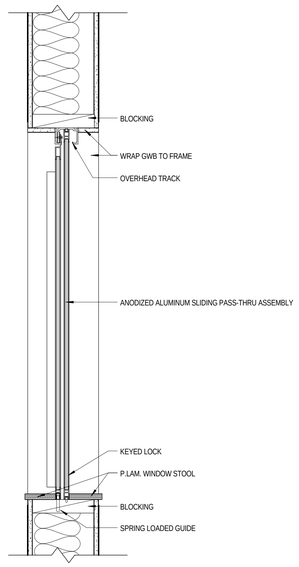
14 STEEL WINDOW HEAD & SILL @ FRAMING
3" = 1'-0"



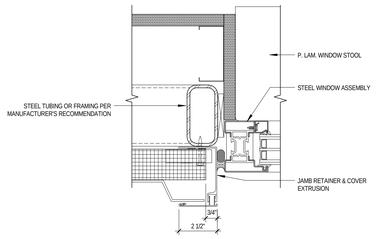
5 RECESSED FLOOR MAT DETAIL
3" = 1'-0"



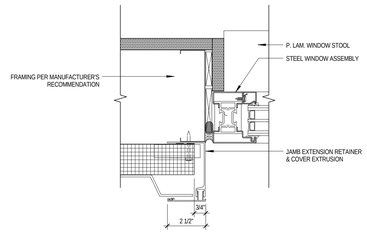
6 CORNER GUARD DETAIL
3" = 1'-0"



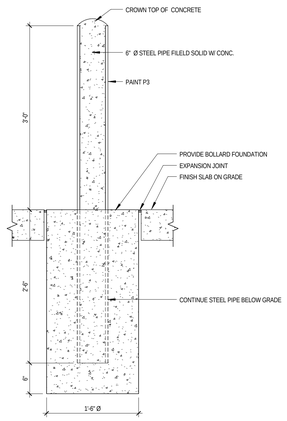
13 INTERIOR SLIDING WINDOW
1 1/2" = 1'-0"



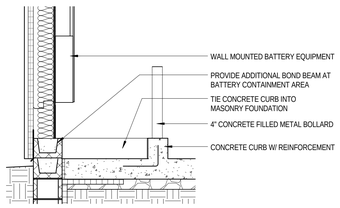
11 STEEL WINDOW JAMB @ GIRTS
3" = 1'-0"



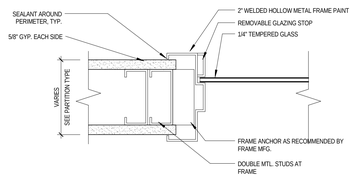
15 STEEL WINDOW JAMB @ FRAMING
3" = 1'-0"



7 STEEL ENCASED CONCRETE BOLLARDS
1" = 1'-0"



8 FLOOR CURB DETAIL
1/2" = 1'-0"



12 INTERIOR HM WINDOW FRAME
3" = 1'-0"

FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

HOPE FURRER ASSOCIATES
STRUCTURAL ENGINEERING

CLARK SURVEYING + ENGINEERING
CIVIL ENGINEERING

MOORE DESIGN ASSOCIATES
LANDSCAPE ARCHITECTURE

SEAL

ARCHITECTS/ENGINEERS:

AE WORKS

6587 Hamilton Avenue
Pittsburgh, Pennsylvania 15206
Ph: 412.287.7333 Fax: 412.287.7334
www.ae-works.com

AE Works Project Number: 13025

Drawing Title
WINDOW AND CONSTRUCTION DETAILS

Approved: Project Director

Project Title:
NEW WAREHOUSE

Location: 510 BUTLER AVENUE, MARTINSBURG, WV 25405

Date: 06/24/2015 **Checked:** JD **Drawn:** PR

Project Number #613-116

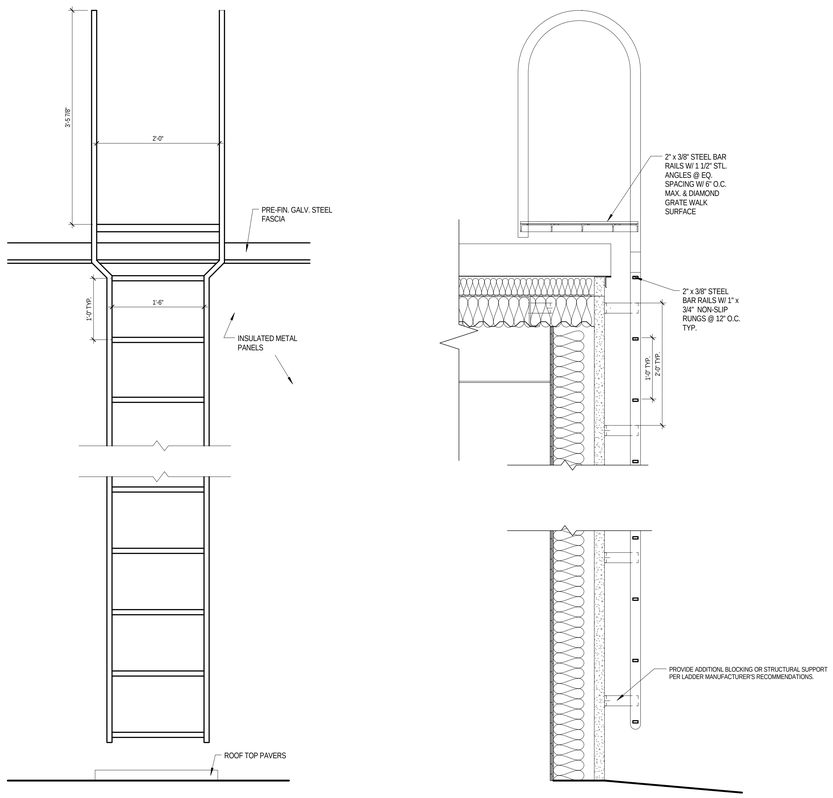
Building Number #519

Drawing Number A602

Office of Construction and Facilities Management

Department of Veterans Affairs

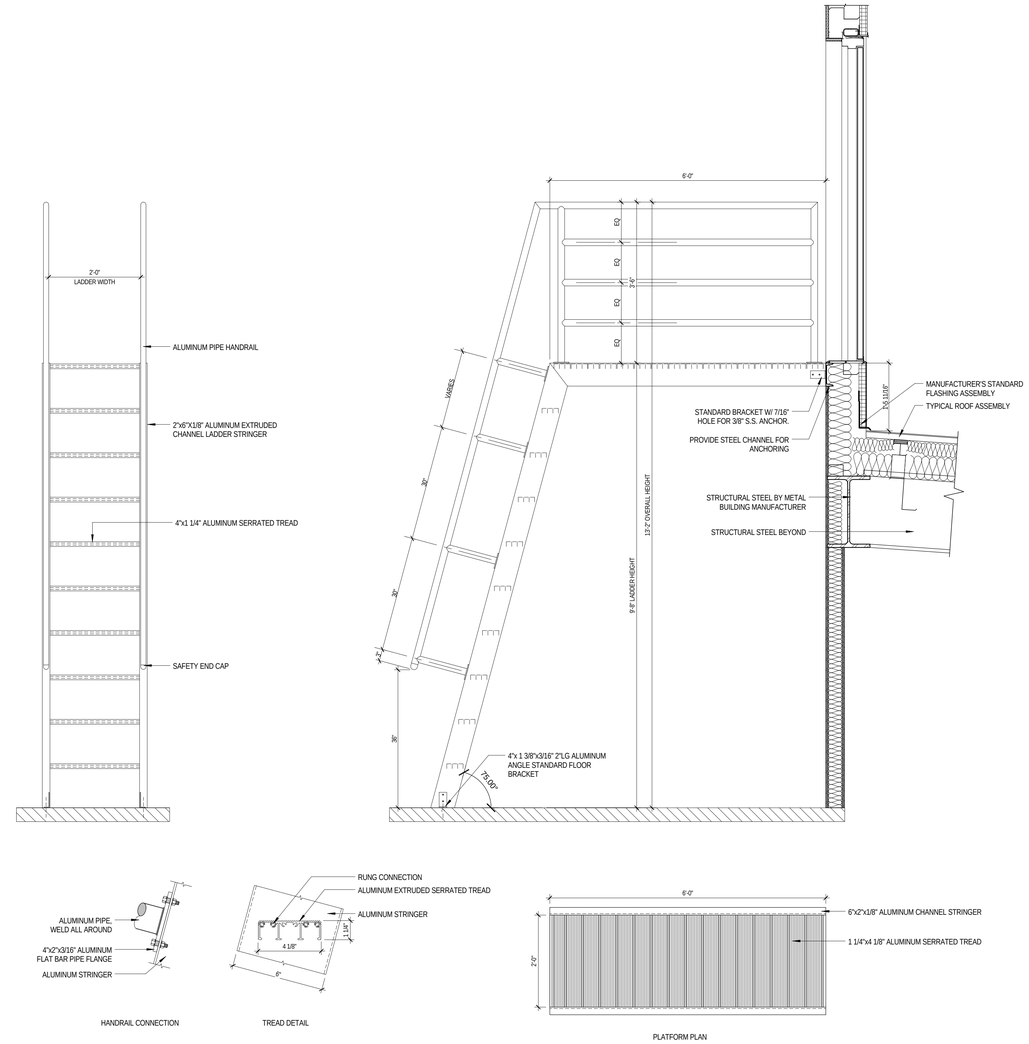
VA FORM 08-6231



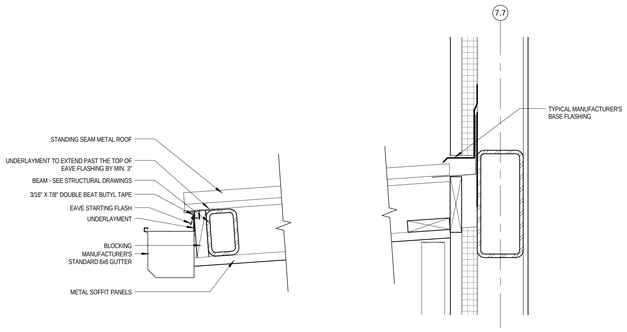
LADDER ELEVATION

SECTION THRU LADDER

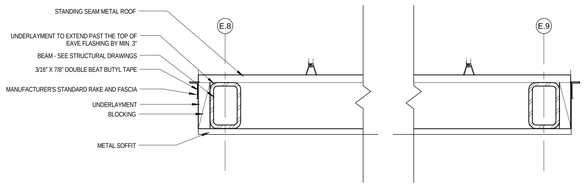
7 EXTERIOR ACCESS LADDER DETAILS
1" = 1'-0"



8 SHIPS LADDER DETAILS
3/4" = 1'-0"



1 SECTION - CANOPY 1
1 1/2" = 1'-0"



2 SECTION - CANOPY 2
1 1/2" = 1'-0"

FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

HOPE FURRER ASSOCIATES
STRUCTURAL ENGINEERING

CLARK SURVEYING + ENGINEERING
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MOORE DESIGN ASSOCIATES
LANDSCAPE ARCHITECTURE

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Pittsburgh, Pennsylvania 15206
Ph: 412.287.7333 Fax: 412.287.7334
www.ae-works.com

AE Works Project Number: 13025

Drawing Title
CONSTRUCTION DETAILS

Approved: Project Director

Project Title:
NEW WAREHOUSE

Location: 510 BUTLER AVENUE, MARTINSBURG, WV 25405

Date: 06/24/2015 **Checked:** JD **Drawn:** PR

Project Number #613-116

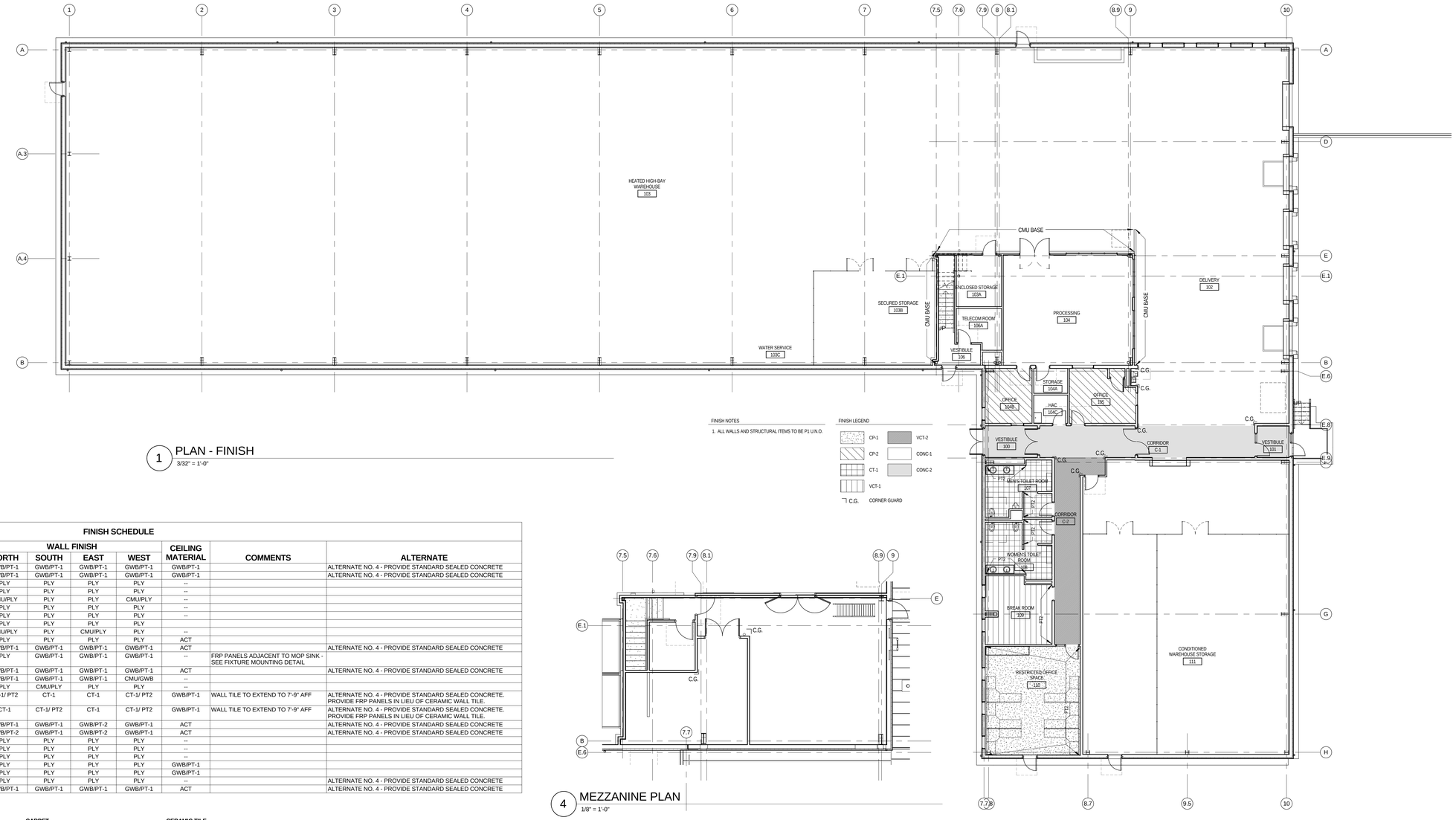
Building Number #519

Drawing Number A603

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231



1 PLAN - FINISH
3/32" = 1'-0"

FINISH NOTES

1. ALL WALLS AND STRUCTURAL ITEMS TO BE P1 U.N.O.

FINISH LEGEND

CP-1	VCT-2
CP-2	CONC-1
CT-1	CONC-2
VCT-1	
C.G.	CORNER GUARD

4 MEZZANINE PLAN
1/8" = 1'-0"

FINISH SCHEDULE

	NAME	FLOOR FINISH	BASE FINISH	WALL FINISH NORTH	WALL FINISH SOUTH	WALL FINISH EAST	WALL FINISH WEST	CEILING MATERIAL	COMMENTS	ALTERNATE
100	VESTIBULE	CONC-2	RB	GWB/PT-1	GWB/PT-1	GWB/PT-1	GWB/PT-1	GWB/PT-1		ALTERNATE NO. 4 - PROVIDE STANDARD SEALED CONCRETE
101	VESTIBULE	CONC-2	RB	GWB/PT-1	GWB/PT-1	GWB/PT-1	GWB/PT-1	GWB/PT-1		ALTERNATE NO. 4 - PROVIDE STANDARD SEALED CONCRETE
102	DELIVERY	CONC-1	--	PLY	PLY	PLY	PLY	--		
103	HEATED HIGH-BAY WAREHOUSE	CONC-1	--	PLY	PLY	PLY	PLY	--		
103A	ENCLOSED STORAGE	CONC-1	--	CMU/PLY	PLY	PLY	CMU/PLY	--		
103B	SECURED STORAGE	CONC-1	RB	PLY	PLY	PLY	PLY	--		
103C	WATER SERVICE	CONC-1	--	PLY	PLY	PLY	PLY	--		
103C	SECURED STORAGE	CONC-1	RB	PLY	PLY	PLY	PLY			
104	PROCESSING	CONC-1	--	CMU/PLY	PLY	CMU/PLY	PLY	--		
104A	STORAGE	CONC-1	RB	PLY	PLY	PLY	PLY	ACT		
104B	OFFICE	CP-2	RB	GWB/PT-1	GWB/PT-1	GWB/PT-1	GWB/PT-1	ACT		ALTERNATE NO. 4 - PROVIDE STANDARD SEALED CONCRETE
104C	HAC	CONC-1	RB	PLY	GWB/PT-1	GWB/PT-1	GWB/PT-1	--	FRP PANELS ADJACENT TO MOP SINK - SEE FIXTURE MOUNTING DETAIL	
105	OFFICE	CP-2	RB	GWB/PT-1	GWB/PT-1	GWB/PT-1	GWB/PT-1	ACT		ALTERNATE NO. 4 - PROVIDE STANDARD SEALED CONCRETE
106	VESTIBULE	CONC-1	RB	GWB/PT-1	GWB/PT-1	GWB/PT-1	CMU/GWB	--		
106A	TELECOM ROOM	CONC-1	RB	PLY	CMU/PLY	PLY	PLY	--		
107	MEN'S TOILET ROOM	CT-1	CT	CT-1/ PT2	CT-1	CT-1	CT-1/ PT2	GWB/PT-1	WALL TILE TO EXTEND TO 7'-9" AFF	ALTERNATE NO. 4 - PROVIDE STANDARD SEALED CONCRETE. PROVIDE FRP PANELS IN LIEU OF CERAMIC WALL TILE.
108	WOMEN'S TOILET ROOM	CT-1	CT	CT-1	CT-1/ PT2	CT-1	CT-1/ PT2	GWB/PT-1	WALL TILE TO EXTEND TO 7'-9" AFF	ALTERNATE NO. 4 - PROVIDE STANDARD SEALED CONCRETE. PROVIDE FRP PANELS IN LIEU OF CERAMIC WALL TILE.
109	BREAK ROOM	VCT-1	RB	GWB/PT-1	GWB/PT-1	GWB/PT-2	GWB/PT-1	ACT		ALTERNATE NO. 4 - PROVIDE STANDARD SEALED CONCRETE
110	RESTRICTED OFFICE SPACE	CP-2	RB	GWB/PT-2	GWB/PT-1	GWB/PT-2	GWB/PT-1	ACT		ALTERNATE NO. 4 - PROVIDE STANDARD SEALED CONCRETE
111	CONDITIONED WAREHOUSE STORAGE	CONC-1	--	PLY	PLY	PLY	PLY	--		
204	MEZZANINE	CONC-1	RB	PLY	PLY	PLY	PLY	--		
204A	MECHANICAL ROOM	CONC-1	RB	PLY	PLY	PLY	PLY			
204B	BIOMED STORAGE	CONC-1	RB	PLY	PLY	PLY	PLY	GWB/PT-1		
204C	ELECTRIC ROOM	CONC-1	RB	PLY	PLY	PLY	PLY	GWB/PT-1		
C-1	CORRIDOR	CONC-2	--	PLY	PLY	PLY	PLY	--		ALTERNATE NO. 4 - PROVIDE STANDARD SEALED CONCRETE
C-2	CORRIDOR	VCT-2	RB	GWB/PT-1	GWB/PT-1	GWB/PT-1	GWB/PT-1	ACT		ALTERNATE NO. 4 - PROVIDE STANDARD SEALED CONCRETE

WINDOW SHADES

MANUFACTURER: LUTRON ROLLER SHADE
TYPE: THE CLASSICO COLLECTION
COLOR: BEIGE/GRAY VSZ-223-8

RUBBER BASE

RB1
MANUFACTURER: ROPPE
COLOR: PEWTER 178
SIZE: 4"

PAINT

PT1
MANUFACTURER: SHERWIN WILLIAMS
COLOR: SW7007 ORIGINAL WHITE

PT2
MANUFACTURER: SHERWIN WILLIAMS
COLOR: SW6523 DENIM

CONCRETE

CONC-1
FINISH: HARDENER

CONC-2
MANUFACTURER: SCOFIELD
PRODUCT: LITHOCHROME
COLORED HARDENER
FINISH: 1138-S SMOKE

SUSPENDED CEILING GRID

MANUFACTURER: ARMSTRONG
TYPE: 9/16" SUPRAFINE
COLOR: WHITE

ACOUSTICAL CEILING TILE

ACT1
MANUFACTURER: ARMSTRONG
TYPE: ULTIMA w/ AirGuard Coating
COLOR: WHITE
SIZE: 2X2

PLASTIC LAMINATE

COUNTERTOPS
MANUFACTURER: PIONITE
COLOR: MG071-R GRANITE BERNARD
LOCATION: BREAK ROOM

CASEWORK
MANUFACTURER: PIONITE
COLOR: WP115SUEDE APPEARS LIKATRE
LOCATION: BREAK ROOM

COUNTERTOPS
MANUFACTURER: PIONITE
COLOR: AG180 SUEDE METEORIC METALLO
LOCATION: RESTROOMS

CASEWORK
MANUFACTURER: PIONITE
COLOR: WP115SUEDE APPEARS LIKATRE
LOCATION: RESTROOMS

CARPET

CP1
MANUFACTURER: PATCRAFT
STYLE: 103S3- HOMEROOM V.3.0
COLOR: 00400 ELECTIVE
SIZE: 24X24 MONOLITHIC

CP2
MANUFACTURER: J&J INVISION
STYLE: RUNWAY MODULAR 7000
COLOR: 1418 UMBER CHIC
SIZE: 24X24 QUARTER TURN

VCT

VCT-1
MANUFACTURER: JOHNSONITE
COLLECTION: AZROCK TEXTILE VCT
COLOR: V-285 NATURAL COTTON

VCT-2
MANUFACTURER: JOHNSONITE
COLLECTION: AZROCK TEXTILE VCT
COLOR: V-290 FUR

CERAMIC TILE

CT-1
MANUFACTURER: CROSSVILLE, INC
COLOR: NOW - MOSS 7A38
SIZE: 12X24
LOCATION: RESTROOM FLOORS

CT-2
MANUFACTURER: CROSSVILLE, INC
COLOR: NOW - MOSS
SIZE: 6X12 COVE BASE
LOCATION: RESTROOM COVE BASE

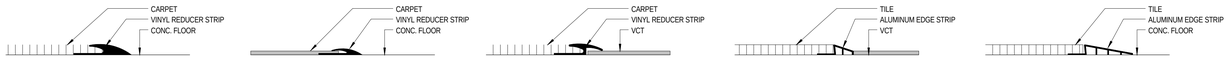
CT-3
MANUFACTURER: CROSSVILLE, INC
COLOR: NOW - MOSS
SIZE: 6X6 DIAGONAL CROSSHATCH
LOCATION: RESTROOM WALLS

CT-4
MANUFACTURER: CROSSVILLE, INC
COLOR: NOW - MOSS
SIZE: 3X18 BULLNOSE
LOCATION: RESTROOM BULLNOSE

RESTROOM PARTITIONS

HDP PARTITIONS
MANUFACTURER: GLOBAL PARTITIONS
COLOR: 9200 GRAY
LOCATION: RESTROOMS

2 PROJECT FINISHES
1/8" = 1'-0"



T1 - CARPET TO CONCRETE FLOOR
T2 - VCT TO CONCRETE FLOOR
T3 - CARPET TO VCT FLOOR
T4 - CERAMIC TO VCT FLOOR
T5 - CERAMIC TO CONCRETE FLOOR

3 FLOOR THRESHOLD DETAILS
6" = 1'-0"

NOTE: PROVIDE THRESHOLDS AT ALL CHANGES IN FLOORING

PROJECT NORTH
TRUE NORTH

FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

HOPE FURRER ASSOCIATES
STRUCTURAL ENGINEERING

CLARK SURVEYING + ENGINEERING
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AE Works Project Number: 13025

Drawing Title
FINISH PLAN

Approved: Project Director

Project Title:
NEW WAREHOUSE

Location: 510 BUTLER AVENUE, MARTINSBURG, WV 25405

Date: 06/24/2015
Checked: JD
Drawn: AM

Project Number #613-116
Building Number #519
Drawing Number A701

Office of Construction and Facilities Management
Department of Veterans Affairs

VA FORM 08-6231

FIRE PROTECTION GENERAL NOTES

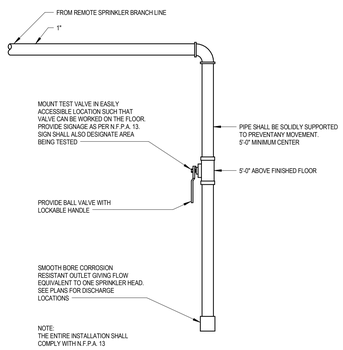
1. ALL WORK SHOWN IS NEW UNLESS INDICATED OTHERWISE.
2. COORDINATE ALL WORK WITH OTHER TRADES AND EXISTING CONDITIONS PRIOR TO THE FABRICATION OR INSTALLATION OF ANY PIPING.
3. THE DRAWINGS ARE DIAGRAMMATIC. THE CONTRACTOR MUST FIELD VERIFY ACTUAL CONDITIONS AT THE SITE PRIOR TO PROCEEDING WITH THE WORK.
4. ALL EXISTING SERVICES ARE SHOWN IN THEIR APPROXIMATE LOCATIONS.
5. ALL NEW PIPING SHALL BE INSTALLED IN SUCH A WAY THAT IT DOES NOT HAMPER ACCESS TO NEW OR EXISTING VALVES, ACCESS DOORS OR EQUIPMENT.
6. SPRINKLER PIPING SHALL BE HYDRAULICALLY DESIGNED BY THE SPRINKLER CONTRACTOR AND SHALL BE APPROVED BY ALL AUTHORITIES HAVING JURISDICTION. VELOCITIES OF WATER IN HYDRAULICALLY DESIGNED SPRINKLER PIPING SHALL NOT EXCEED TWENTY FEET PER SECOND.
7. ALL SPRINKLER HEADS INSTALLED IN LAY-IN CEILINGS SHALL HAVE THE HEADS LOCATED IN THE CENTER OF TILES. IF FOR ANY REASON HEADS CANNOT BE LOCATED IN THE CENTER OF TILES, THEN THE ARCHITECT/ENGINEER SHALL BE CONTACTED FOR NEW LOCATIONS BEFORE INSTALLING ANY HEAD OR PIPING.
8. CONTRACTOR SHALL INCLUDE IN HIS BID A WATER FLOW TEST/FIRE PUMP TEST. THE RESULTS OF WHICH SHALL BE USED TO PERFORM HYDRAULIC CALCULATIONS.
9. ENTIRE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH NFPA 13 LATEST EDITION.
10. ALL WORK SHALL BE STRICTLY COORDINATED AMONG ALL INDIVIDUAL CONTRACTORS BEFORE ANY WORK IS PERFORMED.
11. DO NOT ROUTE PIPING THROUGH ELEVATOR SHAFT(S), ELEVATOR EQUIPMENT ROOM(S) & ELECTRICAL ROOMS, PIPING TO TERMINATE AT SPRINKLER HEAD.
12. PIPES 2-1/2" & LARGER TO BE SCHEDULE 10 STEEL PIPE WITH GROOVED END PREP.
13. PIPES 2" & SMALLER TO SCHEDULE 40 STEEL PIPE WITH THREADED END PREP OR AS NEEDED.
14. PIPES TO BE SIZED PER HYDRAULIC CALCULATIONS.
15. VERIFY ALL CEILING HEIGHTS AT SITE PRIOR TO INSTALLATION. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATIONS OF CEILINGS AND CEILING TYPES.
16. IN ROOMS WHICH ARE INDICATED AS BEING MECHANICAL AND ELECTRICAL ROOMS, THE SPRINKLER CONTRACTOR SHALL COORDINATE THE LOCATION OF HIS PIPING AND SPRINKLER HEADS TO AVOID INSTALLATION OVER ELECTRICAL PANELS OR EQUIPMENT. PROVIDE ADDITIONAL SPRINKLER HEADS AS NECESSARY, AT NO ADDITIONAL COST TO THE OWNER. REFER TO HVAC AND ELECTRICAL DRAWINGS.
17. DESIGN DENSITIES: A. ORDINARY HAZARD GROUP 2: .20/1500 ALL AREAS.
18. FIRE PROTECTION HYDRAULIC CALCULATIONS FOR AUTOMATIC SPRINKLER SYSTEMS SHALL INCORPORATE A MINIMUM 10 PSI SAFETY FACTOR.
19. PRESSURE TEST OF THE AUTOMATIC SPRINKLER SYSTEM SHALL BE WITNESSED BY THE FIRE DEPARTMENT UNLESS SPECIFICALLY WAIVED. TWO (2) WEEKS WRITTEN ADVANCE NOTICE OF TEST SHALL BE GIVEN.
20. FIRE PROTECTION CONTRACTOR SHALL COORDINATE HIS WORK WITH MECHANICAL, ELECTRICAL AND ALL OTHER DISCIPLINES TO AVOID INTERFERENCES PRIOR TO FABRICATION OF ANY PIPE. INTERFERENCES SHALL INCLUDE ROOF OPENINGS, BUS DUCTS, GANGED CONDUIT, DUCT, RUNS, ETC.
21. ALL PIPE PENETRATIONS THROUGH FLOORS OR WALLS SHALL BE SLEEVED AND SEALED TO MAKE WATERTIGHT AND MAINTAIN FIRE RATING.
22. ALL VALVE SUPERVISORY SWITCHES AND WATER FLOW SWITCHES SHALL BE PROVIDED AND INSTALLED BY THE FIRE PROTECTION CONTRACTOR AND WIRED BY THE ELECTRICAL CONTRACTOR.
23. FIRE PROTECTION CONTRACTOR SHALL BE CERTIFIED BY STATE OF WEST VIRGINIA FOR SPRINKLER SYSTEM INSTALLATION.
24. FIRE PROTECTION CONTRACTOR SHALL COMPLY WITH THE DEPARTMENT OF VETERANS AFFAIRS DESIGN MANUAL - SIXTH EDITION.

SPRINKLER HEAD LEGEND

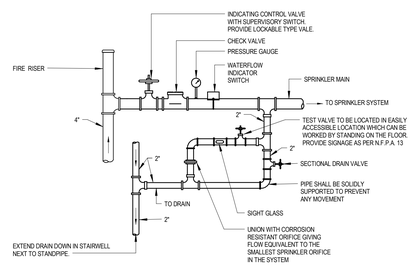
SYMBOL	MANUFACTURER OR APPROVED EQUAL	TYPE	MODEL	ORIFICE	TEMP. RATING (°F)
U/G	VIKING	UPRIGHT W/ GUARD	MICROFAST MODEL M	1/2"	225°
U	VIKING	UPRIGHT	HORIZON	1/2"	225°
S/R	VIKING	SEMI-RECESSED	HORIZON	1/2"	225°
	VIKING - IN-RACK SPRINKLER	UPRIGHT W/ GUARD AND WATER SHIELD	HORIZON	1/2"	225°

FIRE PROTECTION SYMBOLS

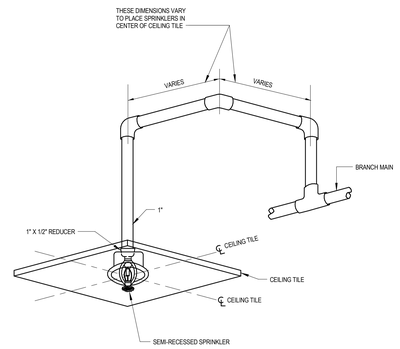
SPR	FIRE LINE
S/R	SEMI-RECESSED SPRINKLER
U/G	UPRIGHT SPRINKLER W/ GUARD
	IN-RACK HEAD - W/ WATER DEFLECTOR
	ZONE CONTROL VALVE
TS	TAMPER SWITCH
XR	EXISTING TO REMAIN
	RISE
	DROP
	CAP
1 2	KEYED NOTE DESCRIBING WORK TO BE DONE
	CONNECT TO EXISTING PIPING THIS POINT
	REMOVE EXISTING PIPING TO THIS POINT



1 SPRINKLER INSPECTOR'S TEST DRAIN DETAIL
1" = 1'-0"



2 FIRE SUPPLY RISER DETAIL
1" = 1'-0"



3 TYPICAL SEMI-RECESSED SPRINKLER DETAIL
1" = 1'-0"

FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

HOPE FURRER ASSOCIATES
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CLARK SURVEYING + ENGINEERING
CIVIL ENGINEERING

MOORE DESIGN ASSOCIATES
LANDSCAPE ARCHITECTURE

SEAL

JASON J. J. DECHECK REGISTERED 17636 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER

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AE Works Project Number: 13025

Drawing Title
SYMBOLS, NOTES & DETAILS

Approved: Project Director

Project Title:
NEW WAREHOUSE

Location: 510 BUTLER AVENUE MARTINSBURG, WV 25405

Date: 06/24/2015 **Checked:** MEW **Drawn:** MEW

Project Number # 613-116

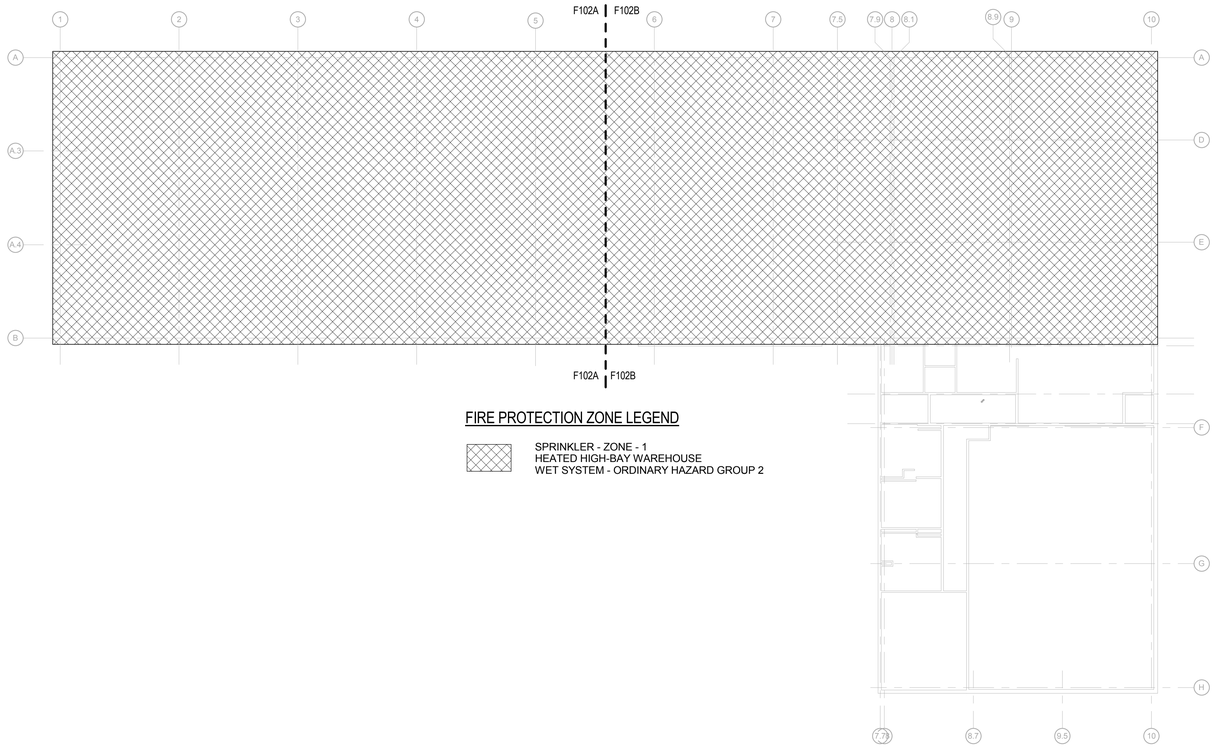
Building Number #519

Drawing Number F001

Office of Construction and Facilities Management

Department of Veterans Affairs

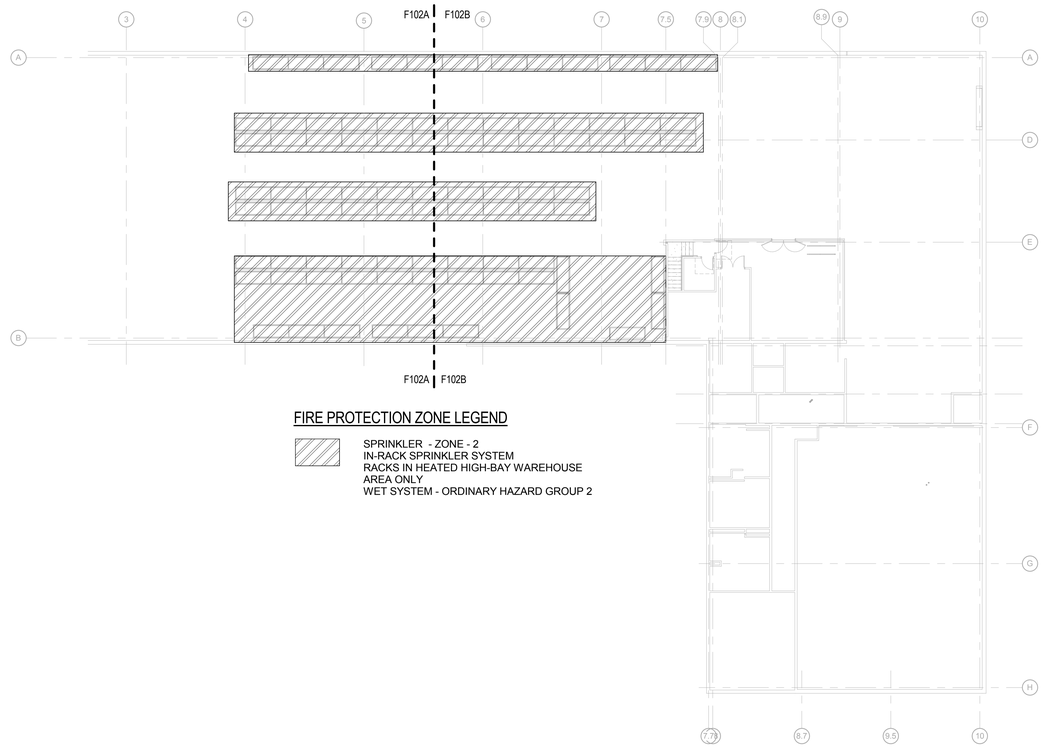
VA FORM 08-6231



FIRE PROTECTION ZONE LEGEND

SPRINKLER - ZONE - 1
HEATED HIGH-BAY WAREHOUSE
WET SYSTEM - ORDINARY HAZARD GROUP 2

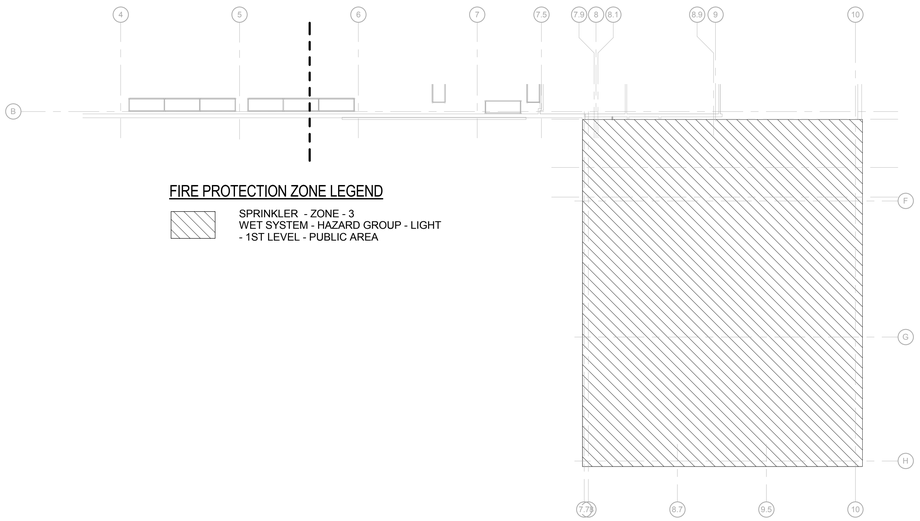
1 FIRE PROTECTION - ZONE 1 LEGEND
1/16" = 1'-0"



FIRE PROTECTION ZONE LEGEND

SPRINKLER - ZONE - 2
IN-RACK SPRINKLER SYSTEM
RACKS IN HEATED HIGH-BAY WAREHOUSE
AREA ONLY
WET SYSTEM - ORDINARY HAZARD GROUP 2

2 FIRE PROTECTION - ZONE 2 LEGEND
1/16" = 1'-0"



FIRE PROTECTION ZONE LEGEND

SPRINKLER - ZONE - 3
WET SYSTEM - HAZARD GROUP - LIGHT
- 1ST LEVEL - PUBLIC AREA

3 FIRE PROTECTION - ZONE 3 LEGEND
1/16" = 1'-0"

PROJECT NORTH
TRUE NORTH

FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

HOPE FURRER ASSOCIATES
STRUCTURAL ENGINEERING

CLARK SURVEYING + ENGINEERING
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SEAL

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AE Works Project Number: 13025

Drawing Title
FIRE PROTECTION - ZONE LEGEND

Approved: Project Director

Project Title:
NEW WAREHOUSE

Location: 510 BUTLER AVENUE
MARTINSBURG, WV 25405

Date: 06/24/2015
Checked: MEW
Drawn: MEW

Project Number
613-116

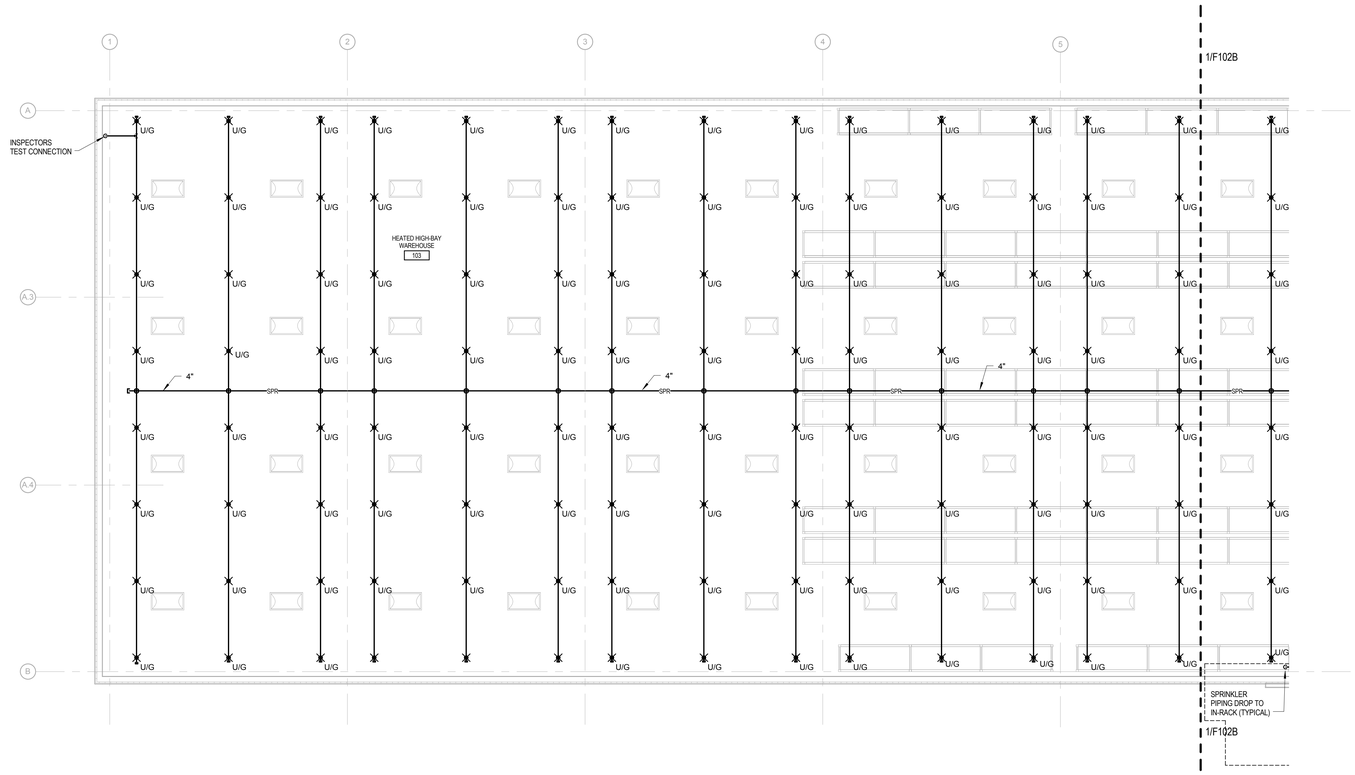
Building Number
#519

Drawing Number
F101

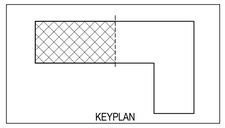
Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231



1 UPPER LEVEL PLAN - FIRE PROTECTION - NEW WORK - SIDE 'A'
1/8" = 1'-0"



FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

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CLARK SURVEYING + ENGINEERING
CIVIL ENGINEERING

MOORE DESIGN ASSOCIATES
LANDSCAPE ARCHITECTURE

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AE Works Project Number: 13025

Drawing Title
UPPER MEZZANINE PLAN - SIDE A - FIRE PROTECTION - NEW WORK

Approved: Project Director

Project Title:
NEW WAREHOUSE

Location: 510 BUTLER AVENUE
MARTINSBURG, WV 25405

Date:	Checked:	Drawn:
06/24/2015	MEW	MEW

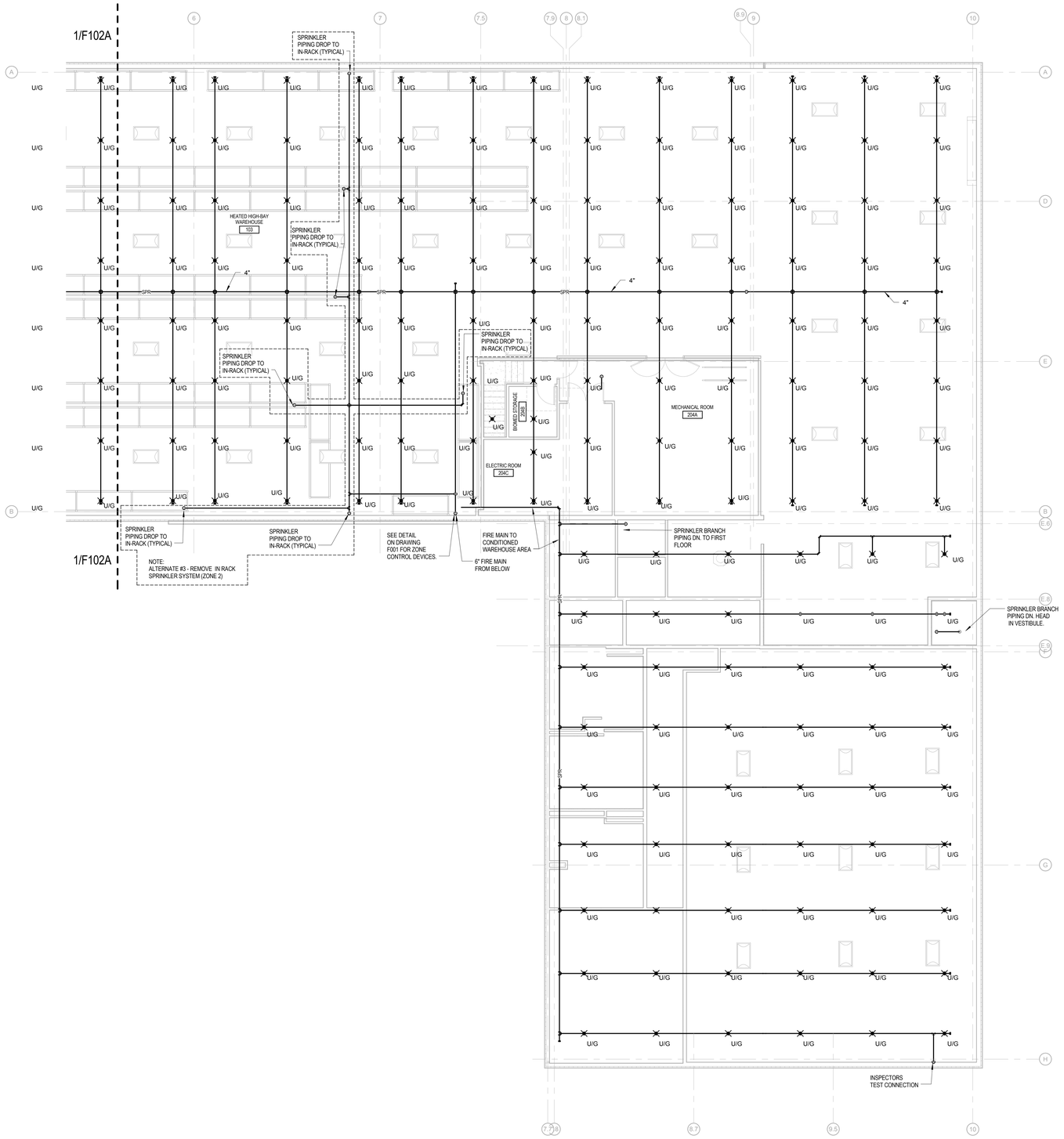
Project Number
613-116

Building Number
#519

Drawing Number
F102A

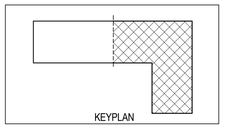
Office of Construction and Facilities Management
Department of Veterans Affairs

VA FORM 08-6231



1 UPPER LEVEL PLAN - FIRE PROTECTION - NEW WORK - SIDE 'B'

1/8" = 1'-0"



FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

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LANDSCAPE ARCHITECTURE

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AE Works Project Number: 13025

Drawing Title
UPPER LEVEL PLAN - SIDE B - FIRE PROTECTION - NEW WORK

Approved: Project Director

Project Title:
NEW WAREHOUSE

Location: 510 BUTLER AVENUE MARTINSBURG, WV 25405

Date: 06/24/2015 **Checked:** MEW **Drawn:** MEW

Project Number # 613-116

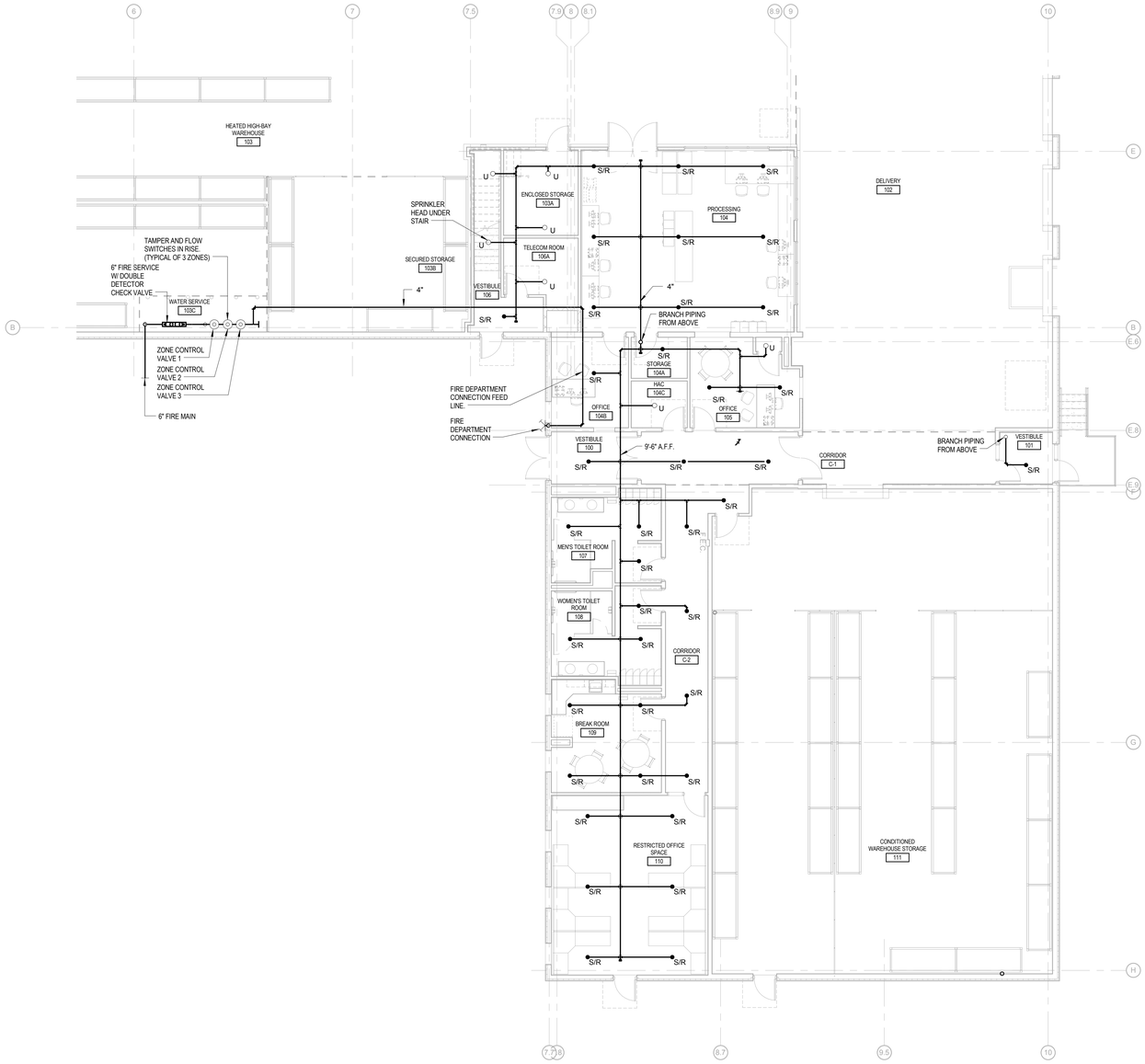
Building Number #519

Drawing Number F102B

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231



1 FIRST FLOOR PLAN - FIRE PROTECTION - NEW WORK
1/8" = 1'-0"

PROJECT NORTH
TRUE NORTH

FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

HOPE FURRER ASSOCIATES
STRUCTURAL ENGINEERING

CLARK SURVEYING + ENGINEERING
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LANDSCAPE ARCHITECTURE

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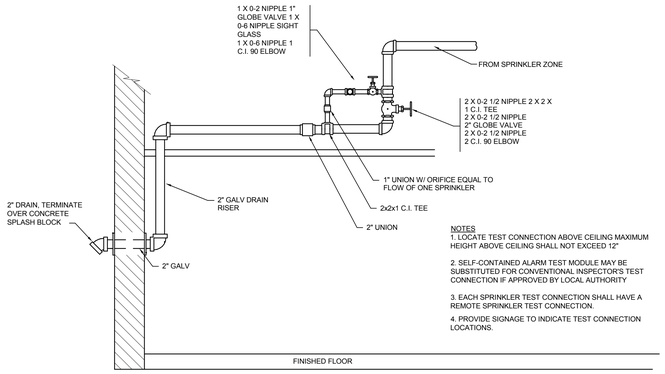
AE Works Project Number: 13025

Drawing Title	FIRST FLOOR PLAN - FIRE PROTECTION - NEW WORK
Approved: Project Director	
Project Title:	NEW WAREHOUSE
Location:	510 BUTLER AVENUE MARTINSBURG, WV 25405
Date:	06/24/2015
Checked:	MEW
Drawn:	MEW
Project Number	# 613-116
Building Number	#519
Drawing Number	F103

Office of Construction and Facilities Management

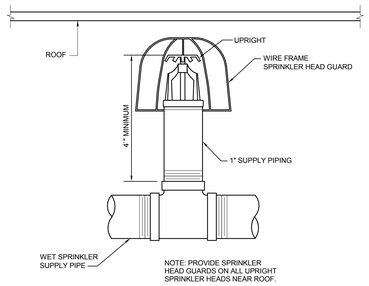
Department of Veterans Affairs

VA FORM 08-6231

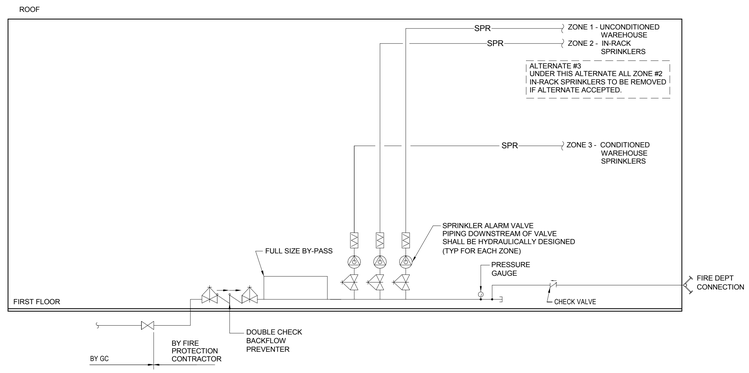


NOTES
1. LOCATE TEST CONNECTION ABOVE CEILING MAXIMUM HEIGHT ABOVE CEILING SHALL NOT EXCEED 12'
2. SELF-CONTAINED ALARM TEST MODULE MAY BE SUBSTITUTED FOR CONVENTIONAL INSPECTORS TEST CONNECTION IF APPROVED BY LOCAL AUTHORITY
3. EACH SPRINKLER TEST CONNECTION SHALL HAVE A REMOTE SPRINKLER TEST CONNECTION.
4. PROVIDE SIGNAGE TO INDICATE TEST CONNECTION LOCATIONS.

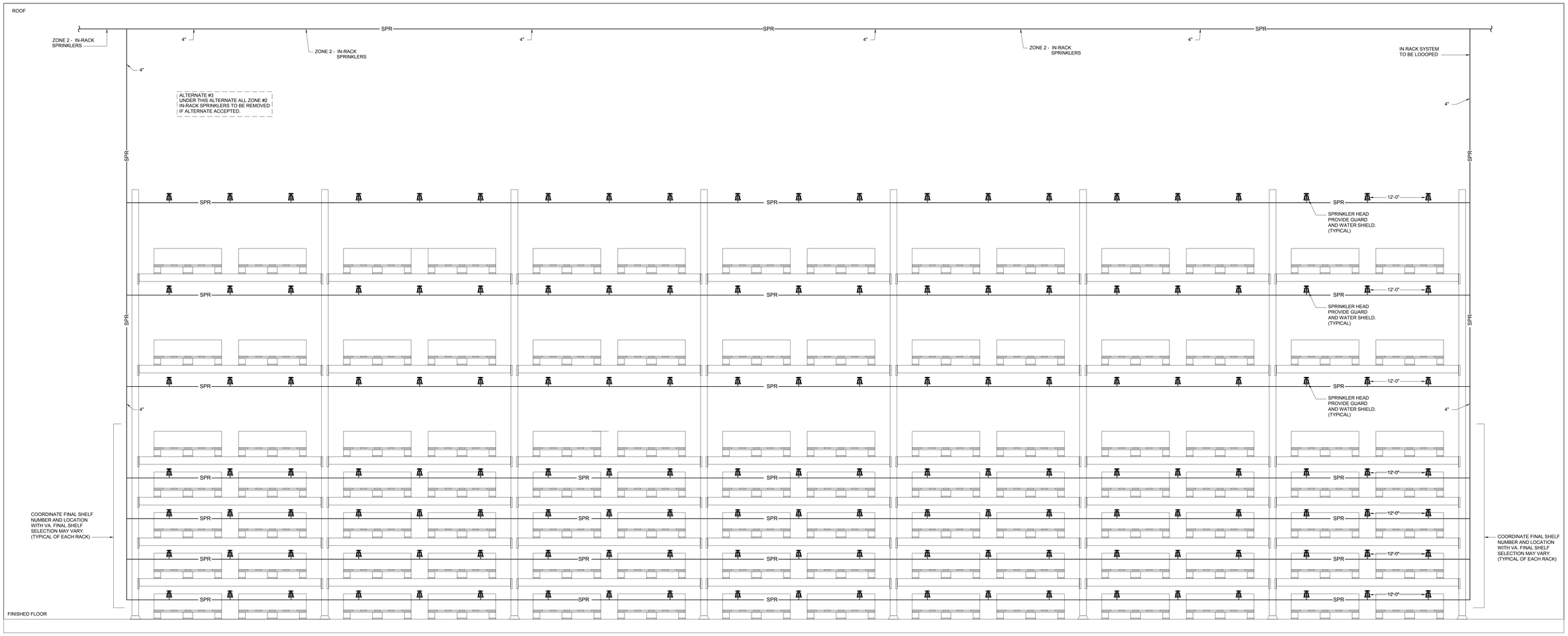
1 INSPECTORS TEST CONNECTION DETAIL
NO SCALE



2 UPRIGHT SPRINKLER DETAIL
NO SCALE



3 FIRE PROTECTION RISER DIAGRAM
NO SCALE



NOTE:
COORDINATE W/ RACK MANUFACTURER AND OWNER FOR NUMBER OF SHELVES ON EACH RACK.

4 IN-RACK SPRINKLER SYSTEM - RISER DIAGRAM
NO SCALE

FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

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AE Works Project Number: 13025

Drawing Title: FIRE PROTECTION DETAILS AND RISER DIAGRAMS

Approved: Project Director

Project Title: NEW WAREHOUSE

Location: 510 BUTLER AVENUE MARTINSBURG, WV 25405

Date: 06/24/2015 | Checked: MEW | Drawn: MEW

Project Number: # 613-116

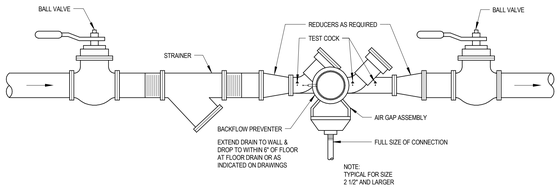
Building Number: #519

Drawing Number: F201

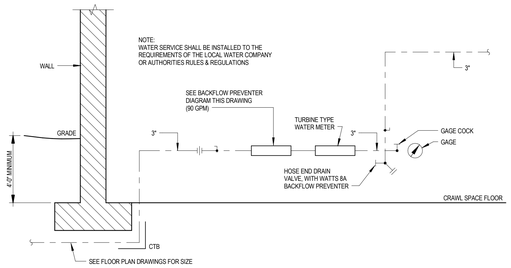
Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231



1 BACKFLOW PREVENTER DETAIL
1" = 1'-0"



4 WATER SERVICE ENTRY DETAIL
1" = 1'-0"

PLUMBING SYMBOLS AND ABBREVIATION LEGEND

SAN	SANITARY SEWER ABOVE GROUND
SAN	BURIED SANITARY SEWER
ST	BURIED STORM SEWER
V	VENT LINE
	DOMESTIC COLD WATER LINE
	DOMESTIC HOT WATER LINE
	DOMESTIC HOT WATER RETURN LINE
	BALL VALVE
	BALANCING VALVE
	SHOCK ARRESTOR - SIZE AS MARKED
	BACKFLOW PREVENTER
CO	CLEANOUT AT CEILING (CO) OR WALL (WCO)
FCO	CLEANOUT AT FLOOR (FCO)
	STRAINER
	DRAIN WITH P-TRAP
	UNION
	CHECK VALVE
	HOSE BIBB (HB)
	WALL HYDRANT (WH)
N.T.S.	NOT TO SCALE
G.C.	GENERAL CONTRACTOR
CW	COLD WATER
HW	HOT WATER
HWR	HOT WATER RETURN
SS	SOIL STACK
VS	VENT STACK
WS	WASTE STACK
VTR	VENT THRU ROOF
I.E.	INVERT ELEVATION
	SQUARE FEET
CO	CLEANOUT TO FINISHED FLOOR
A.F.F.	ABOVE FINISHED FLOOR
ADA	AMERICAN DISABILITIES ACT
TYP	TYPICAL
	DROP
	RISE
F-1, F-2, ETC.	PLUMBING FIXTURE TYPE- SEE SPECIFICATION
1 2 ETC.	KEYED PLUMBING NOTE DESCRIBING WORK TO BE DONE

PLUMBING FIXTURE SCHEDULE

SEE SPECIFICATIONS FOR FIXTURE TYPE DESCRIPTION

TYPE	DESCRIPTION	SIZE					COMMENTS
		FIXTURE	WASTE	VENT	HW	CW	
P103	WATER CLOSET	----	4"	2"	----	1"	WALL MOUNTED
P103,HC	WATER CLOSET - ACCESSIBLE	----	4"	2"	----	1"	WALL MOUNTED, ADA HEIGHT BOWL
P-202	URINAL - ACCESSIBLE	----	4"	2"	----	3/4"	WALL MOUNTED, ADA HEIGHT
P-413	LAVATORY	----	2"	2"	1/2"	1/2"	WALL HUNG, SENSOR FAUCET (BATTERIES)
P-413,HC	LAVATORY - ACCESSIBLE	----	2"	2"	1/2"	1/2"	WALL HUNG, SENSOR FAUCET (BATTERIES) - ACCESSIBLE
P-608	ELECTRIC WATER COOLER - ACCESSIBLE	----	2"	2"	----	1/2"	HANDICAP, WALL HUNG
P-501	MOP BASIN	----	4"	----	1/2"	1/2"	PROVIDE MOP HOOK
P-528	STAINLESS STEEL SINK	----	2"	2"	1/2"	1/2"	COUNTER MOUNTED
P-707	COMBINATION SAFETY SHOWER / EYE WASH	----	4"	2"	----	1-1/4"	FLOOR MOUNTED

MISCELLANEOUS EQUIPMENT AND SPECIALTIES

TAG	DESCRIPTION	WASTE CONN	VENT CONN	HOT WATER	COLD WATER	REMARKS
SA	SHOCK ARRESTOR	----	----	----	----	SIZED PER FIXTURE UNIT CAPACITY
FD-1	FLOOR DRAIN	4"	----	----	----	
FD-1-TP	FLOOR DRAIN W/ TRAP PRIMER	4"	----	----	1/2"	PROVIDE 1/2" CW CONNECTION
FD-2	FLOOR DRAIN - MEDIUM DUTY	4"	----	----	----	DRAIN TO HAVE TRAP PRIMER CONNECTION
P801	WALL HYDRANT	----	----	----	3/4"	
P802	HOSE BIB	----	----	----	3/4"	
TP-1	TRAP PRIMER	----	----	----	1/2"	SINGLE DEVICE TRAP PRIMER

PLUMBING PIPING INSULATION SCHEDULE

DESCRIPTION	PIPE SIZE	INSULATION THICKNESS	TYPE	COMMENTS
DOMESTIC HOT WATER	UP TO 1-1/2"	1"	FLEXIBLE ELASTOMERIC INSULATION	
DOMESTIC HOT WATER	OVER TO 1-1/2"	1-1/2"	FLEXIBLE ELASTOMERIC INSULATION	
DOMESTIC HOT WATER RETURN	UP TO 1-1/2"	1"	FLEXIBLE ELASTOMERIC INSULATION	
DOMESTIC COLD WATER	ALL SIZES	1"	MINERAL FIBER OR FLEXIBLE ELASTOMERIC	
CONDENSATE DRAIN PIPING	ALL SIZES	1/2"	PVC P-TRAP AND SUPPLY COVERS	PROVIDE FOR DOMESTIC WATER SUPPLIES AND STOPS FOR ACCESSIBLE FIXTURES.

THERMOSTATIC WATER MIXING VALVE SCHEDULE

TAG	INLET COLD	INLET HOT	OUTLET TEMP	PRESSURE DROP	TYPE	BASIS OF DESIGN
MV-1	50 DEGREES	140 DEGREES	120 DEGREES	10 PSIG	THERMOSTATIC CONTROLLER - ENCLOSED IN CABINET	LAWLER - HIGH LOW WATER MIXER

HOT WATER RECIRCULATING PUMP SCHEDULE

TAG	CAPACITY	DYNAMIC HEAD	RPM	HP	F.L.A.	VOLTS PHASE	BASIS OF DESIGN
DWP-1	15 GPM	40 FEET	1730	1/2	2.0	460/3	BELL & GOSSETT PD-38-T-B

NOTES:
1. CONTRACTOR SHALL FURNISH AND INSTALL A MAGNETIC STARTER FOR THE PUMP, WITH AT LEAST TWO THERMAL OVERLOAD PROTECTORS. STARTER SHALL BE EQUIPPED WITH MANUAL RESET BUTTONS.
2. PROVIDE BRONZE PUMP.
3. PROVIDE INCREASER / REDUCERS AS REQUIRED TO ACCOMMODATE PUMP INLET / OUTLET SIZE.

SOLAR WATER HEATER SCHEDULE

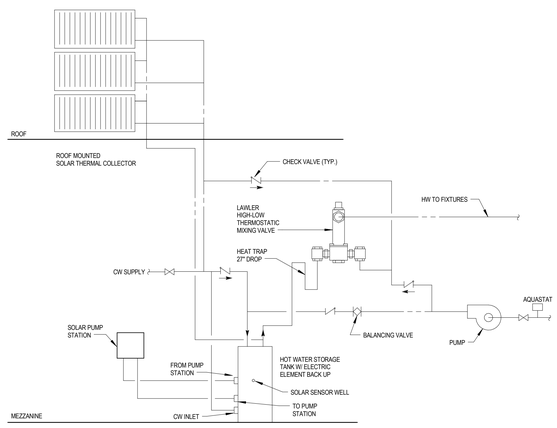
TAG	FIRST DRAW	STORAGE CAPACITY	HEAT SOURCE WATER VOLUME	DIAMETER	HEIGHT	ELECTRICAL BACKUP ELEMENT			FLOW RATE	BASIS OF DESIGN
DWH-1	74 GAL.	82	2.1	24"	70"	4.5 KW	240V-1ø	15 AMPS	14.0 GPM	LOCHINVAR SIT080

NOTES AND ACCESSORIES :
1. MANUFACTURER LISTED AS BASIS OF DESIGN - APPROVED EQUALS WILL BE REVIEWED
2. PROVIDE MODEL NUMBER EXP20004 - FLOOR MOUNTED - 13 GALLON EXPANSION TANK
3. PROVIDE (3) SLV030 ROOF MOUNTED SOLAR COLLECTOR PANELS
4. PROVIDE (1) MODEL SPS1000 SOLAR PUMP STATION - 120V-1ø - 5 AMPS
5. PROVIDE (1) MODEL PUM20024 GLYCOL FEED PUMP ADAPTER
6. PROVIDE (2) MODEL SCA201114 5 GALLON GLYCOL MIX.
7. PROVIDE SYSTEM AND EQUIPMENT TO MEET "ENERGY STAR" CLASSIFICATIONS.
8. REFER TO SPECIFICATION SECTION 23 56 00 SOLAR HEATING SYSTEM.

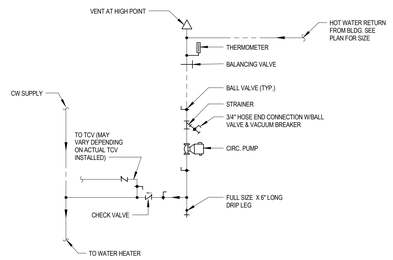
ALTERNATE NO. 1 ELECTRIC WATER HEATER SCHEDULE

TAG	FIRST DRAW	STORAGE CAPACITY	NUMBER OF ELEMENTS	DIAMETER	HEIGHT	ELECTRICAL ELEMENT			FLOW RATE	BASIS OF DESIGN
DWH-1-A	197	50	6	21"	56"	24 KW	240V-1ø	115 AMPS	14.0 GPM	STATE CSB-52-24 SFE

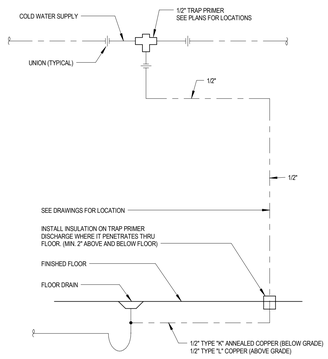
NOTES: HEATER TO BE SUPPLIED AS SUBSITIUTE ONLY IF ALTERNATE NO. 1 IS ACCEPTED.



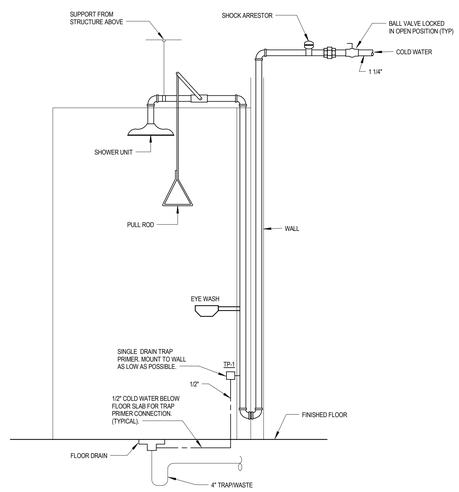
2 MIXING VALVE INSTALLATION DETAIL
1" = 1'-0"



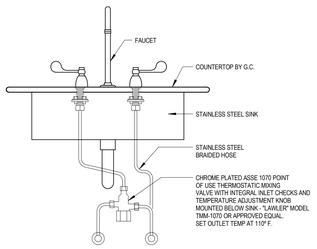
5 HOT WATER RETURN DETAIL
1" = 1'-0"



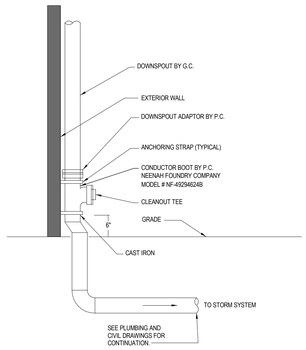
6 SINGLE TRAP PRIMER PIPING SCHEMATIC
1" = 1'-0"



3 EMERGENCY SHOWER/EYE WASH SCHEMATIC
1" = 1'-0"



7 BREAKROOM SINK DETAIL
1" = 1'-0"



8 RAIN WATER BOOT DETAIL
12" = 1'-0"

GENERAL PLUMBING NOTES

1. ALL WORK SHOWN IS NEW UNLESS INDICATED OTHERWISE.
2. ALL EXISTING SERVICES ARE SHOWN IN THEIR APPROXIMATE LOCATIONS.
3. CONTRACTOR SHALL DETERMINE THE EXACT LOCATIONS OF ALL UTILITIES BEFORE COMMENCING WORK AND SHALL BE FULLY RESPONSIBLE FOR ANY DAMAGE WHICH MIGHT OCCUR DUE TO THEIR FAILURE TO EXACTLY LOCATE AND PRESERVE ANY SERVICES, INCLUDING WORK IN EXISTING PIPE CHASES.
4. ALL EXISTING PLUMBING LINES, RISERS, ETC. ENCOUNTERED DURING ALTERATIONS, WHETHER INDICATED OR NOT, SHALL BE DETERMINED TO BE ACTIVE OR INACTIVE BY THIS CONTRACTOR, PRIOR TO COMMENCING ANY WORK. IF LINES ARE ACTIVE THEY SHALL BE OFFSET AS REQUIRED AND RECONNECTED AT THEIR ORIGINAL LOCATIONS. OFFSETS SHALL BE OF THE SAME SIZE AND MATERIAL AS EXISTING, INCLUDING ANY INSULATION. REMOVE ALL USELESS AND INACTIVE PIPING BACK TO THE MAIN, STACK OR RISER. AND CAP. ALL USELESS HOLES IN WALLS AND CEILINGS SHALL BE PATCHED TO MAINTAIN FIRE RATING. ALL SUCH WORK SHALL BE RECORDED ON THE "RECORD" DRAWINGS.
5. THE DRAWINGS ARE DIAGRAMMATIC. THE CONTRACTOR MUST FIELD VERIFY ACTUAL CONDITIONS AT THE SITE PRIOR TO PROCEEDING WITH THE WORK. COORDINATE INSTALLATION OF ALL NEW PIPING, EQUIPMENT, ETC. WITH ALL OTHER TRADES.
6. PATCH ALL OPENINGS IN EXISTING CONSTRUCTION WHERE PLUMBING PIPING HAS BEEN REMOVED, OR WHERE PLUMBING PIPING TO REMAIN IS NOT SEALED. MAINTAIN EXISTING RATING.
7. COORDINATE LOCATIONS OF FLOOR DRAINS IN MECHANICAL ROOM WITH ACTUAL EQUIPMENT BEING INSTALLED. ALL HORIZONTAL SANITARY DRAINAGE PIPING IS PITCHED AT 1/4"/FT UP TO 3" DIA. , 1/8"/FT FOR 4" DIA. TO 6" DIA., LARGER SIZES AS NOTED. ALL HORIZONTAL STORM DRAINAGE PIPING IS PITCHED AT 1/8"/FT.
8. THE PLUMBING DRAWINGS DO NOT INDICATE ALL STRUCTURAL BEAMS, COLUMNS OR EXACT SIZES. SOME DEVIATIONS TO THE PIPING LAYOUT MAY BE REQUIRED. COORDINATE ACTUAL LOCATIONS OF THE PLUMBING LINES DURING CONSTRUCTION.
9. CONTRACTOR TO COMPLY WITH ALL WATER AND SEWER REQUIREMENTS SET FORTH BY THE AUTHORITY HAVING JURISDICTION.
10. INSTALL NEW CLEANOUT MARKER ON EXISTING CLEANOUTS THAT WILL BE COVERED WITH NEW CARPET IDENTIFY ALL CLEANOUTS ON RECORD DRAWINGS.
11. ALL END OF RUN SANITARY PIPING SHALL BE A MINIMUM OF 18" BELOW FINISHED FLOOR.

FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

HOPE FURRER ASSOCIATES
STRUCTURAL ENGINEERING

CLARK SURVEYING + ENGINEERING
CIVIL ENGINEERING

MOORE DESIGN ASSOCIATES
LANDSCAPE ARCHITECTURE

SEAL

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ARCHITECTS/ENGINEERS:

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AE Works Project Number: 13025

Drawing Title
SYMBOLS, SCHEDULES, DETAILS AND NOTES

Approved: Project Director

Project Title:
NEW WAREHOUSE

Location: 510 BUTLER AVENUE MARTINSBURG, WV 25405

Date: 06/24/2015 **Checked:** MEW **Drawn:** MEW

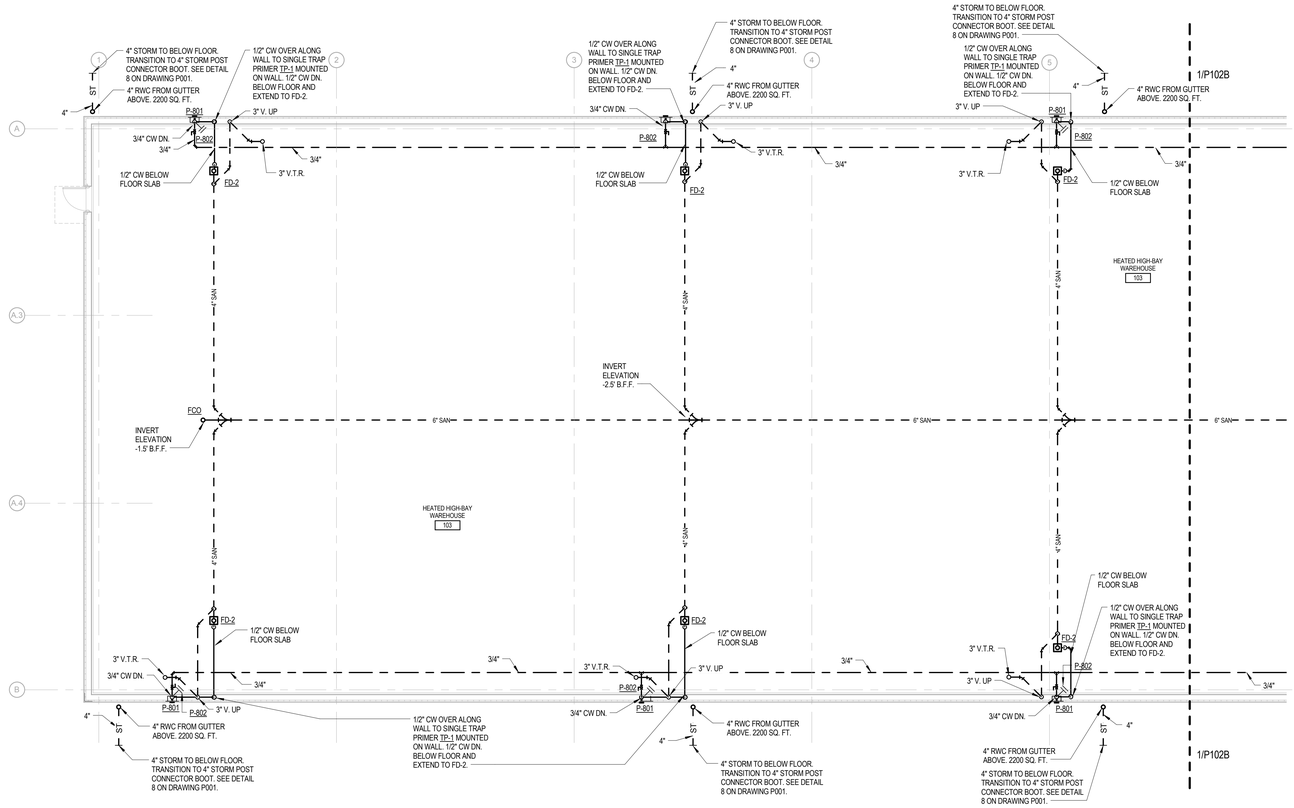
Project Number # 613-116

Building Number #519

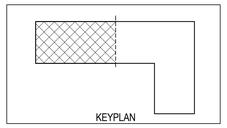
Drawing Number P001

Office of Construction and Facilities Management
Department of Veterans Affairs

VA FORM 08-6231



1 FIRST FLOOR PLAN - SIDE A - PLUMBING
1/8" = 1'-0"



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Revisions:	Date

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AE Works Project Number: 13025

Drawing Title
FIRST FLOOR PLAN - SIDE A - PLUMBING

Approved: Project Director

Project Title:
NEW WAREHOUSE

Location: 510 BUTLER AVENUE
MARTINSBURG, WV 25405

Date:	Checked:	Drawn:
06/24/2015	MEW	MEW

Project Number
613-116

Building Number
#519

Drawing Number
P102A

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Department of Veterans Affairs

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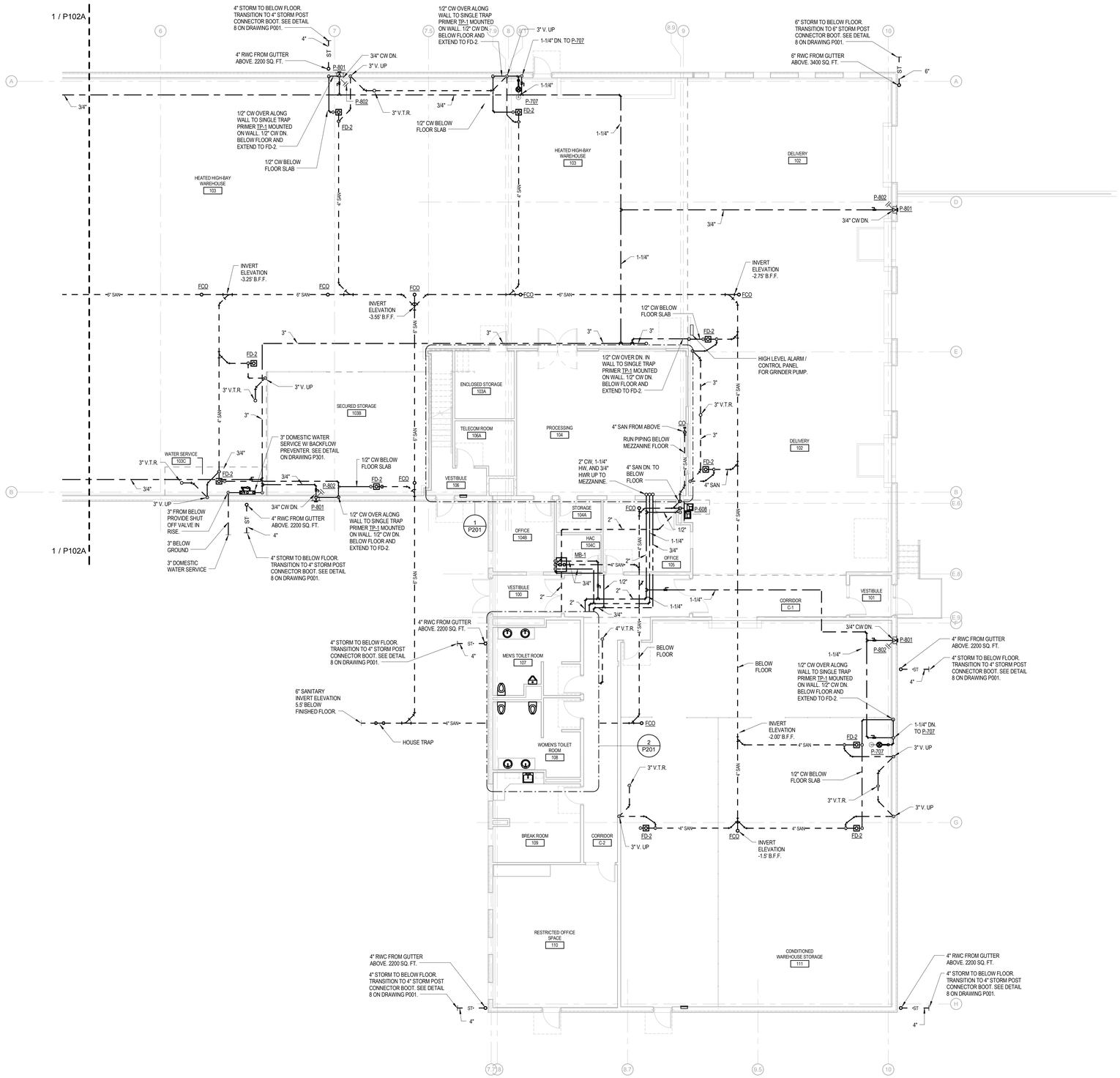
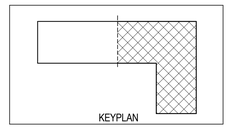


1 FIRST FLOOR PLAN - SIDE B - PLUMBING - NEW WORK
1/8" = 1'-0"



FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

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AE Works Project Number: 13025

Drawing Title
FIRST FLOOR PLAN - SIDE B - PLUMBING

Approved: Project Director

Project Title:
NEW WAREHOUSE

Location: 510 BUTLER AVENUE MARTINSBURG, WV 25405

Date:	Checked:	Drawn:
06/24/2015	MEW	MEW

Project Number
#613-116

Building Number
#519

Drawing Number
P102B

Office of Construction and Facilities Management
Department of Veterans Affairs

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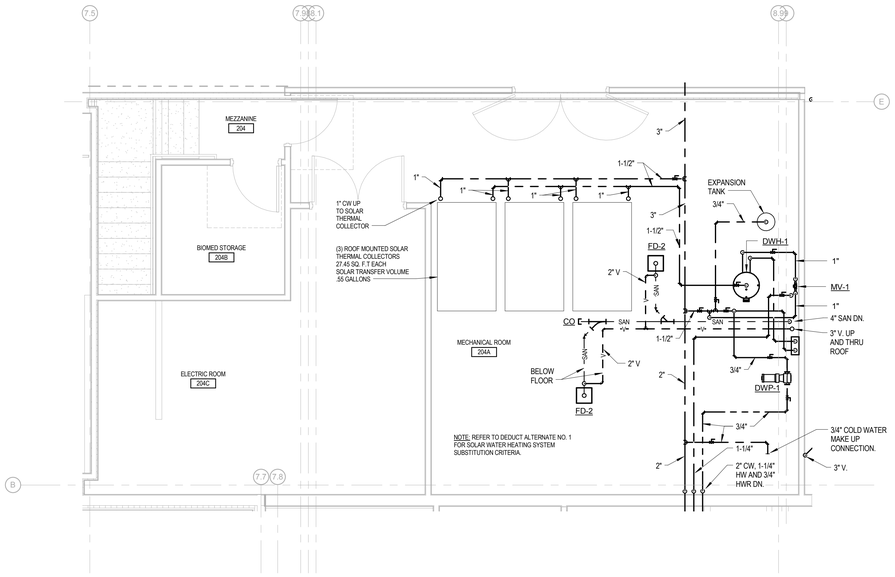
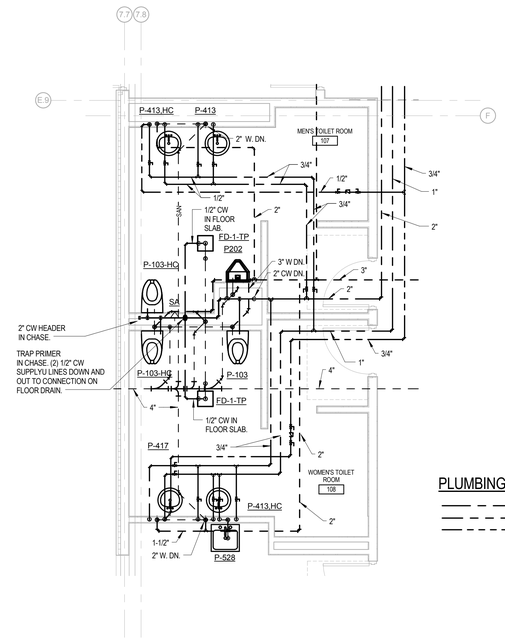


1 MEZZANINE - ENLARGED MECNANICAL ROOM PLAN
1/4" = 1'-0"



2 ENLARGED TOILET ROOM PLAN
1/4" = 1'-0"

PLUMBING SYMBOLS

- DOMESTIC COLD WATER
- DOMESTIC HOT WATER
- DOMESTIC HOT WATER RETURN

PROJECT NORTH
TRUE NORTH

FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

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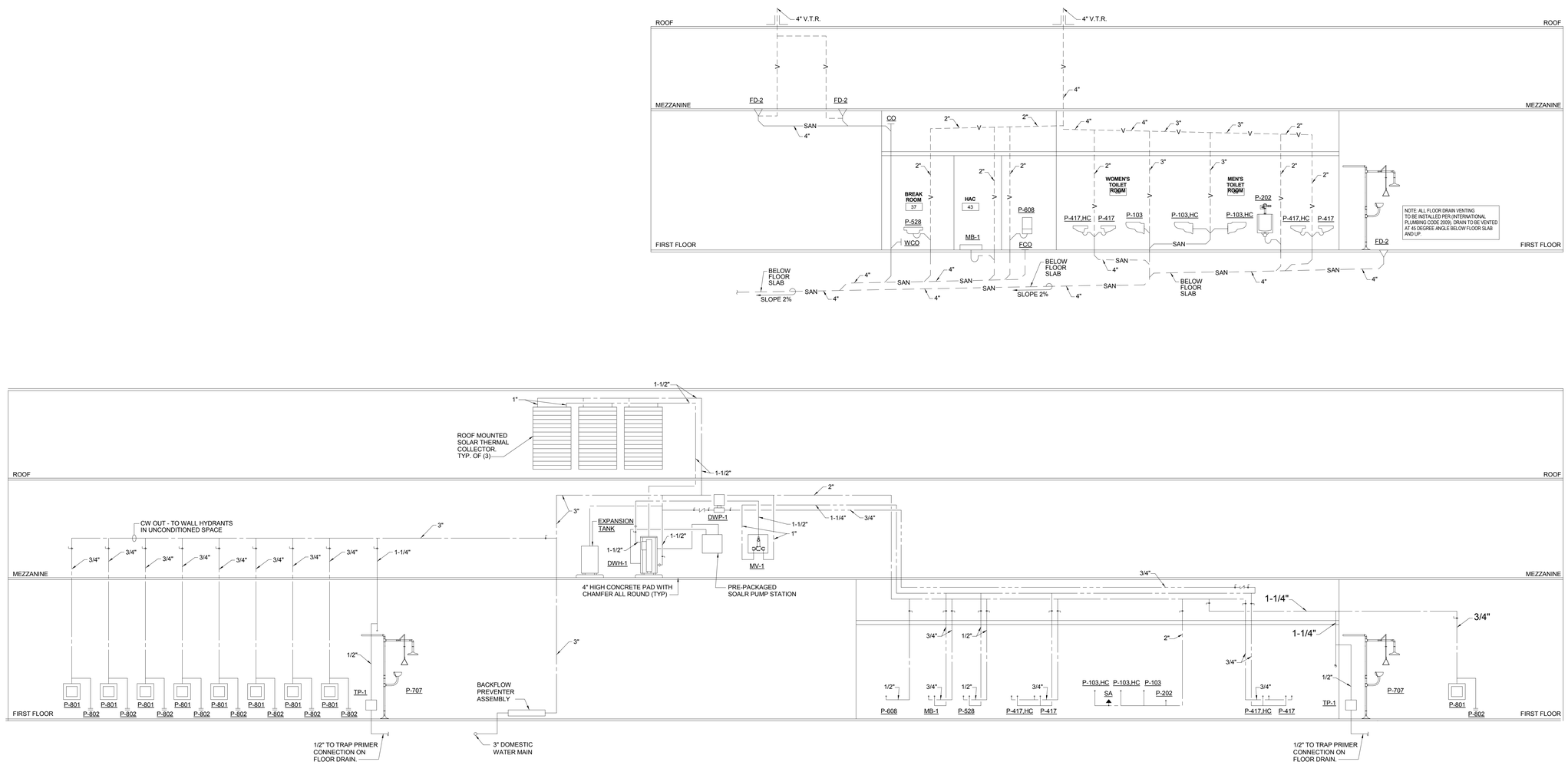
Drawing Title	ENLARGED FLOOR PLANS - PLUMBING
Approved: Project Director	
Project Title:	NEW WAREHOUSE
Location:	510 BUTLER AVENUE MARTINSBURG, WV 25405
Date:	06/24/2015
Checked:	MEW
Drawn:	MEW
Project Number	# 613-116
Building Number	#519
Drawing Number	P201

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231



1 RISER DIAGRAMS
12" = 1'-0"

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AE Works Project Number: 13025

Drawing Title
RISER DIAGRAMS

Approved: Project Director

Project Title:
NEW WAREHOUSE

Location: 510 BUTLER AVENUE
MARTIINSBURG, WV 25405

Date: 06/24/2015
Checked: MEW
Drawn: MEW

Project Number # 613-116

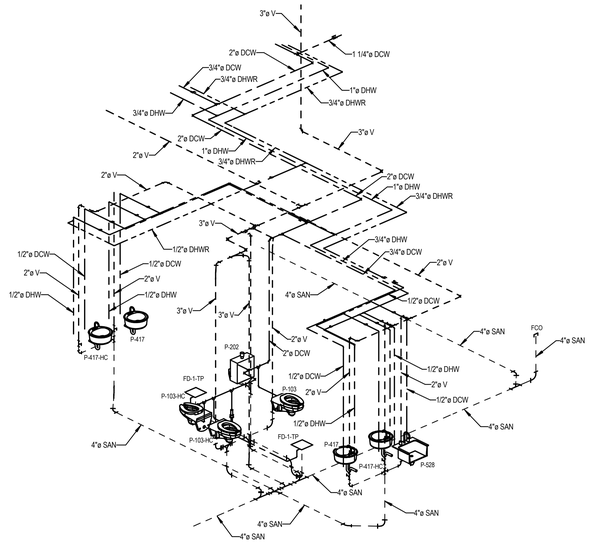
Building Number #519

Drawing Number P301

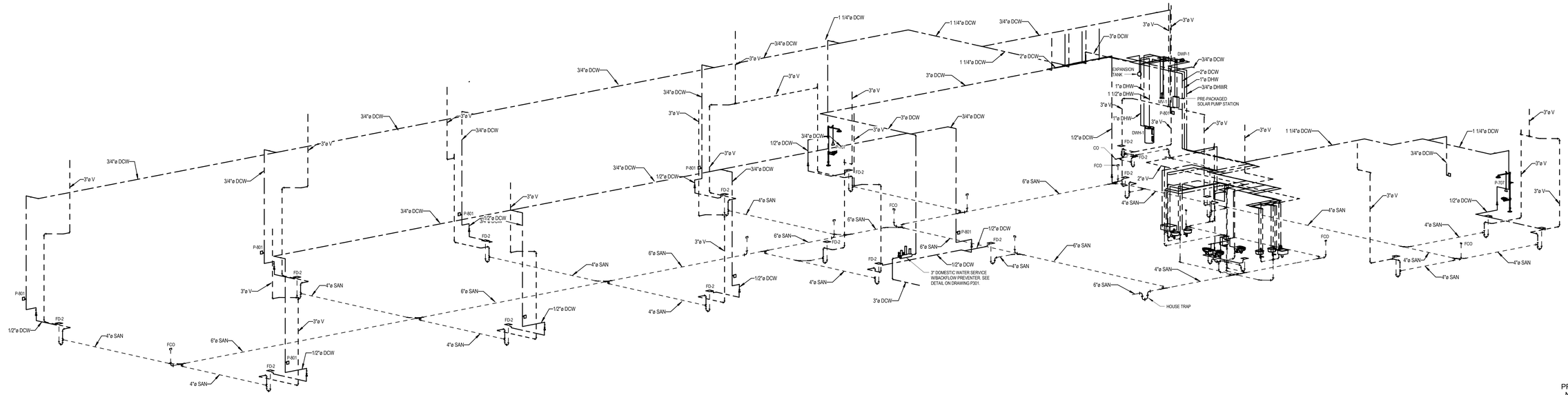
Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231



2 ENLARGED TOILET ROOMS ISOMETRIC VIEW



1 PLUMBING ISOMETRIC VIEW

PROJECT NORTH
TRUE NORTH

FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

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AE Works Project Number: 13025

Drawing Title
PLUMBING ISOMETRIC VIEW

Approved: Project Director

Project Title:
NEW WAREHOUSE

Location: 510 BUTLER AVENUE
MARTINSBURG, WV 25405

Date:	Checked:	Drawn:
06/24/2015	Checker	Author

Project Number
613-116

Building Number
#519

Drawing Number
P401

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231

MISCELLANEOUS ABBREVIATIONS

ABV	ABOVE
APPROX	APPROXIMATELY
AUTO	AUTOMATIC
AAV	AUTOMATIC AIR VENT
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AFMD	AIR FLOW MEASURING DEVICE
AP	ACCESS PANEL
ATC	AUTOMATIC TEMPERATURE CONTROL
AWT	AVERAGE WATER TEMPERATURE
BLDG	BUILDING
BLW	BELOW
BC	BALANCING COCK
BDD	BACKDRAFT DAMPER
CAP	CAPACITY
CFH	CUBIC FEET/ HOUR
CHK V	CHECK VALVE
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
CHWS&R	CHILLED WATER SUPPLY/RETURN
CLG	CEILING
CLG MTD	CEILING MOUNTED
COL	COLUMN
CONC	CONCRETE
CONN	CONNECTION
CONTR	CONTRACTOR
CONT	CONTINUE
CONV	CONVECTOR
CORR	CORRIDOR
CFM	CUBIC FEET PER MINUTE
CO	CLEANOUT
CV	CONTROL VALVE
DB	DRY BULB
DHW	DOMESTIC HOT WATER
DCW	DOMESTIC COLD WATER
DIFF	DIFFUSER
DISCH	DISCHARGE
DN	DOWN
DO	DITTO
DPR	DAMPER
DR	DRAIN
DWG	DRAWING
DX	DIRECT EXPANSION
EA	EXHAUST AIR
EMER	EMERGENCY
EQUIP	EQUIPMENT
EXH	EXHAUST
ETR	EXISTING TO REMAIN
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
EDB	ENTERING DRY BULB
EWB	ENTERING WET BULB
EWT	ENTERING WATER TEMPERATURE
EX	EXISTING
FLG C	FLANGE CONNECTION
FLR	FLOOR
FRM	FROM
FT HD	FEET OF HEAD
FAT	FINAL AIR TEMPERATURE
FC	FLEXIBLE CONNECTION
FD	FIRE DAMPER
S/FD	SMOKE/FIRE DAMPER
FLR DR	FLOOR DRAIN
GA	GAUGE
GL V	GLOBE VALVE
GRAV	GRAVITY
GC	GENERAL CONTRACTOR
GPM	GALLONS PER MINUTE
GV	GATE VALVE
HC	HEATING CONTRACTOR
HP	HORSE POWER
HPD	HIGH PRESSURE DRIP
HTG	HEATING
HV	HIGH VELOCITY
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
HWS&R	HOT WATER SUPPLY AND RETURN
IME	INSULATED METAL ENCLOSURE
IN	INCHES
INCL	INCLUDED
INSUL	INSULATION
INTERL	INTERLOCK
INV	INVERT
IER	INVERTED ECCENTRIC REDUCER
IVS	ISOLATION VALVE STATION
LTG	LIGHTING
LAT	LEAVING AIR TEMPERATURE
LDB	LEAVING DRY BULB
LF	LINEAR FEET
LSDC	LINEAR SUPPLY DIFFUSER CEILING
LWB	LEAVING WET BULB
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MECH	MECHANICAL
MFGR	MANUFACTURER
MIN	MINIMUM
MTD	MOUNTED
MTL	METAL
MTR	MOTOR
MAT	MIXED AIR TEMPERATURE
MAV	MANUAL AIR VENT
MBH	ONE THOUSAND BTU/HOUR
MOD	MOTOR OPERATED DAMPER
MH	MANHOLE
MER	MECHANICAL EQUIPMENT ROOM
NTS	NOT TO SCALE
NA	NOT APPLICABLE
OPER	OPERATED
OPNG	OPENING
OA	OUTSIDE AIR
OBD	OPPOSED BLADE DAMPER
OS&Y	OUTSIDE SCREW AND YOKE
PC	PLUMBING CONTRACTOR
PRD	PRESSURE DIFFERENTIAL VALVE
PD	PUMP DISCHARGE
PG	PRESSURE GAUGE WITH COCK
PRV	PRESSURE REDUCING VALVE
PT	PRESSURE TAP
REQD	REQUIRED
RET	RETURN
REX	REMOVE EXISTING
RM	ROOM
RA	RETURN AIR/RELIEF AIR
RV	RELIEF VALVE
SCH	SCHEDULE
SA	SUPPLY AIR
SHT	SHEET
SHT MTL	SHEET METAL
STL	STEEL
STR	STRAINER
SD	SMOKE DAMPER
SP	STATIC PRESSURE
SPS	STATIC PRESSURE SENSOR
TA	THROWAWAY
TDV	TRIPLE DUTY VALVE
TEMP	TEMPERATURE
TH	THERMOMETER
TRANS	TRANSITION
TYP	TYPICAL
TSTAT	THERMOSTAT
TCV	TEMPERATURE CONTROL VALVE
TR	TEMPERATURE RISE
TV	TURNING VANES
UC	UNDERCUT
V	VALVE
VD	VOLUME CONTROL DAMPER
VFS	VENTURI FLOW STATION
WB	WET BULB
WFMD	WATER FLOW MEASURING DEVICE
WG	WATER GAUGE
WMS	WIRE MESH SCREEN
WTD	WATER TEMPERATURE DROP
W/	WITH
W/O	WITH OUT

EQUIPMENT TAG ABBREVIATIONS

ACC	AIR COOLED CHILLER
ACCU	AIR COOLED CONDENSING UNIT
ACCUM	ACCUMULATOR
AHU	AIR HANDLING UNIT
ASHP	AIR SOURCE HEAT PUMP
B	BOILER
BB	BASEBOARD HEATER
BD	BAROMETRIC DAMPER
BDD	BACK DRAFT DAMPER
CC	CHILLED WATER COOLING COIL
CD	CONDENSATE DRAIN
CIRC	CIRCULATOR
CMPR	COMPRESSOR
CONV	CONVECTOR
CP	CONDENSATE PUMP
CUH	CABINET UNIT HEATER
DC	DRY COOLER
EF	EXHAUST FANS
ER	EXHAUST REGISTER
ERW	EXHAUST REGISTER WALL
ET	EXPANSION TANK
ECUH	ELECTRIC CABINET UNIT HEATER
EUH	ELECTRIC UNIT HEATER
EWH	ELECTRIC WALL HEATER
EVAP	EVAPORATOR
FT	FINNED TUBE RADIATION
FCU	FAN COIL UNIT
FPB	FAN POWERED BOX
FU	FURNACE
GIV	GRAVITY INTAKE VENTILATOR
GRV	GRAVITY ROOF VENTILATOR
H	HUMIDIFIER
HC	HOT WATER HEATING COIL
HUH	HORIZONTAL UNIT HEATER
RG	RETURN GRILLE
RR	RETURN REGISTER
RAG	RETURN AIR GRILLE
RCP	RADIANT CEILING PANEL
RTU	ROOF TOP UNIT
SF	SUPPLY FAN
SSAC	SPLIT SYSTEM AIR CONDITIONING UNIT
SSDC	SECURITY SUPPLY DIFFUSER CEILING
SSEF	SECURITY SMOKE EXHAUST FAN
SSGC	SECURITY SUPPLY GRILLE CEILING
SSGW	SECURITY SUPPLY GRILLE WALL
SLSD	SUPPLY LINEAR SLOT DIFFUSER
P	PUMP
PTAC	PACKAGED TERMINAL AIR CONDITIONING UNIT
UH	UNIT HEATER
UV	UNIT VENTILATOR
UCD	UNDER CUT DOOR
VAV	VARIABLE AIR VOLUME

DRAWING SYMBOLS

VAV / 1	EQUIPMENT / EQUIPMENT NUMBER
1 / H100	DETAIL NUMBER / DRAWING NUMBER WHERE DRAWN
1 / H200	SECTION LETTER / DRAWING NUMBER WHERE DRAWN
	CONNECT TO EXISTING AT THIS POINT
	DEMO/REMOVE TO THIS POINT

PIPELINE ABBREVIATIONS

SYMBOLS	DESCRIPTION
CD	CONDENSATE DRAIN LINE
CTD	COOLING TOWER DRAIN LINE
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
CWS	CONDENSER WATER SUPPLY
CWR	CONDENSER WATER RETURN
HWHS	HOT WATER HEATING SUPPLY
HWHR	HOT WATER HEATING RETURN
LPS	LOW PRESSURE STEAM SUPPLY
LPCR	LOW PRESSURE CONDENSATE RETURN
MPS	MEDIUM PRESSURE STEAM SUPPLY
MPCR	MEDIUM PRESSURE CONDENSATE RETURN
HPS	HIGH PRESSURE STEAM SUPPLY
HPCR	HIGH PRESSURE CONDENSATE RETURN
PC	PUMPED CONDENSATE
HRS	ENERGY (HEAT) RECOVERY SUPPLY
HRR	ENERGY (HEAT) RECOVERY RETURN
RL	REFRIGERANT LINE
RS	REFRIGERANT SUCTION
NAME	PIPE TO BE REMOVED
NAME	EXISTING PIPING TO REMAIN

PIPELINE SYMBOLS

	BALL VALVE
	GATE VALVE
	BUTTERFLY VALVE
	GLOBE VALVE
	PLUG VALVE
	RELIEF VALVE
	ECCENTRIC REDUCER
	INVERTED ECCENTRIC REDUCER
	STRAINER
	ORIFICE UNION
	UNION
	THERMOMETER
	PRESSURE GAUGE
	WATER FLOW MEASURING DEVICE (VENTURI FLOW STATION) BALANCING COCK
	PRESSURE TAP
	PRESSURE REDUCING VALVE
	CHECK VALVE
	TWO-WAY MODULATING CONTROL VALVE
	THREE-WAY MODULATING CONTROL VALVE
	SAFETY VALVE OR PRESSURE RELIEF
A	AUTOMATIC AIR VENT
M	MANUAL AIR VENT
	TWO-WAY CONTROL VALVE (TWO POSITION TYPE)
	MOTORIZED VALVE
	AQUASTAT
	FUNNEL DRAIN
	PIPING TURNED UP
	PIPING TURNED DOWN
	TEE - OUTLET UP
	TEE- OUTLET
	SIDE CONNECTION
	CAPPED OUTLET
	DIRECTION OF FLOW
	PIPE BREAK (SINGLE LINE)
	FLEXIBLE CONNECTION
	BACKFLOW PREVENTION DEVICE

HVAC SYMBOLS

DOUBLE LINE SHEETMETAL

SYMBOLS	DESCRIPTION
12"X12"	RECTANGULAR SUPPLY, RETURN OR RELIEF DUCT WIDTH (SHOWN)XDEPTH
12"/12"	OVAL SUPPLY, RETURN OR RELIEF DUCT WIDTH (SHOWN)XDEPTH
12"	ROUND SUPPLY, RETURN OR DUCT W/TURNING VANES (DUCT WIDTH OVER 18")
	DUCT W/ TURNING VANES
	DUCT W/O TURNING VANES
	RADIUS ELBOW (DUCT WIDTH 17" AND LOWER)
	LOW LOSS TAKE OFF (ARROW INDICATES DIRECTION OF AIR FLOW)
	CONICAL SPIN-IN FITTING
	BOOT CONNECTION WITH MANUAL VD (ARROW INDICATES AIR FLOW DIRECTION)
	RETURN AIR DUCT UP
	SUPPLY DUCT UP
	EXHAUST AIR DUCT UP
	RETURN AIR DUCT DN
	SUPPLY DUCT DN
	EXHAUST AIR DUCT DN
12"X12"	MANUAL VOLUME CONTROL DAMPER (VD)
24"X24" / 24"X24"	RISE/DROP IN DUCTWORK (ARROW SHOWS DIRECTION OF DROP)
S	DUCT/SPACE STATIC PRESSURE SENSOR
WS	WALL SWITCH
T	DUCT/WALL TEMPERATURE SENSOR, ELECTRIC
DD	DUCT MOUNTED SMOKE DETECTOR PROVIDED BY EC, INSTALLED BY HC
M	MOTORIZED DAMPER
B	BACKDRAFT DAMPER
FD	FIRE DAMPER AT FIRE WALL (PROVIDE ACCESS PANEL IN DUCT AND CEILING)
	SMOKE DAMPER/DETECTOR DETECTOR BY E.C. DAMPER BY H.C.
F/SD	COMBINATION FIRE/SMOKE DAMPER
FD FD	FIRE DAMPER IN VERTICAL DUCT THRU FLOOR OR HORIZONTAL DUCT ABOVE CEILING (PROVIDE ACCESS PANEL IN DUCT AND WALL OR CEILING)
	ACCESS DOOR ON BOTTOM OF DUCT (HINGED & GASKETED)
	ACCESS DOOR ON SIDE OF DUCT (HINGED & GASKETED)
AD	SUPPLY AIR DIFFUSER
TF	THERMAL VAV DIFFUSER
	RETURN AIR REGISTER
	EXHAUST REGISTER
	EXHAUST/RETURN AIR REGISTER (DUCT OR WALL)
	SUPPLY AIR REGISTER (DUCT OR WALL)

SINGLE LINE - SHEET METAL

SYMBOLS	DESCRIPTION
24X12	DUCT SIZE (WIDTH X DEPTH)
24"Ø	ROUND DUCT SIZE (DIAMETER)
24"Ø	FLEXIBLE DUCT (DIAMETER SIZE)
	SUPPLY DUCT CROSS SECTION UP
	SUPPLY DUCT CROSS SECTION DN
	RETURN CROSS SECTION UP
	RETURN CROSS SECTION DN
	EXHAUST CROSS SECTION UP
	SQUARE ELBOW WITH TURNING VANES
	RADIUS TURN ELBOW
	DUCT END CAP

HVAC GENERAL NOTES

1. NOT ALL SYMBOLS ARE NECESSARILY USED.
2. COORDINATE FINAL LOCATIONS OF DIFFUSERS AND GRILLES WITH ARCHITECTURAL REFLECTED CEILING PLANS.
3. DRAWINGS ARE DIAGRAMMATIC. CONTRACTOR TO FIELD VERIFY DUCT AND PIPE ROUTING AND COORDINATE INTERFERENCE BETWEEN TRADES PRIOR TO INSTALLATION.
4. ROOF OPENINGS, FLASHING, AND COUNTER FLASHING BY GENERAL CONTRACTOR. LOCATION OF OPENINGS BY HEATING CONTRACTOR.
5. DUCTWORK TO BE INSTALLED TIGHT TO UNDERSIDE OF STRUCTURE ABOVE UNLESS NOTED OTHERWISE.
6. PROVIDE ALL MATERIALS, EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED, AND AS REQUIRED BY CODE.
7. CONTRACT DOCUMENT DRAWINGS FOR MECHANICAL WORK ARE DIAGRAMMATIC AND ARE INTENDED TO CONVEY SCOPE AND GENERAL ARRANGEMENT ONLY. CONTRACTOR SHALL BE RESPONSIBLE TO FIELD SURVEY ACTUAL SITE CONDITIONS AND ACCOMMODATE ACTUAL SITE CONDITIONS AS PART OF SCOPE OF WORK AT NO COST TO OWNER.
8. INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, APPLICABLE BUILDING, STATE, AND LOCAL CODES, SEISMIC REQUIREMENTS, ENERGY CODES, AND INSURANCE UNDERWRITER REQUIREMENTS.
9. COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH ARCHITECTURAL, STRUCTURAL, CIVIL, AND ELECTRICAL WORK, ETC. SHOWN ON OTHER CONTRACT DOCUMENT DRAWINGS.
10. MAINTAIN A MINIMUM OF 6'-8" CLEARANCE TO UNDERSIDE OF PIPES, DUCTS, CONDUITS, SUSPENDED EQUIPMENT, SUPPORTS, ETC., THROUGHOUT ACCESS ROUTES IN MECHANICAL ROOMS.
11. ALL TESTS SHALL BE COMPLETED AND ACCEPTED BY THE INSPECTOR BEFORE ANY MECHANICAL EQUIPMENT OR PIPING INSULATION IS APPLIED.
12. LOCATE ALL TEMPERATURE, PRESSURE AND FLOW MEASURING DEVICES IN ACCESSIBLE LOCATIONS WITH A STRAIGHT SECTION OF PIPE OR DUCT UPSTREAM AND DOWNSTREAM, AS RECOMMENDED BY THE MANUFACTURER FOR ACCURACY.
13. TESTING ADJUSTING AND BALANCING (TAB) AGENCY SHALL BE A MEMBER OF THE ASSOCIATED AIR BALANCING COUNCIL (AABC), THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB), OR THE TESTING, ADJUSTING AND BALANCING BUREAU (TABB). TAB FIRM SHALL HAVE A MINIMUM OF 5 YEARS EXPERIENCE ON SIMILAR PROJECTS. PERFORM TAB IN ACCORDANCE WITH THE REQUIREMENTS OF THE TAB PROCEDURAL STANDARD RECOMMENDED BY THE TAB TRADE ASSOCIATION THAT APPROVED THE TAB FIRM'S QUALIFICATIONS.
14. WHERE TWO OR MORE ITEMS OF THE SAME TYPE OF EQUIPMENT ARE REQUIRED, THE PRODUCTS OF A SINGLE MANUFACTURER SHALL BE USED.
15. COORDINATE ALL FINAL EQUIPMENT CONNECTIONS WITH MANUFACTURERS' CERTIFIED DRAWINGS. COORDINATE AND PROVIDE ALL DUCTWORK AND PIPING TRANSITIONS REQUIRED FOR FINAL EQUIPMENT CONNECTIONS TO FURNISHED EQUIPMENT. FIELD VERIFY AND COORDINATE ALL DUCTWORK AND PIPING DIMENSIONS BEFORE FABRICATION.
16. ALL CONTROL WIRE AND CONDUIT SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE, DIVISION 26 OF THE SPECIFICATIONS, ALL LOCAL CODES, AND OWNER'S INSURANCE UNDERWRITER REQUIREMENTS.
17. ALL HEATING DEVICES AND SURFACES WITH ELEVATED TEMPERATURES WHICH CAN BE ACCESSED OR COME IN CONTACT WITH OWNER PERSONNEL SHALL BE PROTECTED, INSULATED, OR CONTROLLED TO REMAIN BELOW 120°F.
18. THE LOCATIONS AND SIZES OF ALL ITEMS SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS THAT ARE NOT DEFINITELY FIXED BY DIMENSIONS ARE APPROXIMATE ONLY. THE EXACT LOCATIONS AND SIZES NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS SHALL BE DETERMINED BY THE PROJECT SITE CONDITIONS AND SHALL HAVE THE APPROVAL OF THE ENGINEER BEFORE BEING INSTALLED. DO NOT SCALE DRAWINGS.
19. PLAN DRAWINGS AND SECTION CUTS WHICH SPECIFICALLY IDENTIFY SERVICE ROUTE OFFSETS, ELEVATION CHANGES, OBSTRUCTIONS, ACCESS DOORS, BALANCING DEVICES, ETC. ARE SHOWN FOR CLARITY WHERE SPECIFIC KNOWN CONDITIONS EXIST. MECHANICAL CONTRACTOR SHALL COORDINATE EQUIPMENT, DUCTWORK, AND PIPING ROUTINGS WITH ALL OTHER TRADES. REQUIREMENTS NOT SPECIFICALLY IDENTIFIED SHALL NOT BE INTERPRETED AS EXCLUSION FROM CONTRACTOR'S SCOPE OF WORK. CONTRACTOR SHALL BE RESPONSIBLE FOR ACTUAL SITE CONDITIONS AND SHALL INCLUDE SUCH CONDITIONS IN SCOPE OF WORK AT NO ADDITIONAL COST TO THE OWNER.
20. ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND SUPPORT OF MECHANICAL WORK AS SHOWN IN DETAILS FOR PIPING, DUCTWORK AND EQUIPMENT (UNLESS OTHERWISE NOTED) SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
21. ALL EQUIPMENT SUBMITTALS AND SHOP DRAWINGS REQUIRED BY THE SPECIFICATIONS SHALL BE APPROVED BY ENGINEER PRIOR TO PURCHASE, FABRICATION, AND INSTALLATION.
22. ALL EQUIPMENT, PIPING, DUCTWORK, ETC., SHALL BE SUPPORTED AS DETAILED, SPECIFIED AND AS REQUIRED TO PROVIDE A VIBRATION FREE INSTALLATION.
23. ALL OPENINGS IN FIRE RATED WALLS AND SMOKE PARTITIONS DUE TO DUCTWORK, PIPING, CONDUIT, ETC., SHALL BE FIRE STOPPED WITH APPROVED FIRESTOPPING MATERIALS.
24. REFER TO TYPICAL DETAILS FOR DUCTWORK, PIPING AND EQUIPMENT INSTALLATION.
25. UNLESS OTHERWISE SHOWN, LOCATE ALL ROOM THERMOSTATS 48" (OPERABLE PARTS) ABOVE FINISHED FLOOR IN ACCORDANCE WITH ADA REQUIREMENTS. NOTIFY THE ENGINEER OF ANY ROOMS WHERE THE ABOVE LOCATION CAN NOT BE MAINTAINED OR WHERE THERE IS A QUESTION ON LOCATION. COORDINATE FINAL LOCATIONS WITH OWNER.
26. LOCATE ALL MECHANICAL EQUIPMENT (VAV BOXES, CABINET HEATERS, UNIT HEATERS, ETC.,) FOR UNOBSTRUCTED ACCESS TO UNIT ACCESS PANELS, FILTERS, CONTROLS AND VALVING. DO NOT LOCATE FAN POWERED VAV BOXES ABOVE LIGHTING FIXTURES.
27. PROVIDE FLEXIBLE CONNECTIONS IN ALL DUCTWORK SYSTEMS (SUPPLY, RETURN AND EXHAUST) CONNECTED TO FANS AND OTHER EQUIPMENT WHICH REQUIRE VIBRATION ISOLATION. FLEXIBLE CONNECTIONS SHALL BE PROVIDED AT THE POINT OF CONNECTION TO THE EQUIPMENT UNLESS OTHERWISE INDICATED.
28. ALL LOUVERS SHALL BE FURNISHED AND INSTALLED BY THE GENERAL CONTRACTOR (UNLESS OTHERWISE NOTED). GENERAL CONTRACTOR SHALL COORDINATE SIZES, LOCATIONS, AND CONNECTIONS WITH MECHANICAL CONTRACTOR. DUCTWORK CONNECTIONS TO LOUVERS SHALL BE FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR.
29. PROVIDE AN AIR VENT AT THE HIGH POINT OF EACH DROP IN HYDRONIC WATER PIPING SYSTEMS. ALL PIPING SHALL SLOPE TO LOW POINTS. PROVIDE HOSE END DRAIN VALVES AT THE BOTTOM OF ALL RISERS AND LOW POINTS.
30. INSTALL PIPING SO THAT ALL VALVES, STRAINERS, UNIONS, TRAPS, FLANGES, AND OTHER APPURTENANCES REQUIRING ACCESS ARE ACCESSIBLE.
31. ALL ISOLATION VALVES SHALL BE IN A LOCATION AND ELEVATION WHICH ALLOWS FOR EQUIPMENT AND BRANCH PIPING REMOVAL, WHILE MAINTAINING SERVICE UPSTREAM OF THE ISOLATION VALVE.
32. ALL BALANCING VALVES AND ISOLATION VALVES USED TO ADJUST FLOW RATES SHALL BE PROVIDED WITH POSITION INDICATORS AND MAXIMUM ADJUSTABLE STOPS (MEMORY STOPS).
33. ALL ISOLATION VALVES (EXCEPT CONTROL VALVES), STRAINER, AND PIPING SPECIALTIES AND STRAINERS SHALL BE FULL LINE SIZE BEFORE REDUCING SIZE TO MAKE CONNECTIONS TO EQUIPMENT AND CONTROLS.
34. MECHANICAL JOINTS SUCH AS UNIONS, FLANGES, OR THREADED FITTINGS SHALL BE INSTALLED AT EACH EQUIPMENT CONNECTION, IN BYPASSES, AT FLOOR PENETRATIONS, AT CONTROL DEVICES, AND IN LONG PIPE RUNS (100 FEET OR MORE) TO PERMIT DISASSEMBLY FOR ALTERATION AND REPAIRS.
35. MEASURE, CUT, AND INSTALL PIPE LENGTH ACCURATELY TO MINIMIZE MISALIGNMENT. INSTALL ALL PIPING WITHOUT FORCING OR SPRINGING.
36. PROVIDE FLEXIBLE CONNECTIONS IN ALL PIPING SYSTEMS CONNECTED TO PUMPS AND OTHER EQUIPMENT WHICH REQUIRE VIBRATION ISOLATION (EXCEPT WATER COILS). FLEXIBLE CONNECTIONS SHALL BE PROVIDED AS CLOSE TO THE EQUIPMENT AS POSSIBLE OR AS INDICATED ON THE DRAWINGS.
37. PROVIDE VIBRATION ISOLATION FOR ALL MECHANICAL EQUIPMENT TO PREVENT VIBRATION TRANSMISSION TO BUILDING STRUCTURE.
38. CONCRETE HOUSEKEEPING PADS SHALL BE FURNISHED AND INSTALLED BY THE GENERAL CONTRACTOR. MECHANICAL CONTRACTOR SHALL PROVIDE EQUIPMENT WEIGHTS, SIZES, AND LOCATION TO GENERAL CONTRACTOR. MINIMUM CONCRETE PAD THICKNESS SHALL BE IN ACCORDANCE WITH STRUCTURAL DETAILS. PAD SHALL EXTEND BEYOND THE EQUIPMENT FOOTPRINT A MINIMUM OF 6 INCHES ON EACH SIDE.
39. ALL DUCTWORK, PIPING, AND EQUIPMENT SUPPORTED FROM STRUCTURAL STEEL SHALL BE COORDINATED WITH GENERAL CONTRACTOR. ALL ATTACHMENTS TO STEEL MEMBERS, BAR JOISTS, TRUSSES, OR JOIST GIRDERS SHALL BE APPROVED BY STRUCTURAL ENGINEER. WELDING TO STRUCTURAL MEMBERS SHALL NOT BE PERMITTED.
40. MECHANICAL EQUIPMENT, DUCTWORK, AND PIPING SHALL NOT BE SUPPORTED FROM ROOF OR DECK ASSEMBLY. SUPPORTS SHALL ATTACH TO STRUCTURAL MEMBERS. COORDINATE WITH STRUCTURAL DRAWINGS.
41. PROVIDE MANUFACTURER'S MATCHING ROOF CURBS FOR ALL ROOF MOUNTED EQUIPMENT. COORDINATE ACTUAL ROOF PITCH AND CONSTRUCTION DETAILS WITH GENERAL CONTRACTOR. PROVIDE SLOPED CURBS PER MANUFACTURER'S RECOMMENDATIONS. GENERAL CONTRACTOR SHALL INSTALL ROOF CURBS AND FLASHING PER ROOFING MANUFACTURER'S INSTALLATION REQUIREMENTS.
42. UNLESS OTHERWISE NOTED, ALL PIPING AND DUCTWORK IS OVERHEAD, TIGHT TO UNDERSIDE OF STRUCTURE OR SLAB, WITH SPACE FOR INSULATION.
43. PROVIDE CHAINWHEEL OPERATORS FOR ALL EXPOSED VALVES MOUNTED GREATER THAN 7'-0" ABOVE FINISHED FLOOR LEVEL. CHAIN SHALL EXTEND UNOBSTRUCTED TO 7'-0" ABOVE FLOOR LEVEL.
44. ALL PIPING AND DUCTWORK SHALL CLEAR DOORS, WINDOWS, EQUIPMENT CLEARANCES, MAINTENANCE REQUIREMENTS, CODE SETBACKS, ETC. TO ASSURE PROPER OPERATION, INSPECTION, AND MAINTENANCE.
45. ALL VALVES SHALL BE ADJUSTED FOR SMOOTH AND EASY OPERATION.
46. PROVIDE ALL 90 DEGREE SQUARE ELBOWS WITH DOUBLE RADIUS TURNING VANES UNLESS OTHERWISE INDICATED OR SPECIFIED. PROVIDE ACCESS DOORS UPSTREAM OF ALL ELBOWS CONTAINING TURNING VANES.
47. ALL DUCTS SHALL BE GROUNDED ACROSS FLEXIBLE CONNECTIONS WITH FLEXIBLE COPPER GROUNDING STRAPS. GROUNDING STRAPS SHALL BE BOLTED OR SOLDERED TO BOTH THE EQUIPMENT AND THE DUCT.
48. PROVIDE MANUAL VOLUME DAMPERS IN ALL RUN-OUTS TO DIFFUSERS, BRANCH TAKE-OFFS FROM MAIN SUPPLY DUCT, AND IN ALL OTHER AREAS REQUIRED TO PROVIDE PROPER SYSTEM AIRFLOW BALANCING.

FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions: | Date

CONSULTANTS:

HOPE FURRER ASSOCIATES
STRUCTURAL ENGINEERING

CLARK SURVEYING + ENGINEERING
CIVIL ENGINEERING

MOORE DESIGN ASSOCIATES
LANDSCAPE ARCHITECTURE

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AE Works Project Number: 13025

Drawing Title
HVAC SYMBOLS, ABBREVIATIONS AND GENERAL NOTES

Approved: Project Director

Project Title: NEW WAREHOUSE

Location: 510 BUTLER AVENUE MARTINSBURG, WV 25405

Date: 06/24/2015 | **Checked:** JKG | **Drawn:** SPL

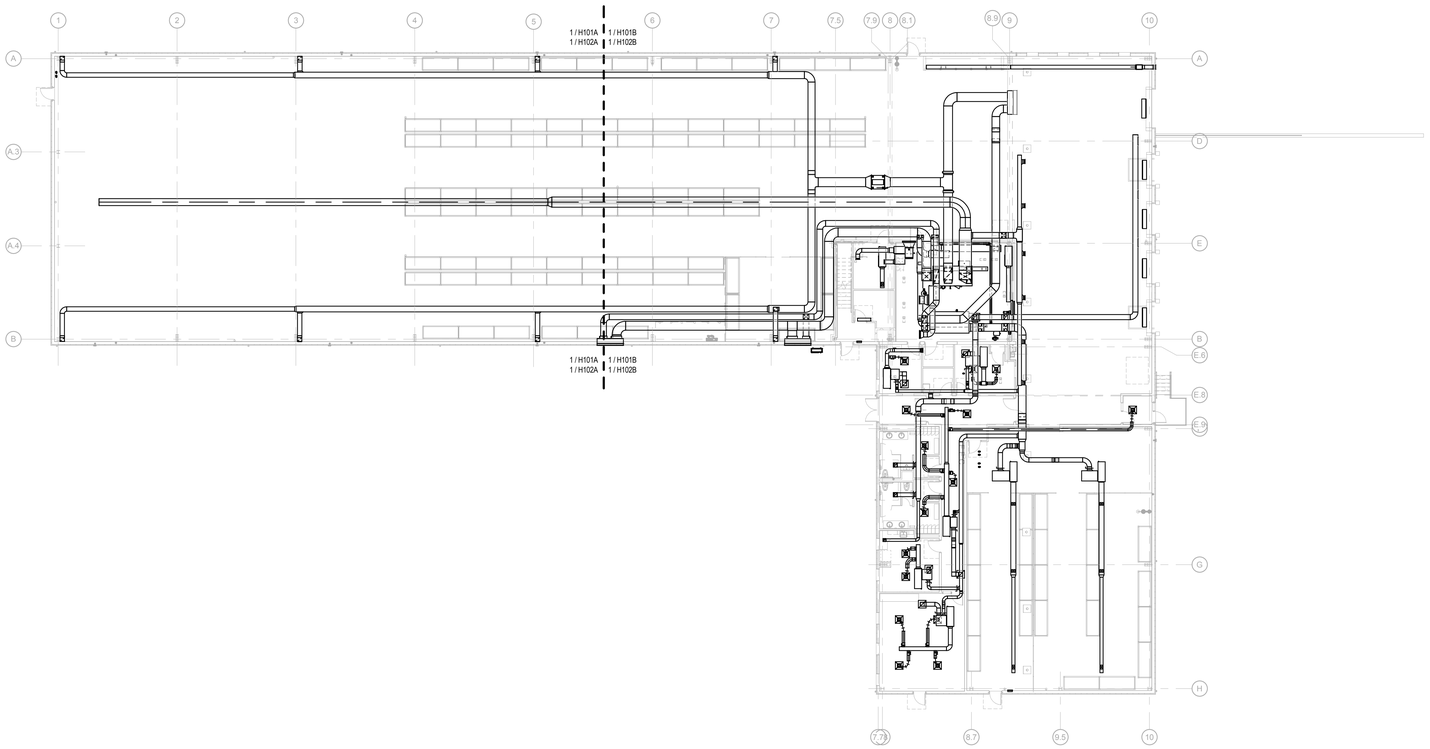
Project Number # 613-116

Building Number #519

Drawing Number H001

Office of Construction and Facilities Management
Department of Veterans Affairs

VA FORM 08-6231



1 OVERALL FIRST FLOOR PLAN - HVAC
1/16" = 1'-0"

PROJECT NORTH
TRUE NORTH

FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

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OVERALL FIRST FLOOR HVAC PLAN

Approved: Project Director

Project Title:
NEW WAREHOUSE

Location: 510 BUTLER AVENUE
MARTINSBURG, WV 25405

Date:	Checked:	Drawn:
06/24/2015	JKG	SPL

Project Number
613-116

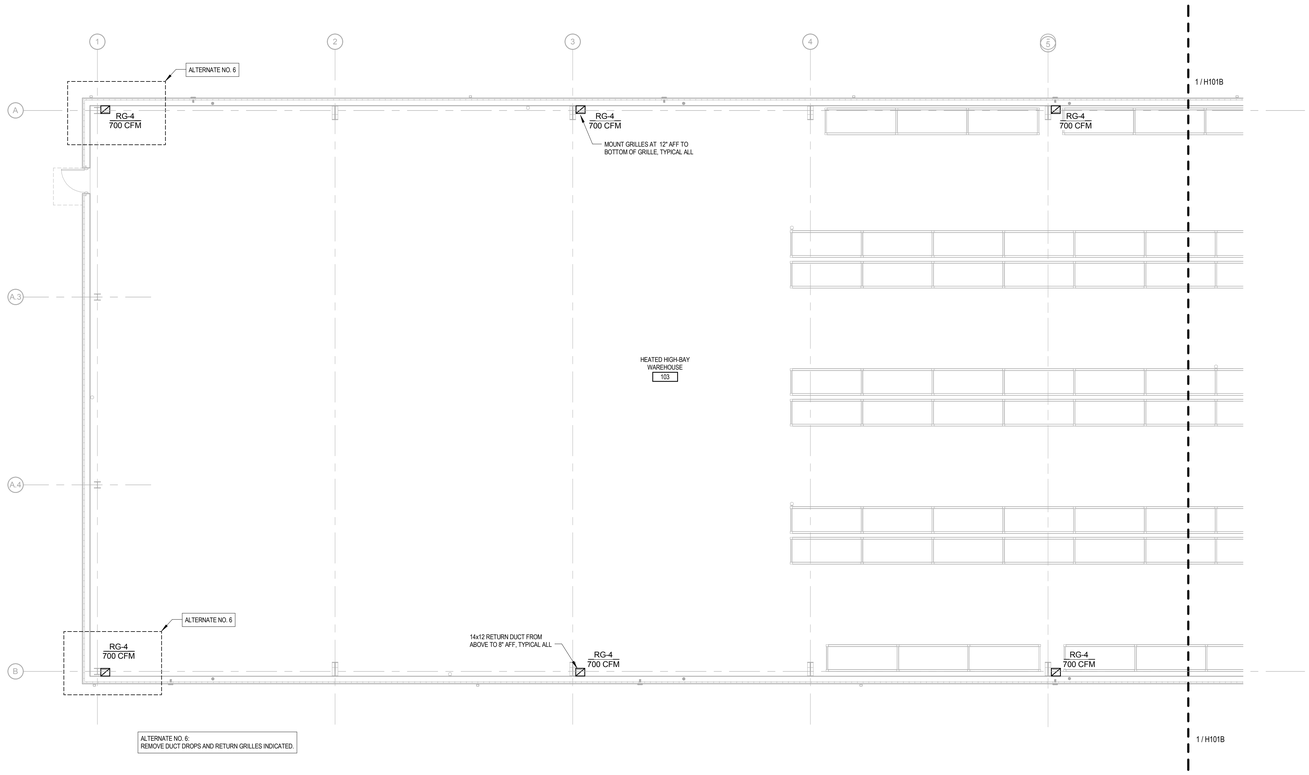
Building Number
#519

Drawing Number
H101

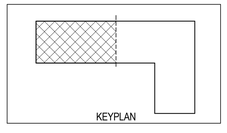
Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231



1 FIRST FLOOR DUCTWORK PLAN - SIDE A
1/8" = 1'-0"



FULLY SPRINKLERED
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Drawing Title
FIRST FLOOR DUCTWORK PLAN - SIDE A

Approved: Project Director

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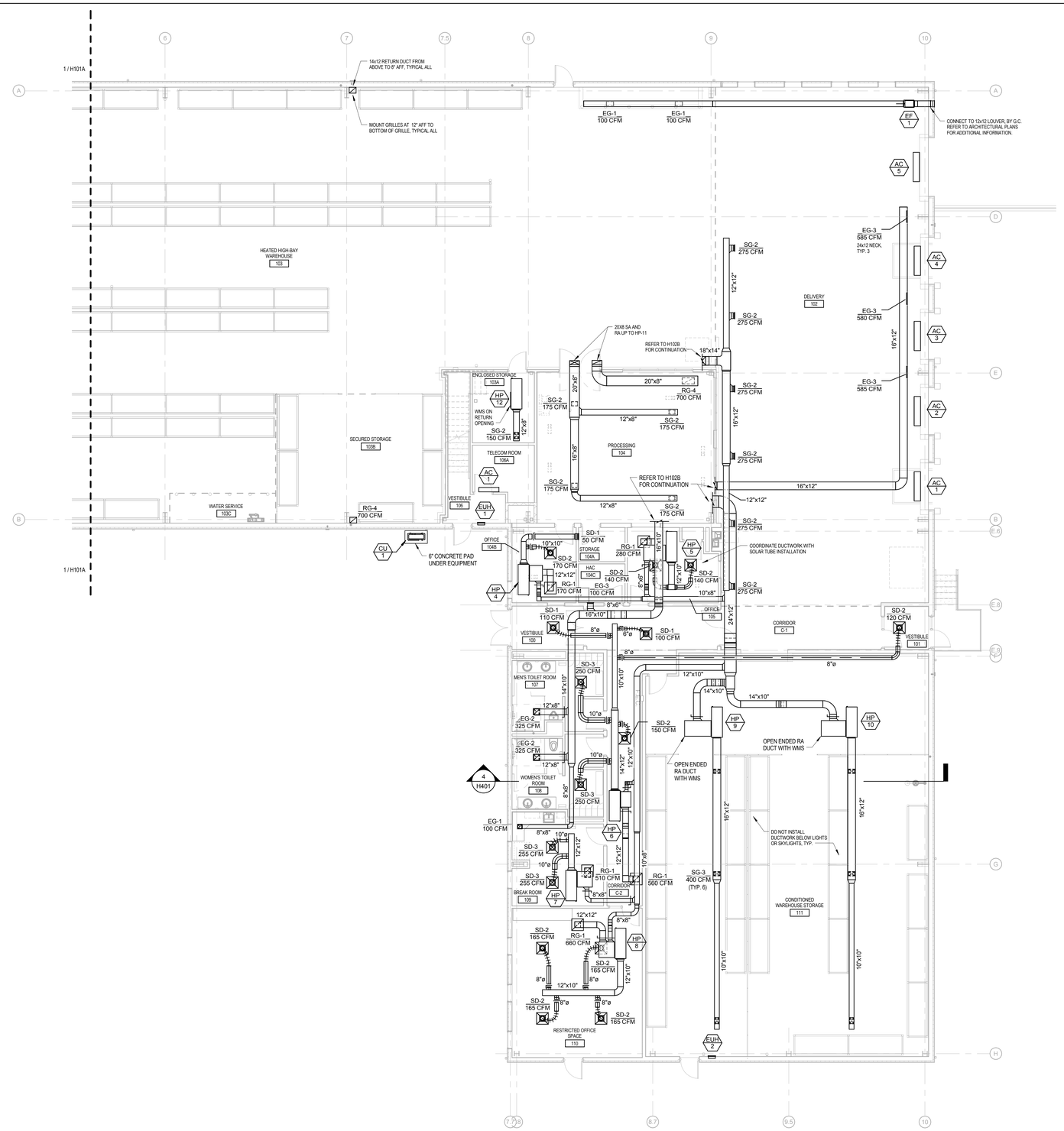
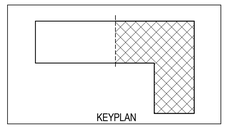


1 FIRST FLOOR DUCTWORK PLAN - SIDE B
1/8" = 1'-0"



FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

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CIVIL ENGINEERING

MOORE DESIGN ASSOCIATES
LANDSCAPE ARCHITECTURE

SEAL

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AE Works Project Number: 13025

Drawing Title
FIRST FLOOR DUCTWORK PLAN - SIDE B

Approved: Project Director

Project Title:
NEW WAREHOUSE

Location: 510 BUTLER AVENUE
MARTINSBURG, WV 25405

Date:	Checked:	Drawn:
06/24/2015	JKG	SPL

Project Number
#613-116

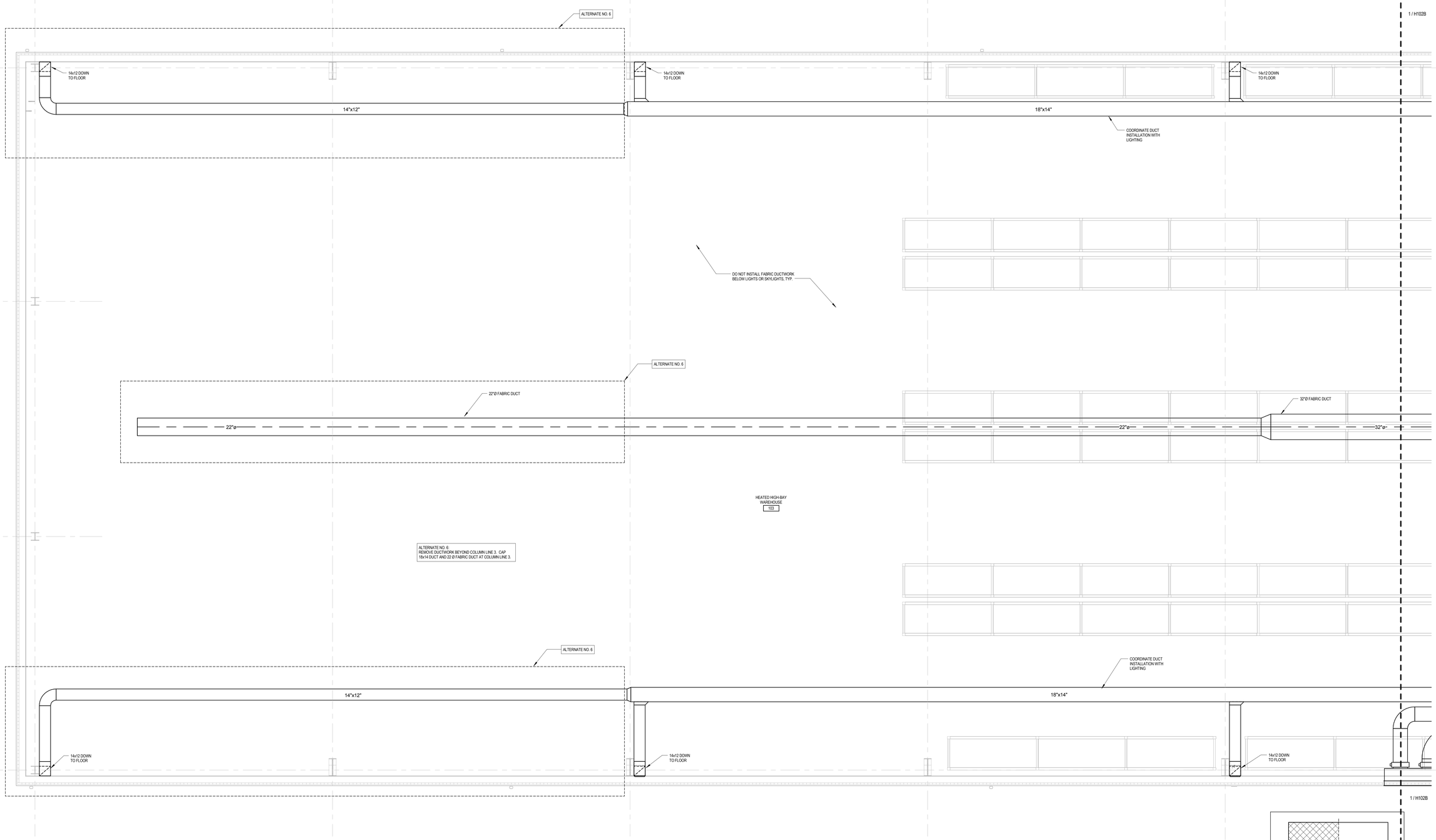
Building Number
#519

Drawing Number
H101B

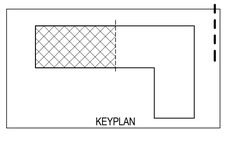
Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231



1 MEZZANINE DUCTWORK PLAN - SIDE A
1/4" = 1'-0"



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AE Works Project Number: 13025

Drawing Title
MEZZANINE DUCTWORK PLAN - SIDE A

Approved: Project Director

Project Title:
NEW WAREHOUSE

Location: 510 BUTLER AVENUE
MARTINSBURG, WV 25405

Date: 06/24/2015
Checked: JKG
Drawn: SPL

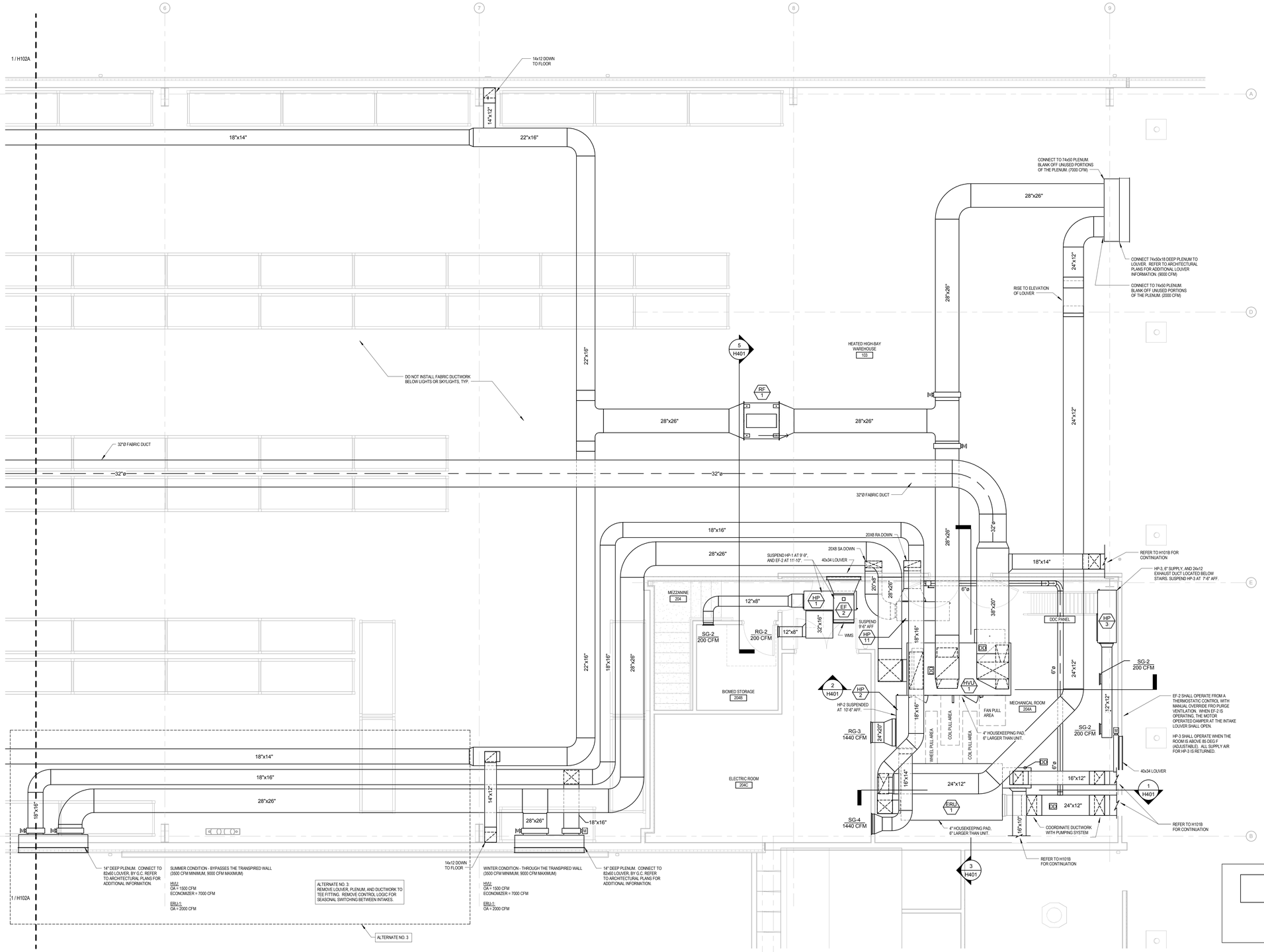
Project Number # 613-116

Building Number #519

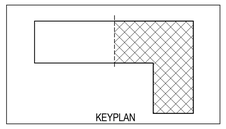
Drawing Number H102A

Office of Construction and Facilities Management
Department of Veterans Affairs

VA FORM 08-6231



1 MEZZANINE DUCTWORK PLAN - SIDE B
1/4" = 1'-0"



PROJECT NORTH
TRUE NORTH

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06/24/2015	JKG	SPL

Project Number
613-116

Building Number
#519

Drawing Number
H102B

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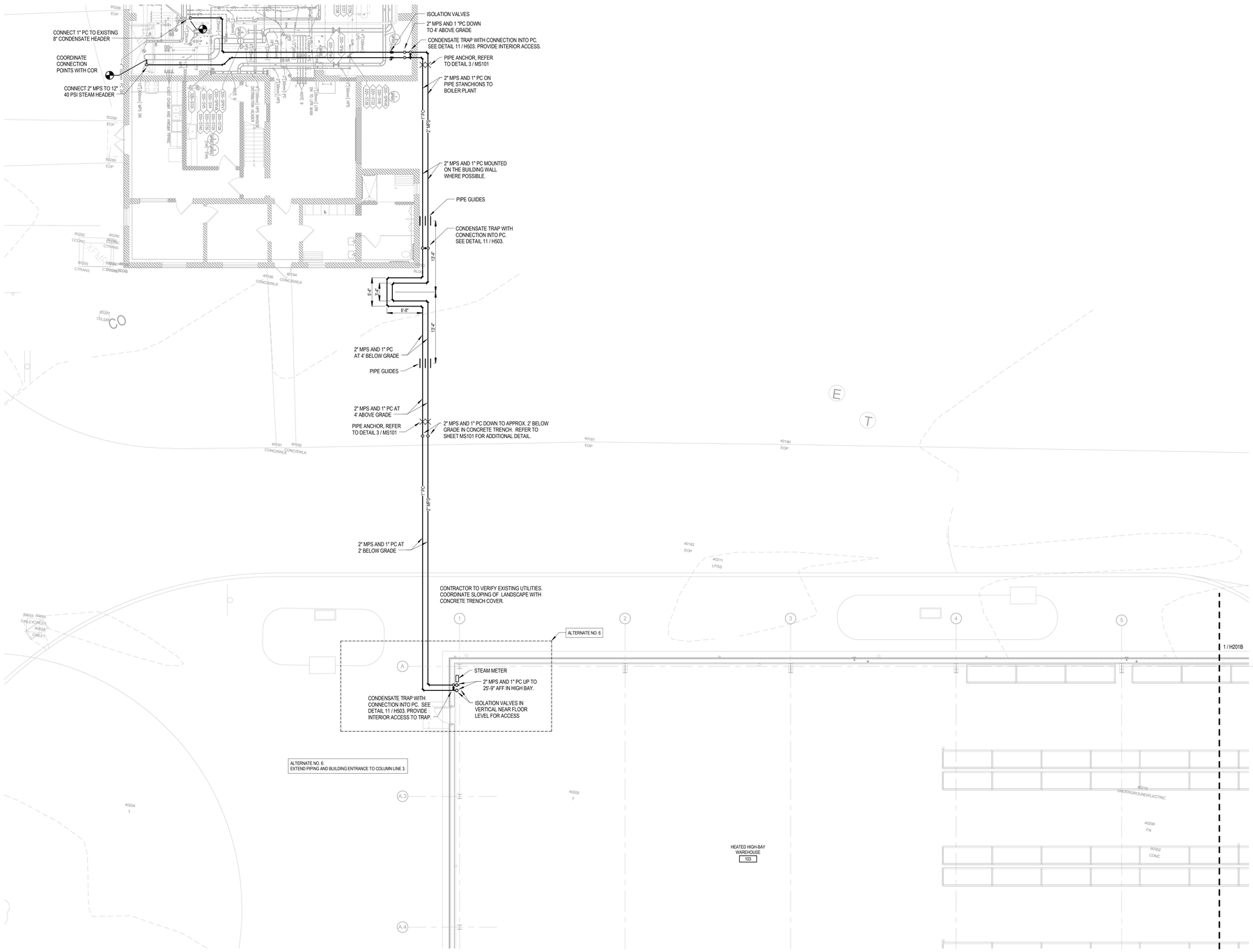
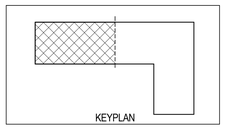
Department of Veterans Affairs

VA FORM 08-6231



1 FIRST FLOOR PIPING PLAN - SIDE A
1/8" = 1'-0"



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Approved: Project Director

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Date:	Checked:	Drawn:
06/24/2015	JKG	SPL

Project Number
613-116

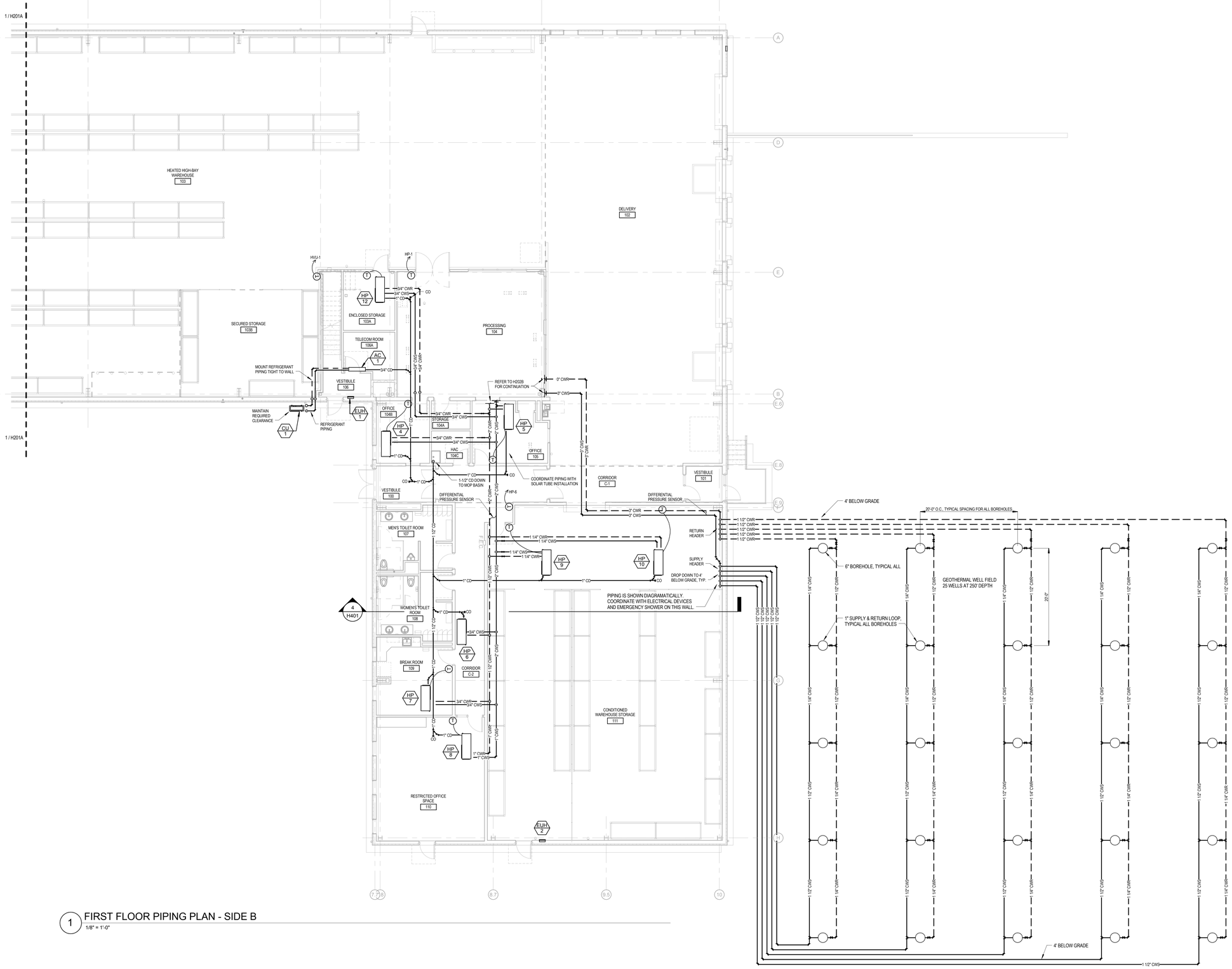
Building Number
#519

Drawing Number
H201A

Office of Construction and Facilities Management

Department of Veterans Affairs

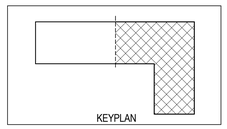
VA FORM 08-6231



GENERAL GEOTHERMAL NOTES:

1. GEOTHERMAL WELLS ARE LOCATED ON A 20'-0" x 20'-0" GRID. FINAL LOCATIONS OF WELLS SHALL BE COORDINATED WITH ALL OTHER SITE UTILITIES. OFFSETTING A WELL TO ACCOMODATE OTHER UTILITIES IS PERMITTED WITH APPROVAL FROM THE COR.
2. PIPE RUNS INDICATED ARE SCHEMATIC AND SHALL BE COORDINATED WITH ALL UNDERGROUND UTILITIES.
3. THERE SHALL BE A MINIMUM OF 4'-0" COVER ON ALL BURIED PIPE.
4. PROVIDE EMS TRACER TAPE AT EACH WELL LOCATION AND PIPING RUNS.
5. ALL CIRCUITS ARE TO HAVE AN ISOLATION VALVE AND PRESSURE / TEMPERATURE PORT.
6. INSTALLING GEOTHERMAL CONTRACTOR TO PROVIDE AS-BUILT PLANS INDICATING THE GPS COORDINATES AND DEPTH OF EACH WELL HEAD. THESE AS-BUILTS SHALL BE PROVIDED TO THE COR AND ENGINEER PRIOR TO THE BACK FILL OF THE SYSTEM.
7. THE END OF THE SUPPLY AND RETURN HEADERS SHALL BE VALVED WITH A BLIND FLANGE FOR EMERGENCY CONNECTION TO PORTABLE EQUIPMENT.
8. SYSTEM IS TO ALARM TO THE DDC, LOOP WATER TEMPERATURES ABOVE 90°F OR BELOW 40°F.
9. ALL GEOTHERMAL WELLS SHALL ASSUME TO REQUIRE STEEL ENCASEMENT.
10. DRILLING CONTRACTOR TO SUBMIT BORE DRILLING LOGS TO THE COR SHOWING THERMAL CONDUCTIVITY AND THERMAL DIFFUSIVITY.
11. CONTACT THE COR IF THE THERMAL CONDUCTIVITY AND THERMAL DIFFUSIVITY ARE SUBSTANTIALLY DIFFERING FROM THE DESIGN DATA. THE THERMAL CONDUCTIVITY IS 1.6 BTU/HR FT F, AND THE THERMAL DIFFUSIVITY IS 1.1 SF/DAY.

1 FIRST FLOOR PIPING PLAN - SIDE B
1/8" = 1'-0"



PROJECT NORTH
TRUE NORTH

FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

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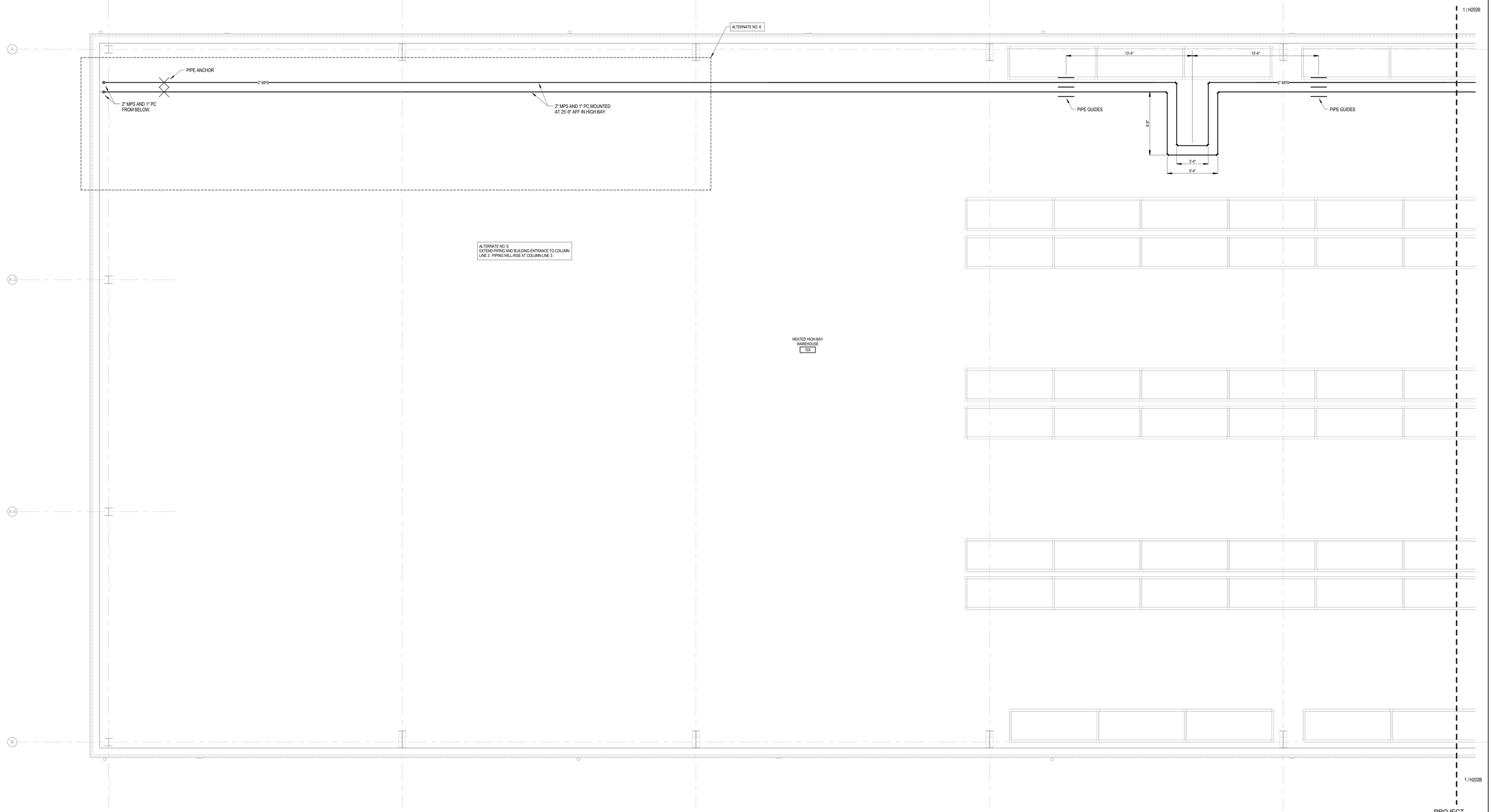
AE Works Project Number: 13025

Drawing Title	FIRST FLOOR PIPING PLAN - SIDE B
Approved: Project Director	
Project Title:	NEW WAREHOUSE
Location:	510 BUTLER AVENUE MARTINSBURG, WV 25405
Date:	06/24/2015
Checked:	JKG
Drawn:	SPL
Project Number	# 613-116
Building Number	#519
Drawing Number	H201B

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231



1 MEZZANINE PIPING PLAN - SIDE A
1/4" = 1'-0"

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Drawing Title
MEZZANINE PIPING PLAN - SIDE A

Approved: Project Director

Project Title:
NEW WAREHOUSE

Location: 510 BUTLER AVENUE
MARTINSBURG, WV 25405

Date: 06/24/2015
Checked: JKG
Drawn: SPL

Project Number # 613-116

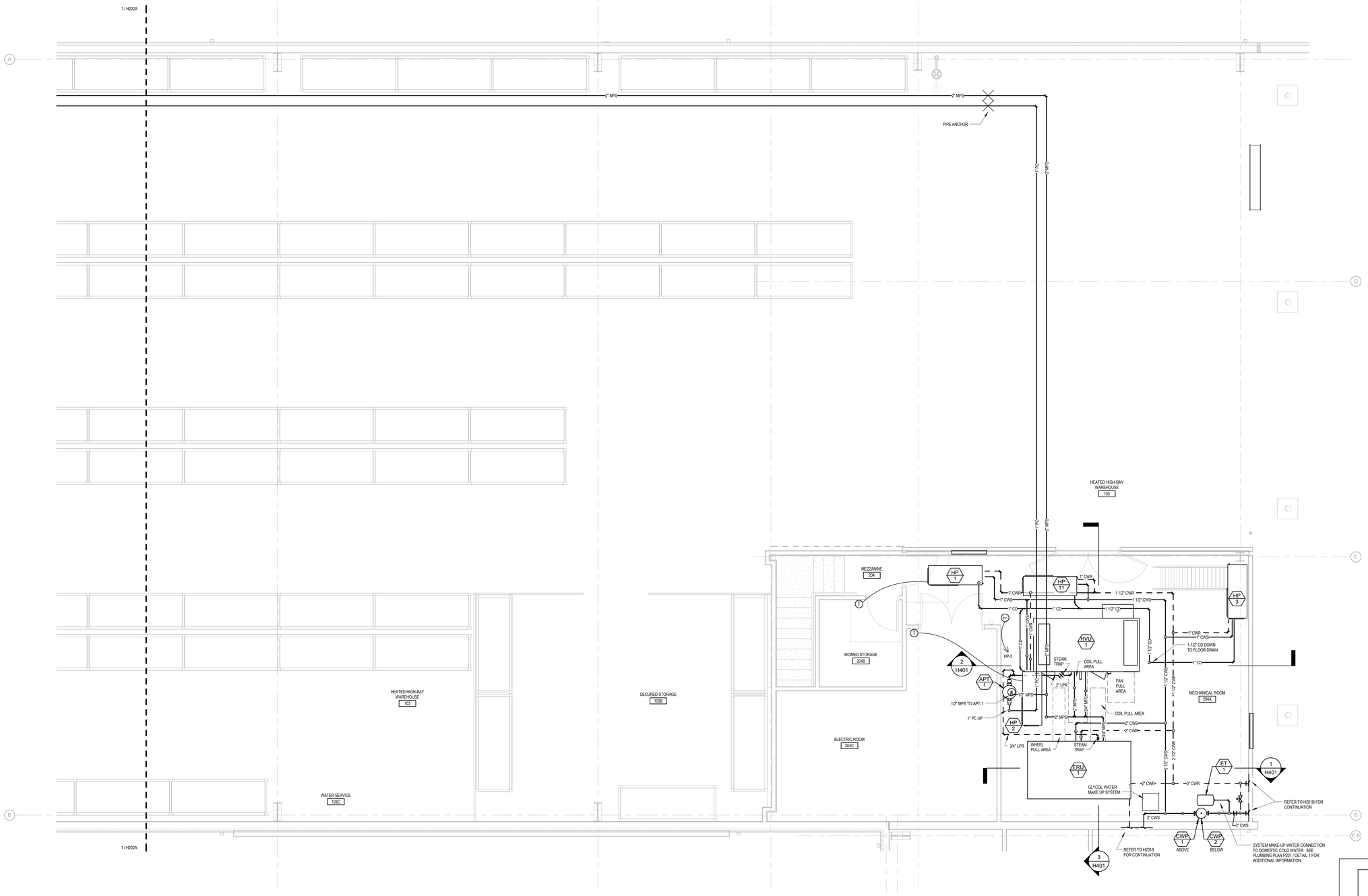
Building Number #519

Drawing Number H202A

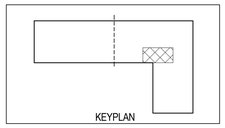
Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231



1 MEZZANINE PIPING PLAN - SIDE B
1/4" = 1'-0"



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AE Works Project Number: 13025

Drawing Title
MEZZANINE PIPING PLAN - SIDE B

Approved: Project Director

Project Title:
NEW WAREHOUSE

Location: 510 BUTLER AVENUE
MARTINSBURG, WV 25405

Date: 06/24/2015
Checked: JKG
Drawn: SPL

Project Number # 613-116

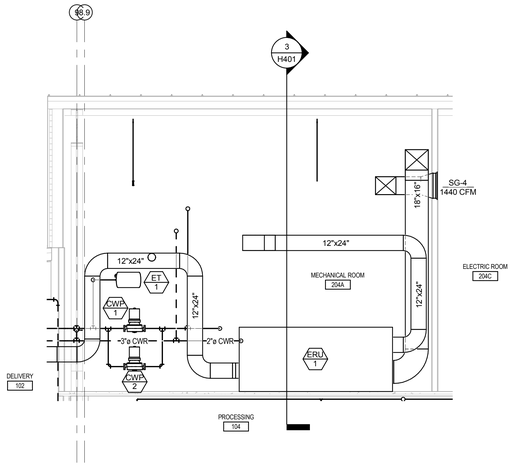
Building Number #519

Drawing Number H202B

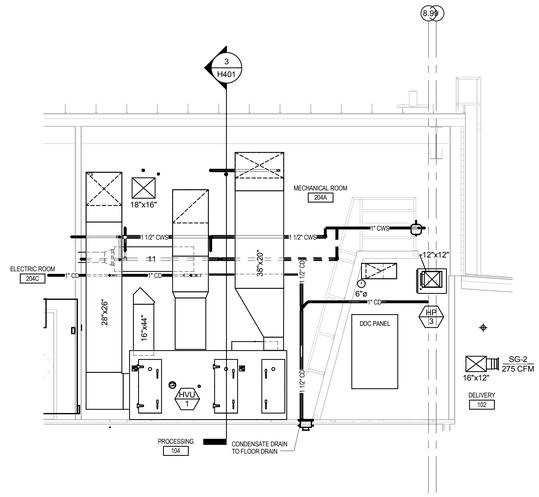
Office of Construction and Facilities Management

Department of Veterans Affairs

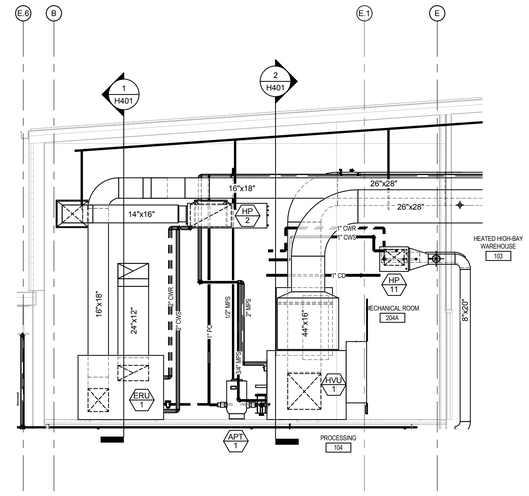
VA FORM 08-6231



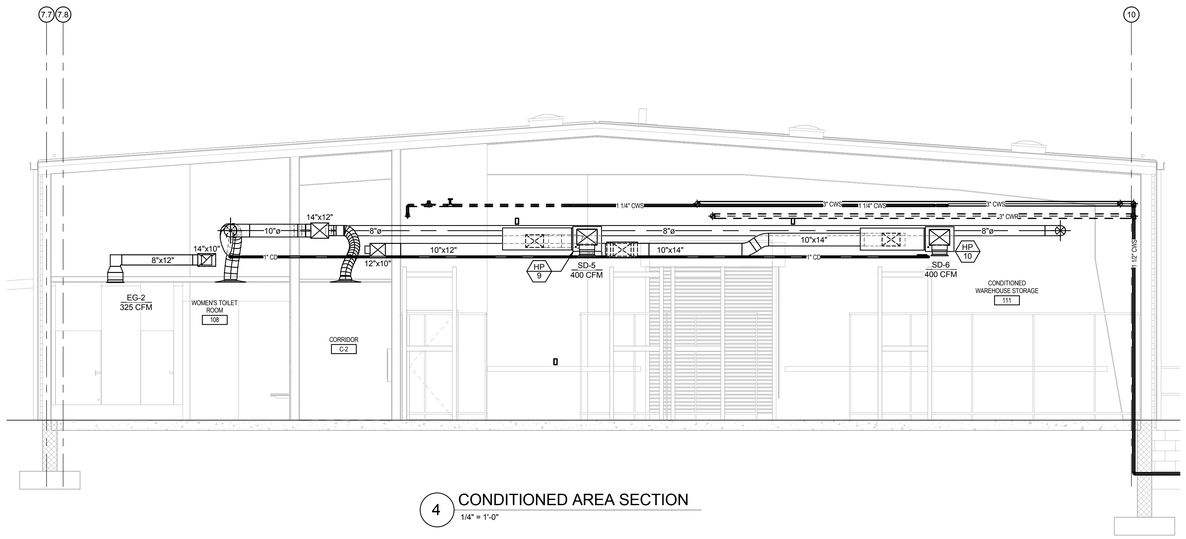
1 MEZZANNINE MECHANICAL ROOM - SOUTH SECTION
1/4" = 1'-0"



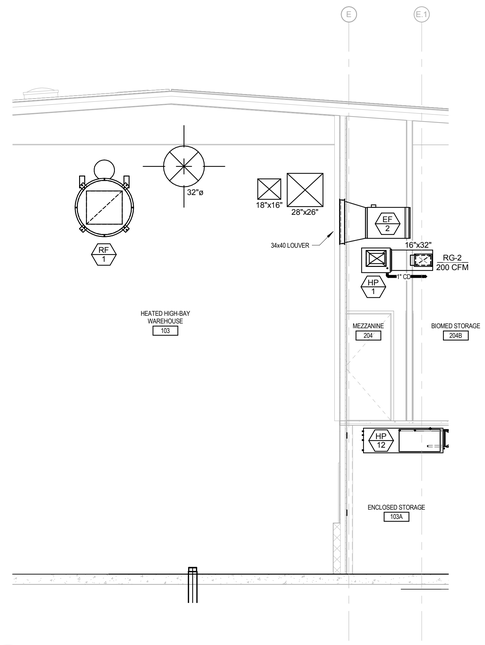
2 MEZZANNINE MECHANICAL ROOM - NORTH SECTION
1/4" = 1'-0"



3 MEZZANNINE MECHANICAL ROOM - WEST SECTION
1/4" = 1'-0"



4 CONDITIONED AREA SECTION
1/4" = 1'-0"



5 HVAC SECTION LOOKING EAST
1/4" = 1'-0"

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www.ae-works.com

AE Works Project Number: 13025

Drawing Title
HVAC SECTIONS

Approved: Project Director

Project Title:
NEW WAREHOUSE

Location: 510 BUTLER AVENUE
MARTINSBURG, WV 25405

Date: 06/24/2015
Checked: JKG
Drawn: SPL

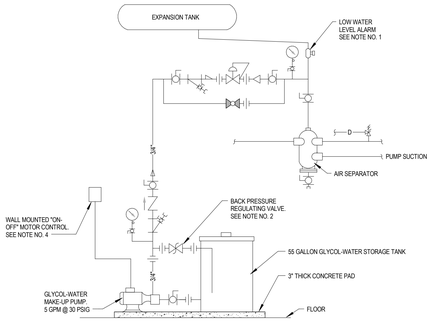
Project Number
613-116

Building Number
#519

Drawing Number
H401

Office of Construction and Facilities Management
Department of Veterans Affairs

VA FORM 08-6231



NOTES:

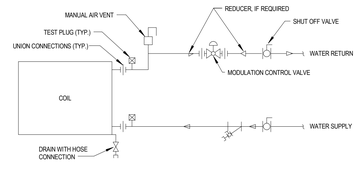
1. PROVIDE LOW WATER LEVEL ALARM. PROVIDE A LOW WATER LEVEL AT ECC. RELIEF VALVE DRAIN SHALL RETURN TO TANK AS SHOWN ON THIS DETAIL.

2. SET REGULATING VALVE TO MAINTAIN MAKE-UP PRESSURE AT 15 PSIG ABOVE HIGHEST SYSTEM PRV SETTING.

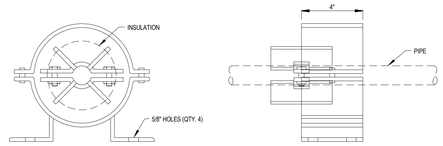
3. MAKE-UP PIPING SYSTEM DOES NOT REQUIRE INSULATION.

4. OPERATE PUMP MANUALLY AS REQUIRED TO FILL.

1 GLYCOL MAKE-UP SYSTEM
NTS

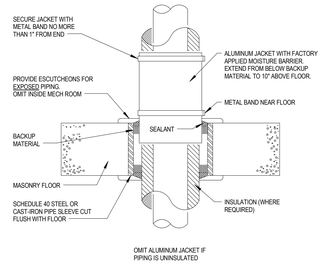


2 TERMINAL UNIT WATER COIL PIPING CONNECTIONS
NTS

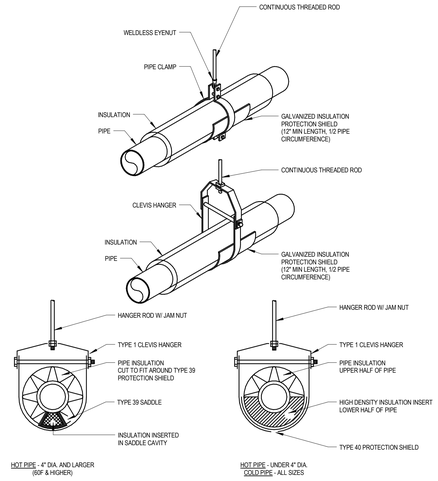


NOTES:
1. ATTACH OUTER HOUSING TO STRUCTURE BY BOLTING OR WELDING.
2. SPIDER CLAMP TO ATTACH TO PIPE AND BE INSULATED.

3 PIPE GUIDE DETAIL
NTS



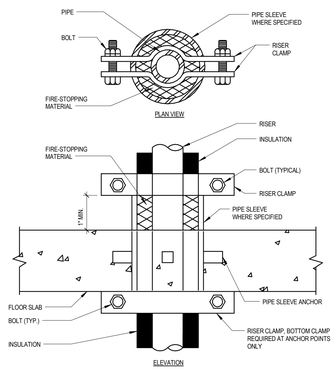
4 FLOOR PIPE PENETRATION DETAIL
NTS



HOT PIPE - 4" DIA. AND LARGER (60F & HIGHER)

HOT PIPE - UNDER 4" DIA.
COLD PIPE - ALL SIZES

5 CLEVIS HANGER
NTS

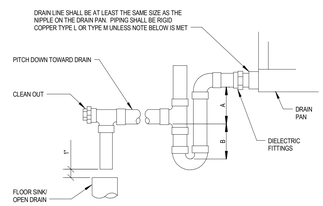


NOTES:

1. PROVIDE ANCHORS ONLY WHERE SHOWN ON DRAWINGS.

2. EXTEND SLEEVE ABOVE FLOOR WHERE SPECIFIED.

6 SUPPORT/ANCHOR FOR PIPE RISERS
NTS



NOTE:
1. PROVIDE STRUCTURAL STEEL SUPPORT FOR EACH AHU. SUPPORT SHALL BE A MINIMUM HEIGHT SUCH THAT THE BOTTOM OF THE AC CONDENSATE TRAP IS ABOVE THE FINISHED FLOOR

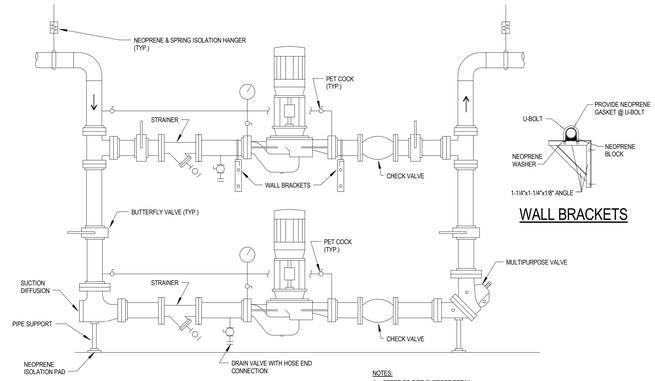
2. CPVC PIPE MAY BE USED ONLY IF APPROVED BY LOCAL VA AND IS INDOORS AND DOES NOT PASS THROUGH RATED BARRIERS.

3. DIELECTRIC FITTING TO BE USED WHEN TWO DISSIMILAR METALS ARE TO BE CONNECTED.

UNIT TYPE	A	B
DRAIN THRU	2" PLUS X	X
BLOW THRU	1" MINIMUM	2X

WHERE X = STATIC PRESSURE IN PAN

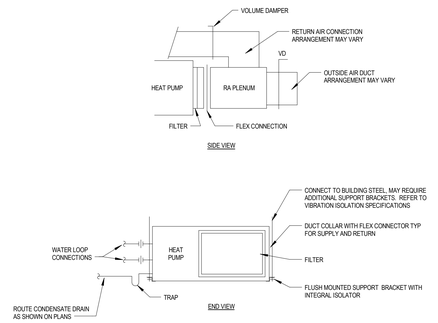
7 AIR HANDLING UNIT DRAIN TRAP DETAIL
NTS



NOTES:
1. REFER TO PIPE SUPPORT DETAIL FOR MOUNTING REQUIREMENTS OF CIRCULATING PUMP

2. PUMP TO BE SUPPORTED AT REDUCERS

8 VERTICAL INLINE PUMP DETAIL
NTS

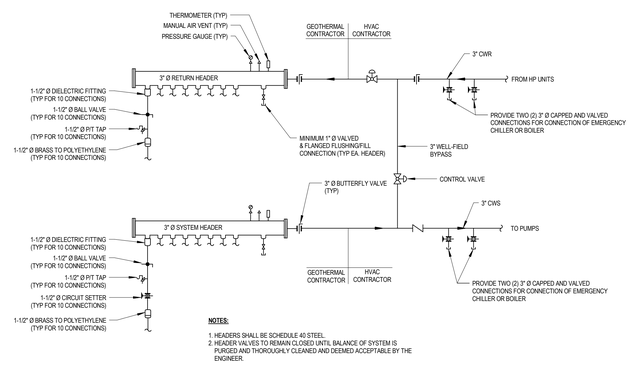


NOTES:

1. DETAIL TYPICAL FOR HORIZONTAL HEAT PUMPS.

2. PLENUM SHALL EXTEND 24" FROM UNIT. PROVIDE DUCT COLLAR AND MANUAL VOLUME DAMPER FOR O.A. AS REQ'D ON DUCT CONNECTED SYSTEMS.

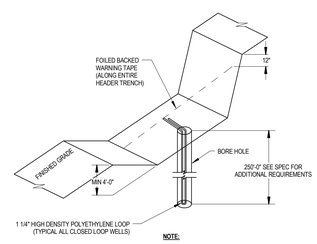
9 HORIZONTAL HEAT PUMP CONNECTION DETAIL
NTS



NOTES:

1. HEADERS SHALL BE SCHEDULE 40 STEEL.
2. HEADER VALVES TO REMAIN CLOSED UNTIL BALANCE OF SYSTEM IS PURGED AND THOROUGHLY CLEANED AND DEEMED ACCEPTABLE BY THE ENGINEER.

11 CLOSED LOOP MANIFOLD PIPING DETAIL
NTS



NOTE:

1. COORDINATE FINAL DEPTH OF HORIZONTAL WELL PIPING WITH OTHER UTILITIES ON SITE. NOTIFY ENGINEER OF FINAL DEPTH PRIOR TO COMMENCING WORK.
2. PROVIDE WEEL CASING AS REQUIRED DURING DRILLING.

12 VERTICAL CLOSED LOOP BORE HOLE DETAIL
NTS

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JASON J. J. DECHECK REGISTERED 17636 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER

ARCHITECTS/ENGINEERS:

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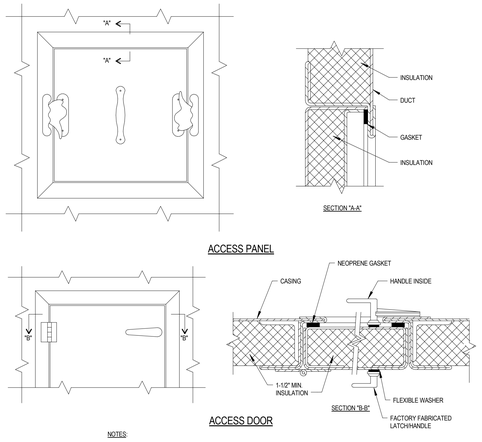
AE Works Project Number: 13025

Drawing Title: HVAC DETAILS	Project Title: NEW WAREHOUSE		Project Number: # 613-116
			Building Number: #519
Approved: Project Director	Location: 510 BUTLER AVENUE MARTINSBURG, WV 25405		Drawing Number
	Date: 06/24/2015	Checked: JKG / Drawn: SPL	H501

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231



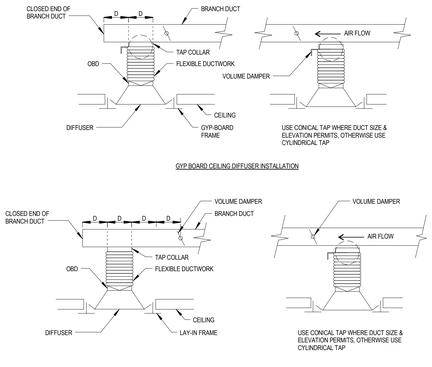
ACCESS PANEL

ACCESS DOOR

NOTES:

1. LATCHES SHALL BE OF THE WEDGE TYPE TO CLOSE DOORS TIGHTLY.
2. HINGES ON THE ACCESS DOORS SHALL HAVE NON-CORROSIVE PINS.
3. SEE SMACNA 2005, FIGURE 9-15

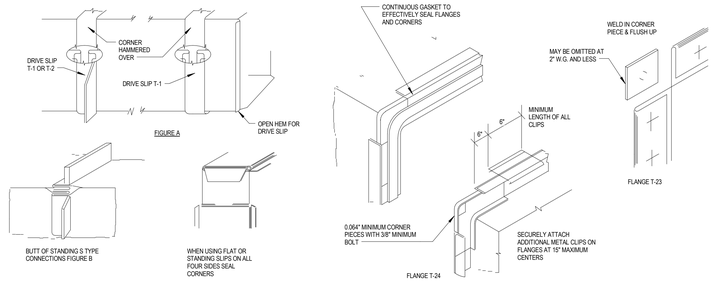
1 ACCESS PANEL & DOOR DETAIL
NTS

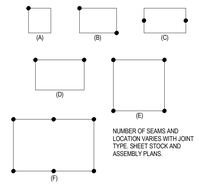


NOTE:

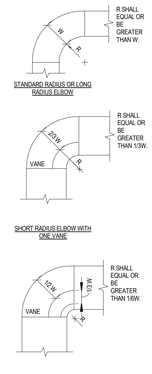
1. ALL FLEXIBLE DUCTWORK SHALL BE UL-181 CLASS 1 RATED.

2 CEILING DIFFUSER INSTALLATION
NTS





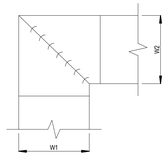
3 CORNER CLOSURES
NTS



NOTES:

1. THE INTERIOR SURFACE OF ALL RADIUS ELBOWS SHALL BE MADE ROUND.
2. ALL STANDARD RADIUS ELBOWS CAN BE SUBSTITUTED WITH SHORT RADIUS ELBOWS. ALL SHORT RADIUS ELBOWS SHALL HAVE VANES. VANES SHALL BE CONSTRUCTED, SUPPORTED AND FASTENED AS RECOMMENDED BY SMACNA.
3. FOR R < 1-1/2 W, VANES SHALL BE USED.

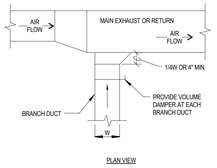
4 DUCTWORK RADIUS ELBOWS
NTS



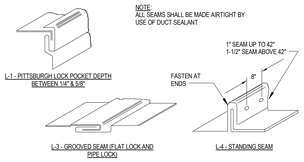
NOTES:

1. ALL VANE ELBOWS SHALL BE CONSTRUCTED AND INSTALLED AS DETAILED BY SMACNA.
2. WHEN W1 DOES NOT EQUAL W2, VANE SHALL BE SINGLE THICKNESS VANE TYPE REGARDLESS OF W DIMENSION.
3. ALL SINGLE THICKNESS VANES SHALL HAVE A 2" RADIUS, 1 1/2" MAXIMUM SPACE BETWEEN VANES AND A 3/4" TRAILING EDGE.
4. WHEN W EQUALS W2 AND W1 IS GREATER THAN 20" VANES SHALL BE DOUBLE VANE TYPE.

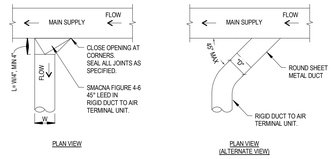
5 DUCTWORK SQUARE VANE ELBOWS
NTS



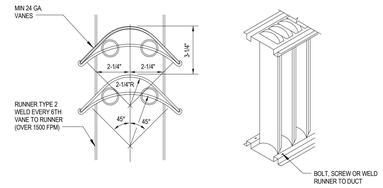
6 EXHAUST/RETURN BRANCH DUCT
NTS



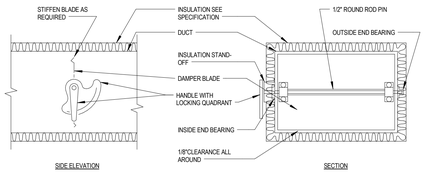
7 LONGITUDINAL SEAMS - RECT. DUCT
NTS



8 SUPPLY DUCT TAKEOFF - AIR TERMINAL UNIT
NTS



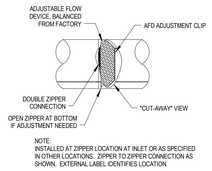
9 VANES & VANE RUNNERS
NTS



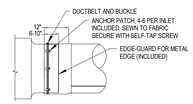
NOTES:

1. DELETE INSULATION STAND-OFF ON DUCTWORK WITHOUT EXTERIOR INSULATION.
2. DETAIL SHOWS SINGLE BLADE DAMPER. DAMPER INSTALLATION SHALL BE SIMILAR FOR MULTI-BLADE DAMPERS & ROUND DAMPERS.

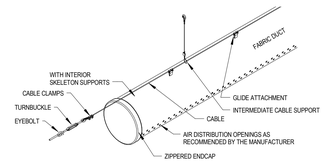
10 VOUME DAMPER
NTS



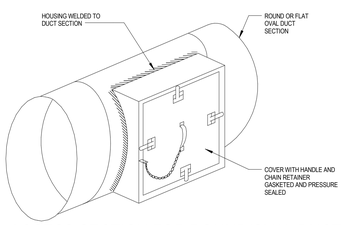
11 FABRIC DUCT - ADJUSTABLE FLOW DEVICE DETAIL
NTS



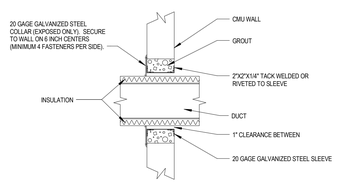
12 FABRIC DUCT - INLET ATTACHMENT DETAIL
NTS



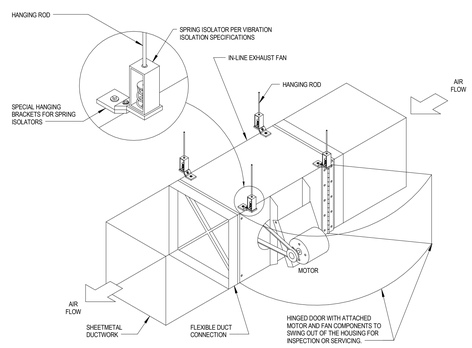
13 FABRIC DUCT - SUSPENSION DETAIL
NTS



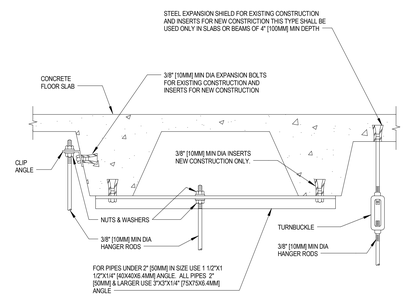
14 ACCESS SECTION FOR ROUND/OVAL DUCT
NTS



15 (NON FIRE-RATED) DUCT PENETRATION THRU WALL DETAIL
NTS



16 IN-LINE EXHAUST FAN
NTS



17 SECURING HANGER RODS IN CONCRETE
NTS

FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

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	Date: 06/24/2015	**Checked:** JKG / **Drawn:** SPL	H502

Office of Construction and Facilities Management

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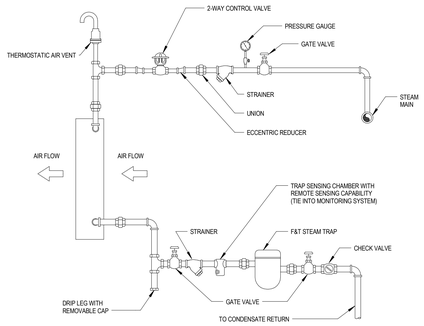


NOTES:

1) SIZE TEMP. CONTROL VALVES FOR 1/3 AND 2/3 OF CAPACITY. #HR. = CFM/970 X TD X 1.08

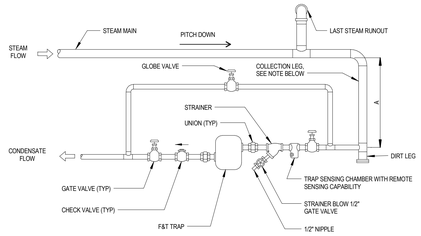
2) SIZE TRAPS FOR MAINS AT SYSTEM PRESSURE WITH A 1.5 SAFETY FACTOR AND MODULATING VALVE TRAPS WITH A 2.5 SAFETY FACTOR.

3) SLOPE PIPING IN DIRECTION OF FLOW 1" IN 40'. WHEN PITCHING AGAINST CONDENSATE FLOW, SLOPE 1/8" PER FOOT BACK TO MAIN.

4) PIPING SHALL BE INSTALLED IN SUCH MANNER THAT IT WILL NOT BLOCK THE SWING OR USE OF ACCESS DOORS OR PANELS; NEITHER SHALL IT BLOCK THE SERVICING OF FILTERS, VALVES, OR EQUIPMENT.

5) TRAP EACH COIL SEPARATELY WHEN INSTALLED IN A BANK OF TWO OR MORE HIGH. ALSO PROVIDE SEPARATE VACUUM BREAKERS.

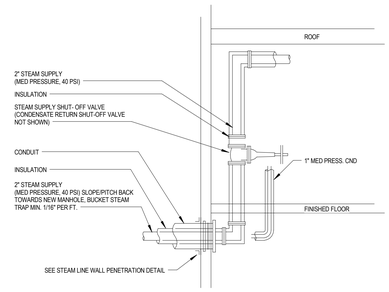
1 INTERIOR STEAM COIL PIPING DETAIL
NTS



NOTE:
DIAMETER OF COLLECTION LEG AND LENGTH A SHALL BE AS FOLLOWS:

STEAM MAIN SIZE	DIAMETER	LENGTH "A"
1/2" - 4"	SAME AS STEAM MAIN	SUPERVISED START UP: 1.5 TIMES MAIN DIA., NEVER SHORTER THAN 8"

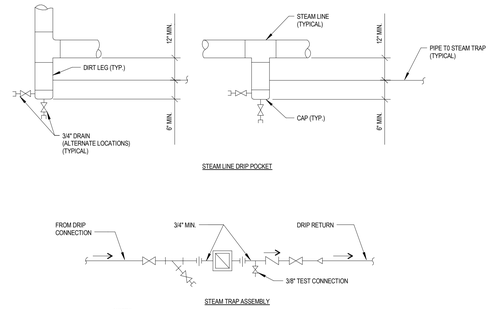
2 LOW PRESSURE END OF MAIN DRIP DETAIL
NTS



NOTE:

CONDENSATE RETURN PIPING IS SHOWN OFF-SET FOR CLARITY

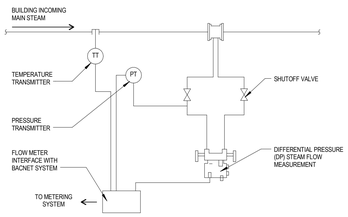
3 STEAM ENTRANCE AT BUILDING SECTION
NTS



NOTES:

1. DRIP POCKET PIPE SIZE SAME AS STEAM MAIN UNLESS OTHERWISE NOTED.

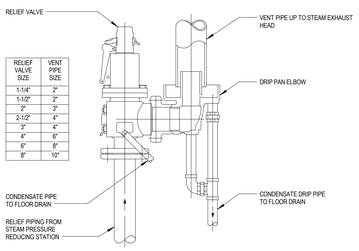
4 STEAM LINE DRIP POCKET TRAP
NTS



NOTES:

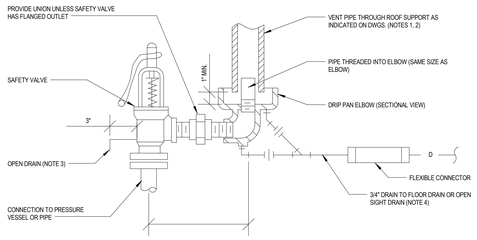
1. MAINTAIN UPSTREAM AND DOWN STREAM DISTANCES RECOMMENDED BY METER MANUFACTURES

5 STEAM METER
NTS



RELIEF VALVE SIZE	VENT PIPE SIZE
1-1/4"	2"
1-1/2"	2"
2"	3"
2-1/2"	4"
3"	4"
4"	6"
6"	8"
8"	10"

6 STEAM RELIEF VALVE
NTS



NOTES:

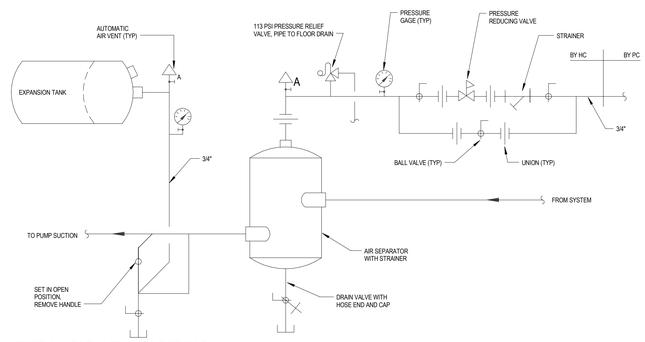
1. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, SIZE THE VENT PIPE SO THAT STEAM IS NOT BLOWN OUT AT THE VENT PIPE ENTRANCE. UTILIZE THE CALCULATION METHOD CONTAINED IN ANSI B31.1 POWER PIPING CODE, APPENDIX II.

2. VENT PIPE SHALL TERMINATE 6' MIN. ABOVE FINISHED ROOF.

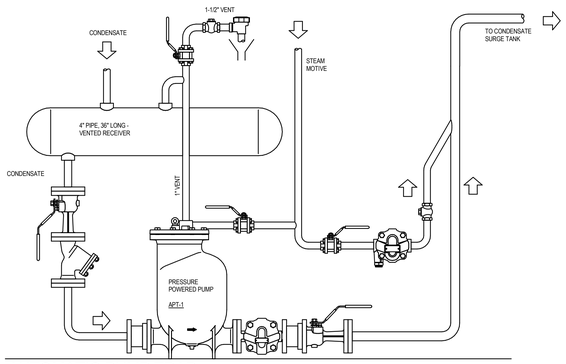
3. DISCHARGE OF DRAIN MUST BE DIRECTED AWAY FROM PLATFORMS OR OTHER AREAS WHICH PERSONNEL MAY OCCUPY.

4. DO NOT CONNECT ANY OTHER DRAIN TO THE DRIP PAN ELBOW DRAIN PIPE.

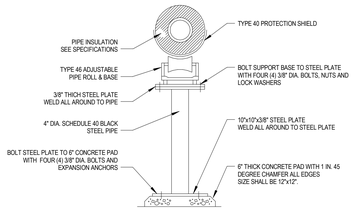
7 STEAM SAFETY VALVE
NTS



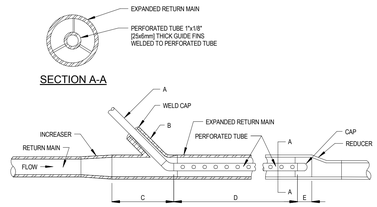
8 EXPANSION TANK PIPING
NTS



9 AUTOMATIC PUMP TRAP
NTS



10 PIPE STANCHION DETAIL
NTS



A	SIZE, TRAP DISCHARGE LINE	1/2" [15mm]	3/4" [20mm]
B	SIZE, 45° WELDING NIPPLE	1" [25mm]	1-1/4" [32mm]
C	LENGTH OF EXPANDED MAIN AHEAD OF TRAP DISCHARGE PIPE	7" [175mm]	7" [175mm]
D	LENGTH OF PERFORATED PIPE	16-1/2" [415mm]	16-1/2" [415mm]
E	LENGTH OF EXPANDED MAIN OF FOLLOWING PERFORATED PIPE	2" [50mm]	2" [50mm]

RETURN MAIN SIZE	UP TO 1-1/2" [40mm]	2" [50mm]	3" [75mm] & OVER
EXPANDED RETURN MAIN SIZE		2-1/2" [65mm]	SAME SIZE

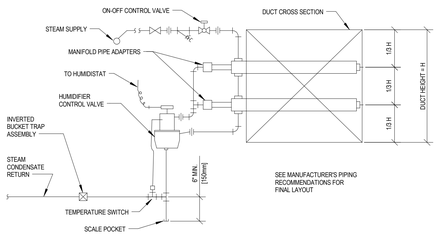
NOTES:

1. 1/2" [15mm] PERFORATED TUBE SHALL HAVE 40 - 1/8" [16mm] DIAMETER HOLES SPACED 1-1/2" [40mm] O.C. IN 4 ROWS.

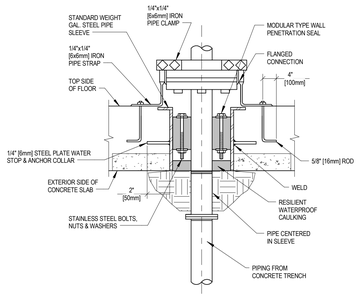
2. 3/4" [20mm] PERFORATED TUBE SHALL HAVE 78 - 1/8" [6mm] DIAMTER HOLES SPACED 1-1/2" [40mm] O.C. IN 6 ROWS.

3. HOLES IN TUBE SHALL BE SPACED EQUALLY AROUND PERIMETER.

11 STEAM TRAP DISCHARGE INTO PUMPED CONDENSATE
NTS



12 STEAM HUMIDIFIER DETAIL
NTS



13 PIPE PENETRATION BELOW GRADE
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FULLY SPRINKLERED CONSTRUCTION DOCUMENTS

Revisions:	Date

CONSULTANTS:

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AE Works Project Number: 13025

Drawing Title: HVAC DETAILS

Approved: Project Director

Project Title: NEW WAREHOUSE

Location: 510 BUTLER AVENUE MARTINSBURG, WV 25405

Date: 06/24/2015 | Checked: JKG | Drawn: SPL

Project Number: # 613-116

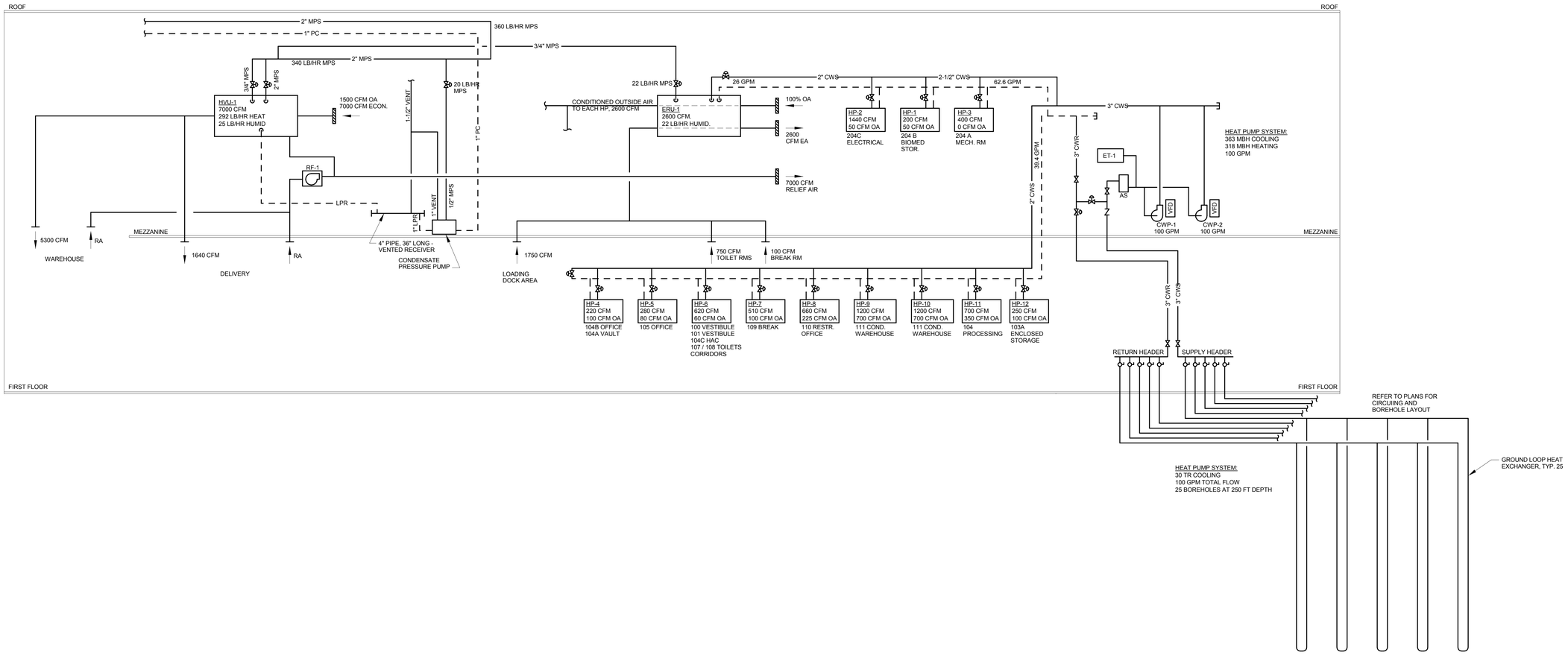
Building Number: #519

Drawing Number: H503

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231



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AE Works Project Number: 13025

Drawing Title: HVAC RISER DIAGRAM

Approved: Project Director

Project Title: NEW WAREHOUSE

Location: 510 BUTLER AVENUE MARTINSBURG, WV 25405

Date: 06/24/2015 | Checked: JKG | Drawn: SPL

Project Number: # 613-116

Building Number: #519

Drawing Number: H601

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231

ENERGY RECOVERY UNIT (WITH HEAT PUMP) SCHEDULE

MARK	SERVICE	WIDTH (IN)	LENGTH (IN)	HEIGHT (IN)	MAX. WEIGHT (LBS)	OUTSIDE AIR SUPPLY FAN AIRFLOW (ACFM)	ESP ("WC)	TSP ("WC)	BHP	HP	VFD (Y/N)	OUTSIDE AIR FILTER PRE-FILTER SECTION PD	MERV	TYPE	FILTER SECTION PD	MERV	TYPE	EXHAUST FAN AIRFLOW (ACFM)	ESP ("WC)	TSP ("WC)	BHP	HP	VFD (Y/N)	EXHAUST AIR FILTER THICK (IN)	MERV	AVG. PD ("WC)	HEATING EAT (DB °F)	LAT (DB °F)	TOT. CAP. (MBH)	EWT (°F)	STEAM HUMIDIFIER CFM	CAP. LB/HR	PRESS PSIG	LVG. RH (%)	COOLING / DEHUMIDIFICATION TOT. CAP. (MBH)	SEN. CAP. (MBH)	EAT (DB/WB °F)	LAT (DB/WB °F)	HOT GAS REHEAT LAT (DB/WB °F)	EWT (°F)	SOURCE WATER FLOW (GPM)	WPD (FT)	THR TO LOOP (MBH)
ERU-1	HP VENTIALTION	68	115	64	2800	2600	1.5	3.1	1.9	3.0	Y	0.5"	7	4" ANGLED	1.5"	13	4" ANGLED	2600	1.5	2.1	1.6	2.0	Y	4	7	0.75	55	72	64.6	60	2600	22.0	40	40	113.0	78.6	77 / 65	50 / 50	72 / 59	90	26.0	6	140.4

NOTES:
1. PROVIDE WITH DOUBLE WALL CONSTRUCTION THROUGHOUT WITH SOLID INNER LINER.
2. STANDARD COLOR UNIT.
3. COMBINATION STARTER / DISCONNECT SWITCH BY MECHANICAL CONTRACTOR, WIRED BY DIV. 26.
4. SINGLE POINT ELECTRICAL CONNECTION.
5. PROVIDE LIGHTS / RECEPTACLES PRE-WIRED WITH NECESSARY TRANSFORMERS.
6. 2-WAY MOTOR OPERATED CONTROL VALVE TO CLOSE WHEN COMPRESSOR IS OFF.
7. FREEZESTAT
8. 40% PROPYLENE GLYCOL.

(SEE CON'T BELOW)

ENERGY RECOVERY UNIT SCHEDULE (CON'T)

MARK	AIR-TO-AIR ENTHALPY WHEEL HEAT EXCHANGER SUMMER OPERATION OUTSIDE AIR EAT (°F)	SUPPLY AIR LAT (°F)	RETURN AIR EAT (°F)	EXHAUST AIR LAT (°F)	EFF (%)	WINTER OPERATION OUTSIDE AIR EAT (°F)	SUPPLY AIR LAT (°F)	RETURN AIR EAT (°F)	EXHAUST AIR LAT (°F)	ELECTRICAL VOLTAGE	PH	MCA	MOCP	BASIS OF DESIGN MANUF.	MODEL
ERU-1	91 / 73	77 / 62	75 / 68	78 / 71	75	0 / -1.5	55 / 43	70 / 51	21 / 18	480	3	23	25	DESERT AIRE	QS08

SPLIT SYSTEM - INDOOR UNIT SCHEDULE

TAG	SERVICE	COOLING CAPACITY (MBH)	SENSIBLE CAPACITY (MBH)	HEATING CAPACITY (MBH)	FILTER TYPE	AIRFLOW HIGH / LOW (CFM)	SOUND RATING (dB-A)	ELECTRICAL VOLT	PH	MCA	MAX. FUSE	BASIS OF DESIGN MANUF.	MODEL	UNIT WEIGHT (LBS)
AC-1	TELECOM ROOM	24	18	---	REUSABLE	635 / 470	43	208	1	0.4	15	DAIKIN	FAQ24PVJU	40

NOTES:
1. REMOTE WIRELESS CONTROLLER.
2. INDOOR UNIT POWER TO BE FED FROM OUTDOOR UNIT.

WATER SOURCE HEAT PUMP SCHEDULE (HORIZONTAL)

MARK	SERVICE	SUPPLY FAN AIRFLOW (ACFM) TOTAL	MIN OA	ESP ("WC)	HP	HEATING EAT (DB °F)	LAT (DB °F)	TOT. CAP. (MBH)	EWT (°F)	COOLING TOT. CAP. (MBH)	SEN. CAP. (MBH)	EAT (DB/WB °F)	LAT (DB/WB °F)	EWT (°F)	SOURCE WATER FLOW (GPM)	WPD (FT)	MAX. WEIGHT (LBS)	ELECTRICAL VOLTAGE	PH	MCA	MOCP	FILTER TYPE	NOTES
HP-1	204 B	200	50	0.75	1/2	65	90	9.1	45 - 60	6.8	5.1	76 / 66	57 / 56	90	4.5	8	150	208	1	2.9	15	MERV 13	EMERGENCY POWER
HP-2	204C	1440	50	0.75	1/2	65	90	41.4	45 - 60	37.5	32.7	76 / 66	57 / 56	90	10.5	8	150	480	3	5.4	15	MERV 13	
HP-3	204 A	400	0	0.75	1/10	65	90	11.4	45 - 60	9.9	6.8	76 / 66	57 / 56	90	2.6	8	150	208	1	3.4	15	MERV 13	
HP-4	104 A / B	220	100	0.75	1/10	65	90	9.4	45 - 60	7.1	5.1	76 / 66	57 / 56	90	1.8	8	150	208	1	2.4	15	MERV 13	
HP-5	105	280	80	0.75	1/10	65	90	9.5	45 - 60	8.2	6.0	76 / 66	57 / 56	90	1.8	8	150	208	1	2.4	15	MERV 13	
HP-6	100, 101, 104C, 107, 108	620	60	0.75	1/2	65	90	17.4	45 - 60	16.1	12.0	76 / 66	57 / 56	90	4.5	8	150	208	1	4.3	15	MERV 13	
HP-7	109	510	100	0.75	1/2	65	90	17.1	45 - 60	15.1	12.0	76 / 66	57 / 56	90	4.5	8	150	208	1	4.3	15	MERV 13	
HP-8	110	660	225	0.75	1/2	65	90	17.9	45 - 60	19.4	15.2	76 / 66	57 / 56	90	4.5	8	150	208	1	3.9	15	MERV 13	
HP-9	111	1200	700	0.75	1/2	65	90	43.8	45 - 60	79.4	50.0	76 / 66	57 / 56	90	10.0	8	150	480	3	11.1	15	MERV 13	
HP-10	111	1200	700	0.75	1/2	65	90	43.8	45 - 60	79.4	50.0	76 / 66	57 / 56	90	10.0	8	150	480	3	11.1	15	MERV 13	
HP-11	104	700	350	0.75	1/2	65	90	22.4	45 - 60	20.2	15.5	76 / 66	57 / 56	90	5.0	8	150	208	1	5.3	15	MERV 13	
HP-12	103A	250	100	0.75	1/10	65	90	9.5	45 - 60	7.3	4.5	76 / 66	57 / 56	90	1.8	8	150	208	1	2.4	15	MERV 13	

NOTES:
1. WATERSIDE ECONOMIZER
2. INTEGRAL COMBINATION STARTER / DISCONNECT SWITCHES BY MECHANICAL CONTRACTOR, WIRED BY DIV. 26.
3. HOSE KITS WITH AUTOMATIC ISOLATION VALVES.
4. 2-WAY MOTOR OPERATED CONTROL VALVE TO CLOSE WHEN COMPRESSOR IS OFF
5. STAINLESS STEEL DRAIN PAN
6. DDC CONTROLLER
7. MUST MEET ENERGY STAR CRITERIA FOR EER AND COP.
8. HEATING EWT IS NORMALLY 60 DEG. 45 DEG IS EXPECTED FIRST WINTER OPERATION.
9. 40% PROPYLENE GLYCOL.
10. ELECTRIC SUPPLEMENTAL EMERGENCY HEAT.

SPLIT SYSTEM - CONDENSER UNIT SCHEDULE

TAG NUMBER	SERVICE	NOMINAL CAPACITY (TONS)	DESIGN AMBIENT (DEG F)	FAN QTY.	WEIGHT (LBS)	REFRIGERANT TYPE	COMP. TYPE	ELECTRICAL VOLTS/ PHASE	MCA	MAX FUSE	BASIS OF DESIGN MANUF.	MODEL
CU-1	AC-1	2	95	1	175	R-410a	INVERTER	208/3	16.5	20	DAIKIN	RZR24PVJU

NOTES:
1. FACTORY INSTALLED/WIRED LOCKING DISCONNECT SWITCH, FAN SPEED CONTROL.
2. FACTORY STANDARD WARRANTY
3. PROVIDE SUPPORT SYSTEM TO RAISE THE UNIT 12" ABOVE GRADE
4. LOW AMBIENT CONTROL
5. PROVIDE CONTROL MODULE FOR CONNECTION TO DDC SYSTEM

HEATING AND VENTILATION UNIT SCHEDULE

MARK	UNIT DIMENSIONS LENGTH	WIDTH	HEIGHT	FACE VEL.	WEIGHT	PRE-FILTER SECTION PD	MERV	TYPE	FILTER SECTION PD	MERV	TYPE	STEAM HEATING COIL CFM	PD	EAT DB	LAT DB	MBH	PSIG	LB/HR	STEAM HUMIDIFIER CFM	LB/HR	PSIG	QTY. TUBES	SUPPLY FAN QTY	MAX. CFM	O.A. CFM	E.S.P.(w.g.)	HP	BHP	RPM	UNIT ELECTRICAL DATA VOLT	PH	FLA	MOCP
HVU-1	123	62	54	390 FPM	2800 LB	0.5"	7	4" ANGLED	1.5"	13	4" ANGLED	7000	0.4"	54 °F	90 °F	272	40	302	7000	35.0	40	6	1	7000	1500	2.0	7.5	6.8	3166	480	3	17.9	20

NOTES:
1. VARIABLE FREQUENCY DRIVE (WIRED BY EC), WITH HAND ON/OFF SWITCH (MANUAL BYPASS).
2. UNIT MOUNTED COMBINATION STARTER / DISCONNECT (WIRED BY EC).
3. REFER TO DRAWINGS FOR COIL ACCESS SIDE.
4. INTERNAL CONTROLLER TO REPORT TO STATION DDC SYSTEM FOR MONITORING AND ALARMING.
5. SPRING ISOLATORS ON FAN BASE

DIFFUSER, REGISTER, AND GRILLE SCHEDULE

TAG	SERVICE	TYPE	AIRFLOW RANGE	NECK SIZE (IN)	INTERNAL DAMPER	MATERIAL	BASIS OF DESIGN MANUF.	MODEL
SD-1	SUPPLY	24x24 LAY-IN	0-120	6"	YES	STEEL	TITUS ø	OMNI
SD-2	SUPPLY	24x24 LAY-IN	120-210	8"	YES	STEEL	TITUS ø	OMNI
SD-3	SUPPLY	24x24 LAY-IN	210-350	10"	YES	STEEL	TITUS ø	OMNI
SD-4	SUPPLY	24x24 LAY-IN	350-600	12"	YES	STEEL	TITUS ø	OMNI
SG-1	SUPPLY	DUCT MTD / SIDEWALL	0-150	12X8	YES	ALUMINUM	TITUS	300 FL
SG-2	SUPPLY	DUCT MTD / SIDEWALL	151-300	12X8	YES	ALUMINUM	TITUS	300 FL
SG-3	SUPPLY	DUCT MTD / SIDEWALL	301-500	12X10	YES	ALUMINUM	TITUS	300 FL
SG-4	SUPPLY	SIDEWALL	501-1500	24x20	YES	ALUMINUM	TITUS	300 FL
RG-1	RETURN	24x24 LAY-IN	0-1400	SEE DWG	NO	ALUMINUM	TITUS	50F
RG-2	RETURN	DUCT MTD / SIDEWALL	0-500	10x14 / 12x8	NO	ALUMINUM	TITUS	350 FL
RG-3	RETURN	24x24 LAY-IN	500-1500	24x20	NO	ALUMINUM	TITUS	350 FL
RG-4	RETURN	DUCT MTD / SIDEWALL	500-1500	24x12 / 12x24	NO	ALUMINUM	TITUS	350 FL
EG-1	EXHAUST	LAY-IN	0-200	10x10	YES	ALUMINUM	TITUS	350 FL
EG-2	EXHAUST	LAY-IN	201-400	12x12	YES	ALUMINUM	TITUS	350 FL
EG-3	EXHAUST	DUCT MTD / SIDEWALL	0-300	SEE DWG	YES	ALUMINUM	TITUS	350 FL

NOTES:
1. VERIFY LOCATION WITH LIGHTS, SPRINKLER HEADS, CURTAIN TRACKS, ETC. ON REFLECTED CEILING PLAN BY MC.
2. DUCT MOUNTED GRILLES TO HAVE 0 DEG DEFLECTION
3. COORDINATE AIR DEVICE FRAME TYPE AND MOUNTING WITH WALL AND CEILING TYPES INDICATED ON ARCHITECTURAL PLANS.

FAN SCHEDULE

MARK	TYPE/SERVICE	BALANCED CFM	SP	HP	ELECTRICAL VOLTAGE	PHASE	AMP	MAX. FUSE	FAN RPM	NOTES	BASIS OF DESIGN MANUF.	MODEL
EF-1	INLINE / EXHAUST	200	0.5	1/6	120	1	7.2	15	1576	1,2,3,4,5,6,7	GREENHECK	BSQ-70-3
EF-2	INLINE / EXHAUST	2000	0.5	3/4	120	1	13.8	20	1664	1	GREENHECK	SQ-130-VG
RF-1	INLINE / RELIEF	7000	0.75	3	480	3	3.8	15	845	1	GREENHECK	TCB-2-24-30

NOTES:
1. INTEGRAL COMBINATION STARTER / DISCONNECT SWITCH BY MECHANICAL CONTRACTOR, WIRED BY DIV. 26.
2. SPARK PROOF CONSTRUCTION
3. EXPLOSION PROOF MOTOR
4. WALL SWITCH
5. INTEGRAL BACKDRAFT DAMPER
6. LOCAL AND REMOTE ALARM TO INDICATE FAN FAILURE
7. EMERGENCY POWER

AIR CURTAIN SCHEDULE

MARK	UNIT DIMENSIONS NOZZLE WIDTH	DOOR HEIGHT	WEIGHT	SUPPLY FAN QTY	MAX. CFM	NOZZLE CFM	HP	ELECTRICAL DATA VOLT	PH	HZ	AMP	BASIS OF DESIGN MANUF.	MODEL
AC-1	84"	8'	180 LB	2	10050	6555	1/2 EA	480	3	60	2.8	BERNER	VSA2084A
AC-2	84"	8'	180 LB	2	10050	6555	1/2 EA	480	3	60	2.8	BERNER	VSA2084A
AC-3	84"	8'	180 LB	2	10050	6555	1/2 EA	480	3	60	2.8	BERNER	VSA2084A
AC-4	84"	8'	180 LB	2	10050	6555	1/2 EA	480	3	60	2.8	BERNER	VSA2084A
AC-5	120"	14'	250 LB	2	15657	10177	1 EA	480	3	60	6.4	BERNER	VSB2120A

NOTES:
1. MOUNTING EXTENSION FRAME. LOCATE UNIT BELOW DOOR PATH.
2. UNIT MOUNTED COMBINATION STARTER / DISCONNECT (WIRED BY EC).

AUTOMATIC PUMP TRAP SCHEDULE

MARK	SERVICE	STEAM MOTIVE (PSIG)	VERT. LIFT (FT)	BACK PRES. (PSIG)	COND LOAD (LB/H)	BASIS OF DESIGN MANUF.	MODEL
APT-1	HVU-1 LPR	40	20	30	325	SPIRAX SARCO	PTC 2"x2"

NOTES:
1. HOUSEKEEPING PAD

ELECTRIC UNIT HEATER SCHEDULE

MARK	SERVICE	TYPE	CAPACITY (BTU/H)	CAPACITY (kW)	STEPS	FAN CFM	ELECTRICAL DATA VOLT	PH	MCA
EUH-1	VESTIBULE 103A	RECESSED WALL	13,650	4.0	1	400	208	1	19.2
EUH-2	COND. STORAGE 110	RECESSED WALL	13,650	4.0	1	400	208	1	19.2

NOTES:
1. INTEGRAL THERMOSTAT
2. OVERHEATING MANUAL RESET SAFETY LIMIT CONTROL
3. INTEGRAL DISCONNECT SWITCH

PUMP SCHEDULE

MARK	SERVICE	TYPE	GPM	HEAD (FT)	RPM	HP	ELECTRICAL DATA VOLT	PH	BASIS OF DESIGN MANUF.	MODEL
CWP-1	CONDENSER LOOP	INLINE	100	85	3450	5	480	3	B&G	2AAC
CWP-2	CONDENSER LOOP	INLINE	100	85	3450	5	480	3	B&G	2AAC

NOTES:
1. SUPPORT PUMPS FROM STRUCTURE, NOT PIPING.
2. COMBINATION STARTER / DISCONNECT SWITCH.
3. VARIABLE FREQUENCY DRIVE
4. PUMPS ARE 100% REDUNDANT. ROTATE WEEKLY.
5. EMERGENCY POWER
6. 40% PROPYLENE GLYCOL.

FULLY SPRINKLERED
CONSTRUCTION DOCUMENTS

Revisions: | Date

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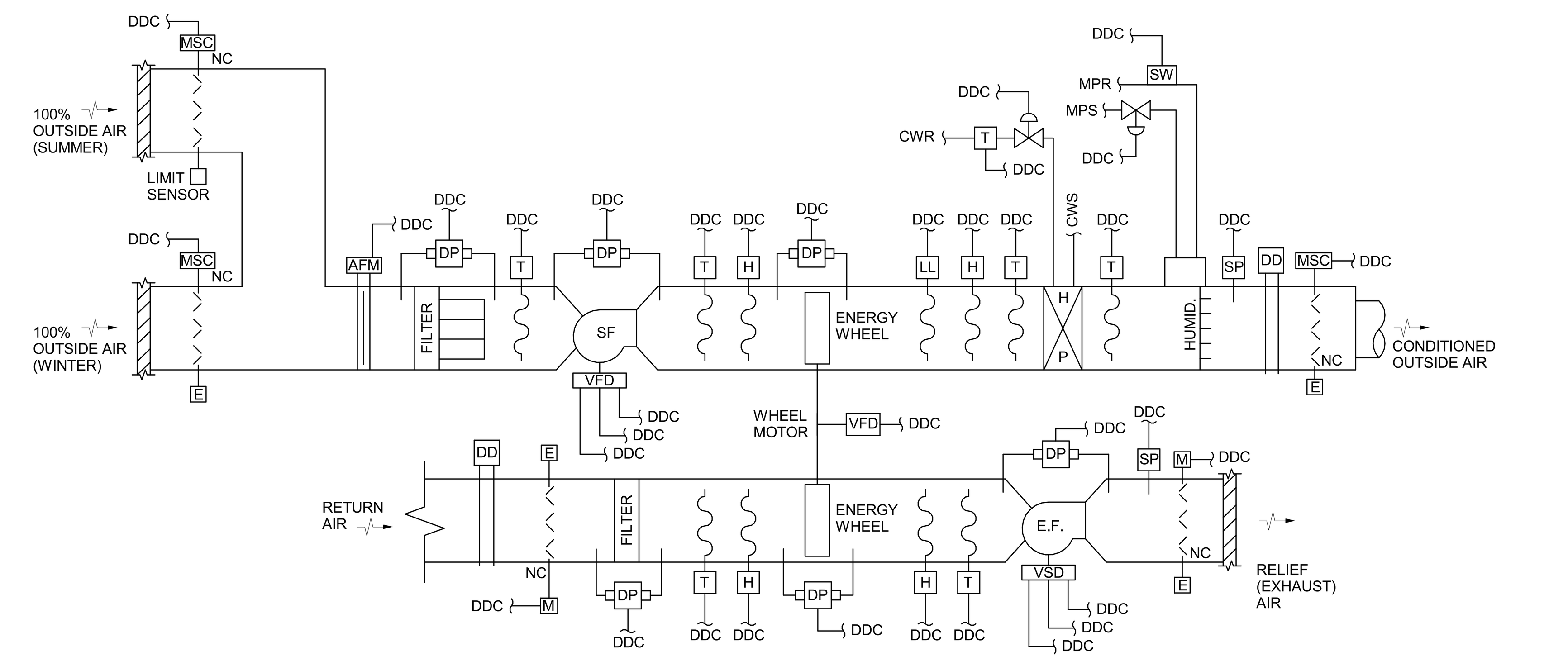


CONTROL DIAGRAM ABBREVIATIONS:

AFM	AIRFLOW MEASUREMENT STATION
BMS	BUILDING MANAGEMENT SYSTEM
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
DD	DUCT MOUNTED SMOKE DETECTOR
DDC	DIRECT DIGITAL CONTROLS (WIRE TO PANEL)
DP	DIFFERENTIAL PRESSURE
E	END SWITCH
EF	EXHAUST FAN
H	HUMIDITY SENSOR
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
LL	LOW LIMIT SENSOR
M	MOTORIZED DAMPER
MSC	MOTORIZED DAMPER - FIRE/SMOKE
MPCR	MEDIUM PRESSURE CONDENSATE RETURN
MPS	MEDIUM PRESSURE STEAM
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
SF	SUPPLY FAN
SP	STATIC PRESSURE
SW	TEMPERATURE SWITCH
T	TEMPERATURE SENSOR
VSD	VARIABLE SPEED DRIVE

ERU-1 IS 100% OUTSIDE AIR. ONCE ENABLED, ERU-1'S SUPPLY AND EXHAUST FAN SHALL RUN CONTINUOUSLY. OUTSIDE AIR DAMPER WILL OPEN FULLY. PROVIDE ACTUATOR FEEDBACK TO CONFIRM DAMPER OPEN POSITION AND ENABLE FAN CONTROL CIRCUIT. WHEN THE SUPPLY AIR FAN IS OFF, THE OUTSIDE AIR DAMPER SHALL BE CLOSED, THE HEAT PUMP CONTROL VALVE SHALL BE CLOSED, THE UNIT COMPRESSOR SHALL BE OFF AND THE EXHAUST FAN AND ENERGY RECOVERY WHEEL SHALL BE OFF.

BASIC CONTROL REQUIREMENTS
THE FOLLOWING CONTROL LOGIC ROUTINES SHALL BE INCLUDED:

1. START/STOP. ERU-1 AND CONTROLS SHALL BE ENABLED / DISABLED BY THE BAS. UNIT CONTROLS SHALL OPERATE AUTOMATICALLY WHEN ENERGIZED.
2. NORMALLY ON/OFF. THE NORMALLY OFF (DISABLED) STATUS SHALL BE: FANS OFF, EXHAUST AIR DAMPERCLOSE, OUTSIDE AIR DAMPER CLOSED, CONDENSER WATER VALVE CLOSED, COMPRESSOR OFF. THE NORMALLY ON STATUS SHALL BE: FANS ON AND OUTSIDE AIR DAMPERS ENABLED, CONDENSER WATER VALVE ENABLED, COMPRESSOR ENABLED.
3. OUTDOOR AIR DAMPER ACTUATORS: UNIT TO HAVE 2-POSITION DAMPER ACTUATORS, WITH SPRING RETURN CLOSED SO THEY WILL CLOSE AUTOMATICALLY ON LOSS OF UTILITY OR CONTROL POWER.
4. FIRE ALARM SHUTDOWN RELAY: A RELAY FROM THE FIRE ALARM SYSTEM SHALL INITIATE A CONTACTOR IN THE ERU FAN STARTER OR VFD WHICH TURNS OFF THE ERU FANS UPON AN ALARM SIGNAL FROM THE FIRE ALARM SYSTEM.
5. DUCT SMOKE DETECTORS: DIVISION 23 SHALL PROVIDE DUCT SMOKE DETECTORS FOR DIVISION 26 TO INSTALL IN THE DUCT. DIVISION 26 SHALL THEN WIRE THE DEVICES TO THE FIRE ALARM SYSTEM.
6. INTERCONNECTS: ASSOCIATED EXHAUST AND SUPPLY FANS SHALL BE STARTED AND STOPPED THROUGH CONTROL POWER FROM THE LOAD SIDE TRANSFORMER FOR THEIR RESPECTIVE AIR HANDLING SYSTEMS. IF SUPPLY FAN FAILS PROOF OF FLOW, THEN THE ASSOCIATED EXHAUST FANS SHALL TURN OFF AND ZONE DAMPERS SHALL LOSE POWER AND SPRING CLOSED.
7. HEATING MODE: WHEN THE SUPPLY AIR TEMPERATURE FALLS BELOW THE ACTIVE HEATING SET POINT, THE CONTROLLER SHALL ENABLE THE HEATING SEQUENCE. ONCE THE TEMPERATURE RISES ABOVE THE SETPOINT PLUS THE DEADBAND (2 DEGREES (ADJ)) THEN THE UNIT WILL ENTER DEADBAND MODE.
8. COOLING MODE: WHEN THE SUPPLY AIR TEMPERATURE RISES ABOVE THE COOLING SET POINT, THE CONTROLLER SHALL SEQUENCE THE STAGES OF COOLING TO MAINTAIN SPACE TEMPERATURE SET POINT. ONCE THE TEMPERATURE FALLS BELOW THE SETPOINT MINUS THE DEADBAND (5 DEGREES (ADJ)) THEN THE UNIT WILL ENTER DEADBAND MODE.
9. DEADBAND MODE: IN DEADBAND MODE, BETWEEN A HIGH AND LOW SETPOINT, NEITHER HEATING NOR COOLING SHALL BE ENABLED.

GENERAL ENERGY RECOVERY CONTROL SEQUENCES
THE MAIN GRAPHICS PAGE FOR THE ERU SHALL INCLUDE ALL PHYSICAL EQUIPMENT, VIRTUAL MODES OF OPERATION, VARIABLE VALUES, ETC. REMOTE SYSTEM DATA SHALL BE PULLED IN AND DISPLAYED ALONG WITH LOCAL ALARMS INCLUDING THE FOLLOWING:

1. OUTSIDE AIR TEMPERATURE FROM REMOTE SENSOR
2. OUTSIDE AIR HUMIDITY FROM REMOTE SENSOR
3. OUTSIDE AIR ENTHALPY (VIRTUAL POINT CALCULATED USING OUTSIDE AIR TEMPERATURE AND HUMIDITY)
4. LOCAL ALARMS: LOW TEMPERATURE, EQUIPMENT FAILURE, HIGH PRESSURE, ETC.

CONTROL SEQUENCE - SUPPLY FAN:
SUPPLY FAN VFD SPEED CONTROL FOR CONSTANT VOLUME. A DUCT MOUNTED DIFFERENTIAL STATIC PRESSURE SENSOR SHALL PROVIDE THE INPUT SIGNAL TO THE VFD TO CONTROL THE FAN SPEED TO MAINTAIN THE DUCT STATIC PRESSURE SETPOINT. THE PURPOSE OF THIS CONTROL IS TO MAINTAIN CONSTANT VOLUME AS THE FILTERS LOAD UP OVER TIME AND PROVIDE AN ADDITIONAL STATIC PRESSURE DROP ON THE FAN WHICH WOULD OTHERWISE REDUCE SYSTEM AIR VOLUME. COORDINATE WITH TAB CONTRACTOR TO SET UP AND ADJUST FOR PROPER DUCT STATIC PRESSURE SETPOINT - USING THE HIGHER SIMULATED 'DIRTY' FILTER PRESSURE DROPS. THE LOCATION OF THE STATIC PRESSURE SENSOR SHALL BE WITHIN 10 FEET OF THE ERU-1 DISCHARGE, IN A NON-TURBULENT ZONE (NOT AN ELBOW), AND ACCESSIBLE FOR CALIBRATION AND SERVICING (IT DOES NOT NEED TO BE 2/3 DOWNSTREAM LIKE IN A VAV SYSTEM). PROVIDE THE FOLLOWING ADDITIONAL CONTROL CONNECTIONS: BINARY INPUT FOR VFD ALARM, ANALOG INPUT FOR VFD SPEED MONITORING, ANALOG INPUT FOR VFD KW POWER CONSUMPTION. THE KW POWER CONSUMPTION SHALL BE USED FOR PROOF OF FLOW.
LOCAL CONTROL: THE SUPPLY AIR FAN CAN BE STARTED AT THE DDC CONTROL PANEL BY INDEXING THE H-O-A SWITCH TO THE HAND POSITION. WHEN THE SUPPLY AIR FAN IS ENERGIZED, THE EXHAUST AIR FAN SHALL BE ENERGIZED.

REMOTE CONTROL: THE SUPPLY AIR FAN SHALL BE PROGRAMMED TO BE STARTED OR STOPPED FROM EITHER THE BMS CONTROL PANEL OR THE CENTRAL DDC CONTROL PANEL WHEN THE H-O-A SWITCH IS IN THE AUTOMATIC POSITION. THE SUPPLY AIR FAN SHALL ENERGIZE AND THE EXHAUST AIR FAN SHALL BE PLACED UNDER CONTROL OF THE LOCAL DDC CONTROL PANEL. THE NORMALLY CLOSED OUTSIDE AIR DAMPER SHALL OPEN VIA ITS DAMPER ACTUATOR, AND BE ALLOWED TO OPERATE VIA THE DAMPER ACTUATOR UNDER CONTROL OF THE DDC LOCAL CONTROL PANEL. IF THE SUPPLY FAN OR EXHAUST FAN FAILS TO START AFTER 20 SECONDS, A SOFTWARE INITIATED ALARM WILL BE SENT TO THE LOCAL DDC CONTROL PANEL AND THE CENTRAL DDC CONTROL PANEL.

CONTROL SEQUENCE - EXHAUST FAN:
EXHAUST FAN SPEED CONTROL FOR CONSTANT VOLUME. SINCE THE SYSTEM IS CV, THE STATIC PRESSURE IN THE EXHAUST DUCT SHOULD BE KEPT AT A STEADY SETPOINT. A EXHAUST DUCT MOUNTED DIFFERENTIAL STATIC PRESSURE SENSOR SHALL PROVIDE THE INPUT SIGNAL TO THE VFD TO CONTROL THE FAN SPEED TO MAINTAIN THE DUCT STATIC PRESSURE SETPOINT. COORDINATE WITH TAB CONTRACTOR TO SET UP AND ADJUST FOR PROPER DUCT STATIC PRESSURE SETPOINT. THE LOCATION OF THE STATIC PRESSURE SENSOR SHALL BE WITHIN 10 FEET OF THE EXHAUST CONNECTION TO THE UNIT, IN A NON-TURBULENT ZONE (NOT AN ELBOW), AND ACCESSIBLE FOR CALIBRATION AND SERVICING. THE FAN SHOULD BE CONTROLLED USING A DUCT STATIC PRESSURE SENSOR. PROVIDE THE FOLLOWING ADDITIONAL CONTROL CONNECTIONS: BINARY INPUT FOR VFD ALARM, ANALOG INPUT FOR VFD SPEED MONITORING, ANALOG INPUT FOR VFD KW POWER CONSUMPTION. THE KW POWER CONSUMPTION SHALL BE USED FOR PROOF OF FLOW.

LOCAL CONTROL: THE EXHAUST FAN CAN BE STARTED AT THE BMS CONTROL PANEL BY INDEXING THE H-O-A SWITCH TO THE HAND POSITION. THIS WILL FUNCTION TO FIRST OPEN THE OUTDOOR AIR DAMPER VIA DAMPER ACTUATOR. WHEN THE OUTDOOR AIR DAMPER HAS BEEN PROVEN FULL OPEN VIA LIMIT SWITCH, THE EXHAUST FAN WILL START. ONCE THE EXHAUST FAN HAS STARTED, THE SUPPLY FAN SHALL START, AND THE ENERGY RECOVERY WHEEL SHALL OPERATE.

REMOTE CONTROL: THE EXHAUST FAN SHALL BE PROGRAMMED TO BE STARTED OR STOPPED FROM THE BMS CONTROL PANEL WHEN THE EXHAUST FAN H-O-A SWITCH IS IN THE AUTOMATIC POSITION. WHEN THE EXHAUST FAN START SIGNAL IS INITIATED FROM THE DDC, THE OUTDOOR AIR DAMPER WILL BE INDEXED OPEN. WHEN THE OUTDOOR AIR DAMPER HAD PROVEN FULL OPEN VIA ITS DAMPER LIMIT SWITCH, THE EXHAUST FAN WILL START. IF THE EXHAUST FAN FAILS TO START AFTER 20 SECONDS, A SOFTWARE INITIATED ALARM WILL BE SENT TO THE LOCAL DDC CONTROL PANEL AND CENTRAL DC CONTROL PANEL.

ALARM SHUTDOWN:
IN ADDITION TO THE ABOVE, AN ALARM SHALL BE INITIATED AT THE LOCAL DDC AND CENTRAL DDC PANEL AT ANY TIME ANY OF THE FOLLOWING ALARM CONDITIONS ARE ACTIVATED. UPON UNIT SHUTDOWN, THE ASSOCIATED CONTROL DAMPERS SHALL SPRING CLOSED.

FREEZE PROTECTION - FREEZESTAT ALARM. A LOW TEMPERATURE CUTOFF TYPE SWITCH SHALL BE USED TO STOP THE FAN WHEN THE SERPENTINE SENSING ELEMENT SENSES TEMPERATURES BELOW THE SETPOINT. THE SETPOINT SHALL INITIALLY BE 35°F. THE DEVICE SHALL BE MANUALLY RESET. THE SENSING ELEMENT SHALL NOT BE LESS THAN ONE LINEAR FOOT PER SQUARE FOOT OF COIL SURFACE AREA. THE SENSING ELEMENT SHALL BE INSTALLED ON THE DOWNSTREAM SIDE OF THE HEAT RECOVERY WHEEL.

HIGH STATIC ALARM: IF A STATIC PRESSURE OF 0.5 IN W.G ABOVE NORMAL CONTROL AND/OR DESIGN STATIC PRESSURE EXISTS AT ANY ONE OF THE HIGH LIMIT STATIC PRESSURE SENSORS, AN ALARM SHALL BE INITIATED AT THE LOCAL DDC CONTROL PANEL. THE SUPPLY FAN AND EXHAUST FAN SHALL STOP.

LOW SUPPLY DUCT STATIC PRESSURE ALARM: WHEN THE FAN IS ON AND THE MEASURED SUPPLY DUCT STATIC PRESSURE IS MORE THAN 0.2" BELOW THE SETPOINT FOR MORE THAN 30 MINUTES.

SMOKE ALARM: IF SMOKE IS SENSED AT ANY DUCT MOUNTED SMOKE DETECTOR, THE SUPPLY FAN WILL SHUT DOWN AND ITS OUTSIDE AIR DAMPERS SHALL CLOSE. THE EXHAUST FAN SHALL REMAIN OPERATING TO EVACUATE ANY SMOKE. THE HVU UNIT SHALL ALSO SHUT DOWN.

DUCT SMOKE DETECTORS COMPATIBLE WITH THE FIRE ALARM SYSTEM SHALL BE FURNISHED BY ELECTRICAL. INSTALL DUCT SMOKE DETECTORS IN THE SUPPLY AND RETURN DUCT (PRIOR TO ANY BRANCH DUCTS) OF THE ENERGY RECOVERY UNIT.

FIRE ALARM SHUTDOWN. ELECTRICAL SHALL PROVIDE AN ADDRESSABLE FIRE ALARM SHUT DOWN RELAY TO BE INSTALLED IN THE ERU STARTER CONTROL CIRCUIT WHICH SHUTS DOWN THE ERU SUPPLY FAN ON A CALL FROM THE FIRE ALARM SYSTEM. WHEN THE FIRE ALARM SYSTEM COMMANDS THE ERU TO SHUT DOWN, ASSOCIATED DAMPERS SHALL LOSE POWER AND SPRING RETURN CLOSE AND ASSOCIATED SUPPLY FAN SHALL TURN OFF.

SUPPLY AIR TEMPERATURE CONTROL:
ALL TEMPERATURE SET POINTS SHALL BE CAPABLE OF BEING ADJUSTED FROM THE BMS CONTROL PANEL. THE MAIN SUPPLY AIR TEMPERATURE SETPOINT (LEAVING THE ERU, NOT THE COIL) SHALL BE THE CONTROLLING TEMPERATURE FOR THE HEAT PUMP. THE MAIN SUPPLY AIR TEMPERATURE SENSOR SHALL BE USED TO MODULATE THE UNIT'S HEAT PUMP COMPRESSOR TO MAINTAIN THE UNIT'S SUPPLY AIR TEMPERATURE.

HUMIDIFICATION MODE :
WHEN RETURN AIR (OR SPACE) HUMIDITY SENSOR READS BELOW A HUMIDITY SETPOINT OF 30% (ADJUSTABLE, BUT LIMITED BETWEEN 10% AND 50%), THE STEAM HUMIDIFIER CONTROL VALVE SHALL OPEN TO THE DISPERSION TUBE. HUMIDIFIER OPERATION SHALL BE STAGED AS RETURN AIR HUMIDITY RISES ABOVE THE SETPOINT (ADJUSTABLE).

A DUCT MOUNTED HIGH LIMIT HUMIDITY SENSOR SHALL DISABLE THE HUMIDIFIER AND ALARM TO THE BMS IF THE DUCT HUMIDITY EXCEEDS 90% (ADJ.). LOCATE THE DUCT HUMIDISTAT A MINIMUM OF TEN DUCT DIAMETERS DOWNSTREAM OF THE HUMIDIFIER

DEHUMIDIFICATION MODE :
WHEN RETURN AIR (OR SPACE) HUMIDITY SENSOR READS ABOVE HIGH HUMIDITY SETPOINT OF 60% (ADJUSTABLE, BUT LIMITED BETWEEN 55% AND 70%), THE COMPRESSORS WILL START ON A CALL FOR COOLING. COMPRESSOR SHALL BE STAGED AS THE INTAKE AIR ENTHALPY RISES ABOVE THE DEW POINT SETPOINT (SET AT THE FACTORY).

WINTER CONDITION (BELOW 55 DEGREES OUTSIDE AIR TEMPERATURE):
A TEMPERATURE SENSOR SENSING THE OUTSIDE AIR TEMPERATURE SHALL FUNCTION THROUGH ITS BMS PANEL TO PROVIDE THE RESET FOR THE UNITS SUPPLY AIR TEMPERATURE. THE HEATING CIRCUIT CONTROL SHALL BE MODULATED BY THE SUPPLY AIR TEMPERATURE LOGIC OF THE ENERGY RECOVERY UNIT. WHEN THE SUPPLY AIR TEMPERATURE IS BELOW THE SET POINT, MODULATE THE HEATING CIRCUIT OPEN TO MAINTAIN SET POINT.

SUMMER CONDITION (ABOVE 55 DEGREES F OUTSIDE AIR TEMPERATURE):
THE UNIT'S OUTSIDE AIR TEMPERATURE SENSOR SHALL FUNCTION THROUGH ITS BMS PANEL TO CLOSE THE HEATING CIRCUIT WHEN THE OUTSIDE AIR TEMPERATURE IS ABOVE 55 DEGREES F (ADJUSTABLE). THE COOLING CIRCUIT SHALL BE MODULATED BY THE SUPPLY AIR TEMPERATURE LOGIC OF THE AIR HANDLING UNIT. WHEN THE SUPPLY AIR TEMPERATURE IS ABOVE THE SET POINT, MODULATE THE COOLING CIRCUIT TO MAINTAIN SET POINT
THE OUTSIDE AIR DAMPER SHALL BE UNDER CONTROL OF THE LOCAL DDC CONTROL PANEL. THE CONDENSER WATER VALVE SHALL BE CLOSED AND SHALL FUNCTION THROUGH ITS LOCAL DDC CONTROL PANEL.

ENERGY RECOVERY WHEEL CONTROL:
THE ENERGY RECOVERY WHEEL SHALL OPERATE USING THE COMPARATIVE ENTHALPY SENSOR TO MEASURE THE ENTHALPY OF THE OUTSIDE AIR AND THE EXHAUST AIR.

1. WHEN THE OUTSIDE AIR ENTHALPY IS GREATER THAN THE EXHAUST AIR ENTHALPY AND THE UNIT IS IN A COOLING MODE ALL OUTSIDE AIR SHALL PASS THROUGH THE ENERGY RECOVERY WHEEL WITH THE EXHAUST AIR PRE-TREATING THE OUTSIDE AIR.
2. WHEN THE OUTSIDE AIR ENTHALPY IS LOWER THAN THE EXHAUST AIR ENTHALPY AND THE UNIT IS IN A COOLING MODE THE ENERGY RECOVERY WHEEL SHALL BE DISABLED.
3. WHEN THE UNIT IS IN HEATING MODE ALL OUTSIDE AIR SHALL PASS THROUGH THE ENERGY RECOVERY WHEEL WITH THE EXHAUST AIR PRETREATING THE OUTSIDE AIR .

ENERGY WHEEL FROST CONTROL: ERU-1 TO RUN CONTINUOUSLY TO BRING IN OUTDOOR AIR AND ELIMINATES FROST FROM THE WHEEL. A VARIABLE FREQUENCY DRIVE REDUCES THE ROTATIONAL SPEED OF THE WHEEL, WHICH IN TURN REDUCES THE EFFECTIVENESS. REDUCING EFFECTIVENESS PREVENTS CONDENSATION FROM OCCURRING AND ALLOWS THE WARM, EXHAUST AIR TO DEFROST THE WHEEL. WHEN THE FROST IS ALLEVIATED, THE WHEEL WILL RAMP BACK UP TO FULL SPEED. THE FROST CONTROL STRATEGY SHOULD ONLY BE ENGAGED WHEN FROST IS ACTUALLY OCCURRING ON THE WHEEL. AN OUTDOOR AIR TEMPERATURE SENSOR LOCATED IN THE OUTDOOR AIR INTAKE COMPARTMENT AND A PRESSURE DROP SENSOR MOUNTED ACROSS THE ENERGY RECOVERY WHEEL WILL ACCOMPLISH THIS. THE OUTDOOR AIR NEEDS TO BE LOWER THAN THE SET POINT ON THE TEMPERATURE SENSOR (5°F (ADJ.)) AND THE PRESSURE DROP ACROSS THE WHEEL NEEDS TO INCREASE (INDICATING FROSTING). SATISFYING BOTH CONDITIONS ENSURES THAT THE FROST CONTROL METHODOLOGY IS ONLY EMPLOYED UNDER A TRUE FROSTING CONDITION.

FILTER PRESSURE MONITORING :
PROVIDE DIFFERENTIAL PRESSURE SENSORS (NOT SWITCHES) FOR ALL INDIVIDUAL FILTER SECTIONS, PRE AND FINAL. OBSERVE AND SET CLEAN FILTER PRESSURE DROP SETPOINT DURING STARTUP (WITH CLEAN FILTERS). THE DIRTY SETPOINT SHALL BE INITIALLY SET TO 2X THE CLEAN SETPOINT - OR AS OTHERWISE LISTED IN THE EQUIPMENT SCHEDULE, OR AS DIRECTED BY THE ENGINEER. BOTH CLEAN AND DIRTY VALUES SHALL BE A DISPLAYED IN THE ERU GRAPHIC SCREEN. DIRTY SETPOINTS SHALL NOT EXCEED THE MANUFACTURER'S MAXIMUM PRESSURE RATING FOR THE FILTERS. REFER TO THE FILTER STATUS PROGRAMMING PARAGRAPH FOR MORE INFORMATION.

GENERAL REQUIREMENTS
CONTROLLER POWER: THE POWER FOR EQUIPMENT CONTROL PANELS SHALL BE POWERED FROM THE LINE SIDE OF THE STARTER FOR THE EQUIPMENT CONTROLLED OR FROM A SEPARATE CIRCUIT (BY DIV. 23) SO THAT THE CONTROLLER WILL CONTINUE TO HAVE POWER AND WILL STAY ON THE BAS NETWORK WHEN THE UNIT IS TURNED OFF OR IS OFF DUE TO FAILURE.
CONTROL DEVICE POWER: THE BASIS FOR CONTROL AND MONITORING OF ALL ACTUATORS AND CONTROL DEVICES IS TO USE LOW VOLTAGE 24V POWER. THE CONTROLS CONTRACTOR SHALL PROVIDE LOW VOLTAGE WIRING FOR ALL CONTROLS. SINCE DIFFERENT CONTROLS CONTRACTORS WOULD EXECUTE THE CONTROL WIRING IN DIFFERENT WAYS, THE PROJECT DOCUMENTS DO NOT INCLUDE LOCATIONS FOR SOURCE 120V POWER TO FEED THE 24V POWER WIRING. THAT TASK SHALL BE THE RESPONSIBILITY OF THE SUCCESSFUL CONTROLS CONTRACTOR. THE CONTROLS CONTRACTOR SHALL COORDINATE WITH THE ELECTRICAL CONTRACTOR AND COMPENSATE THE ELECTRICAL CONTRACTOR FOR DESIRED QUANTITIES AND LOCATIONS FOR 120V POWER SOURCES TO FEED THEIR LOW VOLTAGE SYSTEM DESIGN.
24V DAMPER AND VALVE ACTUATORS: THE BASIS OF DESIGN IS FOR 24V LOW VOLTAGE ACTUATORS FOR ALL AIR-SIDE DAMPERS AND WATER SIDE VALVE ACTUATORS. THE INTENT IS FOR THE CONTROLS CONTRACTOR TO HAVE EXCLUSIVE RESPONSIBILITY FOR INSTALLATION AND OPERATION OF ALL CONTROL SYSTEMS.
ACTUATOR FEEDBACK: PROVIDE BAS MONITORING OF POSITION FEEDBACK OF VALVE AND DAMPER ACTUATORS. END SWITCHES ARE NOT AN ACCEPTABLE METHOD OF MONITORING PARTIAL POSITIONS. AN ACTUATOR FEEDBACK ALARM SHALL BE GENERATED IF THE POSITION FEEDBACK DIFFERS FROM THE COMMANDED POSITION BY MORE THAN 15% FOR 5 MINUTES.
PID LOOP TUNING: IT IS EXPECTED THAT THE CONTROLS TECHNICIANS SHALL PROVIDE PID LOOP TUNING FOR THE VARIOUS CONTROLLED SYSTEMS TO AVOID OVERSHOOTING AND OSCILLATION. AT THE MINIMUM PROPORTIONAL GAIN AND THE INTEGRAL TIME VALUES SHALL BE ADJUSTED BASED UPON DEVICE MANUFACTURERS RECOMMENDATIONS.
ALARM PRIORITY: THE BAS SHALL PROVIDE ALARMS IN A LOGICAL MANNER TO ASSIST THE FACILITY OPERATOR IN PRIORITIZING ALARMS. ALARM TAGS SHALL INCLUDE THE POINT NAME, GENERAL EQUIPMENT NAME, PRIORITY LEVEL, AND ALARM DESCRIPTION. FOR EXAMPLE: KRMC:P07:ERU01_CCTEMP, ERU-1 COOLING COIL TEMPERATURE SENSOR, MEDIUM PRIORITY, HIGH LEAVING AIR TEMPERATURE 5 F ABOVE SET POINT. PRIORITIZE ALARMS BASED UPON THE FOLLOWING CRITERIA. SUBMIT ALARM PRIORITY TO ENGINEER FOR REVIEW.
HIGH PRIORITY - EQUIPMENT FAILURE, FREEZING, OVER HEATING, ETC.
LOW PRIORITY - HIGH/LOW TEMPERATURES, PRESSURES, DIRTY FILTERS, DIAGNOSTICS, ETC.

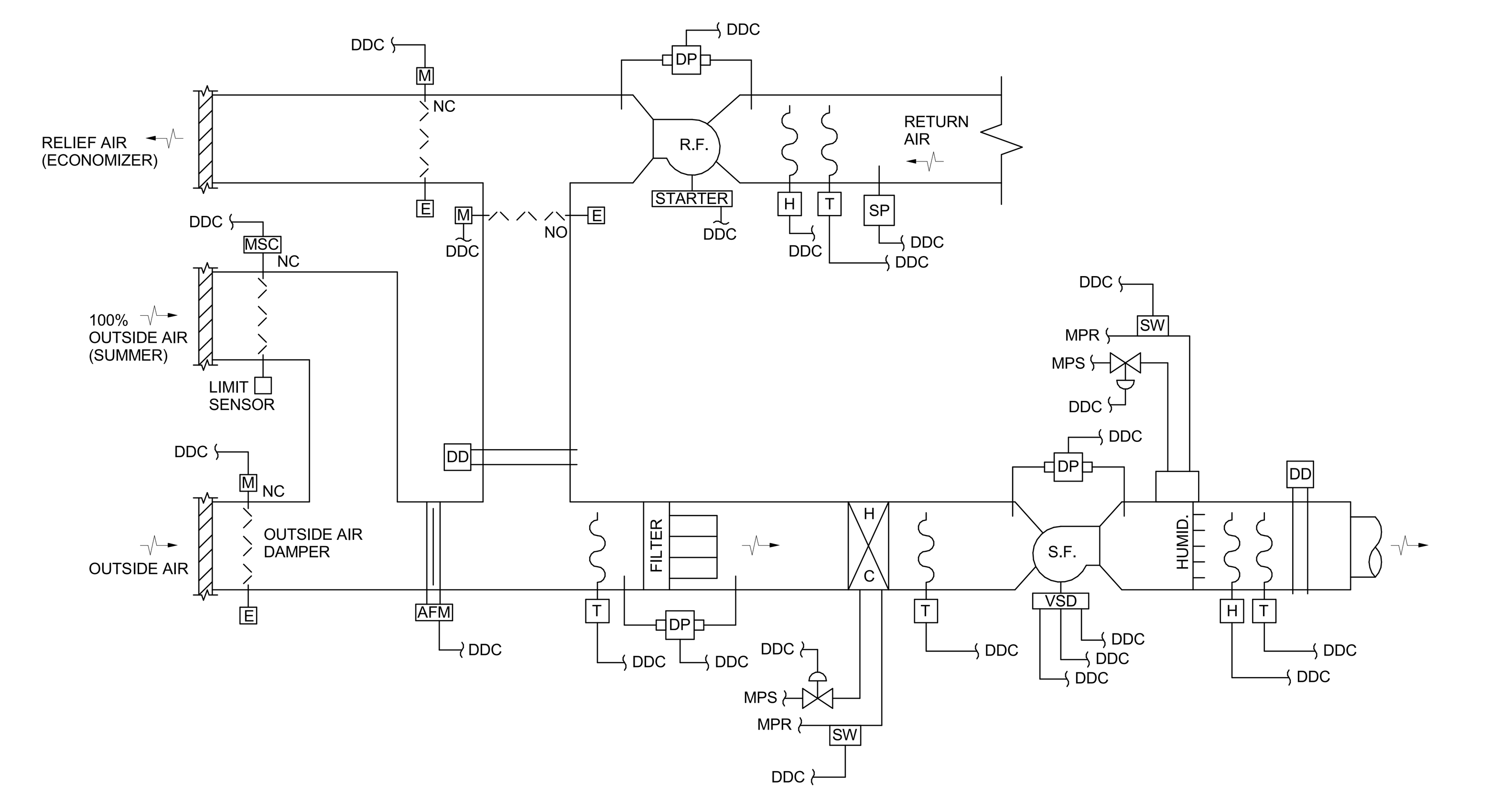
PROVIDE FUNCTION TO DELETE ALL ALARMS FROM THE PRINT QUEUE MANUALLY IF DESIRED. PROVIDE FUNCTION TO SORT ALARMS BY PRIORITY AND PRINT ALARMS BY PRIORITY. PROVIDE A GRAPHIC PAGE TO VIEW BOTH PRIORITY ALARMS. PROVIDE A LOCAL ERROR MESSAGE LINK IN THE LOWER CORNER OF THE GRAPHIC DISPLAY OF THE ERU TO DISPLAY JUST ERROR MESSAGES ASSOCIATED WITH THE PIECES OF EQUIPMENT DISPLAYED IN THE GRAPHIC PAGE.

SEASONAL OUTSIDE AIR DAMPER CONTROL
ERU OUTSIDE AIR REQUIREMENTS:

1. SUMMER CONDITION: THE OUTSIDE AIR DAMPER NOTED ON THE PLANS FOR SUMMER CONDITION SHALL BE OPEN TO ALLOW 2000 CFM OF OUTSIDE AIR. THE WINTER OUTSIDE AIR DAMPER SHALL BE CLOSED.
2. WINTER CONDITION: THE OUTSIDE AIR DAMPER NOTED ON THE PLANS FOR WINTER CONDITION SHALL BE OPEN TO ALLOW 2000 CFM OF OUTSIDE AIR. THE SUMMER OUTSIDE AIR DAMPER SHALL BE CLOSED.

ALTERNATE NO. 3

1 ENERGY RECOVERY UNIT CONTROLS SEQUENCE
NTS



CONTROL DIAGRAM ABBREVIATIONS:

AFM	AIRFLOW MEASUREMENT STATION
BMS	BUILDING MANAGEMENT SYSTEM
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
DD	DUCT MOUNTED SMOKE DETECTOR
DDC	DIRECT DIGITAL CONTROLS (WIRE TO PANEL)
DP	DIFFERENTIAL PRESSURE
E	END SWITCH
EF	EXHAUST FAN
H	HUMIDITY SENSOR
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
LL	LOW LIMIT SENSOR
M	MOTORIZED DAMPER
MSC	MOTORIZED DAMPER - FIRE/SMOKE
MPCR	MEDIUM PRESSURE CONDENSATE RETURN
MPS	MEDIUM PRESSURE STEAM
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
RF	RELIEF / RETURN FAN
SF	SUPPLY FAN
SP	STATIC PRESSURE
SW	TEMPERATURE SWITCH
T	TEMPERATURE SENSOR
VSD	VARIABLE SPEED DRIVE

HVU-1 IS CONSTANT VOLUME UNIT. HVU-1'S SUPPLY FAN SHALL RUN CONTINUOUSLY. THE OUTSIDE AIR DAMPER WILL HAVE A MINIMUM AND ECONOMIZER OPERATION. PROVIDE ACTUATOR FEEDBACK TO CONFIRM DAMPER OPEN POSITION AND ENABLE FAN CONTROL CIRCUIT. WHEN THE SUPPLY AIR FAN IS OFF, THE OUTSIDE AIR DAMPER SHALL BE CLOSED, THE HEATING COIL CONTROL VALVE SHALL BE CLOSED TO THE COIL, HUMIDIFIER VALVE SHALL BE CLOSED.

BASIC CONTROL REQUIREMENTS
THE FOLLOWING CONTROL LOGIC ROUTINES SHALL BE INCLUDED:

1. START/STOP. HVU-1 AND CONTROLS SHALL BE ENABLED / DISABLED BY THE BMS. UNIT CONTROLS SHALL OPERATE AUTOMATICALLY WHEN ENERGIZED.
2. NORMALLY OFF (DISABLED) STATUS: FAN OFF, OUTSIDE AIR DAMPER CLOSED, HEATING CONTROL VALVE CLOSED, HUMIDIFIER CONTROL VALVE CLOSED.
3. NORMALLY ON STATUS: FAN ON AND OUTSIDE AIR DAMPERS ENABLED, HEATING CONTROL VALVE ENABLED, HUMIDIFIER CONTROL VALVE ENABLED.
4. OUTDOOR AIR DAMPER ACTUATORS: UNIT TO HAVE 2-POSITION DAMPER ACTUATORS, WITH SPRING RETURN CLOSED SO THEY WILL CLOSE AUTOMATICALLY ON LOSS OF CONTROL POWER.
5. FIRE ALARM SHUTDOWN RELAY: A RELAY FROM THE FIRE ALARM SYSTEM SHALL INITIATE A CONTACTOR IN THE HVU FAN STARTER OR VFD WHICH TURNS OFF THE HVU FANS UPON AN ALARM SIGNAL FROM THE FIRE ALARM SYSTEM.
6. DUCT SMOKE DETECTORS: DIVISION 23 SHALL PROVIDE DUCT SMOKE DETECTORS FOR DIVISION 26 TO INSTALL IN THE DUCT. DIVISION 26 SHALL THEN WIRE THE DEVICES TO THE FIRE ALARM SYSTEM.
7. INTERCONNECTS: ASSOCIATED SUPPLY FAN SHALL BE STARTED AND STOPPED THROUGH CONTROL POWER FROM THE LOAD SIDE TRANSFORMER.
8. HEATING MODE: WHEN THE SPACE TEMPERATURE FALLS BELOW THE ACTIVE HEATING SET POINT, THE CONTROLLER SHALL ENABLE THE HEATING SEQUENCE. ONCE THE TEMPERATURE RISES ABOVE THE SETPOINT PLUS THE DEADBAND (5 DEGREES (ADJ)) THEN THE UNIT WILL ENTER DEADBAND MODE.
9. VENTILATION MODE: WHEN THE SPACE TEMPERATURE RISES ABOVE THE COOLING SET POINT, THE CONTROLLER SHALL SEQUENCE SUPPLY FAN TO MAINTAIN SPACE TEMPERATURE SET POINT. ONCE THE TEMPERATURE FALLS BELOW THE SETPOINT MINUS THE DEADBAND (5 DEGREES (ADJ)) THEN THE UNIT WILL ENTER DEADBAND MODE.
10. DEADBAND MODE: IN DEADBAND MODE, BETWEEN A HIGH AND LOW SETPOINT, THE HEATING SEQUENCE SHALL BE DISABLED.

CONTROL SEQUENCE - SUPPLY FAN:
SUPPLY FAN VFD SPEED CONTROL FOR CONSTANT VOLUME. A DUCT MOUNTED DIFFERENTIAL STATIC PRESSURE SENSOR SHALL PROVIDE THE INPUT SIGNAL TO THE VFD TO CONTROL THE FAN SPEED TO MAINTAIN THE DUCT STATIC PRESSURE SETPOINT. THE PURPOSE OF THIS CONTROL IS TO MAINTAIN CONSTANT VOLUME AS THE FILTERS LOAD UP OVER TIME AND PROVIDE AN ADDITIONAL STATIC PRESSURE DROP ON THE FAN WHICH WOULD OTHERWISE REDUCE SYSTEM AIR VOLUME. COORDINATE WITH TAB CONTRACTOR TO SET UP AND ADJUST FOR PROPER DUCT STATIC PRESSURE SETPOINT - USING THE HIGHER SIMULATED 'DIRTY' FILTER PRESSURE DROPS. THE LOCATION OF THE STATIC PRESSURE SENSOR SHALL BE WITHIN 10 FEET OF THE HVU-1 DISCHARGE, IN A NON-TURBULENT ZONE (NOT AN ELBOW), AND ACCESSIBLE FOR CALIBRATION AND SERVICING.
PROVIDE THE FOLLOWING ADDITIONAL CONTROL CONNECTIONS: BINARY INPUT FOR VFD ALARM, ANALOG INPUT FOR VFD SPEED MONITORING, ANALOG INPUT FOR VFD KW POWER CONSUMPTION. THE KW POWER CONSUMPTION SHALL BE USED FOR PROOF OF FLOW.
LOCAL CONTROL: THE SUPPLY AIR FAN CAN BE STARTED AT THE DDC CONTROL PANEL BY INDEXING THE H-O-A SWITCH TO THE HAND POSITION.

REMOTE CONTROL: THE SUPPLY AIR FAN SHALL BE PROGRAMMED TO BE STARTED OR STOPPED FROM EITHER THE BMS CONTROL PANEL OR THE CENTRAL DDC CONTROL PANEL WHEN THE H-O-A SWITCH IS IN THE AUTOMATIC POSITION.

ALARM SHUTDOWN:
AN ALARM SHALL BE INITIATED AT THE LOCAL DDC PANEL AND CENTRAL BMS AT ANY TIME ANY OF THE FOLLOWING ALARM CONDITIONS ARE ACTIVATED.

FREEZE PROTECTION - FREEZESTAT ALARM. A LOW TEMPERATURE CUTOFF TYPE SWITCH SHALL BE USED TO STOP THE FAN WHEN THE SERPENTINE SENSING ELEMENT SENSES TEMPERATURES BELOW THE SETPOINT. THE SETPOINT SHALL INITIALLY BE 35°F. THE DEVICE SHALL BE MANUALLY RESET. THE SENSING ELEMENT SHALL NOT BE LESS THAN ONE LINEAR FOOT PER SQUARE FOOT OF COIL SURFACE AREA. THE SENSING ELEMENT SHALL BE INSTALLED ON THE DOWNSTREAM SIDE OF THE COIL.

HIGH STATIC ALARM: IF A STATIC PRESSURE OF 0.5 IN W.G ABOVE NORMAL CONTROL AND/OR DESIGN STATIC PRESSURE EXISTS AT ANY ONE OF THE HIGH LIMIT STATIC PRESSURE SENSORS, AN ALARM SHALL BE INITIATED AT THE LOCAL DDC CONTROL PANEL. THE SUPPLY FAN SHALL STOP.

LOW SUPPLY DUCT STATIC PRESSURE ALARM: WHEN THE FAN IS ON AND THE MEASURED SUPPLY DUCT STATIC PRESSURE IS MORE THAN 0.2" BELOW THE SETPOINT FOR MORE THAN 30 MINUTES.

SMOKE ALARM: IF SMOKE IS SENSED AT ANY DUCT MOUNTED SMOKE DETECTOR, THE SUPPLY FAN WILL SHUT DOWN AND ITS OUTSIDE AIR DAMPERS SHALL CLOSE. THE ERU UNIT SHALL ALSO SHUT DOWN.

DUCT SMOKE DETECTORS COMPATIBLE WITH THE FIRE ALARM SYSTEM SHALL BE FURNISHED BY ELECTRICAL. INSTALL DUCT SMOKE DETECTORS IN THE SUPPLY AND RETURN DUCT (PRIOR TO ANY BRANCH DUCTS) OF THE HEATING AND VENTILATING UNIT.

FIRE ALARM SHUTDOWN. ELECTRICAL SHALL PROVIDE AN ADDRESSABLE FIRE ALARM SHUT DOWN RELAY TO BE INSTALLED IN THE HVU STARTER CONTROL CIRCUIT WHICH SHUTS DOWN THE HVU ON A CALL FROM THE FIRE ALARM SYSTEM. WHEN THE FIRE ALARM SYSTEM COMMANDS THE HVU TO SHUT DOWN, ASSOCIATED DAMPERS SHALL LOSE POWER AND SPRING RETURN CLOSE AND THE SUPPLY FAN SHALL TURN OFF.

SUPPLY AIR TEMPERATURE CONTROL:
ALL TEMPERATURE SET POINTS SHALL BE CAPABLE OF BEING ADJUSTED FROM THE BMS PANEL. THE SPACE AIR TEMPERATURE SETPOINT SHALL BE THE CONTROLLING TEMPERATURE FOR HEATING COILS IN THE HVU. THE COIL LEAVING TEMPERATURE SENSORS ARE GENERALLY FOR MONITORING, NOT NECESSARILY CONTROL. THE SPACE AIR TEMPERATURE SENSOR AND SET POINT SHALL BE USED TO PROVIDE CONTROL INPUT TO THE COIL LOGIC THE SPACE SET POINTS ARE TO PROVIDE 65-72 DEG F IN OCCUPIED MODE AND 50 DEF F IN UNOCCUPIED MODE.

HUMIDIFICATION MODE :
WHEN RETURN AIR (OR SPACE) HUMIDITY SENSOR READS BELOW A HUMIDITY SETPOINT OF 30% (ADJUSTABLE, BUT LIMITED BETWEEN 10% AND 50%), THE STEAM HUMIDIFIER CONTROL VALVE SHALL OPEN TO THE DISPERSION TUBE. HUMIDIFIER OPERATION SHALL BE STAGED AS RETURN AIR HUMIDITY RISES ABOVE THE SETPOINT (ADJUSTABLE).

A DUCT MOUNTED HIGH LIMIT HUMIDITY SENSOR SHALL DISABLE THE HUMIDIFIER AND ALARM TO THE BMS IF THE DUCT HUMIDITY EXCEEDS 90% (ADJ.). LOCATE THE DUCT HUMIDISTAT A MINIMUM OF TEN DUCT DIAMETERS DOWNSTREAM OF THE HUMIDIFIER.

WINTER CONDITION (BELOW 55 DEGREES OUTSIDE AIR TEMPERATURE):
A TEMPERATURE SENSOR SENSING THE OUTSIDE AIR TEMPERATURE SHALL FUNCTION THROUGH ITS BMS PANEL TO PROVIDE THE RESET FOR THE UNITS SUPPLY AIR TEMPERATURE. THE HEATING CONTROL VALVE SHALL BE MODULATED BY THE SUPPLY AIR TEMPERATURE LOGIC OF THE HEATING AND VENTILATING UNIT. WHEN THE SUPPLY AIR TEMPERATURE IS BELOW THE SET POINT, MODULATE THE HEATING CONTROL VALVE OPEN TO MAINTAIN SET POINT.

SUMMER CONDITION (ABOVE 55 DEGREES F OUTSIDE AIR TEMPERATURE):
THE UNIT'S OUTSIDE AIR TEMPERATURE SENSOR SHALL FUNCTION THROUGH ITS BMS PANEL TO CLOSE THE HEATING CONTROL VALVE WHEN THE OUTSIDE AIR TEMPERATURE IS ABOVE 55 DEGREES F (ADJUSTABLE). THE OUTSIDE AIR DAMPER SHALL BE UNDER CONTROL OF THE LOCAL DDC CONTROL PANEL.

ECONOMIZER CONTROL :
WHEN OUTSIDE AIR CONDITIONS PERMIT, AS DETERMINED BY THE FACTORY CONTROLLER, THE UNIT SHALL ALLOW OUTSIDE AIR TO PASS UNCONDITIONED AIR THROUGH THE UNIT.

FILTER PRESSURE MONITORING :
PROVIDE DIFFERENTIAL PRESSURE SENSORS (NOT SWITCHES) FOR ALL INDIVIDUAL FILTER SECTIONS, PRE AND FINAL. OBSERVE AND SET CLEAN FILTER PRESSURE DROP SETPOINT DURING STARTUP (WITH CLEAN FILTERS). THE DIRTY SETPOINT SHALL BE INITIALLY SET TO 2X THE CLEAN SETPOINT - OR AS OTHERWISE LISTED IN THE EQUIPMENT SCHEDULE, OR AS DIRECTED BY THE ENGINEER. BOTH CLEAN AND DIRTY VALUES SHALL BE A DISPLAYED IN THE ERU GRAPHIC SCREEN. DIRTY SETPOINTS SHALL NOT EXCEED THE MANUFACTURER'S MAXIMUM PRESSURE RATING FOR THE FILTERS. REFER TO THE FILTER STATUS PROGRAMMING PARAGRAPH FOR MORE INFORMATION.

GENERAL REQUIREMENTS
CONTROLLER POWER: THE POWER FOR EQUIPMENT CONTROL PANELS SHALL BE POWERED FROM THE LINE SIDE OF THE STARTER FOR THE EQUIPMENT CONTROLLED OR FROM A SEPARATE CIRCUIT (BY DIV. 23) SO THAT THE CONTROLLER WILL CONTINUE TO HAVE POWER AND WILL STAY ON THE BAS NETWORK WHEN THE UNIT IS TURNED OFF OR IS OFF DUE TO FAILURE.
CONTROL DEVICE POWER: THE BASIS FOR CONTROL AND MONITORING OF ALL ACTUATORS AND CONTROL DEVICES IS TO USE LOW VOLTAGE 24V POWER. THE CONTROLS CONTRACTOR SHALL PROVIDE LOW VOLTAGE WIRING FOR ALL CONTROLS. SINCE DIFFERENT CONTROLS CONTRACTORS WOULD EXECUTE THE CONTROL WIRING IN DIFFERENT WAYS, THE PROJECT DOCUMENTS DO NOT INCLUDE LOCATIONS FOR SOURCE 120V POWER TO FEED THE 24V POWER WIRING. THAT TASK SHALL BE THE RESPONSIBILITY OF THE SUCCESSFUL CONTROLS CONTRACTOR. THE CONTROLS CONTRACTOR SHALL COORDINATE WITH THE ELECTRICAL CONTRACTOR AND COMPENSATE THE ELECTRICAL CONTRACTOR FOR DESIRED QUANTITIES AND LOCATIONS FOR 120V POWER SOURCES TO FEED THEIR LOW VOLTAGE SYSTEM DESIGN.
24V DAMPER AND VALVE ACTUATORS: THE BASIS OF DESIGN IS FOR 24V LOW VOLTAGE ACTUATORS FOR ALL AIR-SIDE DAMPERS AND WATER SIDE VALVE ACTUATORS. THE INTENT IS FOR THE CONTROLS CONTRACTOR TO HAVE EXCLUSIVE RESPONSIBILITY FOR INSTALLATION AND OPERATION OF ALL CONTROL SYSTEMS.
ACTUATOR FEEDBACK: PROVIDE BAS MONITORING OF POSITION FEEDBACK OF VALVE AND DAMPER ACTUATORS. END SWITCHES ARE NOT AN ACCEPTABLE METHOD OF MONITORING PARTIAL POSITIONS. AN ACTUATOR FEEDBACK ALARM SHALL BE GENERATED IF THE POSITION FEEDBACK DIFFERS FROM THE COMMANDED POSITION BY MORE THAN 15% FOR 5 MINUTES.
PID LOOP TUNING: IT IS EXPECTED THAT THE CONTROLS TECHNICIANS SHALL PROVIDE PID LOOP TUNING FOR THE VARIOUS CONTROLLED SYSTEMS TO AVOID OVERSHOOTING AND OSCILLATION. AT THE MINIMUM PROPORTIONAL GAIN AND THE INTEGRAL TIME VALUES SHALL BE ADJUSTED BASED UPON DEVICE MANUFACTURERS RECOMMENDATIONS.
ALARM PRIORITY: THE BAS SHALL PROVIDE ALARMS IN A LOGICAL MANNER TO ASSIST THE FACILITY OPERATOR IN PRIORITIZING ALARMS. ALARM TAGS SHALL INCLUDE THE POINT NAME, GENERAL EQUIPMENT NAME, PRIORITY LEVEL, AND ALARM DESCRIPTION. FOR EXAMPLE: KRMC:P07:ERU01_CCTEMP, ERU-1 COOLING COIL TEMPERATURE SENSOR, MEDIUM PRIORITY, HIGH LEAVING AIR TEMPERATURE 5 F ABOVE SET POINT. PRIORITIZE ALARMS BASED UPON THE FOLLOWING CRITERIA. SUBMIT ALARM PRIORITY TO ENGINEER FOR REVIEW.
HIGH PRIORITY - EQUIPMENT FAILURE, FREEZING, OVER HEATING, ETC.
LOW PRIORITY - HIGH/LOW TEMPERATURES, PRESSURES, DIRTY FILTERS, DIAGNOSTICS, ETC.

PROVIDE FUNCTION TO DELETE ALL ALARMS FROM THE PRINT QUEUE MANUALLY IF DESIRED. PROVIDE FUNCTION TO SORT ALARMS BY PRIORITY AND PRINT ALARMS BY PRIORITY. PROVIDE A GRAPHIC PAGE TO VIEW BOTH PRIORITY ALARMS. PROVIDE A LOCAL ERROR MESSAGE LINK IN THE LOWER CORNER OF THE GRAPHIC DISPLAY OF THE ERU TO DISPLAY JUST ERROR MESSAGES ASSOCIATED WITH THE PIECES OF EQUIPMENT DISPLAYED IN THE GRAPHIC PAGE.

SEASONAL OUTSIDE AIR DAMPER CONTROL
HVU OUTSIDE AIR REQUIREMENTS:

1. SUMMER CONDITION: THE OUTSIDE AIR DAMPER NOTED ON THE PLANS FOR SUMMER CONDITION SHALL BE OPEN TO ALLOW 1500 CFM OF OUTSIDE AIR UNDER NORMAL OPERATION. THE DAMPER SHALL BE OPENED TO ALLOW 7000 CFM FOR ECONOMIZER OPERATION. THE WINTER OUTSIDE AIR DAMPER SHALL BE CLOSED.
2. WINTER CONDITION: THE OUTSIDE AIR DAMPER NOTED ON THE PLANS FOR WINTER CONDITION SHALL BE OPEN TO ALLOW 1500 CFM OF OUTSIDE AIR UNDER NORMAL OPERATION. THE DAMPER SHALL BE OPENED TO ALLOW 7000 CFM FOR ECONOMIZER OPERATION. THE SUMMER OUTSIDE AIR DAMPER SHALL BE CLOSED.

ALTERNATE NO. 3

2 HEATING AND VENTILATING UNIT CONTROLS SEQUENCE
NTS

FULLY SPRINKLERED
CONSTRUCTION DOCUMENTS

Revisions: | Date

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CIVIL ENGINEERING

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LANDSCAPE ARCHITECTURE

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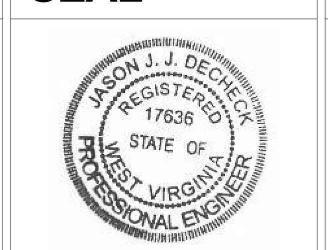

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